Lloyd's Register

6 Redheughs Rigg

South Gyle

Edinburgh, EH12 9DQ

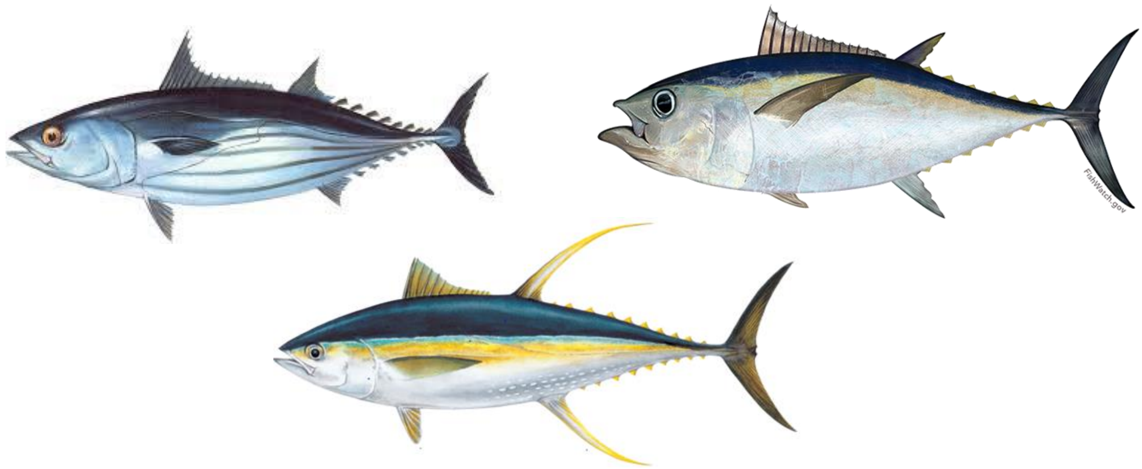
United Kingdom

T +44 (0)13 1619 2100
E fisheries-ca@lr.org

Marine Stewardship Council fisheries assessments

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)

Risk-Based Framework Stakeholder Consultation Document



Conformity Assessment Body (CAB)	Lloyd's Register
Assessment team	Jo Akroyd, Carola Kirchner, Kevin McLoughlin, Rob Blyth-Skyrme, Stewart Norman and David Japp
Fishery client	AGAC
Assessment Type	Initial Assessment

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Assessment Background

The AGAC four oceans Integral Purse Seine Tropical Tuna Fishery targets three species yellowfin, bigeye and skipjack tuna in four areas of operation, namely the Western Central Pacific, Eastern Pacific, Indian and Atlantic oceans and is currently being assessed against the Marine Stewardship Council (MSC) Standard for sustainable fisheries. The fishery is being assessed as 12 separate Units of Assessment (UoAs) but the focus of this document is the three UoAs in the jurisdiction of the Atlantic Ocean and specifically the area under ICCAT management, as shown in Table 1, below:

Table 1: UoAs for the AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)

UoA	Location	Gear Type	Target Species
1	Atlantic Ocean – FAO areas 34 and 47	Purse Seine (FAD and FSC)	Yellowfin tuna
2	Atlantic Ocean – FAO areas 34 and 47	Purse Seine (FAD and FSC)	Bigeye tuna
3	Atlantic Ocean – FAO areas 34 and 47 (East Atlantic skipjack tuna element), and 31 and 41 (West Atlantic skipjack tuna element)	Purse Seine (FAD and FSC)	Skipjack tuna East Atlantic and West Atlantic, scored as two elements with UoA 3

An Assessment Team of independent experts from Lloyd's Register produced the Announcement Comment Draft Report on 21 August 2020 and is preparing to carry out a remote site visit commencing 21 October 2020. A key purpose of the site visit is to collect information and speak to stakeholders with an interest in the fishery.

Following analysis of observer data collected on vessels participating in the fishery, the Assessment Team has determined that the impact of the three purse seine UoAs on Endangered, Threatened and Protected (ETP) species, specifically for silky sharks, oceanic whitetip shark, bigeye thresher sharks, hammerhead sharks, mantas and mobulid rays, needs to be assessed using the MSC's 'Productivity-Susceptibility Analysis' (PSA), which is part of the MSC's 'Risk-Based Framework' (RBF) toolkit. We have contacted you in the hope that you would complete the questionnaire on the following pages and help us to score these ETP species using the PSA.

The PSA is a tool that can be used by MSC Assessment Teams to assess the risk posed by a fishery to species for which there is only limited information available. The RBF process is intended to gather and use information from stakeholders in a structured manner; it is also intended to produce a more precautionary assessment of impact than if the MSC's default assessment tree is employed.

We have tried to simplify the PSA process to produce this questionnaire, but there is still some complexity in the process. Where we ask for information, we have highlighted the section in **bold.**

If you have any queries about the MSC process, you can find more information at the MSC website (www.msc.org), including information about the AGAC Integral Purse Seine Tropical Tuna Fishery under assessment (https://fisheries.msc.org/en/fisheries/agac-four-oceans-integral-purse-seine-tropical-tuna-fishery/@@assessments); alternatively, you can get in touch with us directly (contact details below). The MSC also provides an official template for stakeholder comments, to use if you have views on any aspect of the fishery; it can be downloaded at http://www.msc.org/documents/get-certified/stakeholders.

Thank you for taking the time to participate in this assessment.
Lloyd's Register (fisheries-ca@lr.org) and cc Stewart Norman (stewart@capfish.co.za - Principle 2 Assessor on behalf of Lloyd's Register)

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
About You

Before you start the questionnaire, we need to have your contact details so that we can keep in touch with you as the assessment of the fishery proceeds through its different steps. This will ensure that you are kept fully up to date with progress and that you have further opportunities to participate in the assessment process.

We respect your privacy and security, and will only use this information in accordance with the statement below and in compliance with EU GDPR.

Privacy, Transparency and Confidentiality

1. We ask for your e-mail address in case we need to contact you for clarification of your comments.

2. The MSC process requires assessment inputs to be transparent and verifiable. We will list you as a stakeholder that has contributed to this assessment and may publish your interview response in assessment documents.

3. Your privacy is important to us. We will not publish your e-mail address, nor will we share it with any third parties.

In accordance with the statement above, please provide the following information:

Name:

Company/Organisation:

City/Town:

Country:

Email Address:

Phone Number (please include international code):

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
The Fishery Under Assessment and ETP Species

This page provides a brief description of the fishery under assessment, together with information on the species that are being assessed as ETP species[1] in each UoA.

In cases where there is insufficient information to assess the ETP species using the MSC's default scoring tree, the 'Productivity-Susceptibility Analysis' (PSA) part of the 'Risk Based Framework' (RBF) is being employed. The PSA, for which we request stakeholder input, is detailed on the following pages.

UoAs 1, 2 and 3: Purse seine (FAD and FSC) Atlantic Ocean

The AGAC fleet in the Atlantic Ocean consists of eighteen (18, previously 19 vessels) industrial purse seiners (flagged under both EU and other flag states). The contribution of the UoA catches to the total catches of tropical tunas in the Atlantic Ocean is approximately 26%. The fleet fishes with purse seines[2]: a fishing method used in the open ocean targeting dense schools of pelagic tuna-species. It consists of a large vertical net that is deployed to entirely surround the school of fish. The purse seine has floats along the top line and chains or weights at its bottom to allow the net to sink. Once the fish school is encircled, the net is closed underneath the school by hauling the purse line at the bottom of the net, which is called "pursing". As the volume of the net becomes smaller, the fish become more concentrated and the catch can be finally scooped out using a brailer. Industrial purse seiners can catch schools of tuna free-swimming; aggregated beneath objects, stationary or drifting, purposely built (FAD) or not (floating objects of various types); or swimming along with various species of sharks and mammals, in particular whale-sharks, dolphins, and whales.

Catch data for the AGAC Atlantic Ocean Tuna Fishery were provided to the Assessment Team by the client, as recorded and reported by independent observers (Table 2). The data cover the period 2014-2018, and represent an average of 72% of the landed catch (based on the observed versus landed catch of skipjack tuna (Table 3). While tropical tunas make the majority of the catches of the Atlantic fleet, representing 92.7% of the total catch (with the addition of neritic (frigate and little) tunas, the proportion increases to 97.6%), the remaining catch is made up by other bony fish, sharks, rays, and other bycatch (Table 2).

[1] MSC 2018, SA3.1.5.1, SA3.1.5.2, SA3.1.5.3 - ETP species are species that that are recognised by national ETP legislation; Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE); and, Species listed in the binding international agreements given below:

a) Appendix 1 of the Convention on International Trade in Endangered Species (CITES), unless it can be shown that the particular stock of the CITES listed species impacted by the UoA under assessment is not endangered.
b) Binding agreements concluded under the Convention on Migratory Species (CMS), including:
    i. ii. Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP);
    ii. iii. Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA);
    iii. iv. Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS);
    iv. v. Annex 1, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);
    v. vi. Wadden Sea Seals Agreement;
    vi. vii. Any other binding agreements that list relevant ETP species concluded under this Convention.

[2] You may find further information here: http://www.fao.org/fishery/fishtech/40/en

As per FCP v2.1, 7.7.3 and Table 3, the justification for needing to use RBF is as follows:

PI 2.3.1 – can the impact of the fishery in assessment on ETP species be analytically determined?

- ✓ the extent of interactions of the UoA with ETP species is known from observer records (e.g. available information on catch, bycatch and fate);
- ✓ the direct effects (number/volume) have been recorded;
- × total removals by all fleets in the Atlantic Ocean is not known – therefore the relative contribution of the UoA to mortality cannot be calculated;
- × there is no available indication of stock status or stock size for the ETP chondrichthyans under assessment.

It is therefore not possible to assess the impact of the UoA analytically with respect to ETP chondrichthyan species stock status (see Principle 2 background section and scoring of PI 2.3.1 in the Atlantic Ocean ACDR).

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Table 2: Catch profile for the AGAC Atlantic Ocean tuna fishery based on human-observer data (source: OPAGAC)

Rank	Species	Common name	Weight (t) by Year					Mean wt. (t) 2014-2018	Weight (% of total) by year					Mean % 2014-2018	Estimated total based on SKJ Observed catch %					Mean wt. (t) 2014-2018
			2014	2015	2016	2017	2018		2014	2015	2016	2017	2018		2014	2015	2016	2017	2018	
1	Katsuwonus pelamis	Skipjack tuna	38,130.700	51,945.036	54,273.790	45,837.181	49,167.971	47,870.936	58.858	55.874	54.760	53.629	55.837	55.792	57686.38	58708.22	75833.16	71687.80	70461.41	66875.40
2	Thunnus albacares	Yellowfin tuna	18,360.739	28,017.949	31,853.470	29,069.775	26,629.018	26,786.190	28.342	30.137	32.139	34.011	30.241	30.974	27777.21	31665.86	44506.73	45464.15	38161.39	37515.07
3	Thunnus obesus	Bigeye tuna	3,947.936	6,203.435	5,125.271	4,382.428	5,950.431	5,121.900	6.094	6.673	5.171	5.127	6.758	5.965	5972.67	7011.12	7161.20	6853.97	8527.42	7105.27
4	Auxis thazard	Frigate tuna	1,139.125	1,237.902	2,034.477	2,784.167	2,945.510	2,028.236	1.758	1.332	2.053	3.257	3.345	2.349	1723.34	1399.08	2842.64	4354.34	4221.14	2908.11
5	Auxis sp.	Frigate tunas	1,375.917	1,358.698	988.845	654.660	435.570	962.738	2.124	1.461	0.998	0.766	0.495	1.169	2081.57	1535.60	1381.65	1023.87	624.20	1329.38
6	Euthynnus alletteratus	Little tunny	392.574	996.481	1,680.316	811.142	974.750	971.053	0.606	1.072	1.695	0.949	1.107	1.086	593.91	1126.22	2347.79	1268.60	1396.89	1346.68
7	Caranx crysos	Blue runner	141.193	623.412	627.364	225.721	174.927	358.524	0.218	0.671	0.633	0.264	0.199	0.397	213.61	704.58	876.57	353.02	250.68	479.69
8	Carcharhinus falciformis	Silky shark	150.861	176.086	281.344	469.676	531.939	321.981	0.233	0.189	0.284	0.550	0.604	0.372	228.23	199.01	393.10	734.56	762.31	463.44
9	Elagatis bipinnulata	Rainbow runner	49.792	518.744	520.906	249.334	187.585	305.272	0.077	0.558	0.526	0.292	0.213	0.333	75.33	586.28	727.83	389.95	268.82	409.64
10	Auxis rochei	Bullet tuna	233.962	462.008	217.325	5.630	30.910	189.967	0.361	0.497	0.219	0.007	0.035	0.224	353.95	522.16	303.65	8.81	44.30	246.57
11	Acanthocybium solandri	Wahoo	55.659	144.392	192.242	165.702	173.509	146.301	0.086	0.155	0.194	0.194	0.197	0.165	84.20	163.19	268.61	259.15	248.65	204.76
12	Canthidermis maculata	Rough triggerfish	61.170	255.121	166.984	108.855	131.101	144.646	0.094	0.274	0.168	0.127	0.149	0.163	92.54	288.34	233.32	170.25	187.88	194.46
13	Coryphaena hippurus	Common dolphinfish	76.701	161.539	146.233	127.390	120.828	126.538	0.118	0.174	0.148	0.149	0.137	0.145	116.04	182.57	204.32	199.23	173.16	175.06
14	Makaira nigricans	Atlantic Blue	67.050	130.295	130.052	148.465	150.513	125.275	0.103	0.140	0.131	0.174	0.171	0.144	101.44	147.26	181.71	232.19	215.70	175.66

Rank	Species	Common name	Weight (t) by Year					Mean wt. (t) 2014-2018	Weight (% of total) by year					Mean % 2014-2018	Estimated total based on SKJ Observed catch %					Mean wt. (t) 2014-2018
			2014	2015	2016	2017	2018		2014	2015	2016	2017	2018		2014	2015	2016	2017	2018	
		Marlin																		
15	Mysticeti (NS)	Baleen whales (NS)	190.000	20.000	120.000	60.000	60.000	90.000	0.293	0.022	0.121	0.070	0.068	0.115	287.44	22.60	167.67	93.84	85.98	131.51
16	Rhincodon typus	Whale shark	50.517	23.656	182.345	58.146	61.366	75.206	0.078	0.025	0.184	0.068	0.070	0.085	76.43	26.74	254.78	90.94	87.94	107.36
17	Thunnus alalunga	Albacore	-	247.400	16.000	74.200	14.100	70.340	0.000	0.266	0.016	0.087	0.016	0.077	0.00	279.61	22.36	116.05	20.21	87.64
18	Balaenoptera edeni	Bryde's whale	90.000	20.000	70.000	40.000	-	44.000	0.139	0.022	0.071	0.047	0.000	0.056	136.16	22.60	97.81	62.56	0.00	63.83
19	Sphyrna lewini	Scalloped hammerhead	29.700	56.086	63.117	44.255	41.622	46.956	0.046	0.060	0.064	0.052	0.047	0.054	44.93	63.39	88.19	69.21	59.65	65.07
20	Sphyrna zygaena	Smooth hammerhead	54.318	53.730	32.014	9.715	20.113	33.978	0.084	0.058	0.032	0.011	0.023	0.042	82.18	60.73	44.73	15.19	28.82	46.33
21	Balaenoptera physalus	Fin whale	30.000	-	130.000	-	-	32.000	0.046	0.000	0.131	0.000	0.000	0.035	45.39	0.00	181.64	0.00	0.00	45.41
22	Megaptera novaeangliae	Humpback whale	10.000	10.000	20.000	-	80.000	24.000	0.015	0.011	0.020	0.000	0.091	0.027	15.13	11.30	27.94	0.00	114.65	33.80
23	Prionace glauca	Blue shark	16.502	7.660	33.276	17.317	14.710	17.893	0.025	0.008	0.034	0.020	0.017	0.021	24.97	8.66	46.49	27.08	21.08	25.66
24	Mobulid rays (NS)	Mobulid rays (NS)	1.200	80.550	2.550	7.200	3.150	18.930	0.002	0.087	0.003	0.008	0.004	0.021	1.82	91.04	3.56	11.26	4.51	22.44
25	Mobula japanica	Spinetail Devil Ray	9.600	18.450	23.250	12.300	22.500	17.220	0.015	0.020	0.023	0.014	0.026	0.020	14.52	20.85	32.49	19.24	32.24	23.87
26	Mobula mobular	Devil fish	12.610	8.125	10.950	6.000	19.050	11.347	0.019	0.009	0.011	0.007	0.022	0.014	19.08	9.18	15.30	9.38	27.30	16.05
27	Mobula tarapacana	Chilean devil ray	25.050	7.500	4.350	0.600	2.850	8.070	0.039	0.008	0.004	0.001	0.003	0.011	37.90	8.48	6.08	0.94	4.08	11.49

Rank	Species	Common name	Weight (t) by Year					Mean wt. (t) 2014-2018	Weight (% of total) by year					Mean % 2014-2018	Estimated total based on SKJ Observed catch %					Mean wt. (t) 2014-2018
			2014	2015	2016	2017	2018		2014	2015	2016	2017	2018		2014	2015	2016	2017	2018	
28	Carcharhinidae sp.	Requiem sharks	1.554	10.495	11.550	8.535	15.350	9.497	0.002	0.011	0.012	0.010	0.017	0.011	2.35	11.86	16.14	13.35	22.00	13.14
29	Lepidochelys olivacea	Olive Ridley sea turtle	4.473	6.746	8.277	11.053	14.572	9.024	0.007	0.007	0.008	0.013	0.017	0.010	6.77	7.62	11.56	17.29	20.88	12.83
30	Seriola rivoliana	Longfin yellowtail	0.707	13.572	5.943	12.892	8.326	8.288	0.001	0.015	0.006	0.015	0.009	0.009	1.07	15.34	8.30	20.16	11.93	11.36
31	Istiophorus albicans	Atlantic sailfish	8.170	7.734	7.614	6.403	5.858	7.156	0.013	0.008	0.008	0.007	0.007	0.009	12.36	8.74	10.64	10.01	8.39	10.03
32	Caretta caretta	Loggerhead sea turtle	5.625	9.413	9.936	5.177	3.069	6.644	0.009	0.010	0.010	0.006	0.003	0.008	8.51	10.64	13.88	8.10	4.40	9.11
33	Sphyraena barracuda	Great barracuda	4.448	7.474	6.963	7.052	6.802	6.548	0.007	0.008	0.007	0.008	0.008	0.008	6.73	8.45	9.73	11.03	9.75	9.14
34	Mola mola	Ocean sunfish	3.525	6.600	6.566	3.640	12.337	6.534	0.005	0.007	0.007	0.004	0.014	0.007	5.33	7.46	9.17	5.69	17.68	9.07
35	Lobotes surinamensis	Tripletail	2.919	13.260	7.125	4.709	4.511	6.505	0.005	0.014	0.007	0.006	0.005	0.007	4.42	14.99	9.96	7.36	6.46	8.64
36	Isurus oxyrinchus	Shortfin mako	3.246	7.514	7.206	6.034	5.026	5.805	0.005	0.008	0.007	0.007	0.006	0.007	4.91	8.49	10.07	9.44	7.20	8.02
37	Sphyrna mokarran	Great hammerhead	2.241	6.703	5.633	9.172	3.646	5.479	0.003	0.007	0.006	0.011	0.004	0.006	3.39	7.58	7.87	14.34	5.22	7.68
38	Alopias superciliosus	Bigeye thresher	1.813	12.323	8.935	0.856	0.100	4.805	0.003	0.013	0.009	0.001	0.000	0.005	2.74	13.93	12.48	1.34	0.14	6.13
39	Tout le banc		-	0.005	25.000	-	-	5.001	0.000	0.000	0.025	0.000	0.000	0.005	0.00	0.01	34.93	0.00	0.00	6.99
40	Canthidermis sufflamen	Ocean triggerfish	0.002	18.506	5.065	0.005	-	4.715	0.000	0.020	0.005	0.000	0.000	0.005	0.00	20.92	7.08	0.01	0.00	5.60
41	Carangidae	Jacks and pompanos	3.724	2.282	14.925	0.048	0.083	4.212	0.006	0.002	0.015	0.000	0.000	0.005	5.63	2.58	20.85	0.08	0.12	5.85

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			2014	2015	2016	2017	2018		2014	2015	2016	2017	2018		2014	2015	2016	2017	2018	
42	Carcharhiniformes	Ground sharks	9.750	0.400	-	-	1.800	2.390	0.015	0.000	0.000	0.000	0.002	0.004	14.75	0.45	0.00	0.00	2.58	3.56
43	Manta birostris + Manta sp.	Giant Oceanic Manta Ray	2.202	2.039	3.955	2.706	4.140	3.009	0.003	0.002	0.004	0.003	0.005	0.003	3.33	2.30	5.53	4.23	5.93	4.27
44	Dermochelys coriacea	Leatherback sea turtle	1.317	4.492	4.279	2.584	2.428	3.020	0.002	0.005	0.004	0.003	0.003	0.003	1.99	5.08	5.98	4.04	3.48	4.11
45	Xiphias gladius	Swordfish	5.735	1.087	1.236	1.700	0.806	2.113	0.009	0.001	0.001	0.002	0.001	0.003	8.68	1.23	1.73	2.66	1.16	3.09
46	Sphyrnidae	Hammerhead sharks	2.273	7.897	0.435	0.073	1.260	2.387	0.004	0.008	0.000	0.000	0.001	0.003	3.44	8.93	0.61	0.11	1.81	2.98
47	Coryphaenidae	Dolphinfishes	1.931	5.210	1.425	2.660	-	2.245	0.003	0.006	0.001	0.003	0.000	0.003	2.92	5.89	1.99	4.16	0.00	2.99
48	Odontoceti	Toothed whales	-	10.000	-	-	-	2.000	0.000	0.011	0.000	0.000	0.000	0.002	0.00	11.30	0.00	0.00	0.00	2.26
49	Ranzania laevis	Sender sunfish	0.675	5.150	-	0.075	3.450	1.870	0.001	0.006	0.000	0.000	0.004	0.002	1.02	5.82	0.00	0.12	4.94	2.38
50	Carcharhinus longimanus	Oceanic whitetip	3.901	0.966	0.780	1.146	0.994	1.557	0.006	0.001	0.001	0.001	0.001	0.002	5.90	1.09	1.09	1.79	1.42	2.26
51	Makaira indica	Black marlin	-	3.165	4.634	0.955	0.539	1.859	0.000	0.003	0.005	0.001	0.001	0.002	0.00	3.58	6.47	1.49	0.77	2.46
52	Coryphaena equiselis	Pompano dolphinfish	0.528	2.796	2.256	2.564	0.080	1.645	0.001	0.003	0.002	0.003	0.000	0.002	0.80	3.16	3.15	4.01	0.11	2.25
53	Chelonia mydas	Green turtle	0.694	0.548	2.069	1.762	2.301	1.475	0.001	0.001	0.002	0.002	0.003	0.002	1.05	0.62	2.89	2.76	3.30	2.12
54	Istiophoridae	Marlin	0.576	0.907	3.649	0.604	0.547	1.256	0.001	0.001	0.004	0.001	0.001	0.001	0.87	1.03	5.10	0.94	0.78	1.74
55	Kyphosus sectatrix	Bermuda sea chub	0.343	2.142	1.745	1.004	0.947	1.236	0.001	0.002	0.002	0.001	0.001	0.001	0.52	2.42	2.44	1.57	1.36	1.66

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			2014	2015	2016	2017	2018		2014	2015	2016	2017	2018		2014	2015	2016	2017	2018	
56	Testitudines	Turtle	1.116	0.752	0.391	1.449	0.277	0.797	0.002	0.001	0.000	0.002	0.000	0.001	1.69	0.85	0.55	2.27	0.40	1.15
57	Aluterus monoceros	Unicorn leatherjacket	0.089	1.855	0.352	1.274	0.752	0.864	0.000	0.002	0.000	0.001	0.001	0.001	0.13	2.10	0.49	1.99	1.08	1.16
58	Sharks	Sharks	0.100	0.238	0.100	-	3.750	0.838	0.000	0.000	0.000	0.000	0.004	0.001	0.15	0.27	0.14	0.00	5.37	1.19
60	Kajikia albida (Tetrapturus albidus)	White marlin	0.634	0.430	1.467	0.531	0.326	0.678	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.49	2.05	0.83	0.47	0.96
65	Globicephala macrorhynchus	Short-finned pilot whale	-	-	-	-	2.500	0.500	0.000	0.000	0.000	0.000	0.003	0.001	0.00	0.00	0.00	0.00	3.58	0.72
70	Mobula thurstoni	Smoothtail mobula	-	0.120	0.120	0.480	0.240	0.192	0.000	0.000	0.000	0.001	0.000	0.000	0.00	0.14	0.17	0.75	0.34	0.28
76	Globicephala melas	Long-finned pilot whale	0.500	-	-	-	-	0.100	0.001	0.000	0.000	0.000	0.000	0.000	0.76	0.00	0.00	0.00	0.00	0.15
78	Lepidochelys kempii	Kemp's ridley sea turtle	0.055	0.126	0.037	0.108	0.219	0.109	0.000	0.000	0.000	0.000	0.000	0.000	0.08	0.14	0.05	0.17	0.31	0.15
81	Eretmochelys imbricata	Hawksbill turtle	-	0.026	0.102	0.162	0.210	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.03	0.14	0.25	0.30	0.15
85	Grampus griseus	Risso's dolphin	-	-	0.100	0.250	-	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.14	0.39	0.00	0.11
87	Stenella frontalis	Atlantic spotted dolphin	-	-	-	0.300	-	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.47	0.00	0.09
88	Lamna nasus	Porbeagle	-	0.05	0.05	0.10	0.05	0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.06	0.07	0.016	0.07	0.07
62 other species groups <0.001%			6.148	10.237	5.417	3.634	4.965	6.080	0.00	0.01	0.00	0.00	0.00	0.007	10.26	12.11	9.69	6.67	7.65	9.28

Rank	Species	Common name	Weight (t) by Year					Mean wt. (t) 2014-2018	Weight (% of total) by year					Mean % 2014-2018	Estimated total based on SKJ Observed catch %					Mean wt. (t) 2014-2018
			2014	2015	2016	2017	2018		2014	2015	2016	2017	2018		2014	2015	2016	2017	2018	
									9	1	5	4	6							
Total			64,783.888	92,967.393	99,111.685	85,471.073	88,056.044	86,078.017	100.00	100.00	100.00	100.00	100.00	100.00	100,023.87	107,087.33	140,500.46	135,692.61	128,209.83	122,302.82

Species coding key: Target species, Main Primary species, Minor Primary species, Main Secondary species, Minor Secondary species, ETP species.

Table 3: Representativity of the Atlantic observer data 2014-2018, as calculated based on observer data versus logbook data for skipjack tuna (source: OPAGAC).

	Year					Mean % 2014-2018
	2014	2015	2016	2017	2018	
Total observer reported catch of Skipjack tuna	38,130.7	51,945.0	54,273.8	45,837.2	49,168.0	47,870.9
Total logbook reported catch of Skipjack tuna	57,690.0	58,709.0	75,834.0	71,690.0	70,461.0	66,876.8
Observer coverage level (%) comparing logbook to observed catch	66.10	88.48	71.57	63.94	69.78	71.97

We are using the MSC's PSA during this assessment for the species listed in Table *4*. The PSA makes use of stakeholder views to inform the assessment of the fishery by a team of independent experts. For other aspects of the assessment we are using the 'default' MSC assessment process, where again stakeholder views are important to inform the assessment of the fishery.

Table 4: The species for which the PSA will be used are all categorised as Endangered, Threatened or Protected according to the MSC criteria[1].

Scientific name	**Common name**
Carcharhinus falciformis	Silky shark
Carcharhinus longimanus	Oceanic whitetip shark
Sphyrna lewini	Scalloped hammerhead shark
Sphyrna mokarran	Great hammerhead shark
Sphyrna zygaena	Smooth hammerhead shark
Alopias superciliosus	Bigeye thresher shark
Manta birostris	Giant Oceanic Manta Ray
Manta alfredi	Reef manta
Mobula japanica	Spinetail Devil Ray
Mobula mobular	Devil fish
Mobula thurstoni	Smoothtail mobula
Mobula tarapacana	Chilean devil ray

The PSA is described in detail in the MSC Fisheries Certification Process V2.1 (Annex PF4, MSC 2018). In summary, the data required for the PSA are divided in to two sections, one covering 'productivity' attributes (which effectively describe the biological attributes of the species', and one covering 'susceptibility' attributes (which effectively describe the potential for interaction between the species and the UoA).

The productivity attributes for a species are species specific and do not change between fisheries, and the Assessment Team has already derived productivity information for each species from available online sources.

Information and provisional scoring of 'Productivity' is provided in the following sections. We request that you review this information and confirm that you agree with the Assessment Team's findings, or otherwise.

Information of "Susceptibility" is provided in the following sections. Please, review the 'Susceptibility' information provided and please use the space provided to draft your own scores for susceptibility to support finalisation of the PSA scores for the species under review.

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Productivity – Silky shark

Table 5: Productivity attributes and scores for silky shark (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years *2	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm	>200 cm *5
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 9.5 years (Cortes et al 2015)
*2 – Average maximum age: 22 years (Cortes et al 2015)
*3 – Fecundity: Mean litter size 11 (Cortes et al 2015)
*4 – Average maximum size: 315 cm (Cortes et al 2015)
*5 – Average size at maturity: 215-246 cm (CMS 2014)
*6 – Reproductive level: Viviparous (live bearer) (https://www.fishbase.de/summary/Carcharhinus-falciformis.html)
*7 – Trophic level: 4.5 (https://www.fishbase.de/summary/Carcharhinus-falciformis.html)

Productivity – Oceanic whitetip shark

Table 6: Productivity attributes and scores for oceanic whitetip shark (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years *2	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm *5	>200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 6 years (Cortes et al 2015)
*2 – Average maximum age: 17 years (Cortes et al 2015)
*3 – Fecundity: Mean litter size 5.4 (Cortes et al 2015)
*4 – Average maximum size: 285 cm (Cortes et al 2015)
*5 – Average size at maturity: 193 – 194 cm (CMS 2018)
*6 – Reproductive level: Viviparous (live bearer) (https://www.fishbase.se/summary/carcharhinus-longimanus.html)
*7 – Trophic level: 4.2 (https://www.fishbase.se/summary/carcharhinus-longimanus.html)

Productivity – Scalloped hammerhead shark

Table 7: Productivity attributes and scores for scalloped hammerhead shark (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years	>25 years *2
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm *5	>200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 15 years (Cortes et al 2015)
*2 – Average maximum age: 31 years (Cortes et al 2015)
*3 – Fecundity: 24 (Cortes et al 2015)
*4 – Average maximum size: 370 - 420 cm (CMS 2015b)
*5 – Average size at maturity: 170 – 198 cm (CMS 2015b)
*6 – Reproductive level: Viviparous (live bearer) (https://www.fishbase.se/summary/912)
*7 – Trophic level: 4.1 (https://www.fishbase.se/summary/912)

Productivity – Great hammerhead shark

Table 8: Productivity attributes and scores for great hammerhead shark (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years	>25 years *2
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm	>200 cm *5
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 5 – 8.9 years (Miller et al 2014)
*2 – Average maximum age: 42 years (Cortes et al 2015)
*3 – Fecundity: Mean litter size 15 (Cortes et al 2015)
*4 – Average maximum size: 450 cm (CMS 2015a)
*5 – Average size at maturity: 210-300 cm (Miller et al 2014)
*6 – Reproductive level: Viviparous (live bearer) (Miller et al 2014)
*7 – Trophic level: 4.3 (https://www.fishbase.de/summary/914)

Productivity – Smooth hammerhead shark

Table 9: Productivity attributes and scores for smooth hammerhead shark (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years *2	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm	>200 cm *5
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence !! Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 9 years (Cortes et al 2015)
*2 – Average maximum age: 18 years (Cortes et al 2015)
*3 – Fecundity: Mean litter size 33.5 (Cortes et al 2015)
*4 – Average maximum size: 250 – 350 cm (CMS 2019)
*5 – Average size at maturity: 247-288 cm (CMS 2019)
*6 – Reproductive level: Viviparous (live bearer) (https://www.fishbase.se/summary/Sphyrna-zygaena.html)
*7 – Trophic level: 4.9 (https://www.fishbase.se/summary/Sphyrna-zygaena.html)

Productivity – Bigeye thresher shark

Table 10: Productivity attributes and scores for bigeye thresher shark (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years *2	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm	>200 cm *5
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 13.5 years (Cortes et al 2015)
*2 – Average maximum age: 22 years (Cortes et al 2015)
*3 – Fecundity: Mean litter size 2 (Cortes et al 2015)
*4 – Average maximum size: 350 cm (http://fishbase.mnhn.fr/Summary/SpeciesSummary.php?ID=2534&AT=Tiburon+zorro)
*5 – Average size at maturity: 332 - 341cm (CMS 2015c)
*6 – Reproductive level: Ovoviviparous (live bearer) (http://fishbase.mnhn.fr/Summary/SpeciesSummary.php?ID=2534&AT=Tiburon+zorro)
*7 – Trophic level: 4.5 (http://fishbase.mnhn.fr/Summary/SpeciesSummary.php?ID=2534&AT=Tiburon+zorro)

Productivity – Giant Oceanic Manta Ray (representing scores also for Reef Manta Ray)

Table 11: Productivity attributes and scores for giant Oceanic Manta Ray (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years *2	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm	>200 cm *5
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: Triangulated based on maximum age and maximum size at maturity
*2 – Average maximum age: 20 years (https://www.fishbase.se/summary/2061)
*3 – Fecundity: Mean litter size 2 (https://www.fishbase.se/summary/2061)
*4 – Average maximum size: 650 cm (CMS 2015d)
*5 – Average size at maturity: 380 – 460 cm (https://www.fishbase.se/summary/2061)
*6 – Reproductive level: Ovoviviparous (live bearer) (https://www.fishbase.se/summary/2061)
*7 – Trophic level: 3.5 (https://www.fishbase.se/summary/2061)

Productivity – Spinetail devil ray (representing scores also for devil fishes, smoothtail mobula & Chilean devil ray)

Table 12: Productivity attributes and scores for spinetail devil ray (Table PF4, MSC 2018).

Productivity Attribute	High productivity (Low risk, score=1)	Medium productivity (medium risk, score=2)	Low productivity (high risk, score=3
Average age at maturity	<5 years	5-15 years *1	>15 years
Average maximum age	<10 years	10-25 years *2	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year *3
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm *4
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm *5	>200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer *6
Trophic Level	<2.75	2.75-3.25	>3.25 *7
Density dependence ‼ Not scored (to be used when scoring invertebrate species only)	Compensatory dynamics at low population size demonstrated or likely	No depensatory or compensatory dynamics demonstrated or likely	Depensatory dynamics at low population sizes (Allee effects) demonstrated or likely

*1 – Average age at maturity: 5 - 6 years (Cuevas-Zimbrón et al 2012)
*2 – Average maximum age: 20 years (https://www.fishbase.se/summary/2061)
*3 – Fecundity: Mean litter size 1 (CMS 2015e)
*4 – Average maximum size: 310 cm (https://www.fishbase.se/summary/2587)
*5 – Average size at maturity: 198 – 205 cm (https://www.fishbase.se/summary/2587)
*6 – Reproductive level: Ovoviviparous (live bearer) (https://www.fishbase.se/summary/2587)
*7 – Trophic level: 3.4 (https://www.fishbase.se/summary/2587)

Please provide the following information:

1) Are there any 'Productivity' provisional scores that you do not agree with?

2) If you disagree with any provisional score, please provide your score and any supporting information with references if available.

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Susceptibility - Background information

UoAs 1, 2 and 3: Purse seine (FAD & FSC) Atlantic Ocean

The fishery under assessment operates for the most part in the eastern Atlantic Ocean (Figure 1) or FAO Major fishing areas 34 and 47 (http://www.fao.org/fishery/area/search/en). The location and timing of fishing activities can be validated by Vessel Monitoring System (VMS) records and is reported by each flag state to ICCAT. When overlaid with species distribution maps this information is used to determine the risk or likelihood of the fishery interacting with a particular species and is valuable for scoring the impact of the UoA using the RBF.

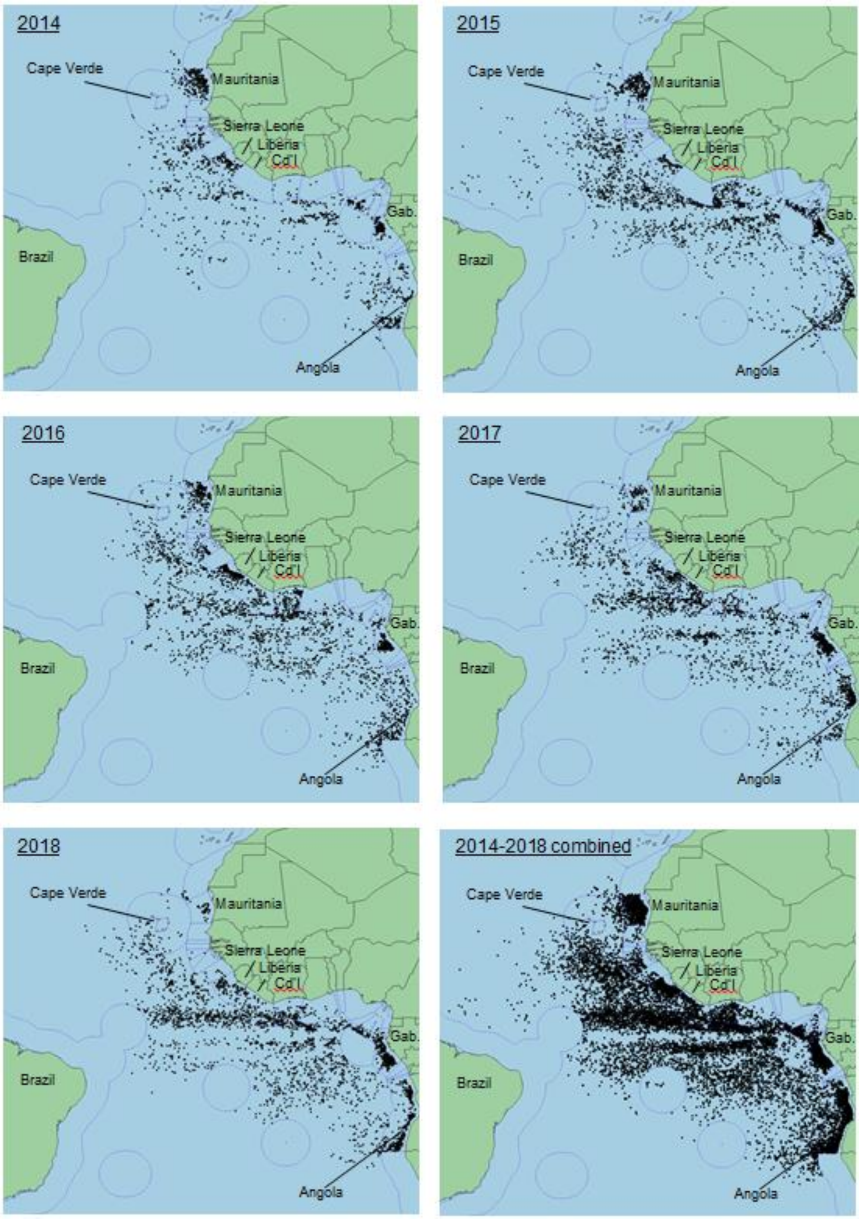

Figure 1: **Set locations for the AGAC Atlantic Ocean Tuna Fishery, each year 2014-2018 and combined. Location data from client. EEZ locations from Flanders Marine Institute 2019. Gab. = Gabon, Cd'I = Côte d'Ivoire (OPAGAC data).**

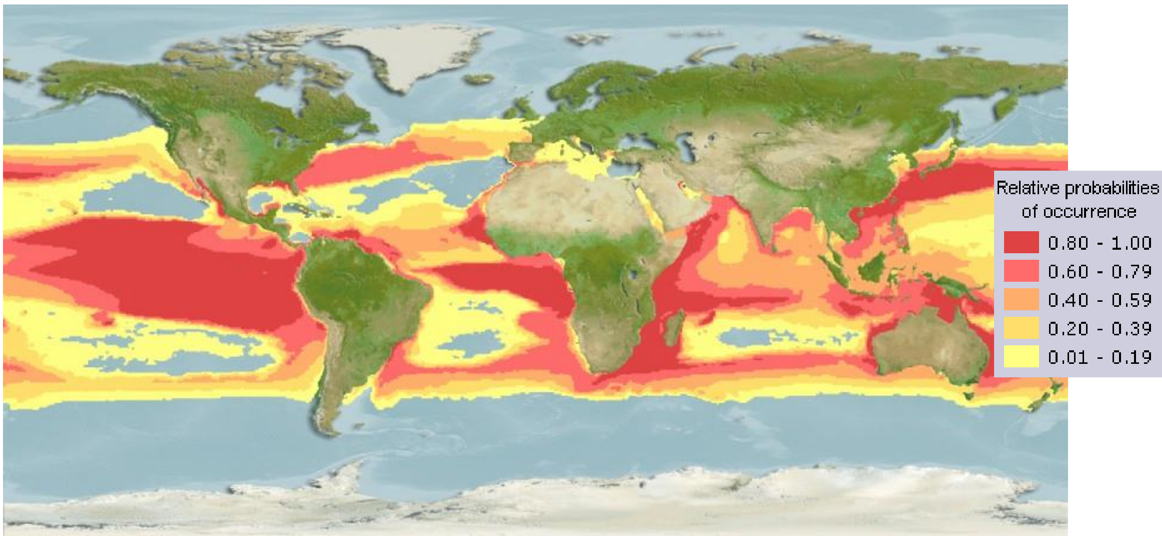

Figure 2: Relative probability of occurrence of silky shark (*Carcharhinus falciformis*) based on known distribution and habitat suitability. Source: https://www.fishbase.de/summary/Carcharhinus-falciformis.html.

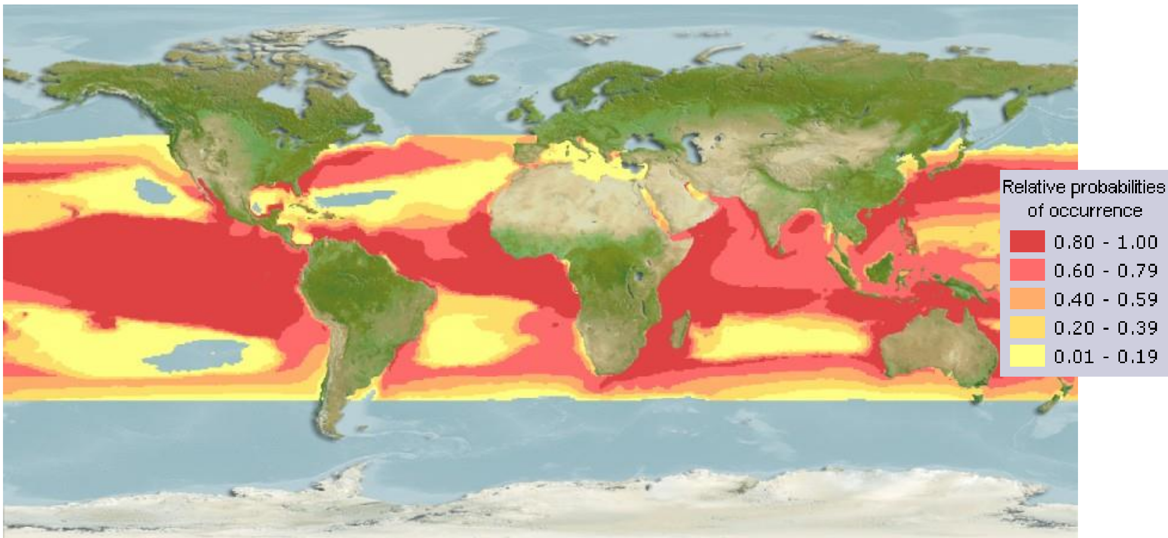

Figure 3: Relative probability of occurrence of oceanic whitetip shark (*Carcharhinus longimanus*)based on known distribution and habitat suitability. Source: https://www.fishbase.se/summary/carcharhinus-longimanus.html.

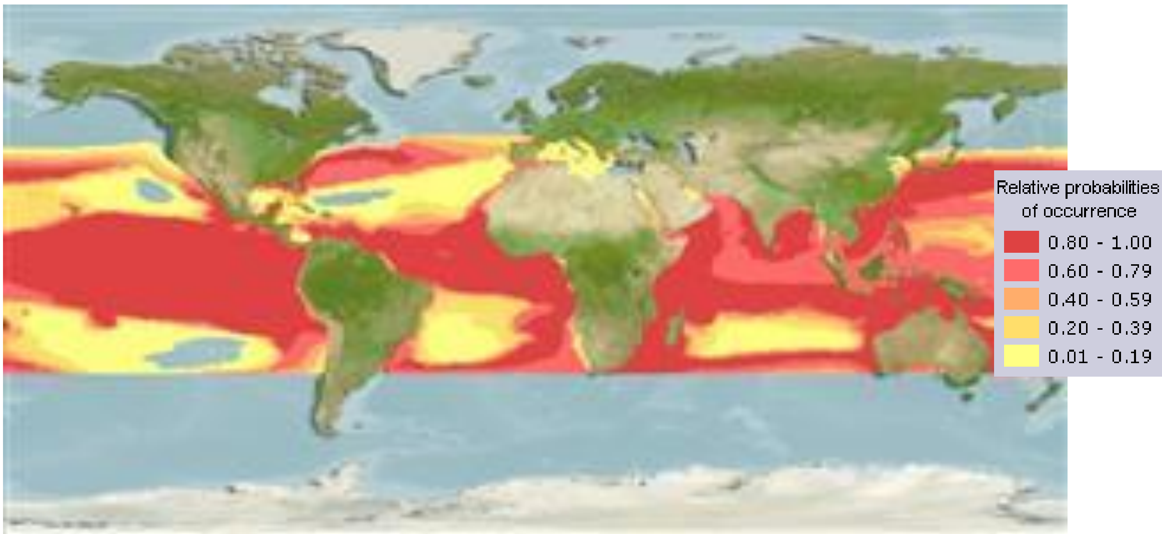

Figure 4: Relative probability of occurrence of scalloped hammerhead shark (*Sphyrna lewini*) based on known distribution and habitat suitability. Source: https://www.fishbase.se/summary/912.

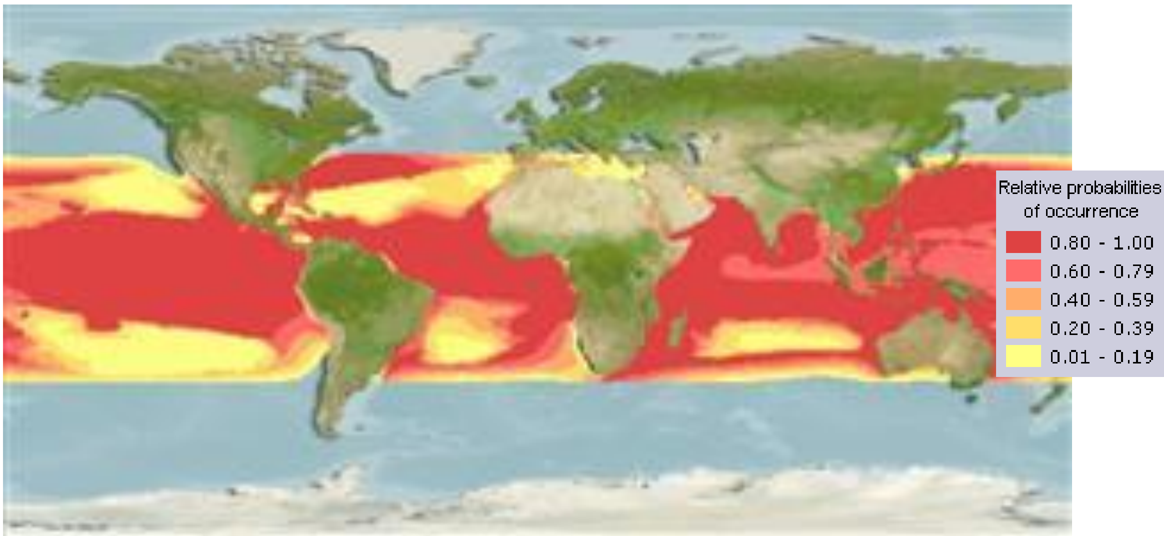

Figure 5: Relative probability of occurrence of great hammerhead shark (*Sphyrna mokarran*) based on known distribution and habitat suitability. Source: https://www.fishbase.de/summary/914.

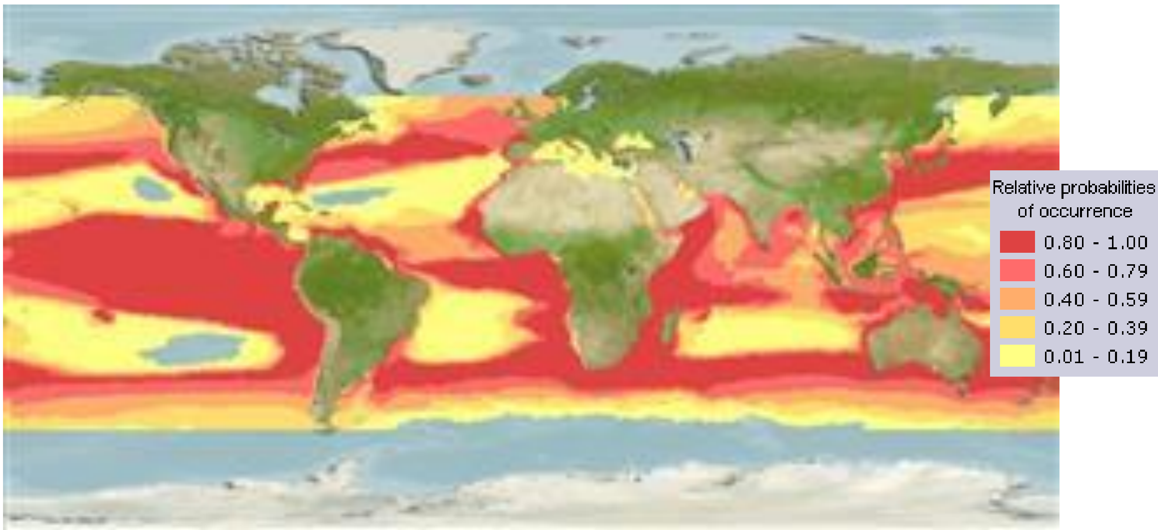

Figure 6: Relative probability of occurrence of smooth hammerhead shark (*Sphyrna zygaena*) based on known distribution and habitat suitability. Source: https://www.fishbase.se/summary/Sphyrna-zygaena.html.

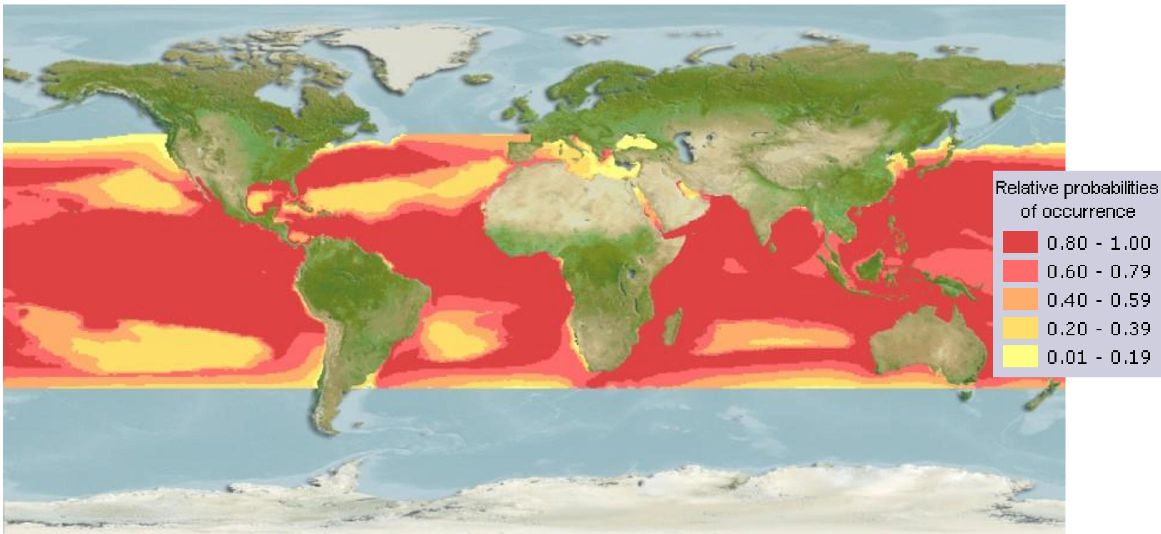

Figure 7: Relative probability of occurrence of bigeye thresher shark (*Alopias superciliosus*) based on known distribution and habitat suitability. Source: http://fishbase.mnhn.fr/Summary/SpeciesSummary.php?ID=2534&AT=Tiburon+zorro.

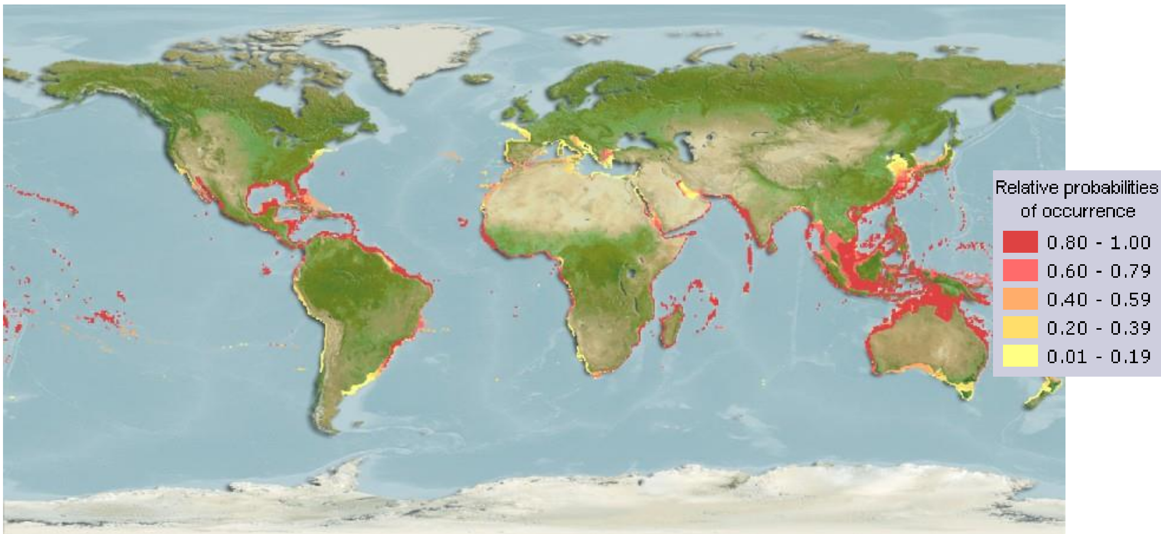

Figure 8: Relative probability of occurrence of giant manta ray (*Mobula birostris*) based on known distribution and habitat suitability. Source: https://www.fishbase.se/summary/2061.

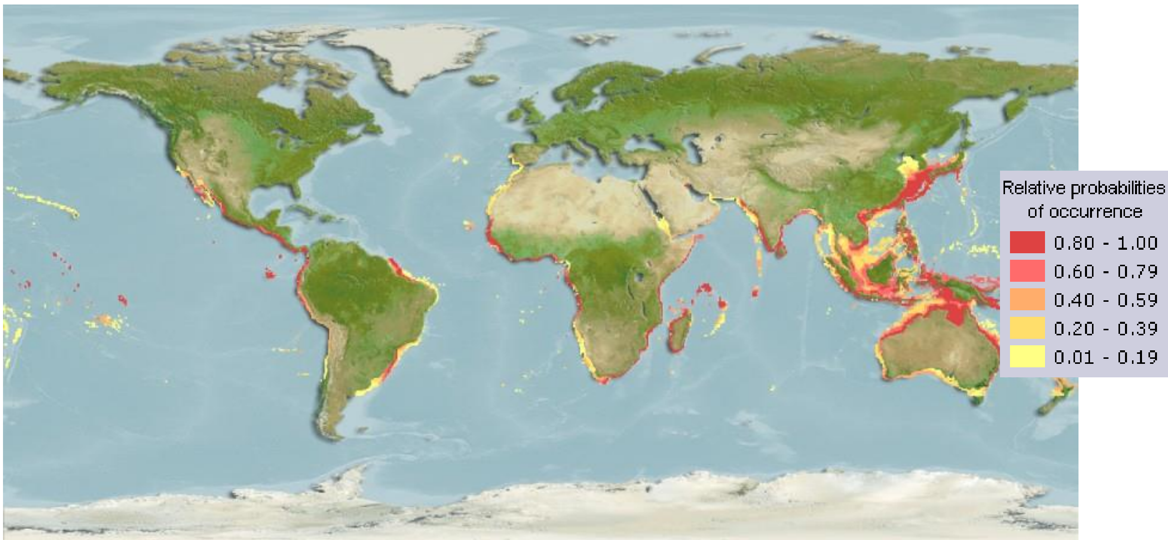

Figure 9: Relative probability of occurrence of spinetail mobula (*Mobula japanica*) based on known distribution and habitat suitability. Source: https://www.fishbase.se/summary/2587.

ETP Chondrichthyan susceptibility

Summary information is provided below, but the Assessment Team is interested to know if stakeholders consider there to be better information available.

- Information on 'areal overlap' is provided in Figures 1-9.
- Information on 'encounterability' is limited but the fishery is a pelagic purse seine fishery setting on both free schools (FSC) and schools associated with fish aggregating devices (FADs). The purse seine is exclusively set in deep water and mostly takes place on the high seas excepting for where there are bilateral fishing agreements in place. Santana et al (2002) showed from two vessels and 32 trips in the Atlantic and Indian oceans that the maximum depth attained by the net was 163 m and 182 m for two vessels. No distinction is made during the assessment between FAD-caught or FSC-caught target and bycatch species (including ETP species) however, FADs also attract non-tuna species, and these species are taken when purse seiners fish on FADs. Free-swimming school sets are usually characterised by low amounts of by-catch of non-target species. Even though by-catch at FADs may be a relatively small proportion of the total catch, the fact that fishing on floating objects is a part of the fleet's overall strategy results in an increase in by-catch and a consequent increase in the risk score assigned for the purse seine fishery.
- There is no available information directly on maturity of the catch provided by the observer program however, observers do estimate the length of chondrichthyan bycatch and a summary of the records is provided in
- Table *13* indicating that individuals less than size at maturity are caught.
- Observers record the fate of each individual or group of ETP species and estimates of post-capture mortality can be inferred from observer data and are provided in
- Table *14*.

Table 13: The average individual length (cm) of ETP chondrichthyans caught by UoA purse seiners in the Atlantic Ocean, 2014-2018 reported by scientific observers and average length of each species at maturity. Source: OPAGAC.

Scientific name	Common name	Number of records	Average individual length (cm)	Average length at maturity (cm)
Carcharhinus falciformis	Silky shark	21691	**129**	215-246
Carcharhinus longimanus	Oceanic whitetip	54	**160**	193-194
Sphyrna lewini	Scalloped hammerhead	2379	**210**	170-198
Sphyrna mokarran	Great hammerhead	354	**216**	210-300
Sphyrna zygaena	Smooth hammerhead	865	**209**	247-288
Alopias superciliosus	Bigeye thresher	39	**256**	332-341
Manta birostris	Giant manta	240	**205**	380-460
Mobula japanica	Spinetail devil ray	375	**204**	198-205

Table 14: The number of live releases of ETP chondrichtyhans shown as a proportion of the total number of observed individuals on board UoA purse seiners in the Atlantic Ocean, 2014-2018. Source: OPAGAC.

Scientific name	Common name	Total number observed 2014 - 2018	Proportion of live releases (from deck or net)
Carcharhinus falciformis	Silky shark	36947	**59%**
Carcharhinus longimanus	Oceanic whitetip	146	**71%**
Sphyrna lewini	Scallope hammerhead	4470	**69%**
Sphyrna mokarran	Great hammerhead	339	**71%**
Sphyrna zygaena	Smooth hammerhead	2335	**70%**
Alopias superciliosus	Bigeye thresher	112	**52%**

Manta birostris	Giant manta	260	**88%**
Mobula japanica	Spinetail devil ray	749	**61%**

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Susceptibility - Stakeholder scoring

Scoring susceptibility (PF4.4, MSC 2018)

Please note: Only the impact of the UoA should be taken into account.

- Areal overlap (availability)
    - The scoring of areal overlap should consider the entire distribution of the species and the overlap of the UoA fishing gear with concentrations of the species or stock; I.e., this should take account of uneven distribution of the species/stock, including of marginal and core areas; fishing activity in marginal areas will score lower for susceptibility than activity in core areas.
- Encounterability
    - The scoring of encounterability shall consider the likelihood that a species will encounter fishing gear that is deployed, based on overlap of the gear's fishing depth/position with the distribution of the species within the water column (and any behavioural elements that may make the species more or less likely to overlap with the gear).
- Selectivity
    - Terms "rarely", "regularly" and "frequently" in Table PF5 shall be interpreted as follows:
        - "Rarely" means that the capture of individuals smaller than the size at maturity occurs in less than 5% few gear deployments.
        - "Regularly" means that the capture of individuals smaller than the size at maturity occurs in 5% to 50% of the gear deployments.
        - "Frequently" means that the capture of individuals smaller than the size at maturity occurs in more than 50% of gear deployments.
- Post-capture mortality
    - In the absence of observer data or other verified field observations made during commercial fishing operations that indicate the individuals are released alive and post-release survivorship is high, the default value for the PCM of all species shall be high risk
    - A reduced score for PCM may be awarded where a large portion of the animals are returned alive and survive the encounter.

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Susceptibility - Stakeholder scoring

Table 15: PSA susceptibility attributes and scores (From Table PF5, MSC 2018).

Susceptibility attribute	Low susceptibility (low risk, score=1)	Medium susceptibility (medium risk, score=2)	High susceptibility (high risk, score=3
Areal overlap (availability) Overlap of the fishing effort with a species concentration of the stock	<10% overlap	10-30% overlap	>30% overlap
Encounterability The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability)	Medium overlap with fishing gear	High overlap with fishing gear (high encounterability) Default score for target species (P1)
Selectivity of gear type Potential of the gear to retain species	a Individuals < size at maturity are rarely caught (<5% of gear deployments)	a Individuals < size at maturity are regularly caught (5-50 % of gear deployments)	a Individuals < size at maturity are frequently caught (>50%)
	b Individuals < size at maturity can escape or avoid gear	b Individuals < half the size at maturity can escape or avoid gear	b Individuals < half the size at maturity are retained by gear
Post-capture mortality (PCM) The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released postcapture and survival	Evidence of some released postcapture and survival	Retained species or majority dead when released Default score for retained species (P1 or P2)

Table 16: Stakeholder susceptibility scores for ETP chondrichthyans for the AGAC purse seine fishery in the Atlantic Ocean.

PLEASE FILL IN THE TABLE BELOW USING THE INFORMATION PROVIDED AND YOUR OWN KNOWLEDGE OF THE FISHERY						
			Susceptibility			
Scoring element	Scientific name	Common name	**Availability**	**Encounterability**	**Selectivity**	**Post-capture mortality**
1	*Carcharhinus falciformis*	Silky shark				
2	*Carcharhinus longimanus*	Oceanic whitetip shark				
3	*Sphyrna lewini*	Scalloped hammerhead shark				
4	*Sphyrna mokarran*	Great hammerhead shark				
5	*Sphyrna zygaena*	Smooth hammerhead shark				
6	*Alopias superciliosus*	Bigeye thresher shark				
7	*Manta birostris*	Giant Oceanic Manta Ray				
8	*Mobula japanica*	Spinetail Devil Ray				

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Susceptibility - Stakeholder scoring and comments

1. Do you have any additional comments with respect to scoring ‘Susceptibility’ for the ETP chondrichthyans under assessment?

2. Are there any references or projects that you are aware of that would enable the assessment team to score susceptibility more accurately?

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
PSA provisional scoring summary

The PSA was used to score the species listed in Table 17 below. Where productivity attributes were not available for a particular species a representative species was selected and the score for that species will be assigned to the other species for which information was not available. This applies to reef manta (*Manta alfredi*), devil fish (*Mobula mobular),* smoothtail mobula (*Mobula thurstoni*) and Chilean devil ray (*Mobula tarapacana*). Where conditions are raised they would apply to all species and not just those for which information is available.

The final determination of the PSA score and equivalent MSC score is calculated automatically. The PSA score is automatically rounded to 2 decimal points and MSC score per scoring element is rounded to the nearest whole number. Any scoring element which is ranked as 'high risk' would result in an automatic MSC score of <60. 'Medium risk' outcomes result in a score of 60-79 and subsequently a condition will be raised for that element. A score of 'low risk' or >80 must be achieved in order to indicate that the fishery is not having a detrimental impact on the species under assessment and is implementing best-practice measures to reduce susceptibility to fishing mortality.

Table 17: Summary of provisional productivity scores for ETP chondrichthyans caught by the AGAC purse seine fishery (FAD & FSC) in the Atlantic Ocean. Once susceptibility scores have been determined, following stakeholder consultation, the final MSC score will be calculated automatically.

					Productivity Scores [1-3]									**Susceptibility Scores [1-3]**								
Scoring element	**Family name**	**Scientific name**	**Common name**	**Species type**	Average age at maturity	Average max age	Fecundity	Average max size	Average size at maturity	Reproductive strategy	Trophic level	Density dependance	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)	PSA Score	**MSC PSA-derived score**	Risk Category Name	MSC scoring guidepost
1	Carcharhinidae	*Carcharhinus falciformis*	Silky shark	Vertebrate	2	2	3	3	3	3	3		2.71									
2	Carcharhinidae	*Carcharhinus longimanus*	Oceanic whitetip shark	Vertebrate	2	2	3	3	2	3	3		2.57									
3	Sphyrnidae	*Sphyrna lewini*	Scalloped hammerhead shark	Vertebrate	2	3	3	3	2	3	3		2.71									
4	Sphyrnidae	*Sphyrna mokarran*	Great hammerhead shark	Vertebrate	2	3	3	3	3	3	3		2.86									
5	Sphyrnidae	*Sphyrna zygaena*	Smooth hammerhead shark	Vertebrate	2	2	3	3	3	3	3		2.71									
6	Alopiidae	*Alopias superciliosus*	Bigeye thresher shark	Vertebrate	2	2	3	3	3	3	3		2.71									
7	Mobulidae	*Manta birostris*	Giant Oceanic Manta Ray	Vertebrate	2	2	3	3	3	3	3		2.71									
	Mobulidae	*Manta alfredi*	Reef manta	Vertebrate																		
8	Mobulidae	*Mobula japanica*	Spinetail Devil Ray	Vertebrate	2	2	3	3	2	3	3		2.57									
	Mobulidae	*Mobula mobular*	Devil fish	Vertebrate																		
	Mobulidae	*Mobula thurstoni*	Smoothtail mobula	Vertebrate																		
	Mobulidae	*Mobula tarapacana*	Chilean devil ray	Vertebrate																		

AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean)
Stakeholder general comments and feedback

As in informed stakeholder of the fishery if you have any additional comments or feedback about the process used to score ETP chondrichthyans, specifically with reference to:

1) **The need to use the RBF framework instead of the default assessment tree, i.e. do you agree or disagree that the impact of the fishery on the species in question cannot be determined analytically?**

2) **Has the best available information been referenced with respect to determine productivity scores for the species in question?**

3) **Has the best available information been referenced with respect to determine susceptibility scores for the species in question?**

4) **Any other comments?**

Thank you very much for your time and interest in participating in the assessment of the AGAC four oceans Integral Purse Seine Tropical Tuna Fishery (Atlantic Ocean) against the MSC Standard. We will ensure that you are included in the list of stakeholders for the fishery and that you are sent relevant information on the progress of the fishery through the assessment process.

Canadian 0A, 0B and 2+3KLMNO Greenland Halibut Fishery
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