



ICCAT Shortfin Mako catch analysis

01Jan2018-31Dec2020



Area of interest (AOI)	Atlantic Ocean (ICCAT Convention Area)
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Summary	<ul style="list-style-type: none"> • Within Task I nominal catch data, 21 flag-states reported shortfin mako (SMA) catch in 2018 in the ICCAT Area of Interest (AOI), followed by 22 in 2019, and 18 in 2020. • Within Task II catch-effort data, 16 flag-states reported SMA catch in 2018 in the ICCAT AOI, followed by 19 in 2019, and 15 in 2020. • SMA catch was represented similarly in Task I and Task II data, suggesting that Task II data is a typical sample of total SMA catch. However, individual flag states showed Task I- Task II variability. • Flag-states that reported SMA catch in Task I data but not in Task II included Côte d'Ivoire (2018, 2020), EU-Italy (2018, 2019), EU-Spain (2018, 2020), Russian Federation (2018, 2019), Senegal (2018, 2019), St Vincent and the Grenadines (2019), UK (Bermuda) (2019) and UK (2020). • Across all flag-states, 1,837.034 MT of SMA was reported in Task II data in 2018, 1,655.236 MT in 2019, and 1,632.045 in 2020. For fleets which reported SMA catch by number only, a total of 15,280 SMA in 2018, 2,721 in 2019, and 2,160 in 2020 were reported. • SMA catch by weight and number was highest in grid cells that intersected EEZs. Sixty-five (65) coastal states were potentially represented in SMA catch. • SMA catch was reported across for gears including longline, bait boat, handline, gillnet, purse seine, trawl and trap. • Belize, Namibia, and South Africa reported SMA catch from grid cells entirely on land during the analysis period. • Differences in 2019 annual Task II data were found in different t2ce dataset versions published by ICCAT. • Analysis indicated that flag-states targeting swordfish (SWO) are likely to report catching significant amounts of SMA. However, not all SWO fleets report SMA in Task I or Task II data.

Acronyms and Abbreviations			
AOI	Area of Interest	RFMO	Regional Fisheries Management Organisation
BFT	Bluefin tuna (<i>Thunnus thynnus</i>)	SMA	Shortfin mako shark (<i>Isurus oxyrinchus</i>)
EEZ / EFZ	Exclusive Economic Zone / Exclusive Fishing Zone	SWO	Swordfish (<i>Xiphias gladius</i>)
EU	European Union (with country suffix) as flag-state	Task I (t1nc)	Nominal catch ICCAT dataset by species, region, gear, and flag, and where possible. Responsibility for reporting catch and landings data generally lies with flag states.
ICCAT	International Commission for the Conservation of Atlantic Tunas	Task II (t2ce)	Catch and fishing effort statistics for each species by small area (1°x1° or 5°x5° square cells), gear, flag, and month.

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Executive Summary

This report summarises the results of geospatial analysis of reported catches of shortfin mako (*Isurus oxyrinchus*), having the ICCAT species code SMA, within the ICCAT Convention Area for the period 01Jan2018-31Dec2020. SMA catch was extracted from available Task II catch-effort datasets published by the RFMO ICCAT and converted into georeferenced 1°x1° and 5°x5° data grid cells. Task II data were used as catch-effort data has an associated spatial attribute, a feature absent for the more comprehensive Task I nominal catch data (both published open-access by ICCAT). SMA representation in Task I and Task II data was compared for individual flag-states for the period 2018-2020. Broadly, SMA catch (as a percentage of total catch) in Task II data was considered to be representative of trends in Task I data. However, some individual flag-states indicated potential under- or overestimation in the Task I to Task II relationship for SMA catch.

The presented analysis differentiated reported SMA catch between flag-states, and catch weight and number reported between ICCAT area quadrants. Additionally, catch weight and number of SMA was calculated between areas of the high seas region and that within or along the boundaries of coastal-state Exclusive Economic Zones (EEZs).

- Across all flag-states, 1,837.034 MT of SMA was reported in 2018, and 1,655.236 MT in 2019. A further 1,632.045 MT of SMA catch was reported in 2020. For fleets which reported SMA catch by number only, a total of 15,280 SMA in 2018, 2,721 in 2019 and 2,160 were reported.
- Across the period 2018-2020, highest SMA catch by weight was reported in the southeast quadrant. However, SMA catch by number was highest in the southwest quadrant in 2018-2019 and in the northwest quadrant in 2020. When calculated across all fleets, SMA catch by both weight and number was consistently higher in grid cells that were within or intersected EEZs than in grid cells entirely on the high seas.
- Longline gears were most frequently associated with SMA catch as reported by flag-states in 2018-2020, but other gears included bait boat, handline, gillnet, purse seine, trawl and trap.
- SMA catch was reported by flag-states in grid cells that intersected or were within the EEZs of 65 coastal-states (this includes Overseas Territories/Departments, Autonomous Regions, Unincorporated Territories and Constituent Countries).
- Twenty (20) flag-states reported Task II SMA catch between 2018-2020 in the ICCAT Area of Interest (AOI), most reported catch by weight but 3 reported by number only.

- Trends in Task II data and key findings are presented and discussed for all flag-states reporting SMA catch in the 2018-2020 analysis period, key points of note include
 - In an archived copy of the Task II dataset (t2ce_20201218web), published data showed USA SMA catch of 818 in both 2018 and 2019. However, in the latest version available on the ICCAT data repository (t2ce_20220131web), USA SMA catch in 2018 was reported as 818 and 701 in 2019. In addition, overall Task II catch weight from the flag-state EU-Spain changed from 83,587,214.32 kg (83,587.21 MT) to 98,395,586.32 kg (98,395.586 MT) for the year 2019. The reason for this change in open-access, published data is unknown, and clarification as to this issue and reporting requirements for flag-states may be beneficial.
 - Brazil reported a substantial reduction in the number of SMA caught over the analysis period, from 12,298 in 2018 to 1,025 in 2019. However, as Brazil reports Task II catch by number, any comparisons to Task I data (reported by weight) were limited. This situation was particularly unfortunate due to Brazil being one of the flag-states with the highest landings of SMA (Task I) in all analysis years. Consequently, the representativeness of Brazil Task II SMA catch mapping may have been considerably limited.
 - No Task II data (for all species) are available for the flag-states Algeria, EU-Italy, Côte d'Ivoire, Grenada, Guyana, Liberia, Libya, Sao Tome & Principe and St Kitts & Nevis, in some years of the 2018-2020 period, although Task I data were available.
 - Namibia reported zero SMA catch by weight in 2019 within Task I data, but 634.144 MT in Task II for the same period. However, Namibia reported some of the highest SMA catch for any flag-state across all years of the analysis period. Additionally, Task I and Task II data for Namibia data regularly showed SMA catch (by weight) substantially exceeding SWO catch – in unique contrast to all other flag-states for the period.
 - P.R. China reported SMA catch only in 2019 (27.642 MT). When considering that ICCAT lists 46 active vessels under the P.R. China flag-state, it might be expected that more SMA would be represented when compared to smaller or similar sized fleets.
 - EU-France reported 1.466 MT of SMA catch in 2019, and 0.085 MT in 2020 only (zero SMA catch in 2018). ICCAT lists 4,735 active vessels under the EU-France flag-state, therefore it might be expected that SMA catch would be substantially higher than apparent in the available data.
 - EU-Spain reported SMA catch in only 2019, this being in grid cells that intersected the

Spain and France EEZs (Mediterranean). ICCAT lists 1,359 active vessels under the EU-Spain flag, therefore it might be expected that SMA catch would be higher in 2019 and be reported in 2018 and 2020. These Task II trends are in stark contrast to the substantial SMA catch reported by EU-Spain in Task I data in all years of the analysis period.

- Absence of Task I SMA catch representation in Task II data by EU-Spain substantially limited efforts to map the extent and distribution of SMA catch using Task II data. In addition to limiting the mapping of SMA catch for EU-Spain in isolation, efforts to map inter-fleet SMA catch distribution and intensity may have been negatively affected, due to the considerable contribution of EU-Spain landings towards inter-fleet SMA catch across the ICCAT region.
- SMA catch from EU-Portugal was represented across the widest range of gears of any flag-state, including longline, bait boat, handline, gillnet, purse seine, trawl and trap.
- The flag-states Belize, and South Africa reported SMA catch from grid cells entirely on land during the analysis period. It is unclear as the cause of this likely coordinates error, but there may be benefit in requesting clarification from the respective flag-states.

Key recommendations

- It is recommended that clarification be sought from ICCAT as to the differences in Task II annual data between dataset t2ce_20201218web, covering data up to and including 2019, and dataset t2ce_20220131web, containing data up to and including 2020.
- Where considerable increases or decreases in SMA catch are reported by flag-states, it is recommended that clarification be sought from flag-states as to whether this accurately represents a change in practice e.g. fishing depth, bycatch recording etc., or potentially catch by weight (in kilograms) being erroneously reported as number.
- It is recommended to seek clarification of the status of Task II data for several fleets. At the time of analysis, no Task II data was publicly available for some fleets from 2018 (Algeria, EU-Italy, Côte d'Ivoire, Grenada, Guyana, Liberia, Libya, Sao Tome & Principe), 2019 (Guyana, Liberia, Libya, Sao Tome & Principe) and 2020 (Grenada, Guyana, Liberia, St Kitts & Nevis). It is also recommended to seek clarification on reporting requirements for flag-states in general (Task I and Task II).
- For flag-states with unexpectedly low reported weights or numbers of SMA catch, it is

recommended that checks be made as to how SMA is recorded by flag-states e.g. SMA reported under species code oSks (“Other sharks”). Appropriate sources of such information may include vessel log books.

- It is recommended to investigate the factors leading to the disparity in the relationship between SWO and SMA catch reported from longline gear by different flag-states.
- It is recommended that a review of reporting requirements for Task II data be considered, to increase alignment in reporting practices between flag-states
- Where discrepancies appear in the form of grid cells entirely on land, in the case of flag-states Belize, Namibia, and South Africa in 2018-2019, it is recommended to seek clarification from flag-states as to the true location of this SMA catch in the ICCAT AOI. Appropriate sources may include vessel logbooks.
- Where SMA catch has been reported for grid cells entirely or partially within coastal-state EEZs, coastal-states may wish to review access agreements for relevant flag-state during the period 2018-2019.

1 Introduction

The convention area of the International Commission for the Conservation of Atlantic Tunas (ICCAT) covers the Atlantic basin, bounded by a box of 70°N to 60°S and 70°W to 20°E (these longitudinal limits marking the boundary to the Pacific and Indian Oceans, respectively). The eastern and western limits of the ICCAT area in the northern hemisphere extend to the western edge of the Gulf of Mexico, and the easternmost boundary of the Black Sea (Figure 1).

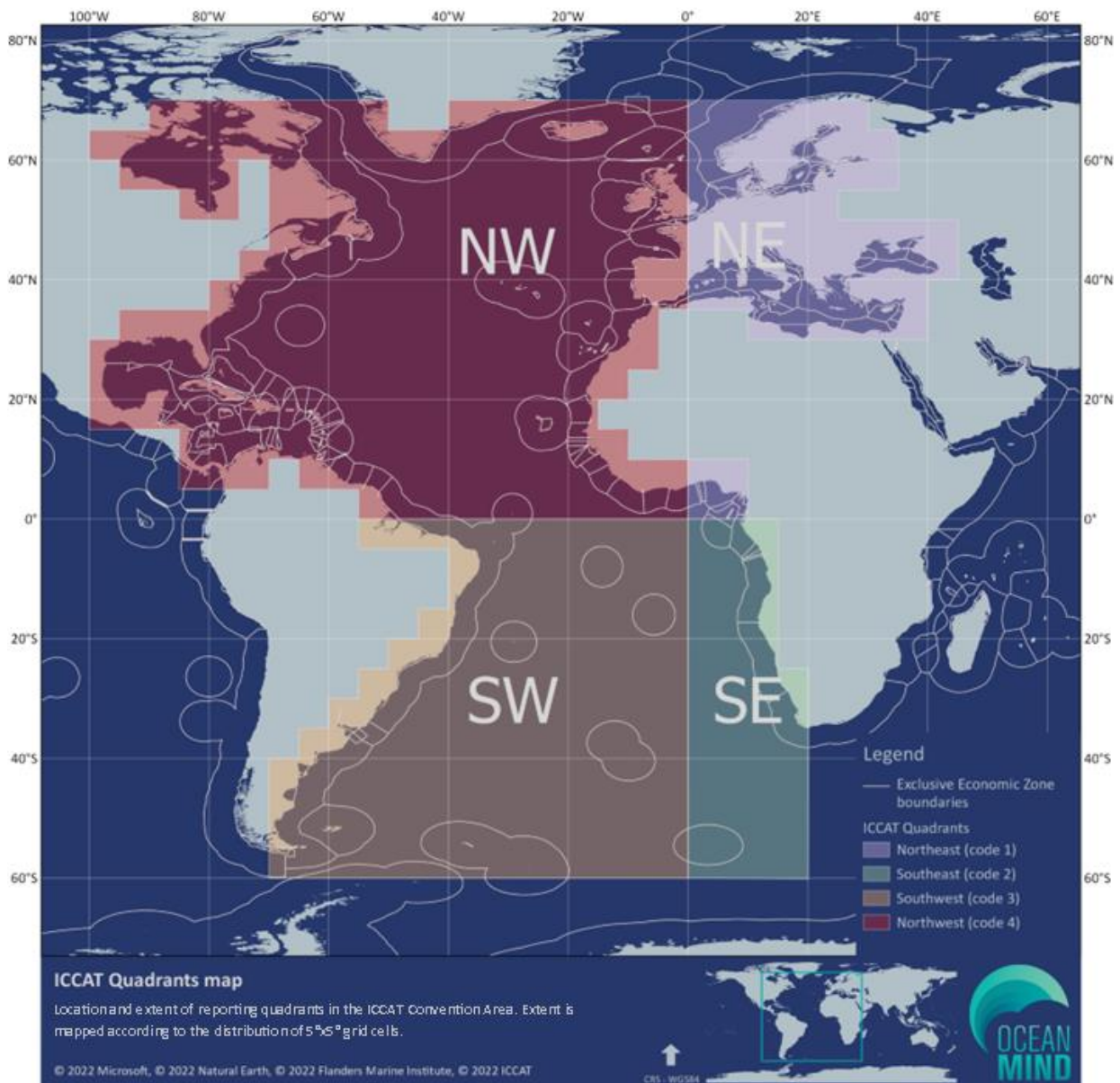


Figure 1: Area of Interest (AOI) for analysis period 01Oct2018-31Dec2020, with location and extent of ICCAT catch-effort reporting quadrants for a 5°x5° grid

Tracking studies have indicated that considerable variability in behaviour is exhibited by SMA in different regions of the Atlantic, with those tagged in the southwest Atlantic showing more limited movement to other areas than those at equatorial latitudes. Tracking information, in addition to genetic studies has contributed to SMA being managed within discreet stock areas; Southern Atlantic Shortfin mako and Northern Atlantic Shortfin mako. In both stocks areas concerns have been raised as to the exploitation of subadult biomass with SMA of age 3-10 being the most vulnerable but the species not reaching maturity until around 21 years. This apparent cryptic biomass of adult specimens in catch statistics also limits information on the productive cohort of the SMA populations in the ICCAT area. SMA in the North Atlantic are of particular conservation concern, with a prohibition on retaining of northern Atlantic mako in place for 2022-2023.¹

ICCAT reports that several flag-states (South Africa, Namibia, Mexico, Brazil, Uruguay, South Korea, EU-Cyprus, and EU-France) have committed to improving quality and collection of catch-effort data for shark species, including SMA. The same report¹ noted that other fleets (Belize, Canada, P.R. China, Panama, EU-Portugal, Taiwan, USA) should be revised to complete the species catch compositions with shark species (including SMA).

This report summarises the results of geospatial analysis of reported catches of shortfin mako (*Isurus oxyrinchus*), having the ICCAT species code SMA, within the ICCAT Convention Area for the period 01Jan2018-31Dec2020. This analysis differentiated reported SMA catch between flag-states, and catch weight and number reported between ICCAT area quadrants (Figure 1), and between areas of the high seas region and that within or along the boundaries of coastal-state Exclusive Economic Zones (EEZs).

Funding for the presented analysis was provided by Sharkproject International, with analysis being performed by OceanMind.

¹ Report of the 2019 Shortfin Mako Shark Stock Assessment Update Meeting (Madrid, Spain 20-24 May 2019)

2 Methodology

As shown in [Figure 1](#), the analysis area comprised the whole Atlantic basin from 70°N to 60°S. Spatial analysis of reported SMA catch was possible using the spatial component of Task II catch-effort data, as published online by ICCAT (<https://www.iccat.int/en/accesingdb.html>), and made available publicly in a grid system format.

Task I catch data (T1NC) is considered by ICCAT to be the nominal annual catch of tuna, tuna-like species and sharks. Nominal catch is divided by region, gear, flag and species and reported in kilograms, round (live) weight. For the presented analysis, catch weight is converted into metric tonnes (MT).

According to ICCAT, Task II - Catch & Effort (T2CE) is defined as:

“The complete species (tuna, tuna like species and sharks) catch composition (in weight <kg> or/and in number of fish) obtained by a given amount of effort (absolute value) in a given stratification or detail level (stratum)”.

Under a requirement from ICCAT’s Standing Committee on Research and Statistics (SCRS), flag-states must submit T2CE data every year by fleet and gear (vessel anonymised). However, the proportion of Task I catch reported in Task II data by flag-states can vary considerably, due to the minimum reporting requirements for 5%. Consequently, species catch coverage (proportion of Task I catch represented by Task II) can range from 5% to 100%, depending on multiple factors.

In order to check the validity of using Task II data, frequently a subset of Task I data, as an indicator of SMA catch location for flag-states, Task II catch-effort data were compared against Task I nominal catch data (see Task II data source) for the same period 2018-2020. In addition to presentation of total catch and SMA catch, aggregated by flag-state, the percentage of catch consisting of SMA was also calculated for both Task I and Task II data. Totals and percentages for Task I and Task II data for individual flag-states are presented in tabular form for comparison and evaluation.

As shown in [Figure 1](#), catch and effort data is split across major geographic quadrants divided by the Equator (latitude 0°) and the Greenwich parallel (longitude 0°). Gridded catch-effort data is

anonymised by flag-states, with a monthly sum of catch (by species) being published for each grid cell (at a variety of resolutions including 1°x1° and 5°x5°). Published gridded data provided the coordinates of the corner of the cell closest to 0° latitude and 0° longitude. Geographic distribution of catch was plotted in the software QGIS. Only grid cells within the period 01Jan2018-31Dec2020 that had SMA catch of >0 were included in analysis. Depending on the flag-state, SMA catch was reported either by weight in kilograms (converted to metric tonnes for analysis) or by number.

Cells were differentiated between grid cells where the entirety of the cell area was within the high seas region, and grid cells where all or part of the cell area was within the boundaries of a coastal-state EEZ ("EEZ-cells"). SMA annual catch totals are presented across fleets and also broken down into individual flag-states for the analysis period 2018-2020.

An archived copy of the Task II dataset for 1950-2019 (t2ce_20201218web) used for preliminary analysis of Task II data showed several key differences to the most recent version (at the time of reporting) of the Task II dataset for 1950-2020 (t2ce_20220131web). For example, t2ce_20201218web showed USA SMA catch of 818 in both 2018 and 2019. However, in the latest version available on the ICCAT data repository (t2ce_20220131web), USA SMA catch in 2018 was reported as 818 and 701 in 2019. In addition, overall Task II catch weight from the flag-state EU-Spain changed from 83,587,214.32 kg (83,587.21 MT) to 98,395,586.32 kg (98,395.586 MT) for the year 2019. The reason for this change in open-access, published data is unknown, and clarification as to this issue and reporting requirements for flag-states may be beneficial. All presented totals in the current report are calculated using values published in t2ce_20220131web.

Active vessel lists and numbers for individual flag-states were sourced from the ICCAT register of vessels (web query at <https://www.iccat.int/en/VesselsRecord.asp>). Reported numbers of active vessels for flag-states are presented as of 09Aug2022.

3 Representation of SMA in Task I and Task II data

As shown in [Table 1](#), 21 flag-states reported shortfin mako (SMA) catch in 2018 in the ICCAT AOI, within Task I nominal catch data. Within 2018 Task I data, by far the highest reported SMA as a percentage of total catch was declared by Namibia (14.60%) ([Table 1](#)). In contrast, 16 flag-states reported SMA catch (13 by weight, 3 by number) in Task II catch-effort data in 2018. Again, Namibia reported high SMA catch, as a percentage of total catch, with 15.95%, but Brazil, Morocco and South Africa also reported relatively high values (5.53%, 5.80%, and 5.77%, respectively) ([Table 1](#), [Table 4](#)).

It should be noted that no Task II data are published for Côte d'Ivoire and EU-Italy in 2018 (for any catch species), and it is unclear whether these flag-states reported any Task II data in 2018. It is recommended that clarification be sought from these flag-states as to the cause of the Task II data unavailability in 2018.

As shown in [Table 2](#), 22 flag-states reported Task I shortfin mako (SMA) catch in 2019. In marked contrast to the high value in 2018 ([Table 17](#)), Namibia declared zero catch of SMA in Task I data in 2019 ([Table 2](#)). The 2 fleets reporting highest SMA catch as a percentage of total catch in 2019 were Canada (3.06%) and EU-Portugal (mainland) (3.37%), as shown in [Table 2](#).

Nineteen (19) flag-states reported SMA catch (16 by weight, 3 by number) in Task II catch-effort data in 2019. Despite reporting zero SMA catch in Task I data in 2019, Namibia reported high Task II SMA catch, as a percentage of total catch, with 17.44%. As such, it is recommended that clarification be sought as to the Task I-Task II reporting procedure from the Namibian flag-state for 2019. Relatively high SMA catch, as a percentage of total catch, were reported by Portugal (mainland), Morocco, Canada and South Africa in 2019 (3.37%, 3.63%, 3.06%, and 2.65%, respectively) ([Table 2](#)).

As shown in [Table 3](#), 18 flag-states reported shortfin mako (SMA) catch in 2020, within Task I nominal catch data.

In 2020 Task I data, reported SMA catch as a percentage of total catch weight was considerably higher for Namibia (10.40%) than other flag-states ([Table 3](#)). However, EU-Portugal (mainland) also reported relatively high SMA catch, as a percentage of total catch, in 2019 with 5.26% ([Table 3](#)). Fifteen (15) 16 flag-states reported SMA catch (12 by weight, 3 by number) in Task II catch-effort data in 2020. As observed in Task I data, Namibia reported high SMA catch, as a percentage

of total catch, with 13.44%, but Brazil (2.43%), Morocco (2.80%), EU-Portugal (5.27%), and Trinidad and Tobago (2.62%) also reported relatively high values ([Table 3](#), [Table 4](#)).

Table 1: Task I (nominal catch) and Task II overall catch totals, SMA catch total by weight (MT), and SMA as a percentage of total catch per flag-state 2018. Flag-states with zero Task I and Task II SMA catch are omitted from analysis.

Flag-state		Catch total (MT)	Task I SMA total (MT)	SMA % of total catch	Catch total (MT)	Task II SMA total (MT)	SMA % of total catch
Belize		33,824.63	26.62	0.07	33,210.57	26.605	0.08
Brazil		50,435.11	398.55	0.79	<i>Task II reported by number</i>		
Canada		1,720.18	54.70	3.18	1,493.33	49.235	3.3
P.R. China		6,125.65	0	0	6,125.65	0	0
Côte d'Ivoire		18,513.06	3.88	0.02	-	-	-
EU-France		66,942.41	1.44	0.002	57,511.22	0	0
EU-Italy		13,786.28	0.90	0.006	-	-	-
Japan		29,996.61	112.93	0.37	<i>Task II reported by number</i>		
Mexico		10,897.46	2.48	0.02	1,306.58	2.446	0.19
Morocco		16,015.81	594.1	3.7	4,221.71	244.912	5.8
Namibia		6,712.21	980.21	14.6	3,801.15	606.269	15.95
EU-Portugal	<i>Portugal</i>	16,846.69	545.1	3.23	17,092.42	549.077	3.21
	<i>Azores</i>	9,735.41	26.29	0.27	9,735.41	26.291	0.27
	<i>Madeira</i>	3,309.66	0.51	0.01	3,309.65	0.512	0.02
Russian Federation		2,004.23	0.006	0.0003	2,004.00	0	0
Senegal		43,676.72	72.09	0.16	36,110.85	0	0
South Africa		4,235.48	244.38	5.76	4,235.71	244.386	5.77
South Korea		3,202.78	13.36	0.41	3,058.37	13.367	0.44
EU-Spain		143,880.87	2,209.08	1.53	90,415.99	0	0
St. Vincent and Grenadines		1,513.16	0	0	1,369.98	0.141	0.01
Taiwan		27,189.77	68.81	0.25	27,033.18	63.896	0.24
Trinidad and Tobago		3,360.04	2.30	0.06	1,326.65	2.251	0.17
UK	<i>Bermuda</i>	127.57	0	0	<i>Task II reported by number</i>		
	<i>UK</i>	73.79	0	0	72.632	0	0
	<i>St. Helena</i>	260.32	0.17	0.06	240.391	0.16	0.07
USA		25,010.36	166.34	0.66	<i>Task II reported by number</i>		
Venezuela		6,671.05	7.48	0.11	5,263.437	7.485	0.142

Table 2: Task I (nominal catch) and Task II overall catch totals, SMA catch total by weight (MT), and SMA as a percentage of total catch per flag-state 2019. Flag-states with zero Task I and Task II SMA catch are omitted from analysis.

Flag-state	Task I			Task II			
	Catch total (MT)	SMA total (MT)	SMA % of total catch	Catch total (MT)	SMA total (MT)	SMA % of total catch	
Belize	31,391.65	9.05	0.03	31,373.47	9.058	0.03	
Brazil ²	48,081.01	739.31	1.54	6,721.39	10.05	0.15	
Canada	2,086.71	63.75	3.06	2,086.71	63.751	3.06	
P.R. China	6,853.62	20.29	0.3	6,860.97	27.642	0.4	
Côte d'Ivoire	18,485.52	7.65	0.04	18,149.40	7.657	0.04	
EU-France	61,725.06	2.32	0.004	57,691.18	1.466	0.003	
EU-Italy	14,097.00	0.02	0.0001	114.005	0	0	
Japan	27,638.84	88.17	0.32	<i>Task II reported by number</i>			
Mexico	9,324.80	2.05	0.02	961.37	2.059	0.22	
Morocco	15,218.86	501.1	3.29	5,201.29	188.926	3.63	
Namibia	6,781.43	0	0	3,637.13	634.144	17.44	
EU-Portugal	<i>Portugal</i>	15,381.27	517.65	3.37	15,381.246	517.659	3.37
	<i>Azores</i>	6,933.14	12.59	0.18	6933.048	12.599	0.18
	<i>Madeira</i>	1,999.35	1.31	0.07	1999.359	1.314	0.07
Russian Federation	1,500.81	0.2	0.01	1,500.00	0	0	
Senegal	52,663.72	33.07	0.06	42,124.49	0	0	
South Africa	4,179.30	110.17	2.64	4,162.13	110.17	2.65	
South Korea	3,086.47	9.73	0.32	3,071.57	9.739	0.32	
EU-Spain	144,795.48	1,955.80	1.35	98,395.59	0.017	0.00001	
St. Vincent and Grenadines	1,078.52	3.29	0.3	868.015	0	0	
Taiwan	26,068.19	45.07	0.17	26,635.57	49.331	0.19	
Trinidad and Tobago	3,118.99	1.16	0.03	1,085.66	1.162	0.11	
UK	<i>Bermuda</i> ³	158.68	0.2	0.13	1.24	0	0
	<i>UK</i>	49.19	0.03	0.06	48.894	0.034	0.07
	<i>St. Helena</i>	347.21	0.21	0.06	310.28	0.19	0.06
USA	32,265.02	57.83	0.18	<i>Task II reported by number</i>			
Venezuela	5,252.23	8.26	0.16	3,942.88	8.262	0.21	

² Brazil reported majority of Task II data by number in the period 2018-2020, see also [Table 4](#)

³ Bermuda reported Task II data by number in 2018 (rather than weight) – no SMA catch was reported from this flag-state in 2018

Table 3: Task I (nominal catch) and Task II overall catch totals, SMA catch total by weight (MT), and SMA as a percentage of total catch per flag-state 2020. Flag-states with zero Task I and Task II SMA catch are omitted from analysis.

Flag-state		Catch total (MT)	Task I		Catch total (MT)	Task II	
			SMA total (MT)	SMA % of total catch		SMA total (MT)	SMA % of total catch
Belize		31,160.36	1.92	0.006	31,014.28	1.92	0.006
Brazil		46,800.89	542.33	1.15	Task II reported by number		
Canada		2,400.09	20.2	0.84	2,350.80	20.208	0.86
P.R. China		5,090.20	2.51	0.04	5,093.98	6.283	0.12
Côte d'Ivoire		10,301.18	13.59	0.13	274.881	0	0
EU-France		45,197.71	0.22	0.0004	37,126.53	0.085	0.0002
EU-Italy		12,981.79	0	0	86.15	0	0
Japan		23,660.89	32.37	0.13	Task II reported by number		
Mexico		7,410.68	2.19	0.02	979.186	2.191	0.22
Morocco		18,024.63	382.4	2.12	5,503.42	153.861	2.8
Namibia		9,084.38	945.12	10.4	4,194.72	563.889	13.44
EU-Portugal	<i>Portugal</i>	14,956.90	787.84	5.26	14,956.89	787.84	5.27
	<i>Azores</i>	5,109.02	1.78	0.03	5,469.99	1.877	0.03
	<i>Madeira</i>	1,053.42	1.48	0.14	1,055.49	1.488	0.14
Russian Federation		3,916.00	0	0	3,917.37	0	0
Senegal		35,550.04	0	0	35,104.37	0	0
South Africa		5,418.04	45.83	0.84	5,418.05	45.832	0.85
South Korea		2,286.67	0	0	818.667	0	0
EU-Spain		122,241.88	1,668.91	1.36	68,575.65	0	0
St. Vincent and Grenadines		965.5	0	0	623.95	0	0
Taiwan		25,777.95	54.43	0.21	25,438.18	37.673	0.15
Trinidad and Tobago		3,095.10	1.23	0.03	46.978	1.231	2.62
UK	<i>Bermuda</i>	138.21	0	0	222	0	0
	<i>UK</i>	101.26	0.01	0.01	100.159	0	0
	<i>St. Helena</i>	93.73	0	0	82.692	0	0
USA		41,567.15	51.71	0.12	Task II reported by number		
Venezuela		3,576.08	7.66	0.21	3,502.78	7.667	0.22

Table 4: Task II overall catch totals, SMA catch total by number, and SMA as a percentage of total catch for 3 flag-states reporting Task II in number only for 2018-2019

Flag-state	2018			2019			2020		
	Catch total	SMA total	SMA % of total catch	Catch total	SMA total	SMA % of total catch	Catch total	SMA total	SMA % of total catch
Brazil	222,109	12,298	5.53	71,572	1,025	1.43	55,495	1,354	2.43
Japan	686,897	2,164	0.31	538,551	995	0.18	443,381	10	0.002
USA	106,974	818	0.76	120,899	701	0.57	91,297	796	0.87

3.1 Task II as a representative sample of Task I SMA data

Comparative analysis of Task I and Task II overall catch and SMA catch (as a proportion of overall catch) indicated several flag-states where Task II may be considered a representative sample of Task I data in 2018-2020.

In 2018, 9 flag-states reported similar overall catch weights in Task I nominal catch and Task II catch-effort data (Table 1), similarity being <5% difference in overall catch, as follows:

- Belize
- Canada
- P.R. China
- EU-Portugal (mainland and territories)
- Russian Federation⁴
- South Africa
- South Korea
- Taiwan
- United Kingdom (UK)

As presented in Table 2, 10 flag-states reported similar overall catch weights in Task I nominal catch and Task II catch-effort data in 2019:

- Belize
- Canada

⁴ Russian Federation only declared SMA catch in Task I data in 2018 (0.006 MT) and 2019 (0.2 MT), SMA catch was not reported in Task II data by this flag-state in 2018-2020.

- P.R. China
- Côte d'Ivoire
- EU-Portugal (mainland and territories)
- Russian Federation⁴
- South Africa
- South Korea
- Taiwan
- United Kingdom (UK)

In 2020, 10 flag-states reported similar overall catch weights in Task I nominal catch and Task II catch-effort data (Table 3), as follows:

- Belize
- Canada
- P.R. China
- EU-Portugal (mainland and territories)
- Russian Federation⁴
- Senegal
- South Africa
- Taiwan
- United Kingdom (UK)
- Venezuela

Eight (8) flag-states report similar catch-totals in Task I and Task II data in all years of the period 2018-2020 (Belize, Canada, P.R. China, EU-Portugal, Russian Federation, South Africa, Taiwan, UK). However, when considering representation of specifically SMA catch between Task I and Task II data, 2 of these flag-states show potential over-estimation within Task II data (Table 1, Table 2, Table 3). These flag-states are discussed further in Section 3.2 (Canada, P.R. China).

3.2 Task I < Task II SMA catch as percentage of total catch

For the presented analysis, Task II was considered to be potentially overestimated if SMA as a percentage of total catch was $\geq 0.1\%$ higher in Task II than Task I.

Although the flag-states Canada and P.R. China reported broadly similar total catches across Task I and Task II data for the period 2018-2020, when considering SMA as a percentage of total catch, Canada Task II exceeded Task I in 2018 by 0.11%, and P.R China Task II exceeded Task I by 0.11% in 2019. Other fleets also reported higher SMA as percentage of total catch in Task II than Task I, as presented in [Table 5](#).

Table 5: Flag-states reporting Task II exceeding Task I (SMA catch as percentage of total catch) where difference equals or is greater than 0.1% in 2018-2020. Order descending highest-lowest difference per year.

2018	2019	2020
Brazil (difference 4.74%) [†]	Namibia (difference 17.44%)	Namibia (difference 3.04%)
Morocco (difference 2.1%)	USA (difference 0.40%) [†]	Trinidad and Tobago (difference 2.59%)
Namibia (difference 1.35%)	Morocco (difference 0.34%)	Brazil (difference 1.28%) [†]
Mexico (difference 0.16%)	Mexico (difference 0.20%)	USA (difference 0.75%) [†]
Canada (difference 0.12%)	P.R. China (difference 0.1%)	Morocco (difference 0.68%)
Trinidad and Tobago (difference 0.11%)		Mexico (difference 0.20%)
USA (difference 0.10%) [†]		

[†] Difference calculated from Task I (weight - MT) and Task II (number)

As shown in [Table 5](#), differences in the representation of SMA catch between Task I and Task II data was calculated at a maximum of 4.74%, with the exception of Namibia (Namibia reporting zero SMA catch in Task I data of 2019). It is possible that this Task II overestimation may have a biasing effect if using Task II as a proxy, or representative sample for the location and distribution of Task I SMA catch by individual fleets.

3.3 Task I > Task II SMA catch as percentage of total catch

For the presented analysis, Task II was considered to be potentially underestimated if SMA as a percentage of total catch was $\geq 0.1\%$ higher in Task I than Task II.

As shown in [Table 6](#), differences in the representation of SMA catch between Task I and Task II data was calculated at a maximum of 1.53%. However, it is possible that this underestimation may have a biasing effect if using Task II as a proxy or representative sample for the location and distribution of SMA catch by individual fleets.

Table 6: Flag-states reporting Task I exceeding Task II (SMA catch as percentage of total catch) where difference equals or is greater than 0.1% in 2018-2020. Order descending highest-lowest difference per year.

2018	2019	2020
EU-Spain (difference 1.53%)	EU-Spain (difference 1.35%)	Côte d'Ivoire (difference 0.13%)
	St Vincent and the Grenadines (difference 0.30%)	EU-Spain (difference 1.36%)
	Japan (difference 0.13%) [†]	
	UK (Bermuda) (difference 0.12%)	
	Brazil (difference 0.10%) [†]	

[†] Difference calculated from Task I (weight - MT) and Task II (number)

Absence of SMA catch representation is of particular concern for flag-states which reported SMA catch in Task I data but with zero SMA catch represented in Task II data. Examples of flag-states with 0 (zero) SMA catch reported in Task II but with >0 MT reported in Task I include Côte d'Ivoire (2018, 2020), EU-Italy (2018, 2019), Russian Federation (2018, 2019), Senegal (2018, 2019), EU-Spain (2018, 2020), St Vincent and the Grenadines (2019), UK (Bermuda) (2019) and UK (2020). It should be noted, however, that SMA catch was frequently at very low tonnages in Task I data for these flag-states in certain years ([Table 1](#), [Table 2](#), [Table 3](#)).

In spite of this potential explanation, absence or underestimation of SMA catch representation in Task II catch-effort data may potentially limit this dataset's usefulness in comprehensively analysing spatial distribution of annual SMA catch reported by some fleets.

4 SMA catch (Task II)

Analysis indicated that 1,837.034 MT of SMA was reported across all flag-states in 2018, as available in ICCAT catch-effort datasets (Table 7). In 2019, fleets reported a total of 1,655.236 MT of SMA catch and 1,632.045 MT in 2020. Additionally, 3 fleets (Brazil, Japan and USA) reported by number rather than by weight, a reported a total of 15,280 SMA in 2018; 2,721 in 2019 and 2,160 in 2020 (Table 7).

Table 7: Shortfin mako (SMA) catch by weight (metric tonnes) and/or number across all fleets in the ICCAT area (and quadrants) for the period 2018-2020

		2018		2019		2020	
		Weight (MT)	Number	Weight (MT)	Number	Weight (MT)	Number
Northwest quadrant	1°x1°	2.446	0	4.874	0	4.257	510
	5°x5°	625.011	1,250	592.971	857	543.292	729
	Subtotal	627.457	1,250	597.845	857	547.549	1,239
Southwest quadrant	1°x1°	0.16	0	0.19	0	0.037	0
	5°x5°	268.324	12,451	239.985	1,167	274.924	913
	Subtotal	268.484	12,451	240.175	1,167	274.961	913
Northeast quadrant	1°x1°	0	0	0	0	0	0
	5°x5°	0.701	0	8.716	0	5.372	0
	Subtotal	0.701	0	8.716	0	5.372	0
Southeast quadrant	1°x1°	244.386	0	110.17	0	45.832	0
	5°x5°	696.006	1,579	698.33	697	758.331	8
	Subtotal	940.392	1,579	808.5	697	804.163	8
Total	1,837.034 MT	15,280	1,655.23 MT	2,721	1,632.045 MT	2,160	

Relatively little SMA catch was reported in the northeast quadrant (Table 7), with the highest catch by weight (MT) being reported in the southeast quadrant in 2018 and 2019. The highest SMA catch by number was reported in the southwest quadrant in 2018 and 2019. By 2020, highest SMA catch by number was reported from the northwest quadrant. As shown in Figure 2, the high SMA catch weight reported in the southeast quadrant could be principally attributed to just three (3) 5°x5° cells along the southwest Africa coast in 2018-2020. A similar trend is partially reflected in the northeast quadrant where a single grid cell associated with Macaronesia comprises a considerable proportion of the total. Although 2018 and 2019 there was a wide distribution of grid cells across the AOI with SMA catch (MT), as shown by Figure 2, the highest

proportion of SMA catch by weight in 2018-2020 was reported from grid cells that were within or intersected EEZs (Table 8).

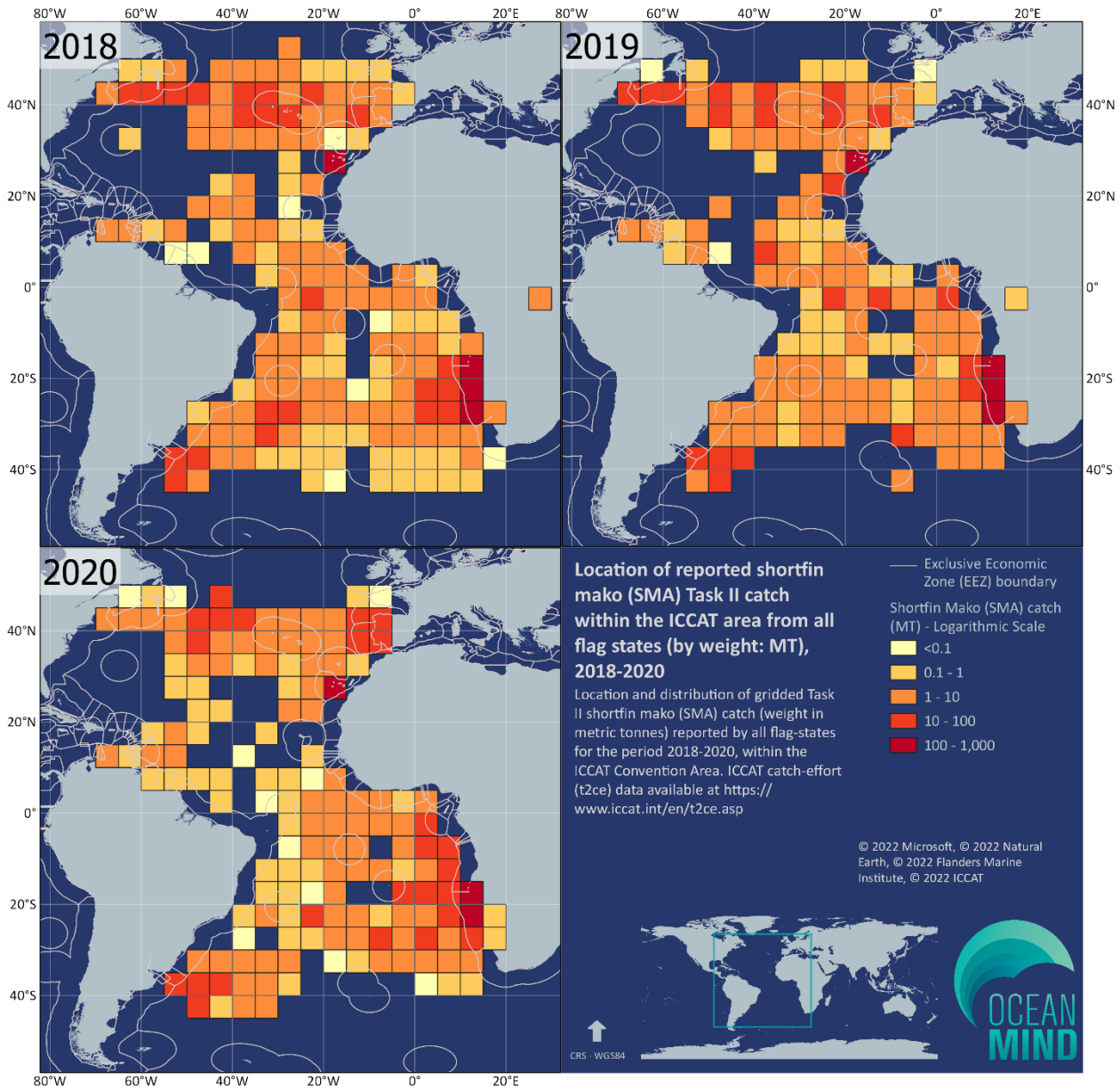


Figure 2: Location of reported catch of shortfin mako (SMA) within the ICCAT area for the period 2018-2020 for all flag-states, 5°x5° gridded catch reported by weight (metric tonnes)

As shown in Figure 8, grid cells that were entirely within land boundaries (southern and central Africa) were also reported as having SMA catch in 2018 and 2019. Flag-states which reported SMA catch in these grid cells are discussed in detail in Section 5. However, it is surmised that these are the result of errors in the coordinates reported from this SMA catch, and it may be

beneficial to clarify these circumstances with relevant flag-states.

Table 8: Shortfin mako (SMA) catch by weight (metric tonnes) and/or number across all fleets for cells intersecting EEZs and high seas cells for the period 2018-2020

	2018		2019		2020	
	Weight (MT)	Number	Weight (MT)	Number	Weight (MT)	Number
EEZ and EEZ boundary	1,534.77	13,892	1,402.69	2,041	1,243.39	1,816
High Seas	302.264	1,388	252.53	680	388.66	344
Total	1,837.03	15,280	1,655.23	2,721	1,632.04	2,160

When considering SMA catch by number, the highest catch of SMA was reported in the southwest quadrant in 2018, although catch in the southwest quadrant continued to comprise a considerable proportion of SMA catch (by number) in 2019, the highest catch was reported from the northwest quadrant (Table 7). However, as shown in Figure 3, catch of SMA (by number) in the northwest quadrant was dispersed to cell clusters close to the North American coast and to the Brazil coast in the south of the quadrant. As also shown in Figure 3, much of the SMA catch (by number) reported in the southeast quadrant in 2018 was from 2 cells with very high reported catch. This is further reflected in the division of catch (by number) between EEZ-cells and on the high seas presented in Table 8, where 13,892 of the annual total of 15,280 reported in 2018 was located in EEZ-cells.

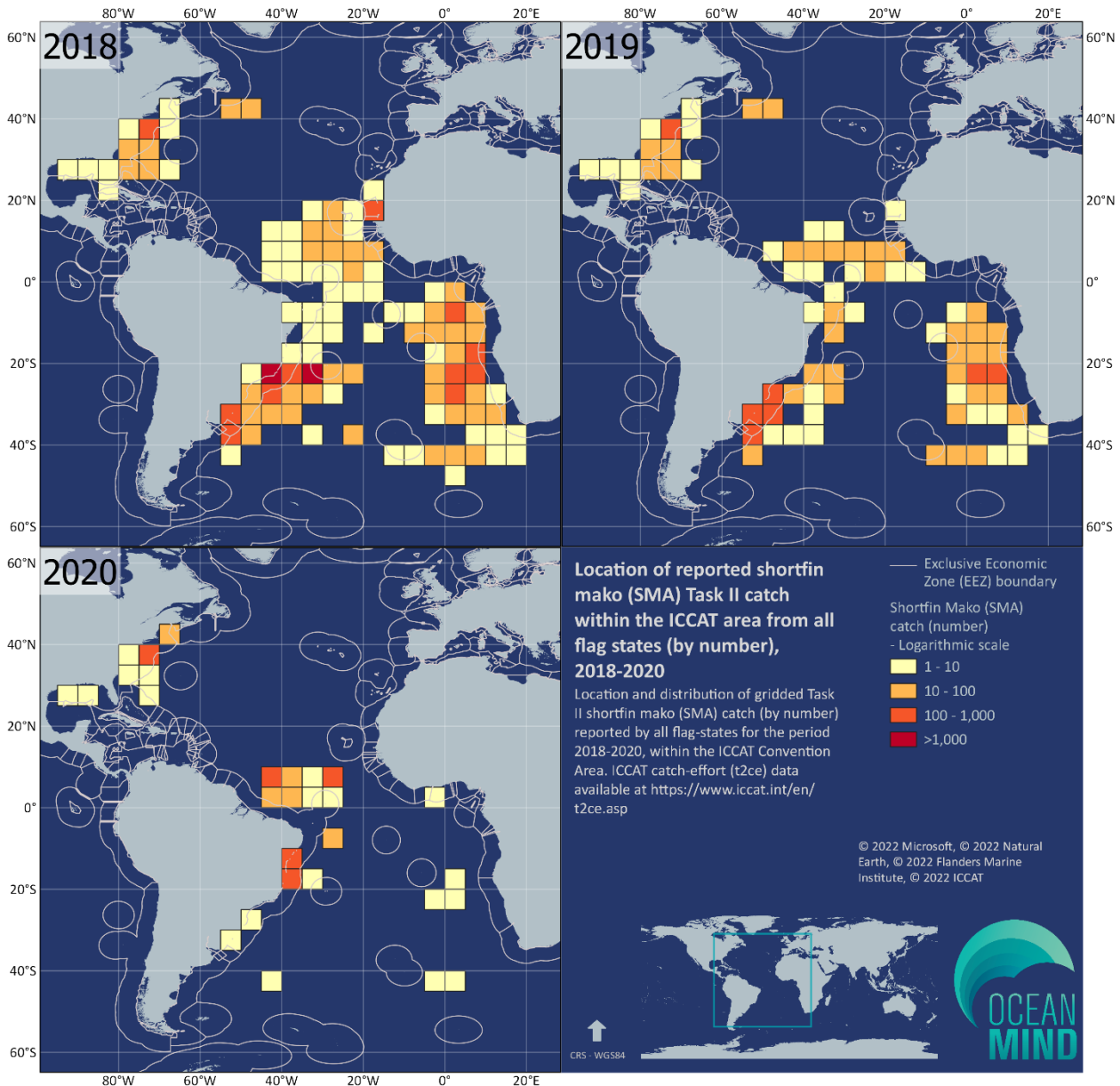


Figure 3: Location of reported catch of shortfin mako (SMA) within the ICCAT area for the period 2018-2020 for all flag-states, 5°x5° gridded catch reported by number only

As presented in Figure 4, and Table 7, some SMA catch data by weight was available at 1°x1° resolution. Much of this higher resolution data was located within northwest and southeast quadrants, a trend consistent across 2018, 2019 and 2020. However, in 2019 there was further reporting of SMA catch (by weight) at 1°x1° resolution reported along the western African coast (Figure 4). This West African distribution was not observed at 1°x1° resolution in 2020, although additional clusters of 1°x1° SMA catch were reported in and around the USA and Canadian EEZs.

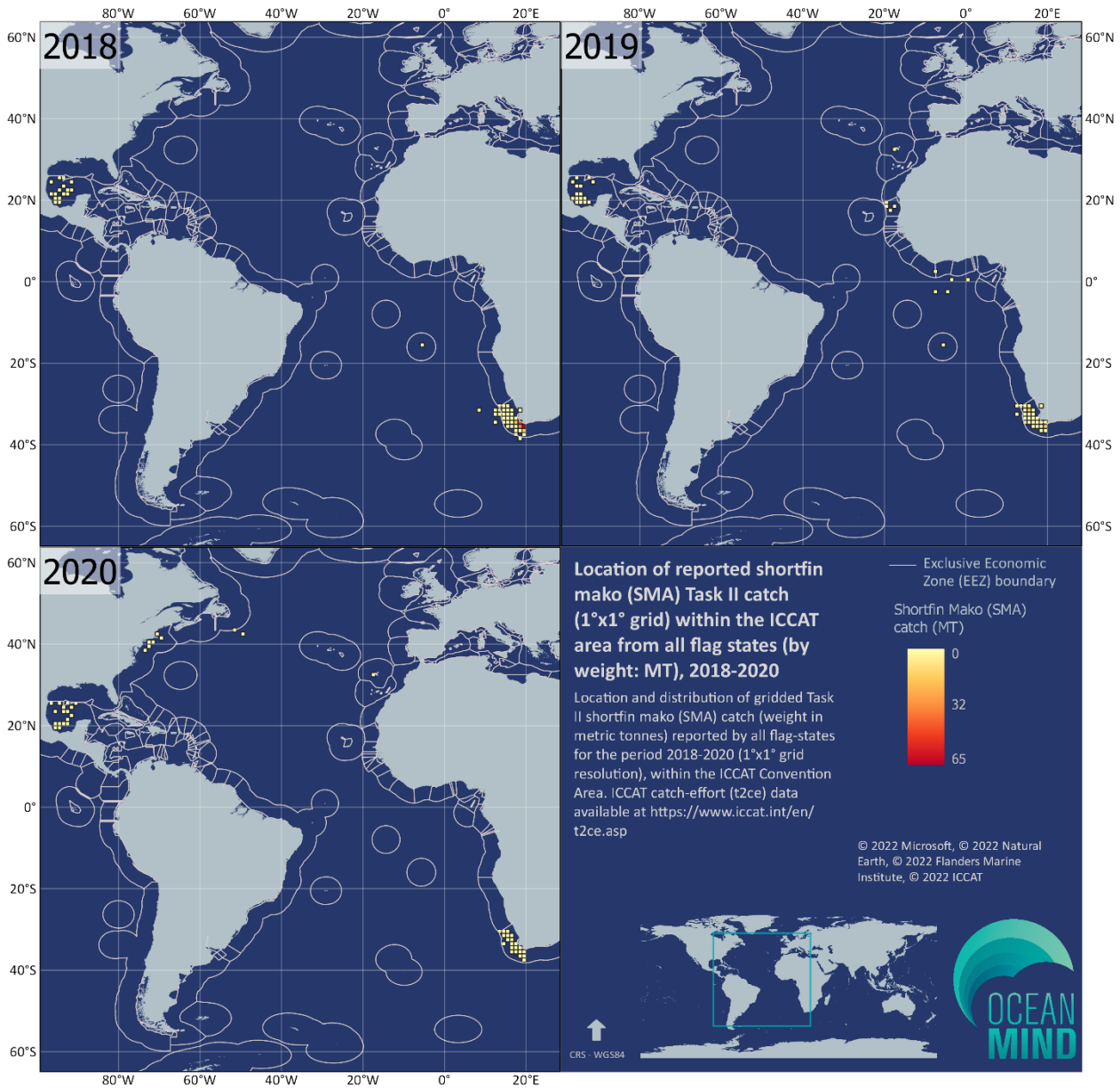


Figure 4: Location of reported catch of shortfin mako (SMA) within the ICCAT area for the period 2018-2020 for all flag-states, 1°x1° gridded catch reported by weight (MT) only

5 SMA catch by flag state

Table 9 and Table 10 present the reported catch of SMA, by weight and number respectively. Across the period 2018-2020, a total of 20 flag-states reported catch of SMA in the ICCAT AOI. However, not all flag-states reported SMA catch in both 2018 and 2019. Breakdown by flag-state is discussed in context within individual flag-state sections 5.1-5.20.

Table 9: Task II Shortfin mako (SMA) catch by weight (metric tonnes) by flag-state for cells intersecting EEZs and high seas cells for the period 2018-2020

Flag-state	2018			2019			2020			
	EEZ	High seas	Total	EEZ	High seas	Total	EEZ	High seas	Total	
Belize	7.81	18.795	26.605	2.665	6.393	9.058	1.92	0	1.92	
Brazil	0	0	0	10.05	0	10.05	0	0	0	
Canada	49.235	0	49.235	63.751	0	63.751	20.208	0	20.208	
P.R. China	0	0	0	5.121	22.521	27.642	1.263	5.02	6.283	
Côte d'Ivoire	0	0	0	7.657	0	7.657	0	0	0	
EU-France	0	0	0	1.127	0.339	1.466	0.041	0.044	0.085	
EU-Portugal	<i>Portugal</i>	315.117	233.96	549.077	369.779	147.88	517.659	466.688	321.152	787.84
	<i>Azores</i>	26.29	0	26.291	0.173	12.426	12.599	1.877	0	1.877
	<i>Madeira</i>	0.512	0	0.512	0	1.314	1.314	1.488	0	1.488
EU-Spain	0	0	0	0.017	0	0.017	0	0	0	
Mexico	2.446	0	2.446	2.059	0	2.059	2.191	0	2.191	
Morocco	244.912	0	244.912	188.926	0	188.926	153.861	0	153.861	
Namibia	588.434	17.835	606.269	599.728	34.416	634.144	517.595	46.294	563.889	
South Africa	241.772	2.614	244.386	110.111	0.059	110.17	45.81	0.022	45.832	
South Korea	3.907	9.46	13.367	6.694	3.045	9.739	0	0	0	
St. Vincent and Grenadines	0.141	0	0.141	0	0	0	0	0	0	
Taiwan	46.875	17.021	63.896	26.713	22.618	49.331	23.757	13.916	37.673	
Trinidad and Tobago	0.215	2.036	2.251	0.081	1.081	1.162	0.369	0.862	1.231	
UK	<i>UK</i>	0	0	0	0.034	0.034	0	0	0	
	<i>St. Helena</i>	0.161	0	0.161	0	0.19	0.191	0	0	0
Venezuela	6.942	0.543	7.485	8.04	0.222	8.262	6.317	1.35	7.667	

Table 10: Task II Shortfin mako (SMA) catch by number by flag-state for cells intersecting EEZs and high seas cells for the period 2018-2020

Flag-state	2018			2019			2020		
	EEZ	High seas	Total	EEZ	High seas	Total	EEZ	High seas	Total
Brazil	12,103	195	12,298	840	185	1,025	982	372	1,354
Japan	971	1,193	2,164	328	667	995	0	10	10
USA	818	0	818	701	0	701	796	0	796

5.1 Belize

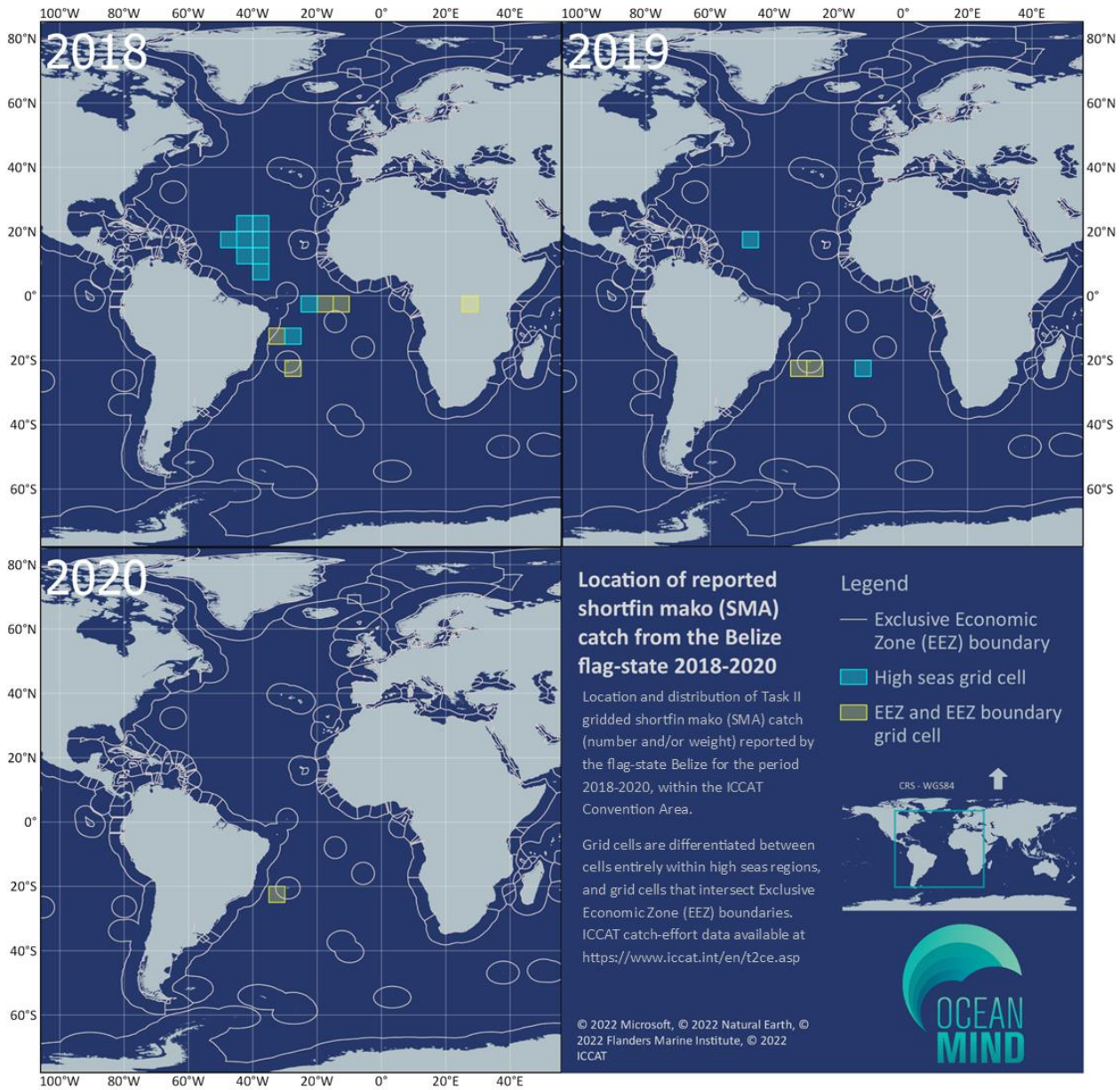


Figure 5: Location of gridded shortfin mako (SMA) catch by the Belize flag-state for the period 2018-2020

During the period 2018-2020, the flag-state Belize only reported SMA catch from longline gears. As shown in [Figure 5](#), Belize reported SMA catch from grid cells both in the high seas region and cells intersecting the Brazil EEZ in 2018 and 2019. Additionally, in 2019, Belize reported SMA catch from grid cells intersecting the EEZ of UK (Ascension Island). Belize only reported SMA catch from a single grid cell intersecting the Brazil EEZ in 2020.

ICCAT currently lists 26 active authorised vessels that operate under the Belize flag. As presented in [Table 9](#), Belize reported 26.605 MT of SMA catch in 2018 and 9.058 MT in 2019, with weight of SMA catch being greater in cells on the high seas than those intersecting EEZs in both years ([Table 9](#)). Of the period 2018-2020, SMA catch was lowest in 2020, with 1.920 MT declared in a single grid cell adjoining an EEZ ([Table 9](#)).

The flag-state Belize reported SMA catch from a grid cell that was entirely on land and undoubtedly represents an error in the coordinates of this grid cell (as published by the RFMO). This erroneously positioned cell represents 3.023 MT of SMA catch from 2018 (11.3% of annual total) and so clarification should be sought from the Belize flag-state as to the location of this SMA catch.

5.2 Brazil

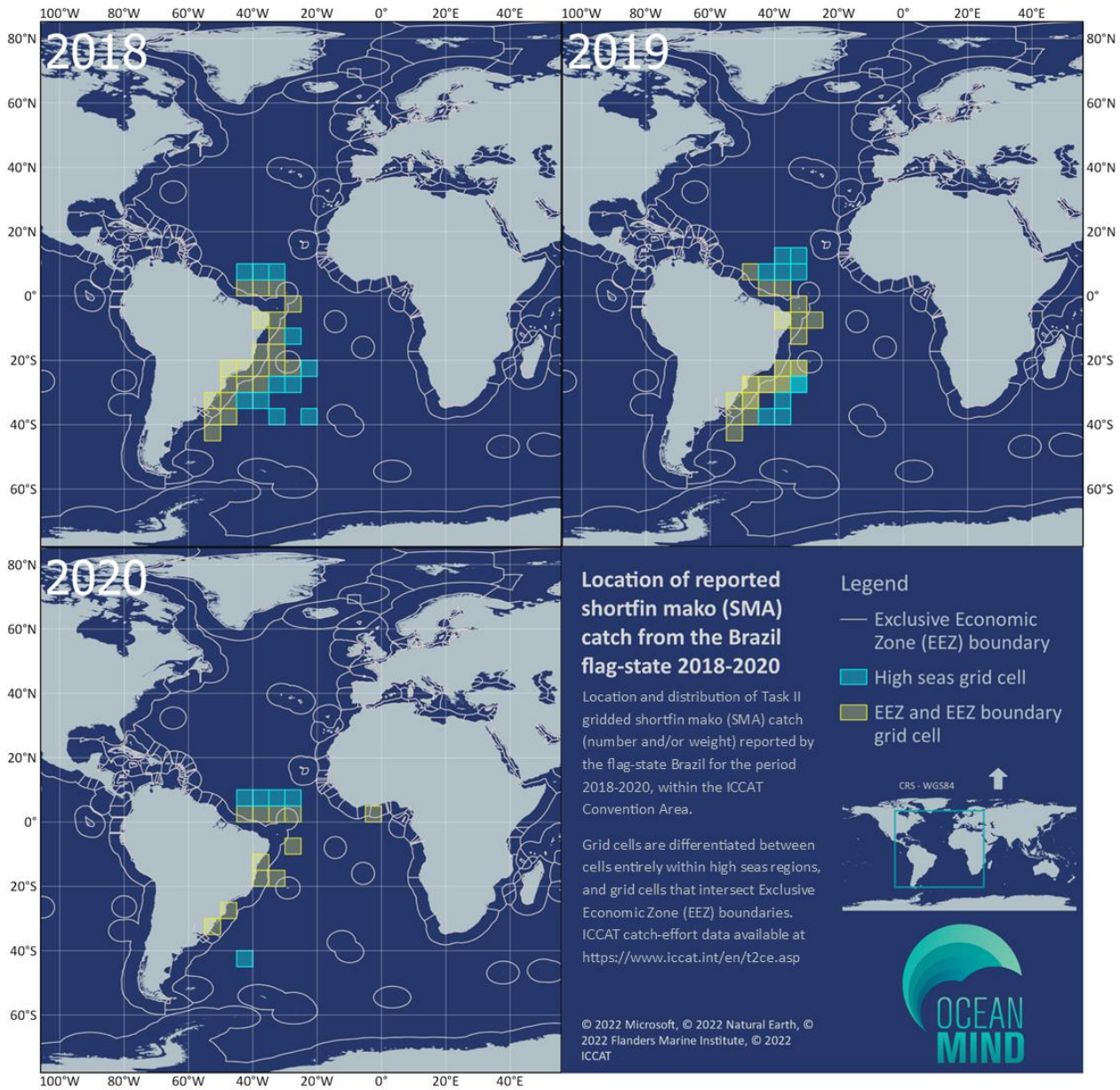


Figure 6: Location of gridded shortfin mako (SMA) catch by the Brazil flag-state for the period 2018-2020

Brazil reported all SMA catch by number, rather than by weight (Table 10), with the exception of 2019 (reporting Task II SMA catch both in number and weight). All Brazil SMA catch was reported from northwest and southwest quadrants (Figure 6). Brazil reported a substantial reduction in SMA catch over the 2018-2019 period, from 12,298 in 2018 to 1,025 in 2019 (Table 10). Most of this reduction was from grid cells that intersected EEZs, with up to 4 coastal-states being

represented in these cells (Table 11). Considering the magnitude of this reduction, it is recommended that clarification be sought as to whether this accurately represents a change in practice e.g. fishing depth, bycatch recording etc., or potentially catch by weight (in kilograms) being erroneously reported as number in 2018. Despite this considerable decrease from 2018-2019, SMA catch increased from 1,025 to 1,354 over the period 2019-2020 (Table 10).

The only SMA catch reported by weight in Task II data from the Brazil flag-state was in 2019 (9.676 MT), entirely from EEZ adjacent cells.

All SMA catch from Brazil in the period 2018-2020 was associated with longline gears. As shown in Table 10 and Figure 6, Brazil reported SMA catch in grid cells on both the high seas and intersecting EEZs (Argentina, Brazil and Uruguay) in both 2018 and 2019. Additionally, Brazil reported SMA catch in a grid cell that intersected the France (French Guiana) EEZ in 2019. ICCAT currently lists 23 active authorised vessels operating under the Brazil flag. By 2020, an additional grid cell with declared SMA catch by Brazil overlapped the EEZs of Ghana and Côte d'Ivoire, an eastward shift, though remaining within the southeast ICCAT quadrant (Figure 6).

Table 11: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Brazil in 2018-2020

2018		2019		2020	
Argentina	Uruguay	Argentina	France (French Guiana)	Brazil	Côte d'Ivoire
Brazil		Brazil	Uruguay	Ghana	Uruguay

5.3 Canada

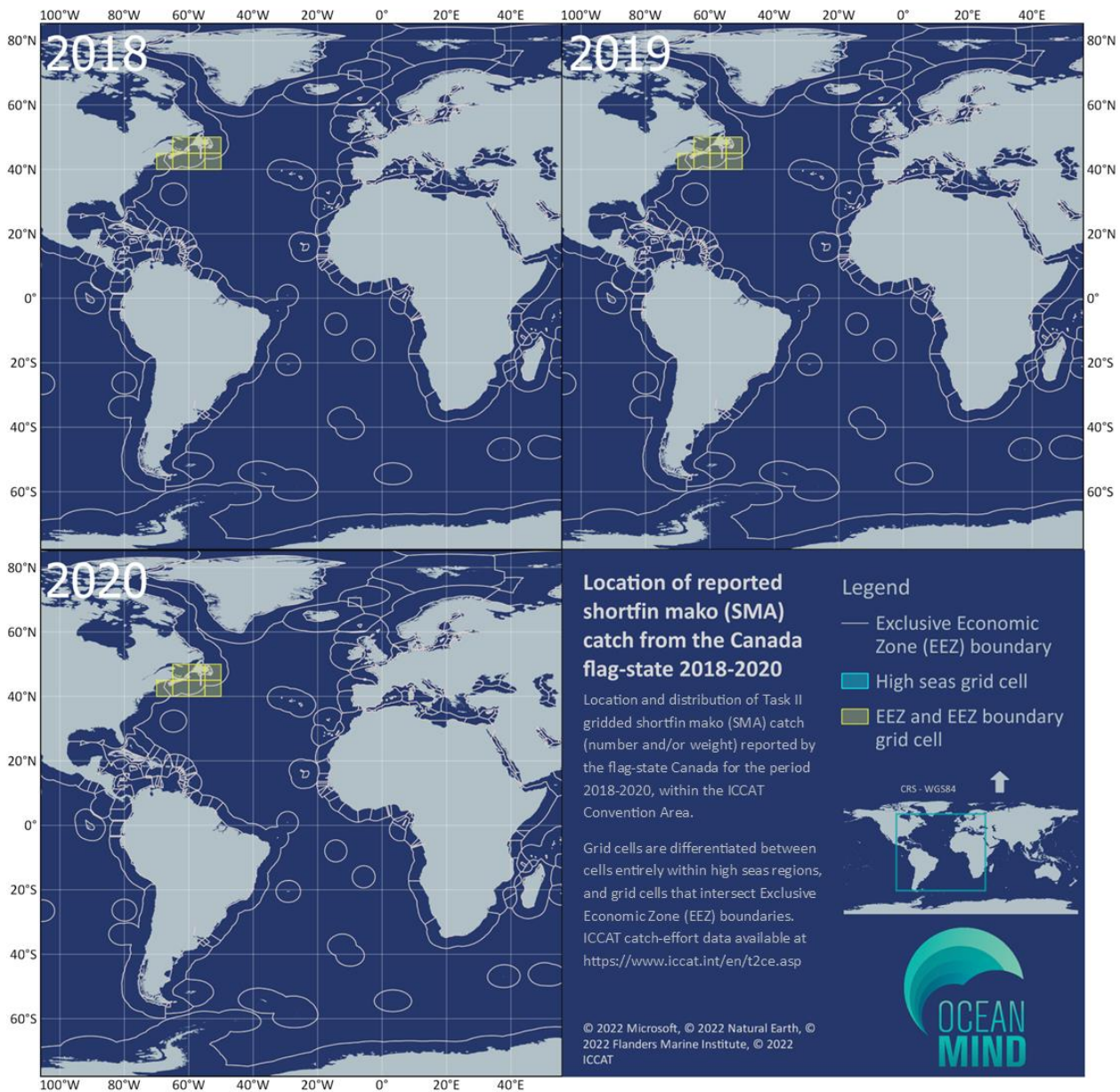


Figure 7: Location of gridded shortfin mako (SMA) catch by the Canada flag-state for the period 2018-2020

During the period 2018-2020, SMA catch was reported by Canada from vessels including gillnet, handline, trap, longline and trawl. Table 9 displays that Canada reported 63.751 MT of SMA catch in 2019, an increase from 49.240 MT reported in 2018. Reported SMA catch reduced to 20.208 MT in 2020 (Table 9). Canada reported SMA catch in grid cells that intersected the Canada and USA EEZs in 2018, 2019 and 2020 (Figure 7), with no SMA catch being reported in high seas grid cells. Canada has 3 vessels authorised to operate as listed as active vessels by ICCAT.

5.4 P.R. China

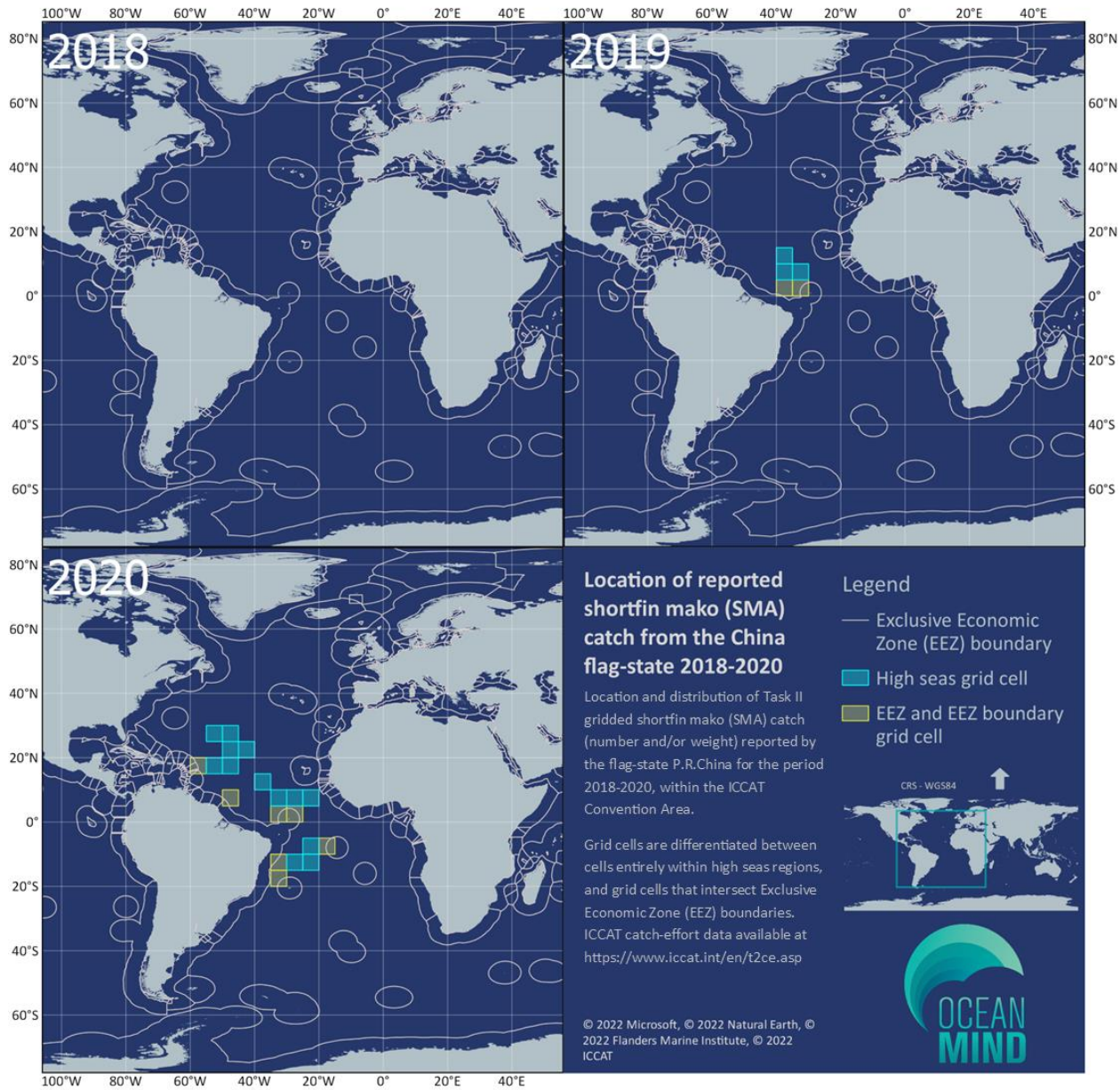


Figure 8: Location of gridded shortfin mako (SMA) catch by the China flag-state for the period 2018-2020

The flag-state P.R. China reported SMA catch in 2019, in grid cells intersecting the Brazil EEZ and in the high seas region (Figure 8). P.R. China reported SMA catch in grid cells intersecting the EEZs of 8 coastal-states in 2020 (Table 9). SMA catch reported by P.R. China in 2019 and 2020 was associated with longline gears. As presented in Table 9, P.R. China declared a total of 27.642 MT of SMA catch in 2019, 18.5% of this being in grid cells within or intersecting EEZs. China reported

no SMA catch in the ICCAT Convention Area in 2018. However, P.R. China reported SMA catch in 2020, with 6.283 MT being notably lower than in 2019 (27.642 MT, [Table 9](#)). P.R. China declared SMA catch in grid cells associated with the EEZs of multiple coastal states in 2020 ([Table 12](#)).

When considering that ICCAT lists 46 active vessels under the P.R. China flag-state authorised to operate in the ICCAT area, it might be expected that more SMA would be represented within catches by this flag-state than apparent in the catch-effort data available. This is particularly notable when compared to the flag-state Canada which declared more than double the catch weight of SMA in 2019 ([Table 9](#)), despite having only 3 active vessels listed, compared with the 45 vessels of P.R. China.

Table 12: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by P.R. China in 2018-2020

2018	2019	2020	
N/A	Brazil	Antigua & Barbuda	France (French Guiana)
		Barbados	France (Martinique)
		Brazil	France (Guadeloupe)
		Dominica	UK (Ascension)

5.5 Côte d'Ivoire

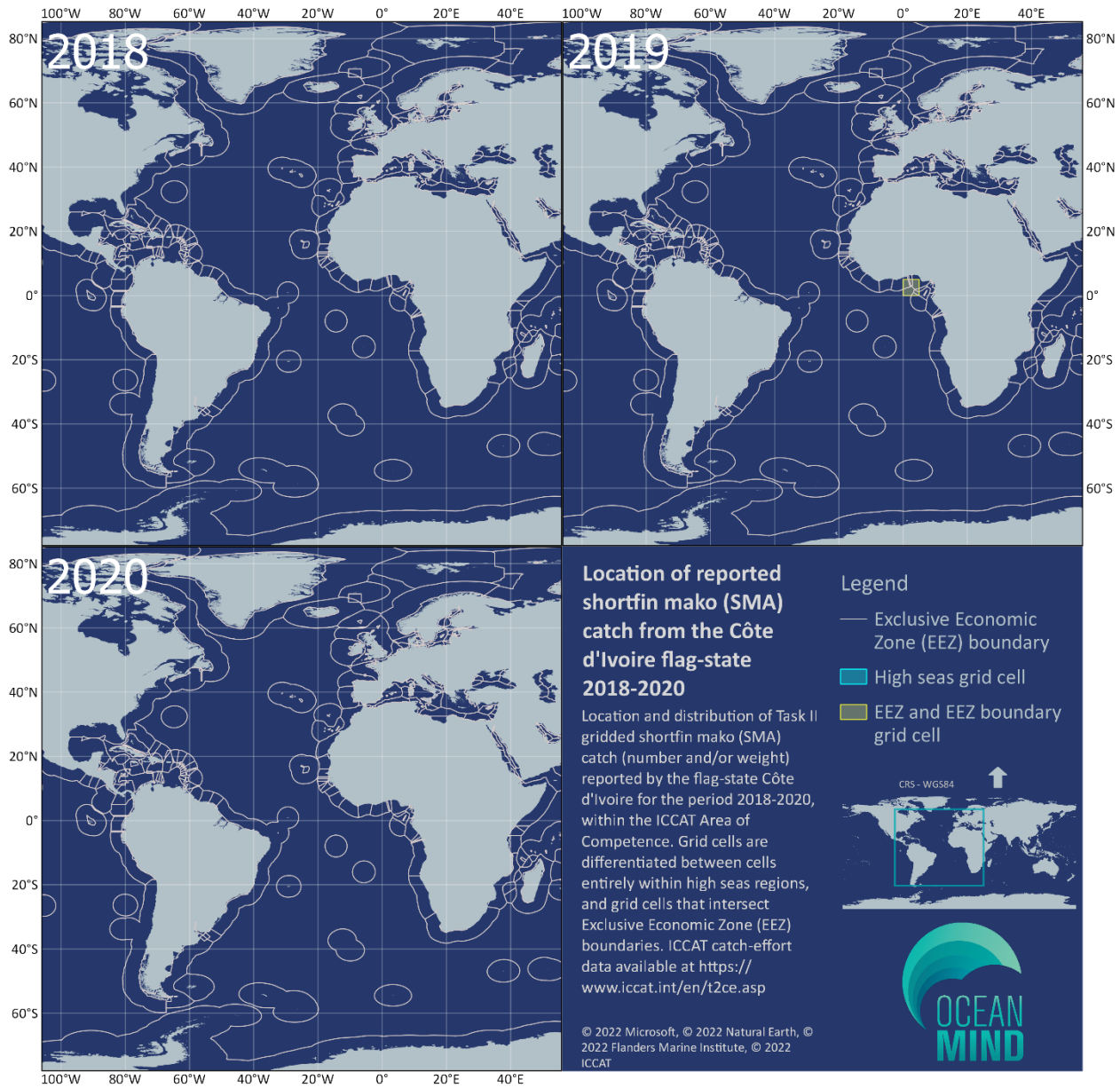


Figure 9: Location of gridded shortfin mako (SMA) catch by the Côte d'Ivoire flag-state for the period 2018-2020

The flag-state Côte d'Ivoire reported no Task II SMA catch in 2018 or 2020. However, this flag-state reported 7.657 MT of SMA catch in a single grid cell in 2019 (Figure 9, Table 9). All SMA catch reported by Côte d'Ivoire was associated with gillnet gear, with 26 active vessels being authorised under ICCAT. The single grid cell with reported SMA catch in 2019 overlapped 5 coastal-state EEZs (Table 13), though data resolution does not permit identification of any single

EEZ within which catch was reported.

Table 13: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Côte d'Ivoire in 2018-2020

2018	2019		2020
N/A	Equatorial Guinea	Sao Tome and Principe	N/A
	Ghana	Togo	
	Nigeria		

5.6 EU-France

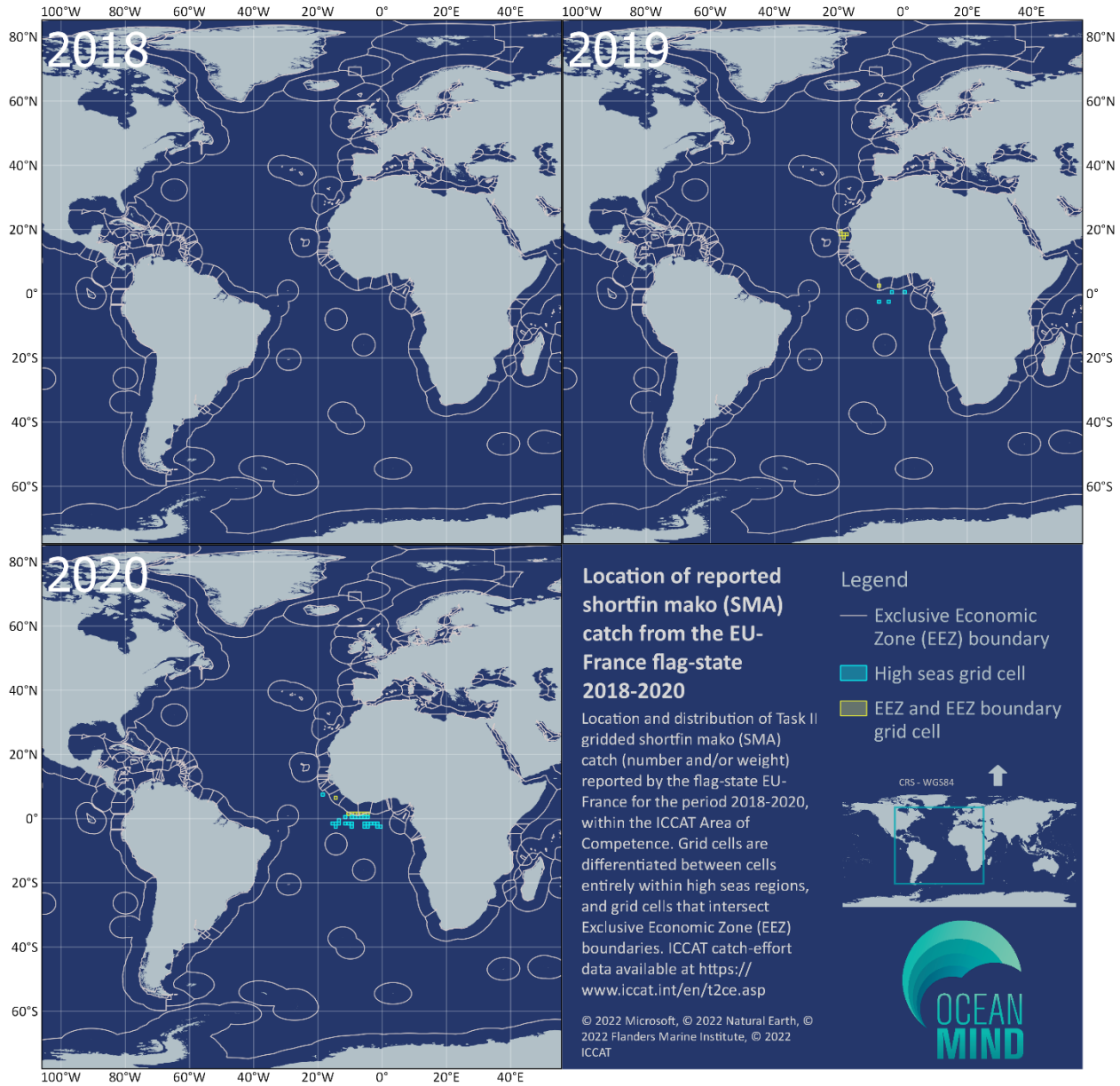


Figure 10: Location of gridded shortfin mako (SMA) catch by the EU-France flag-state, 2018-2020

EU-France reported 1.466 MT of SMA catch in 2019 (Table 9), including in grid cells (at 1°x1° resolution) that intersected EEZs and also on the high seas (Figure 10). Sixty percent of the reported catch weight of SMA from EU-France in 2019 was reported from grid cells that intersected or were within EEZs of 4 coastal-states (Table 14). EU-France reported 0.085 MT of SMA catch in 2020 (Table 9), including in grid cells that intersected EEZs and also on the high seas (Figure 10). As in 2019, EEZ cells were associated with coastal-states in West Africa (Table 14), a

shift southwards from those in 2019.

All SMA catch from EU-France in 2019 was reported from gillnet and longline gears. SMA catch was reported from longline, gillnet, trammel net and purse seine gears in 2020. The same flag-state did not report any SMA catch in 2018 (Table 9). However, considering that ICCAT lists 4,735 active vessels under the EU-France flag-state, it might be expected that SMA catch would be substantially higher and also reported in 2018. When reflected against Côte d'Ivoire, a flag-state with only 26 active vessels which reported 7.657 MT of SMA in 2019, the considerably more expansive fleet of EU-France (175 times that of Côte d'Ivoire) might be expected to report at least an equal weight of SMA catch, particularly when operating in similar regions in 2019 (Gulf of Guinea).

Table 14: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by EU-France in 2018-2020

2018	2019		2020	
N/A	Cape Verde	Liberia	Côte d'Ivoire	Sierra Leone
	Côte d'Ivoire	Mauritania	Liberia	

5.7 EU-Portugal (and Autonomous Regions)

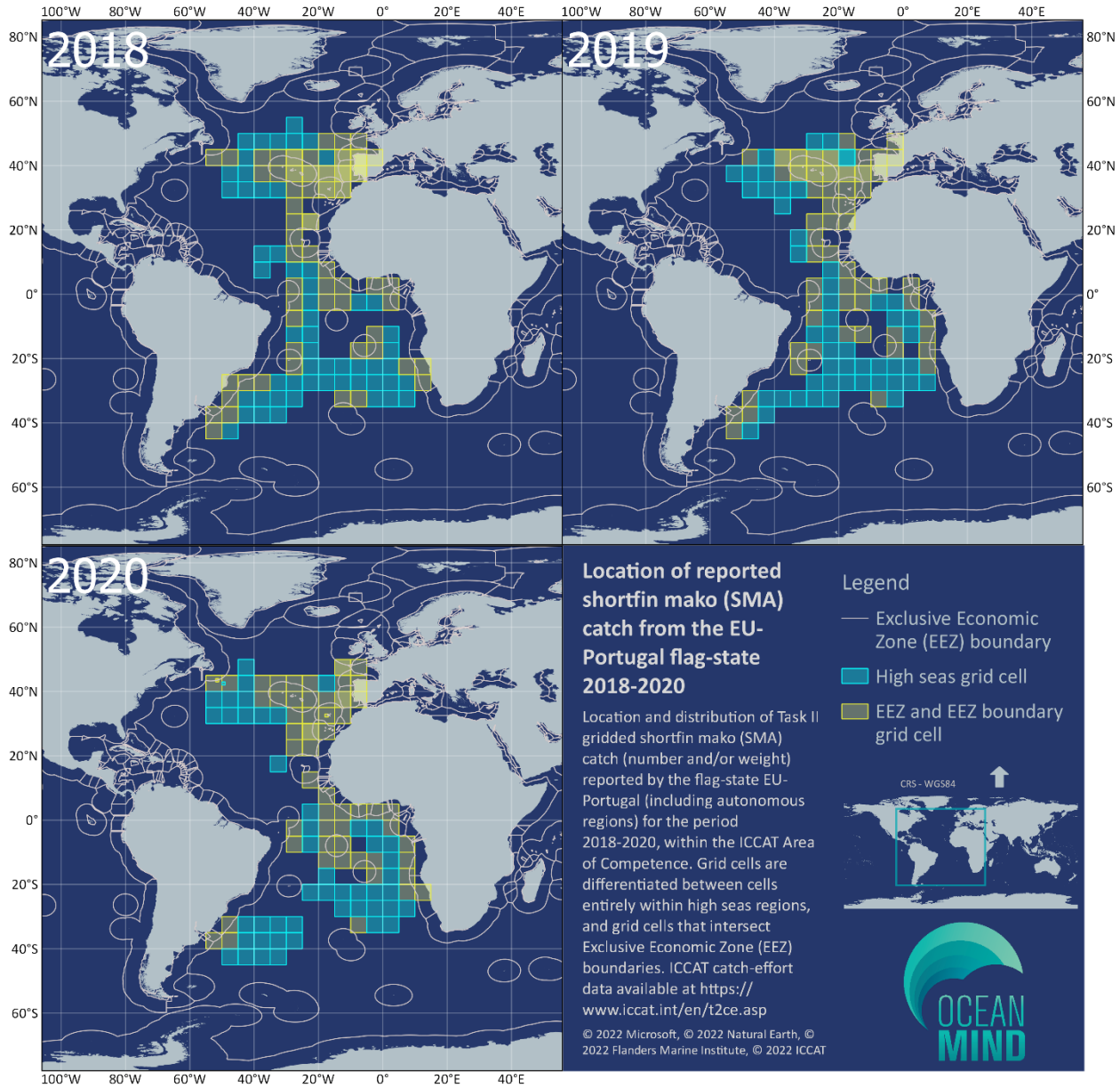


Figure 11: Location of gridded shortfin mako (SMA) catch by the EU-Portugal (and Autonomous Regions) flag-state for the period 2018-2020

ICCAT lists 156 vessels as active and flagged to EU-Portugal. EU-Portugal reported a total of 575.88 MT of SMA catch in 2018, with a decrease to 531.572 MT in 2019 and increasing again to 791.205 MT in 2020 (Table 9). Less than 4% of this total catch was reported by the Autonomous Regions of the Azores and Madeira (Table 9), decreasing over the 2018-2020 period. As shown in Figure 11, there was a wide distribution of grid cells with reported SMA catch from EU-Portugal

in 2018-2020, including catch in all ICCAT quadrants. The highest proportion of SMA catch was reported from grid cells that intersected or were within EEZs (Table 9). There were a considerable number of coastal-states represented by grid cells that intersected EEZs, with SMA catch being reported from up to 38 coastal-states in 2019 and 2020 (including Overseas Territories/Departments and Autonomous Regions) (Table 15). SMA catch from EU-Portugal was represented across a wide range of gears, including longline, bait boat, handline, gillnet, purse seine, trawl and trap.

Table 15: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by EU-Portugal (and Autonomous Regions) in 2018-2020

2018		2019		2020	
Argentina	Portugal	Angola	Namibia	Angola	Morocco
Benin	Portugal (Azores)	Argentina	Nigeria	Argentina	Namibia
Brazil	Portugal (Madeira)	Benin	Portugal	Benin	Nigeria
Canada	Sao Tome and Principe	Brazil	Portugal (Azores)	Brazil	Portugal
Cape Verde	Senegal	Canada	Portugal (Madeira)	Canada	Portugal (Azores)
Equatorial Guinea	Sierra Leone	Cape Verde	Republic of the Congo	Cape Verde	Portugal (Madeira)
France	South Africa	Democratic Republic of the Congo	Sao Tome and Principe	Republic of the Congo	Sao Tome and Principe
Gambia	Spain	Equatorial Guinea	Senegal	Democratic Republic of the Congo	Senegal
Ghana	Spain (Canary Islands)	Gabon	Sierra Leone	Equatorial Guinea	Sierra Leone
Guinea	Spain (Ceuta)	Gambia	Spain	Gabon	Spain (Ceuta)
Guinea-Bissau	Togo	Ghana	Spain (Canary Islands)	Gambia	Spain (Canary Islands)
Ireland	UK	Guinea	Spain (Ceuta)	Ghana	Togo
Côte d'Ivoire	UK (Ascension)	Guinea-Bissau	Togo	Guinea-Bissau	UK
Liberia	UK (Gibraltar)	Ireland	UK (Ascension)	Guinea	UK (Ascension)
Morocco	UK (Saint Helena)	Côte d'Ivoire	UK (Gibraltar)	Ireland	UK (Gibraltar)
Namibia	UK (Tristan da Cunha)	Liberia	UK (Saint Helena)	Côte d'Ivoire	UK (St Helena)
Nigeria	Uruguay	Mauritania	UK (Tristan da Cunha)	Liberia	UK (Tristan da Cunha)
		Morocco	Uruguay	Mauritania	Uruguay
EU-Portugal (Azores)					
2018		2019		2020	
Cape Verde	Portugal (Madeira)	France	Portugal (Madeira)	France	Portugal (Madeira)
Morocco	Spain	Portugal	Spain	Ireland	Spain
Portugal	Spain (Canary Islands)	Portugal (Azores)	UK	Morocco	Spain (Canary Islands)
Portugal (Azores)	UK (Gibraltar)			Portugal	UK
EU-Portugal (Madeira)					
2018		2019		2020	
Portugal	Portugal (Madeira)	Portugal (Madeira)		Portugal (Madeira)	
Morocco	Spain (Canary Islands)				

5.8 EU-Spain

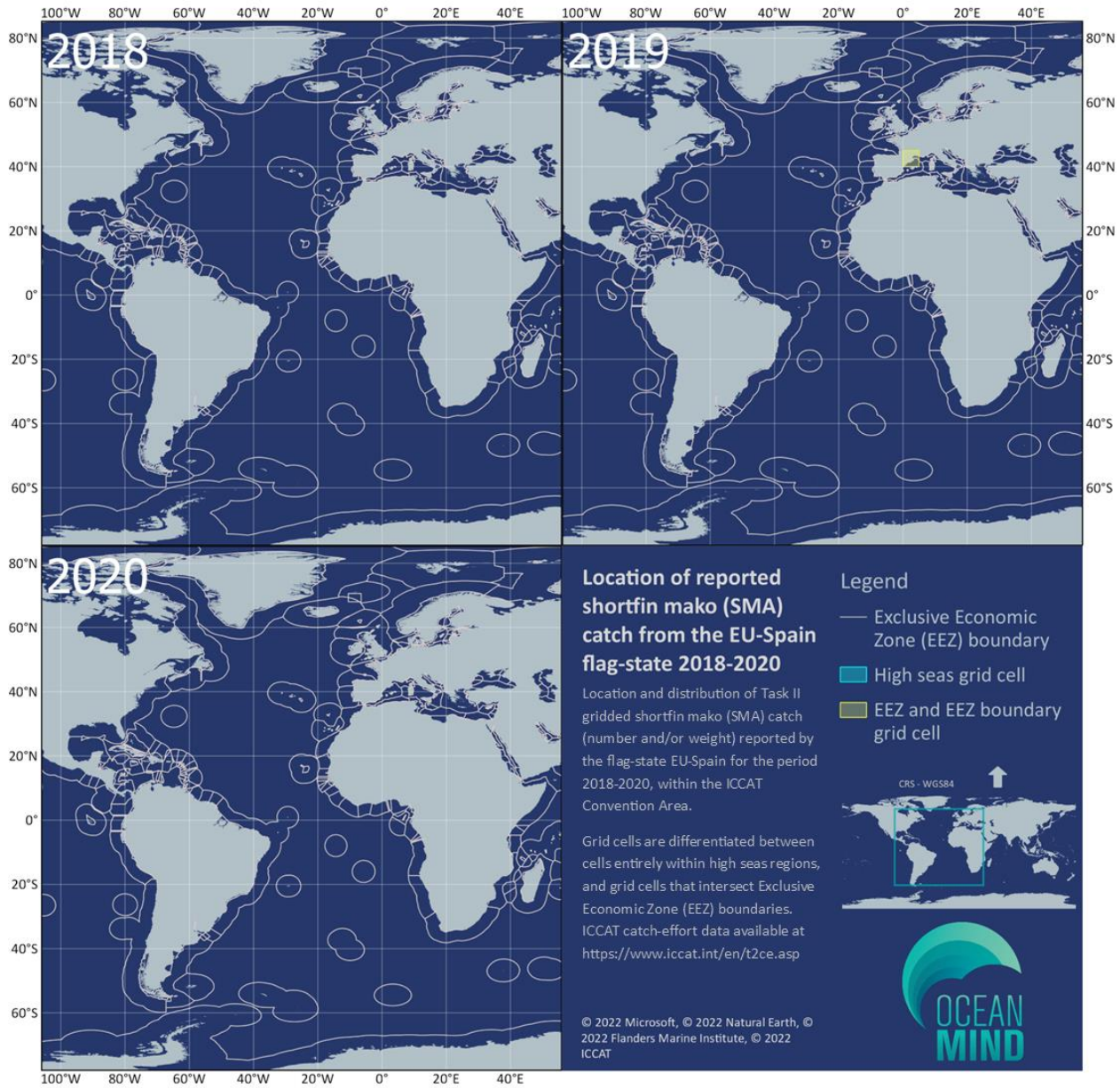


Figure 12: Location of gridded shortfin mako (SMA) catch by the EU-Spain flag-state for the period 2018-2020

EU-Spain reported Task II SMA catch in only 2019, this being in grid cells that intersected the Spain and France EEZs (Figure 12), totalling 0.017 MT in SMA catch weight (Table 9). All SMA catch from EU-Spain was reported from longline gears. EU-Spain reported no catch of SMA in the ICCAT Convention Area in 2018 and 2020. When considering that ICCAT lists 1,359 active vessels under the EU-Spain flag, it might be expected that SMA catch would be higher in 2019

and represented in 2018 and 2020. When compared with EU-Portugal, a flag-state which reported >530 MT of SMA catch in 2018, 2019 and 2020 with 156 active vessel currently listed, it might be expected that EU-Spain would report a commensurate or higher catch of SMA with a fleet 8 times the size.

5.9 Japan

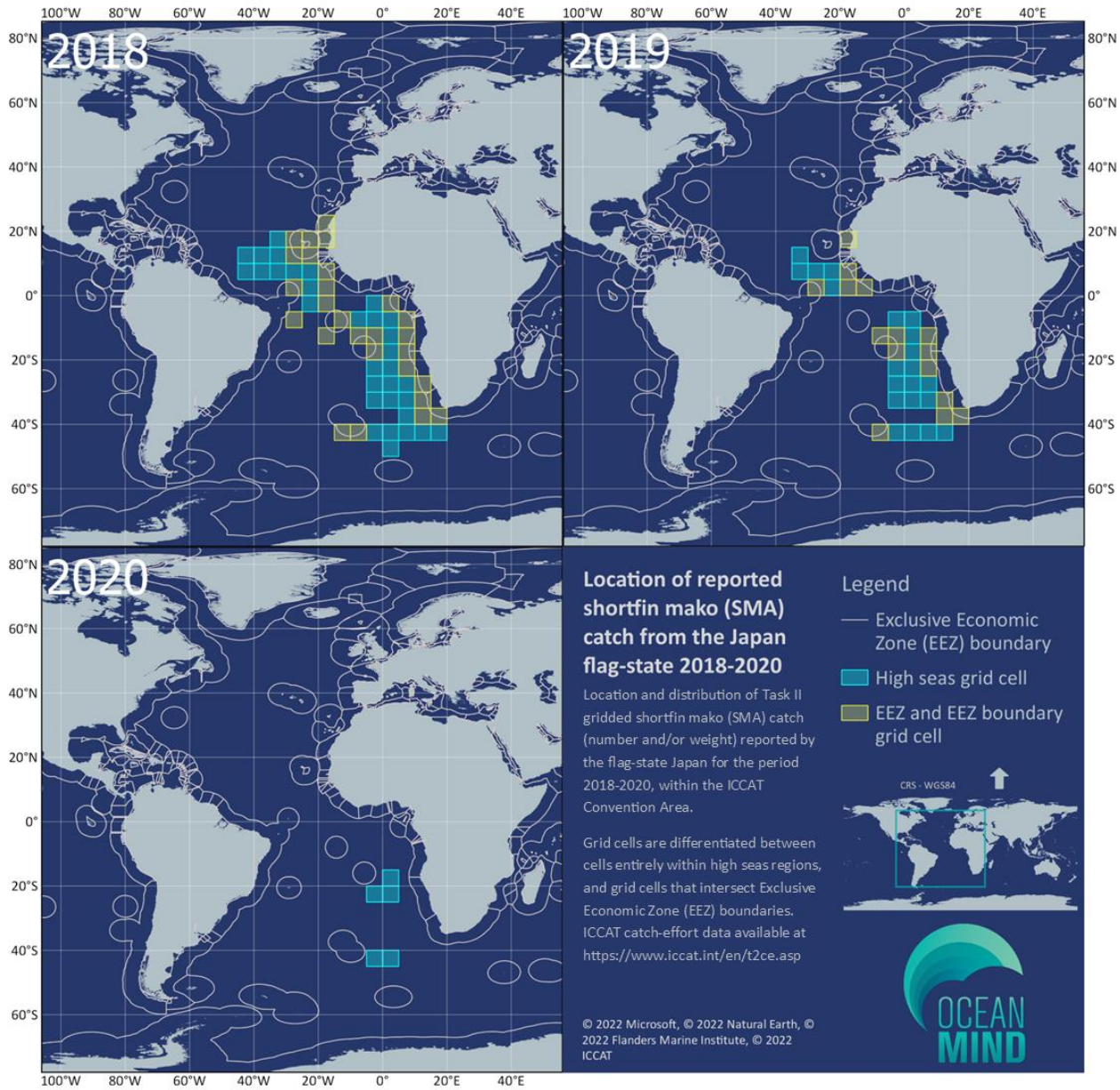


Figure 13: Location of gridded shortfin mako (SMA) catch by the Japan flag-state for the period 2018-2020

ICCAT lists 177 active vessels flagged to Japan, and all SMA catch for the 2018-2020 period was reported from longline gears. Japan reported SMA catch from grids cells both on the high seas and those intersecting EEZs in both 2018 and 2019 but only reported catch in high seas grid cells in 2020 (Figure 13). Reported SMA catch by Japan was by number and reduced to a total of 995 in 2019 from 2,164 in 2018 (Table 10). SMA catch reported in Task II data by Japan was

considerably reduced again in 2020, to 10 (Table 10). Across all years reported SMA catch was consistently higher in high seas grid cells than in EEZ-cells (Table 10). As shown in Figure 13, there was also a significant reduction in the number of grid cells in which SMA catch was reported from 2019 to 2020.

There was a considerable reduction on the potential number of coastal-state that may be represented in EEZ-cell SMA catch from up to 20 in 2018 to just 7 in 2019 and none in 2020 (Table 16). However, due to the resolution of the available gridded data, it was not possible to identify specific SMA catches within EEZ boundaries. Where SMA catch is suspected to have occurred within EEZ boundaries, enquiries may be made regarding access agreements and possibly further requests for logbook data from flag-states.

Table 16: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Japan in 2018-2020

2018		2019		2020
Angola	Namibia	Angola	Senegal	N/A
Brazil	Republic of the Congo	Mauritania	Guinea-Bissau	
Cape Verde	Sao Tome and Principe	Namibia	Liberia	
Democratic Republic of the Congo	Senegal	Guinea		
Equatorial Guinea	Sierra Leone			
Gabon	South Africa			
Gambia	Spain (Canary Islands)			
Guinea	UK (Ascension)			
Guinea-Bissau	UK (Saint Helena)			
Mauritania	UK (Tristan da Cunha)			

5.10 Mexico

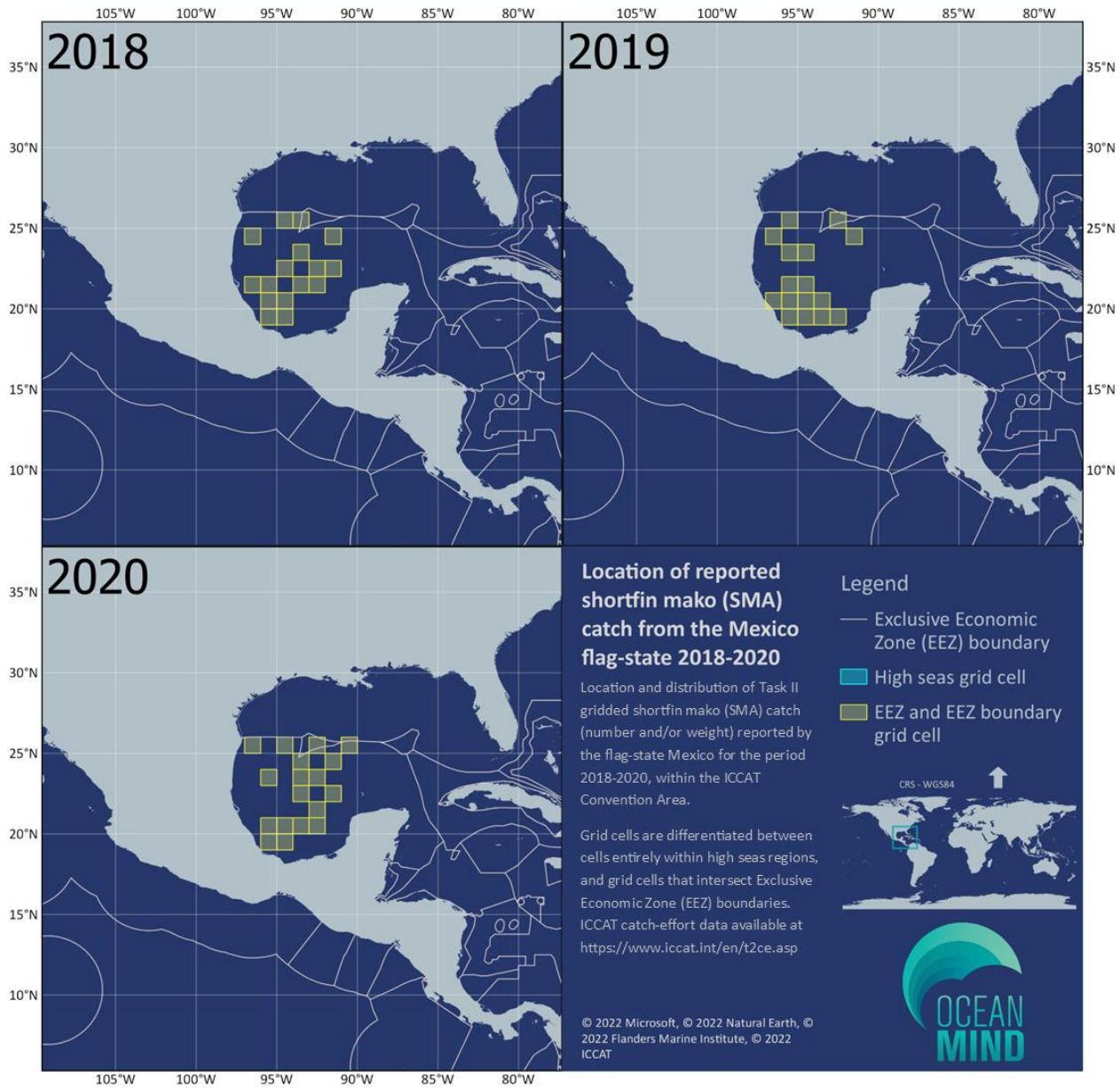


Figure 14: Location of gridded shortfin mako (SMA) catch by the Mexico flag-state for the period 2018-2020

Mexico reported 2.446 MT of SMA catch in 2018, 2.059 MT in 2019 and 2.191 MT in 2020 (Table 9). All SMA catch reported by Mexico in the period 2018-2020 was at 1°x1° resolution, being reported from cells that intersected or were within the Mexico and USA EEZs in all years (Figure 14). All SMA catch reported by Mexico was from longline gears, with ICCAT listing 2 active vessels flagged to Mexico. When compared to catch weights of SMA reported by other flag-states with

a greater number of authorised vessels, reported SMA catch of >1 MT per Mexico-flagged vessel may be considered high.

5.11 Morocco

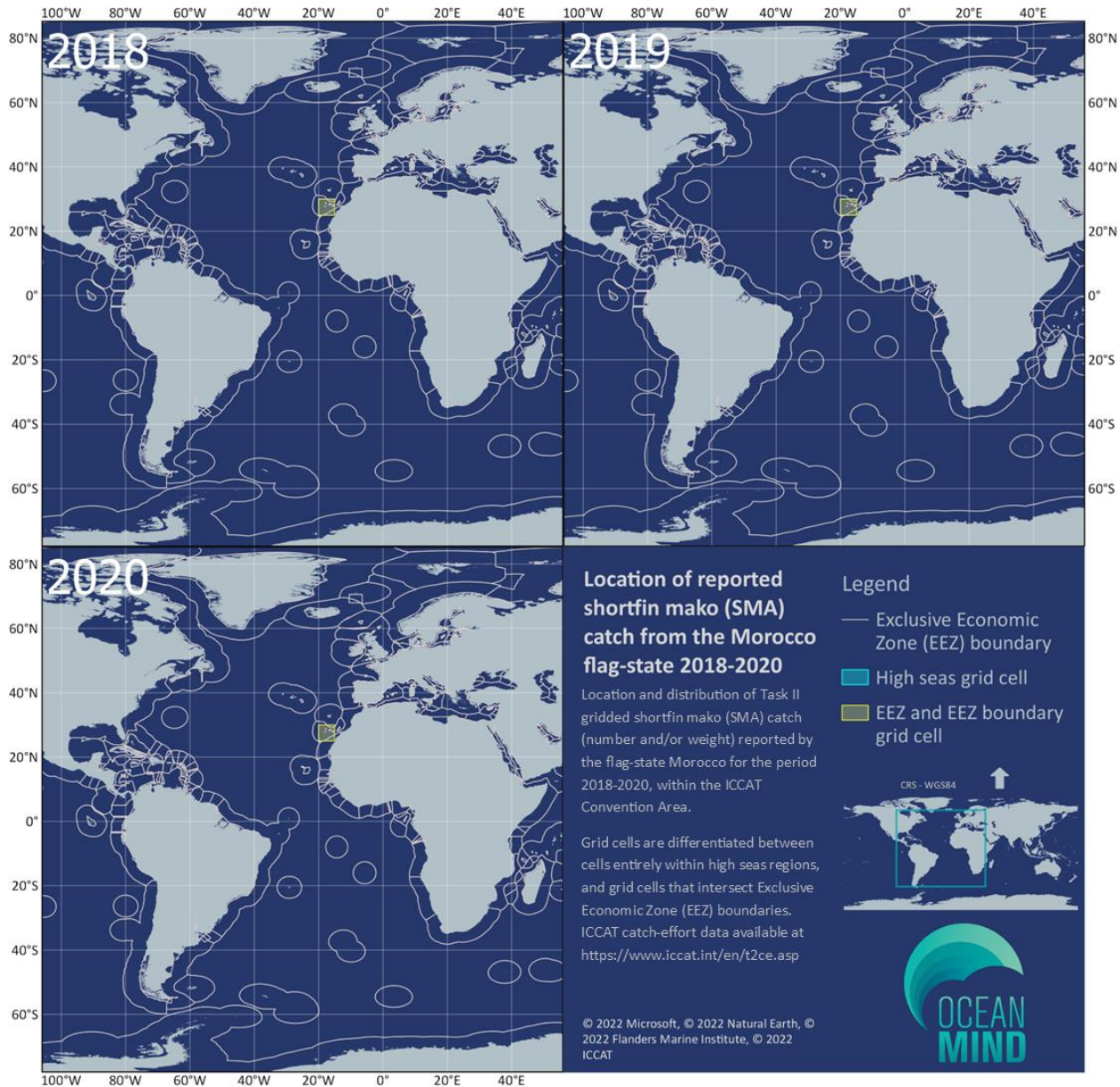


Figure 15: Location of gridded shortfin mako (SMA) catch by the Morocco flag-state for the period 2018-2020

The flag-state Morocco has 4,157 active vessels listed under ICCAT. Within Task II data, Morocco reported 244.912 MT of SMA catch in 2018, 188.926 MT in 2019 and 153.861 MT in 2020 (Table 9). All SMA catch reported by the flag-state Morocco was associated with longline gears. SMA

catch was reported from a single grid cell that intersected the EEZs of EU-Spain (Canary Islands) and EU-Portugal (Madeira), as well as that associated with the disputed area of Western Sahara (Figure 15).

5.12 Namibia

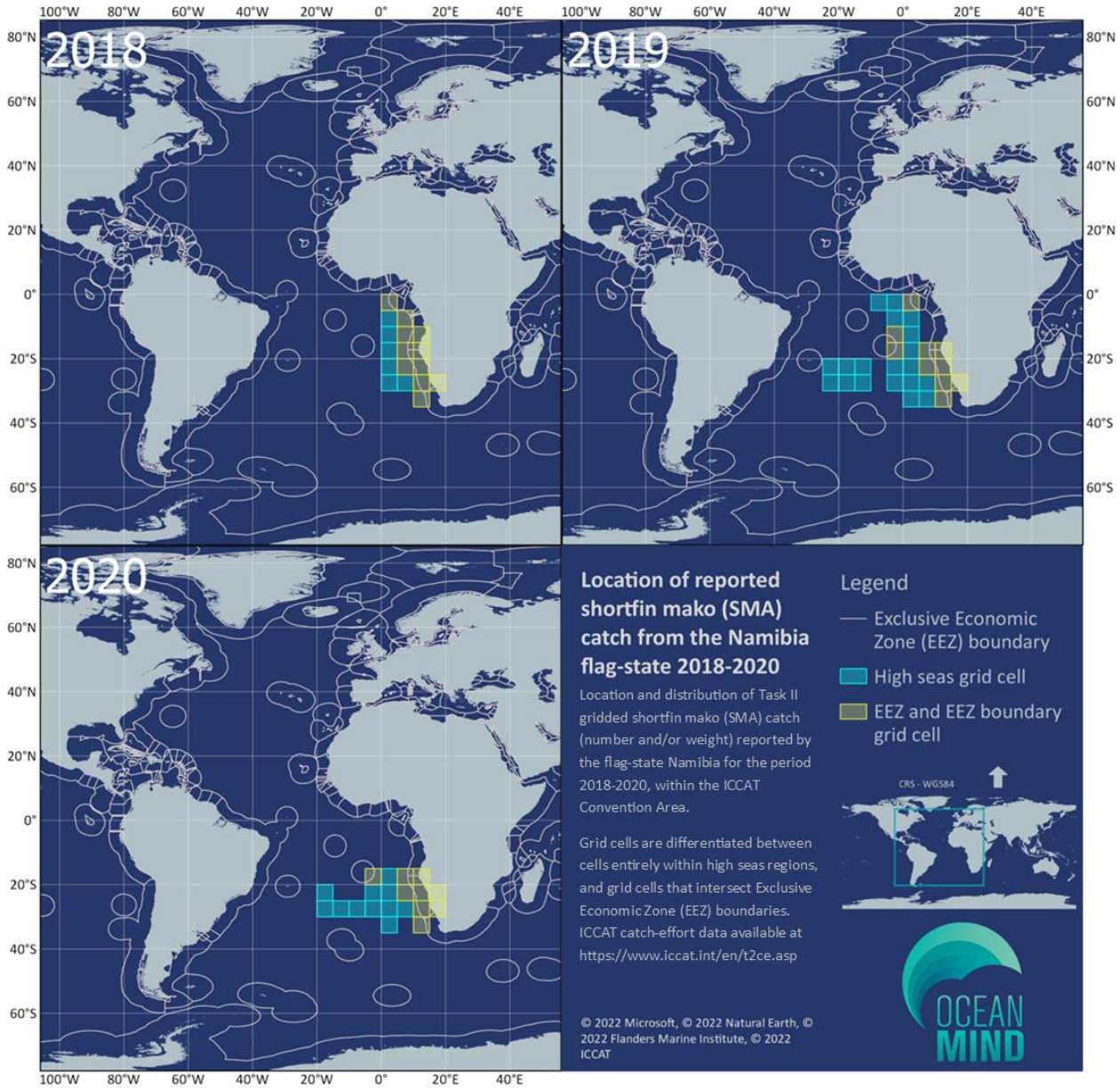


Figure 16: Location of gridded shortfin mako (SMA) catch by the Namibia flag-state for the period 2018-2020

SMA catch reported by the flag-state Namibia for the period 2018-2020 was mainly confined to the southeast quadrant of the ICCAT area (Figure 16). All SMA catch reported by Namibia was from longline gears, and ICCAT currently lists 23 active vessels for this flag-state. As shown in Figure 16, Namibia reported catch of SMA in grid cells both intersecting EEZs and on the high seas, with a considerably higher proportion of the 606.269 MT (2018), 634.144 MT (2019) and

563.889 MT (2020) SMA catch being reported from EEZ-cells than on the high seas (Table 9). As shown in Table 1, Table 2, and Table 3, Namibia consistently reports one of the highest catch weights of SMA (both in absolute weight and percentage of overall catch). This is particularly notable when compared against other fleets with comparable SAM catch but considerably higher number of vessels, such as EU-Portugal. It is unclear whether the nature or management of the Namibian fishery may be a contributory factor towards this high SMA catch.

Up to 8 coastal-states were represented in grid cells with SMA catch that intersected EEZs (Table 17).

Table 17: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Namibia in 2018-2020

2018		2019		2020	
Angola	Namibia	Angola	Sao Tome and Principe	Angola	South Africa
Democratic Republic of the Congo	Republic of the Congo	Equatorial Guinea	South Africa	Namibia	UK (St Helena)
Equatorial Guinea	Sao Tome and Principe	Namibia	UK (Saint Helena)		
Gabon	South Africa				

5.13 South Africa

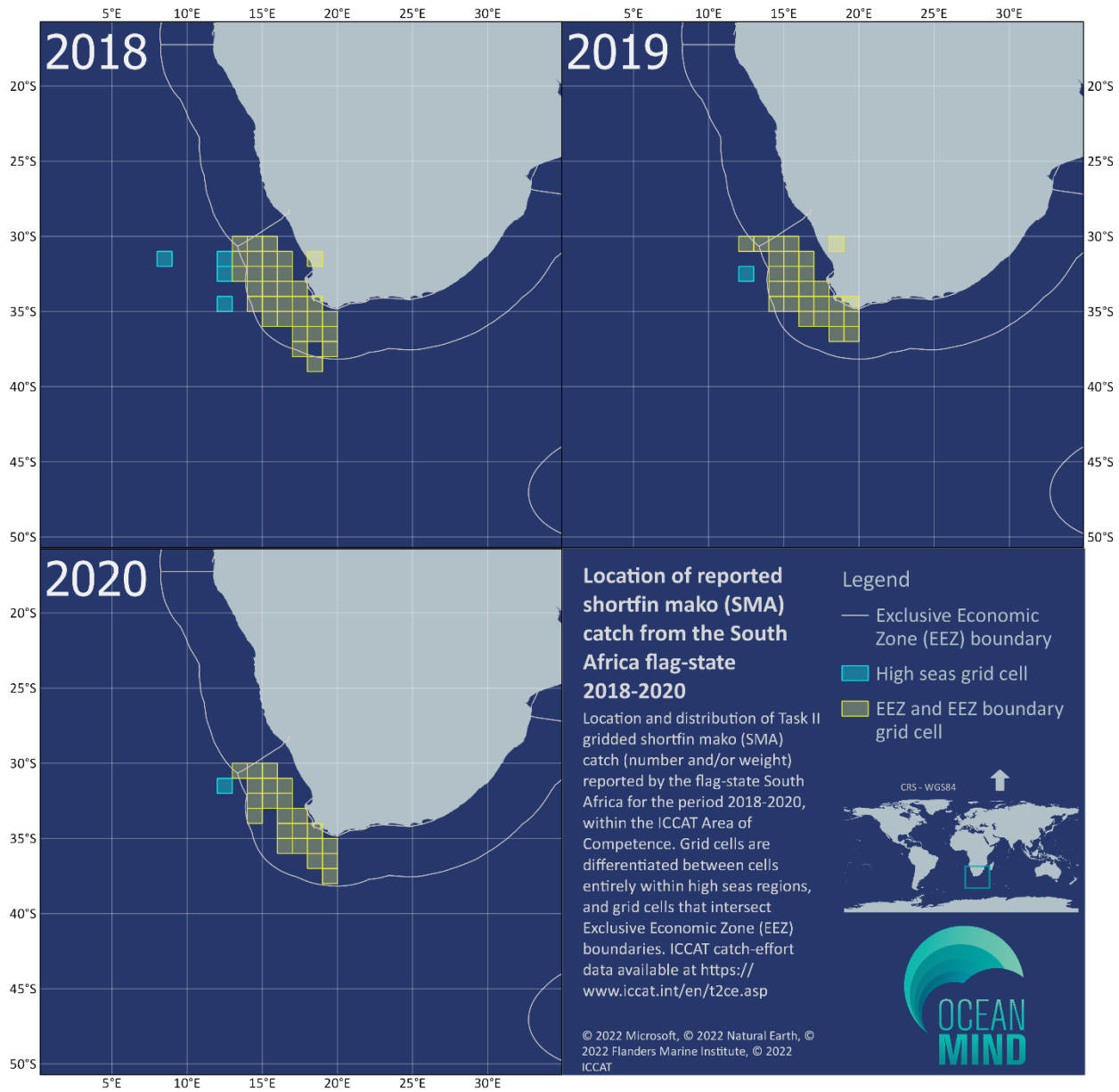


Figure 17: Location of gridded shortfin mako (SMA) catch by the South Africa flag-state for the period 2018-2020

South Africa has 51 active vessels listed under ICCAT. South Africa reported 244.422 MT of SMA catch in 2018, 110.170 MT in 2019, and 45.382 MT in 2020, with <1.1% of these annual totals being reported from grid cells in high seas areas (Table 9). The flag-state South Africa reported SMA catch at 1°x1° grid cell resolution. South Africa reported SMA catch from grid cells in the high seas region, in grid cells intersecting the Namibia EEZ, and in cells intersecting and within

the South Africa EEZ in 2018-2020 (Figure 17). All South Africa reported SMA catch was associated with longline gears.

South Africa reported SMA catch in a 1°x1° grid cell that was entirely on land (centroid 30.5°S 18.5°E), reporting 0.0594 MT of SMA catch in 2019 from this cell. It is unclear as to the reason behind this coordinate error, but clarification of this catch location may be sought from the flag-state.

5.14 South Korea

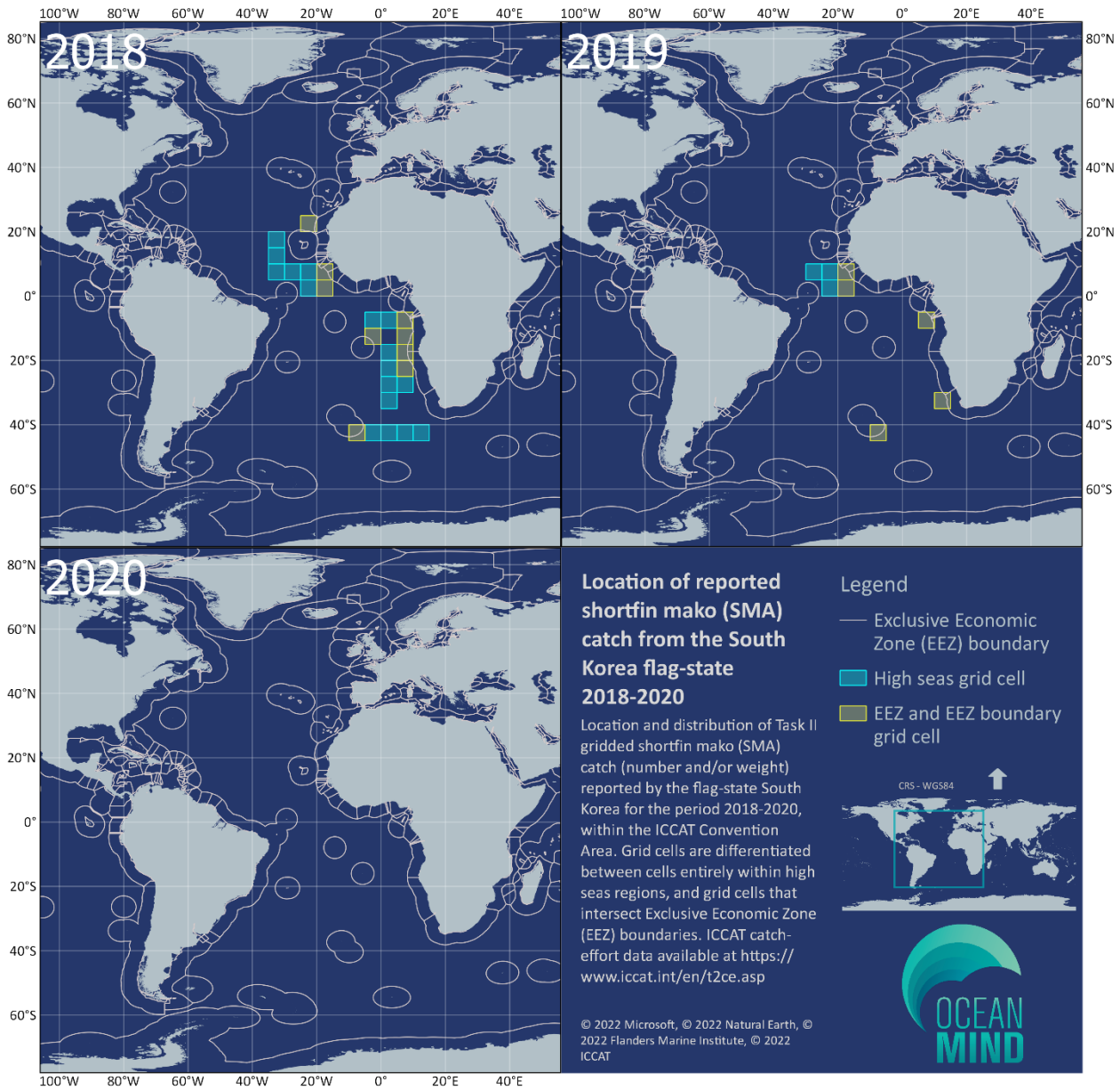


Figure 18: Location of gridded shortfin mako (SMA) catch by the South Korea flag-state for the period 2018-2020

South Korea reported SMA catch from grid cells both on the high seas and intersecting up to 9 EEZs (Table 18) in 2018 and 2019 (Figure 18). South Korea reported a reduction in SMA catch from 13.367 MT in 2018 to 9.739 MT in 2019, with SMA catch weight in high seas cells exceeding that in EEZ-cells in 2018, but the opposite being reported in 2019 (Table 9). ICCAT currently lists 26 active South Korea vessels, and all SMA catch in 2018 and 2019 by South Korea was reported

from longline gears. No Task II SMA catch was reported by South Korea in 2020 (Table 9).

Table 18: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by South Korea in 2018-2020

2018		2019		2020
Angola	Republic of the Congo	Angola	Namibia	N/A
Cape Verde	Senegal	Congo	Senegal	
Democratic Republic of the Congo	Sierra Leone	Gabon	Sierra Leone	
Guinea	Spain (Canary Islands)	Guinea	South Africa	
Guinea-Bissau		Guinea-Bissau		

5.15 St Vincent and Grenadines

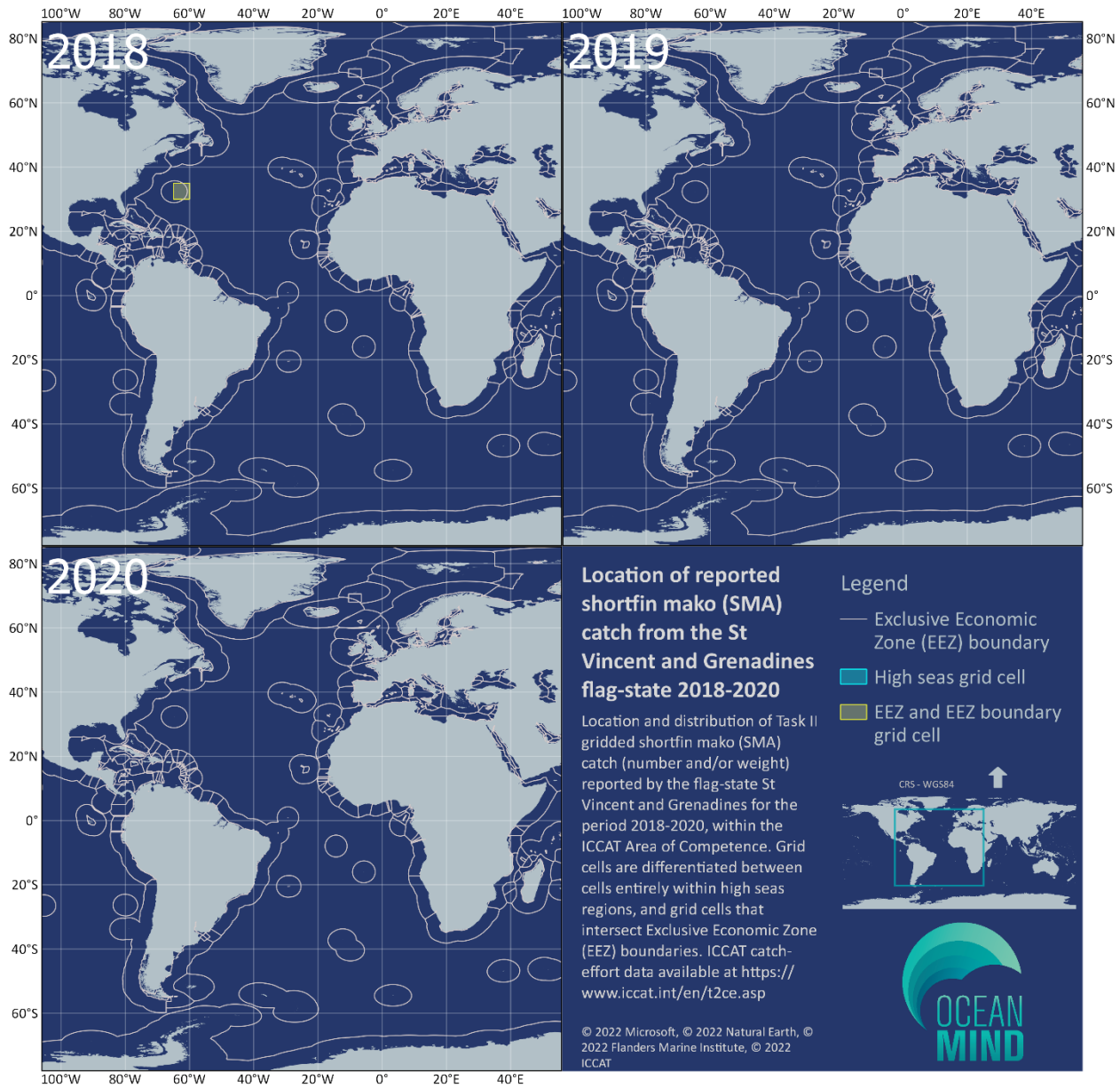


Figure 19: Location of gridded shortfin mako (SMA) catch by the St Vincent and Grenadines flag-state for the period 2018-2020

The flag-state St Vincent and Grenadines reported SMA catch only in 2018, being in a single grid cell that intersected the UK (Bermuda) EEZ (Figure 19). This flag-state reported 0.141 MT of SMA catch in 2018 (Table 9). All SMA catch reported by St Vincent and Grenadines was associated with longline gears, however, currently ICCAT lists 0 active vessels flagged to St Vincent and Grenadines, although historical data is under construction (not accessible). It is unknown

whether any St Vincent and Grenadines vessels were active and authorised by ICCAT in 2018. This flag-state did not report any SMA catch in 2019 or 2020.

5.16 Taiwan

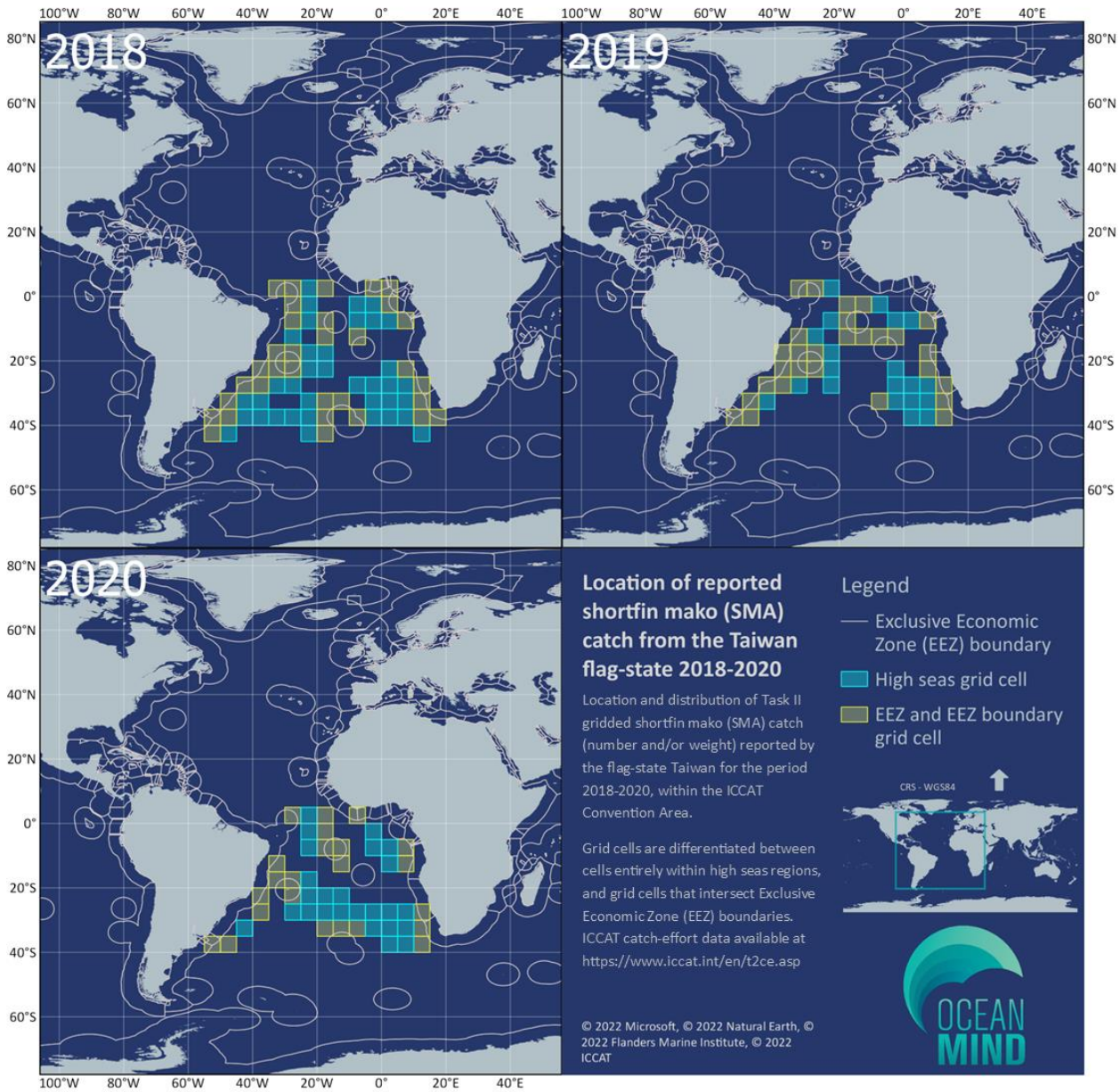


Figure 20: Location of gridded shortfin mako (SMA) catch by the Taiwan flag-state for the period 2018-2020

Most grid cells within which SMA catch reported by Taiwan between 2018 and 2020 were in the southwest and southeast quadrants (Figure 20). The Taiwan fleet reported declining catches of SMA over the analysis period with 63.896 MT reported in 2018, 49.331 MT in 2019 and 37.673 MT in 2020 (Table 9). In all years of 2018-2020, Taiwan reported higher SMA catch weight in grid cells intersecting EEZs than on the high seas, although this difference narrowed considerably

from 2018 (high seas catch 26.6% of total) to 2019 (high seas catch 45.8% of total) (Table 9). Where catch was reported from grid cells intersecting or within EEZ boundaries, up to 20 coastal-state EEZs (including Overseas Territories) may be represented (Table 19). Taiwan has 82 active vessels listed under ICCAT, and all SMA catch in the period 2018-2019 was reported from longline gears.

Table 19: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Taiwan in 2018-2020

2018		2019		2020	
Angola	Nigeria	Angola	Republic of the Congo	Angola	Liberia
Argentina	Republic of the Congo	Argentina	South Africa	Argentina	Namibia
Benin	Sao Tome and Principe	Brazil	UK (Ascension)	Brazil	Sierra Leone
Brazil	Sierra Leone	Brazil (Trindade)	UK (Saint Helena)	Republic of the Congo	South Africa
Democratic Republic of the Congo	South Africa	Democratic Republic of the Congo	UK (Tristan da Cunha)	Democratic Republic of the Congo	UK (Ascension)
Equatorial Guinea	Togo	Gabon	Uruguay	Gabon	UK (Tristan da Cunha)
Gabon	UK (Ascension)	Namibia		Côte d'Ivoire	Uruguay
Ghana	UK (Saint Helena)				
Côte d'Ivoire	UK (Tristan da Cunha)				
Namibia	Uruguay				

5.17 Trinidad and Tobago

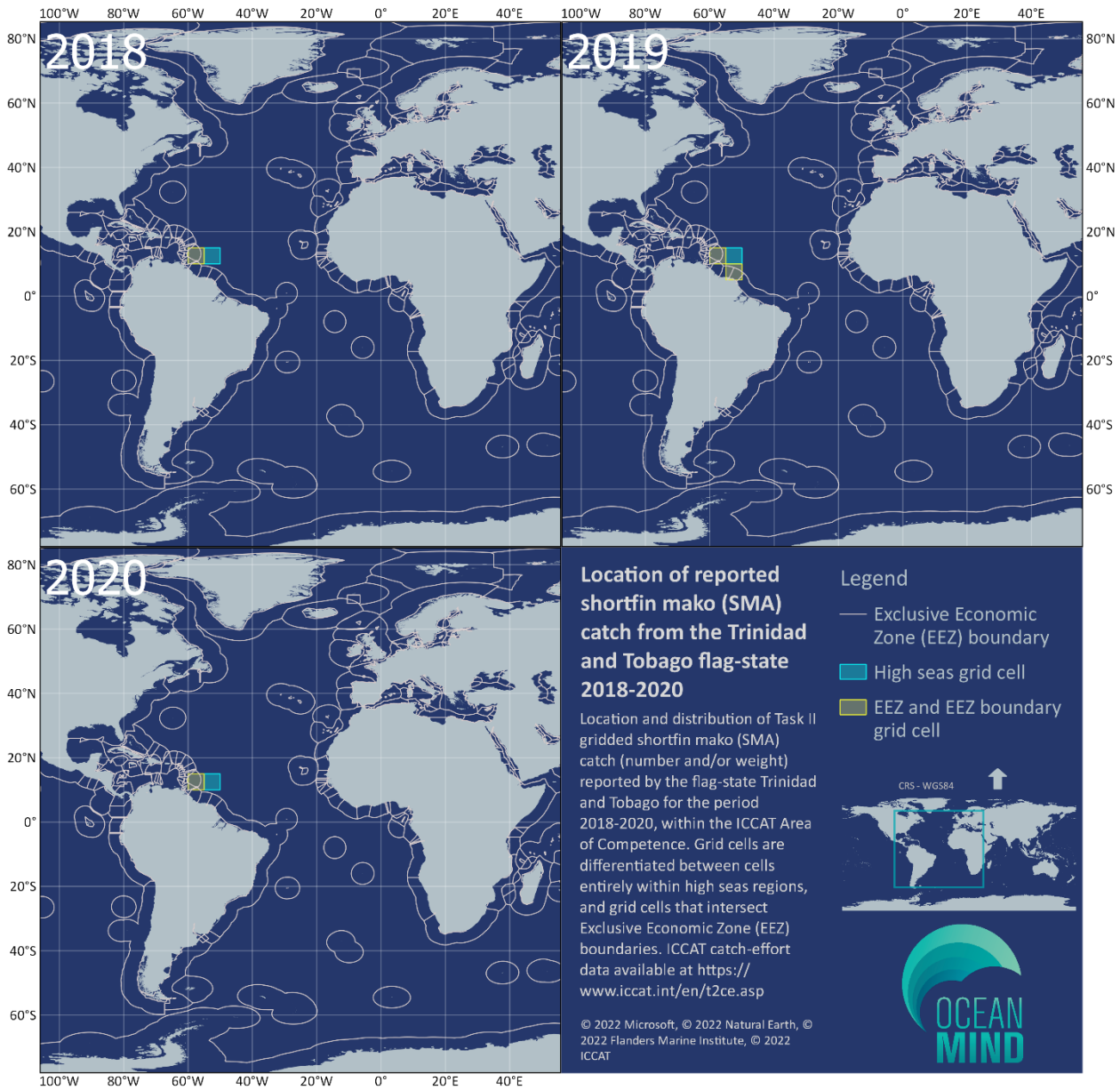


Figure 21: Location of gridded shortfin mako (SMA) catch by the Trinidad and Tobago flag-state for the period 2018-2020

All SMA catch reported by Trinidad and Tobago in 2018-2020 was in the northwest quadrant (Figure 21) and was associated with longline gears. Up to 3 coastal-state EEZs may be represented in SMA catch in 2018, this increasing to a maximum of 6 by 2020 (Table 20). The flag-state reported 2.251 MT of SMA catch in 2018, 1.162 MT in 2019, and 1.231 MT in 2020 (Table 9). SMA catch was reported by Trinidad and Tobago in grid cells both intersecting EEZs and on the high

seas in 2018-2020, with the highest proportion of SMA catch in all years being reported from grid cells on the high seas ([Table 9](#)). ICCAT currently lists 13 active vessels flagged to Trinidad and Tobago.

Table 20: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Trinidad and Tobago in 2018-2020

2018	2019		2020	
Barbados	Barbados	Guyana	Barbados	St Lucia
Guyana	Brazil	Suriname	Guyana	Trinidad and Tobago
Trinidad and Tobago	France (French Guiana)		Trinidad and Tobago	Venezuela

5.18 United Kingdom (and Overseas Territories)

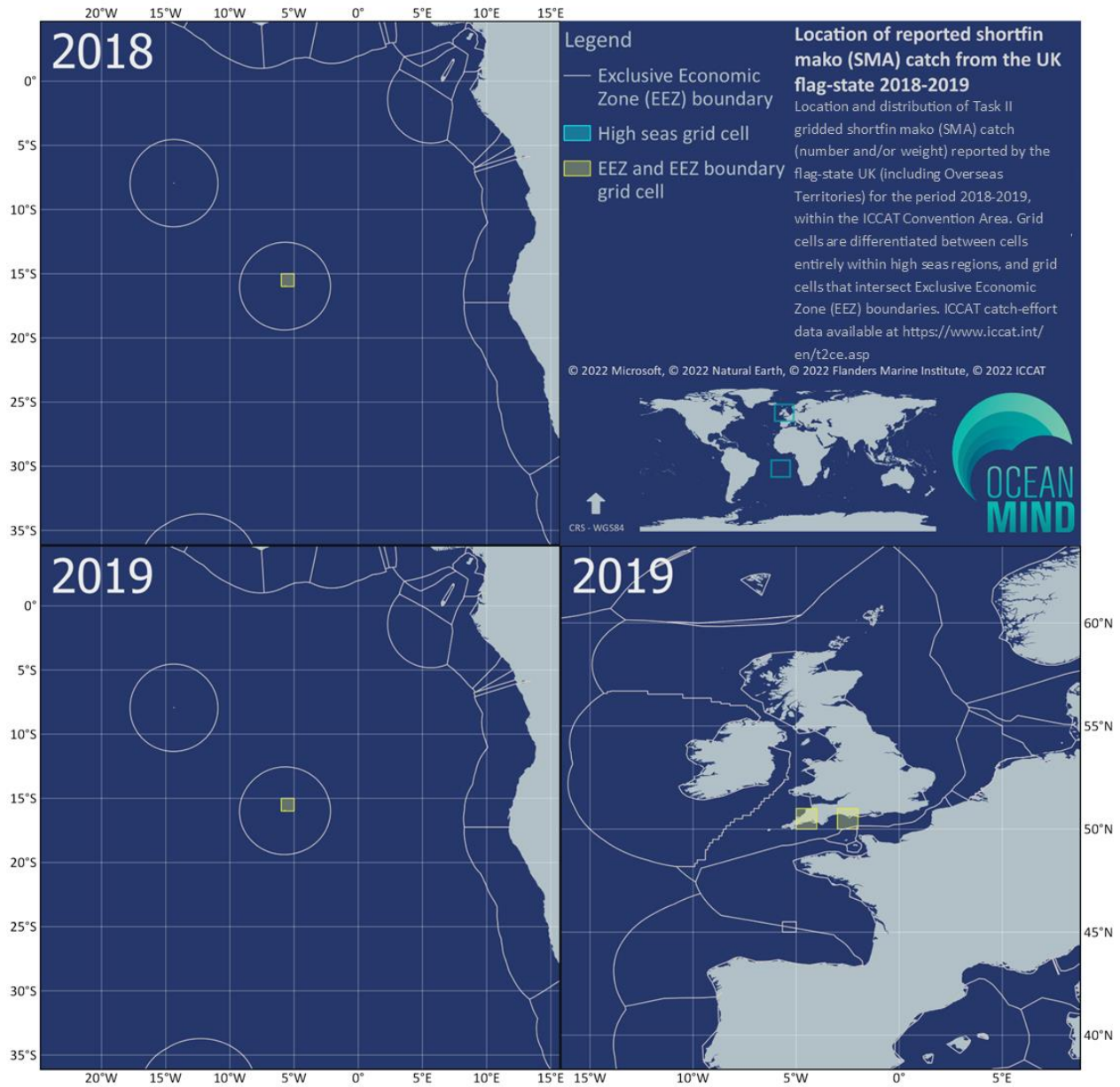


Figure 22: Location of gridded shortfin mako (SMA) catch by the United Kingdom (and Overseas Territories) flag-state for the period 2018-2019

SMA catch was reported by the UK Overseas Territory of St Helena in both 2018 and 2019, with additional SMA catch being reported by UK in 2019 (Table 9). The flag-state UK (including Overseas Territories) reported 0.161 MT of SMA catch in 2018 and 0.225 MT in 2019 (Table 9). No SMA catch was reported by UK (mainland and Territories) in Task II data in 2020. Only 2 vessels flagged to the UK are listed as active by ICCAT. SMA catch was reported from trawl and bait boat

vessels in the period 2018-2019. SMA catch was reported at 1°x1° resolution, and in 2018 was reported in a grid cell entirely within the UK (St Helena) EEZ. In 2019, SMA catch was reported in grid cells entirely within the UK (St Helena) and UK EEZs, in addition to a grid cell intersecting the UK and UK (Guernsey) EEZ boundary ([Figure 22](#))

5.19 United States of America (USA)

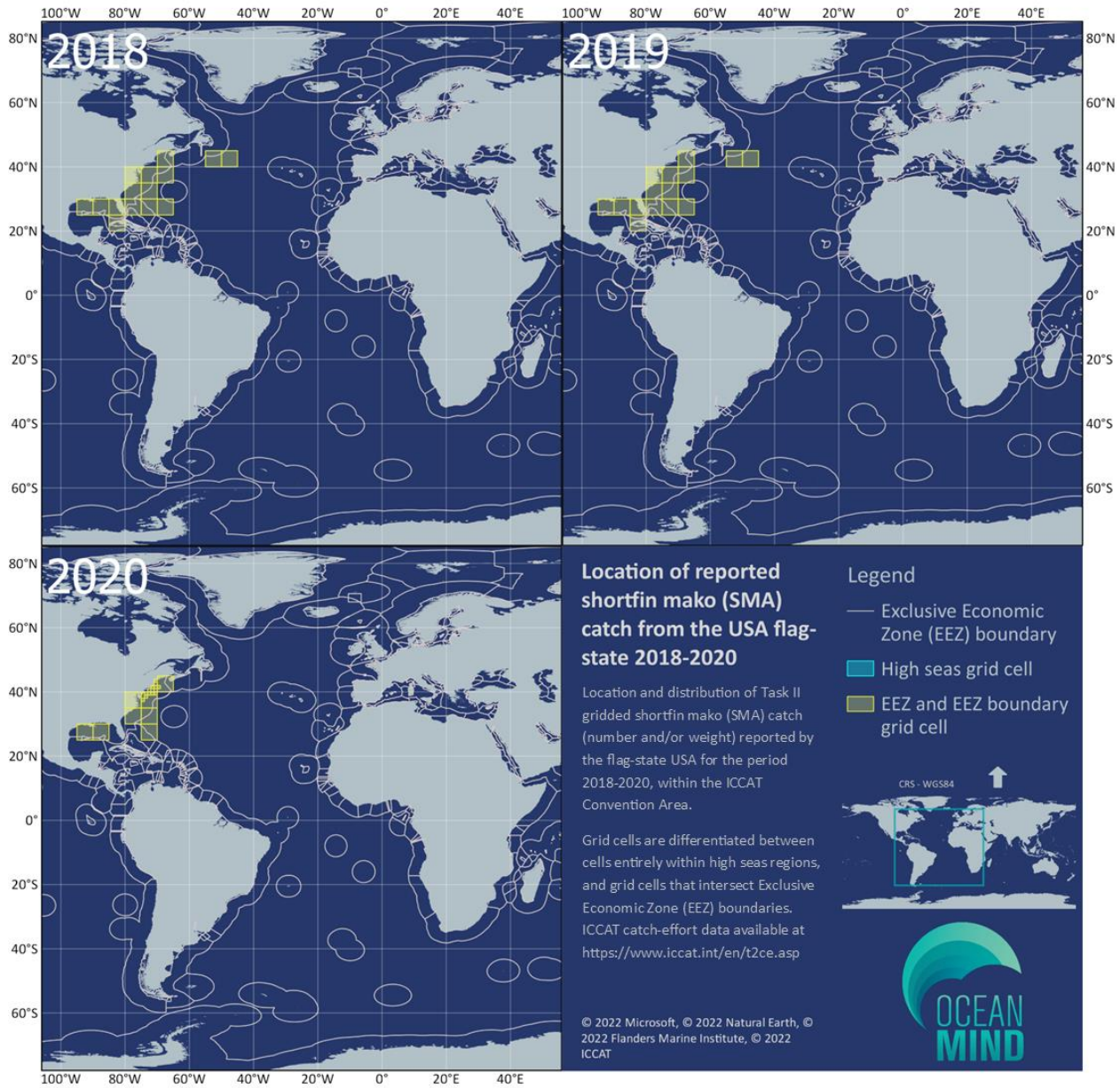


Figure 23: Location of gridded shortfin mako (SMA) catch by the USA flag-state for the period 2018-2020

As displayed in Table 10, USA reported SMA catch of 818 (number) in 2018, reducing to 701 (number) in 2019. SMA catch increased to 796 in Task II data in 2020. All this reported catch was in grid cells that were within or intersected EEZ boundaries, and grid cell locations were identical across both years (Figure 23). The reported grid cells intersected up to 8 EEZs, including Overseas Territories (Table 21). ICCAT lists 422 active vessels flagged to USA, and all SMA catch reported by USA for 2018-2019 was associated with longline gears.

Table 21: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by USA in 2018-2020

2018		2019		2020	
Bahamas	Cuba	Bahamas	Cuba	Bahamas	Mexico
United Kingdom (Bermuda)	Mexico	United Kingdom (Bermuda)	Mexico	Canada	UK (Turks and Caicos)
Canada	UK (Turks and Caicos Islands)	Canada	UK (Turks and Caicos Islands)	Cuba	USA
United Kingdom (Cayman Islands)	USA	United Kingdom (Cayman Islands)	USA		

5.20 Venezuela

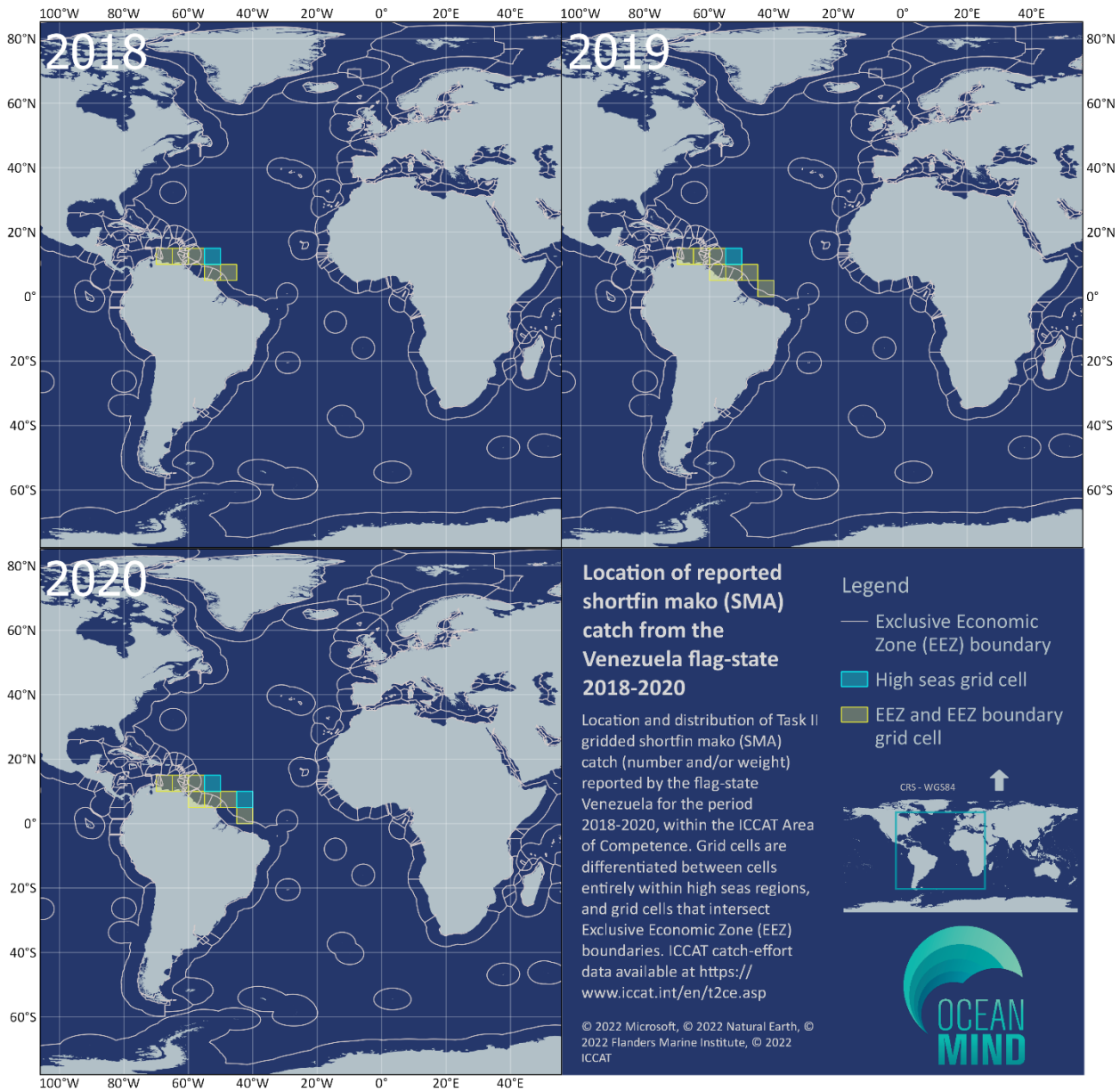


Figure 24: Location of gridded shortfin mako (SMA) catch by the Venezuela flag-state for the period 2018-2020

The flag-state Venezuela reported a total of 7.485 MT catch of SMA in 2018, 8.262 MT in 2019, and 7.667 MT in 2020 (Table 9). Although Venezuela reported SMA from grid cells that intersected EEZs and also on the high seas (Figure 24), the largest proportion of reported SMA catch (>90% in 2018-2019, >80% in 2020) was from grid cells that intersected EEZ boundaries. Up to 16 coastal-states (including Unincorporated Territories and Constituent Countries) may be

represented in SMA catch reported by Venezuela from grid cells intersecting EEZs in 2018-2020 (Table 22). All SMA catch reported by Venezuela for the 2018-2020 period was associated with longline gears.

Table 22: EEZs intersected by grid cells with Task II shortfin mako (SMA) catch reported by Venezuela in 2018-2020

2018		2019		2020	
Barbados	Netherlands (Bonaire)	Barbados	Netherlands (Bonaire)	Barbados	Netherlands (Bonaire)
Brazil	Netherlands (Curaçao)	Brazil	Netherlands (Curaçao)	Brazil	Netherlands (Curaçao)
Dominica	Saint Lucia	Dominica	Saint Lucia	Dominica	St Lucia
France (French Guiana)	St Vincent and the Grenadines	France (French Guiana)	St Vincent and the Grenadines	France (French Guiana)	St Vincent and the Grenadines
France (Martinique)	Suriname	France (Martinique)	Suriname	France (Martinique)	Suriname
Grenada	Trinidad and Tobago	Grenada	Trinidad and Tobago	Grenada	Trinidad and Tobago
Guyana	USA (Puerto Rico)	Guyana	USA (Puerto Rico)	Guyana	USA (Puerto Rico)
Netherlands (Aruba)	Venezuela	Netherlands (Aruba)	Venezuela	Netherlands (Aruba)	Venezuela

6 Shortfin mako and swordfish catch

Studies have stated that SMA catch may be associated with fisheries for swordfish (SWO), in particular, in swordfish longline fisheries⁵. When considering SMA catch reported by flag-states for the period 2018-2020 in the ICCAT region, there is a potential relationship between the reported catch of SWO and SMA. Not all fleets reported both SMA and SWO catch in any year, and in several cases both SWO and SMA catch was reported at very low weight from non-longline gears. However, as presented in [Tables 23-25](#), considerable catch weight of SWO and SMA for most flag-states was reported from longline gears. Although some flag-states reported catch by specific types of longline e.g. Longline-SWO, Longline-BFT, this distinction was not apparent for several fleets. Consequently, SMA and SWO catch is reported across all types of longline gear.

As shown in [Table 23](#), 18 flag-states reported both SWO and SMA catch (in Task I and/or Task II data) in 2018. Nineteen (19) flag-states reported both SWO and SMA catch (in Task I and/or Task II data) in 2019 ([Table 24](#)). In a notable decrease from 2018 and 2019, only 15 flag-states reported both SWO and SMA catch (in Task I and/or Task II data) in 2020 ([Table 25](#)).

Across all flag-states, SMA catch declared from longline gears in 2018 represented 94.83% (Task I data) and 99.50% (Task II data) of all declared SMA catch by weight. Similarly, 98.78% (Task I) and 98.46% (Task II) of SWO catch was reported from longline gears in 2018.

Across all flag-states, SMA catch declared from longline gears in 2019 represented 94.22% (Task I data) and 99.06% (Task II data) of all declared SMA catch by weight. Within Task I data, 98.76% of SWO catch was associated with longline gear, and in Task II 98.14% of SWO catch was associated with longline gear in 2019.

Across all flag-states, SMA catch declared from longline gears in 2020 represented 99.10% (Task I data) and 99.60% (Task II data) of all declared SMA catch by weight. In 2020, 98.62% (Task I) and 98.50% (Task II) of SWO catch was reported from longline gears.

⁵ Baibbat, S.A. et al. (2017) Catch rate and size frequency of the shortfin mako (*Isurus oxyrinchus*) caught as by-catch by the swordfish longline fishery south of the Moroccan Atlantic coast. *Collect. Vol. Sci. Pap. ICCAT* **74**:1867-1872

Box 1: Results of Spearman Rank Correlation Coefficient and Regression ANOVA between SWO total catch and SMA total catch for years 2018-2020

- Across all flag-states, there was significant positive correlation between SWO total catch and SMA total catch in Task I data in 2018 (Spearman Rank Correlation Coefficient, $r=0.45$, $p<0.01$). There was a significant relationship determined by Method of Least Squares Regression between SWO catch and SMA catch (Regression ANOVA, $F_{1,36}= 152.9$, $P<0.01$). The equation for the line of fit through the points was $SWO = 160 + 3.45 SMA$ which accounted for 80.4% (R^2) of the variation in the Y-variable in 2018 (Task I).
- Across all flag-states, there was significant positive correlation between SWO total catch and SMA total catch in Task II data in 2018 (Spearman Rank Correlation Coefficient, $r=0.54$, $p<0.01$). There was a significant relationship determined by Method of Least Squares Regression between SWO catch and SMA catch (Regression ANOVA, $F_{1,36}= 17.7$, $P<0.01$). The equation for the line of fit through the points was $SWO = 140 + 1.86 SMA$ which accounted for 31.1% (R^2) of the variation in the Y-variable in 2018 (Task II).
- Across all flag-states, there was significant positive correlation between SWO total catch and SMA total catch in Task I data in 2019 (Spearman Rank Correlation Coefficient, $r=0.41$, $p=0.01$). There was a significant relationship determined by Method of Least Squares Regression between SWO catch and SMA catch (Regression ANOVA, $F_{1,33}= 323.8$, $P<0.01$). The equation for the line of fit through the points was $SWO = 240 + 4.36 SMA$ which accounted for 90.4% (R^2) of the variation in the Y-variable in 2019 (Task I).
- Across all flag-states, there was significant positive correlation between SWO total catch and SMA total catch in Task II data in 2019 (Spearman Rank Correlation Coefficient, $r=0.59$, $p=0.01$). There was a significant relationship determined by Method of Least Squares Regression between SWO catch and SMA catch (Regression ANOVA, $F_{1,33}= 17.7$, $P<0.01$). The equation for the line of fit through the points was $SWO = 190 + 2.42 SMA$ which accounted for 33.0% (R^2) of the variation in the Y-variable in 2019 (Task II).
- Across all flag-states, there was significant positive correlation between SWO total catch and SMA total catch in Task I data in 2020 (Spearman Rank Correlation Coefficient, $r=0.49$, $p<0.01$). There was a significant relationship determined by Method of Least Squares Regression between SWO catch and SMA catch (Regression ANOVA, $F_{1,35}= 99.2$, $P<0.01$). The equation for the line of fit through the points was $SWO = 160 + 4.16 SMA$ which accounted for 73.1% (R^2) of the variation in the Y-variable in 2020 (Task I).
- Across all flag-states, there was significant positive correlation between SWO total catch and SMA total catch in Task II data in 2020 (Spearman Rank Correlation Coefficient, $r=0.45$, $p<0.01$). There was a significant relationship determined by Method of Least Squares Regression between SWO catch and SMA catch (Regression ANOVA, $F_{1,35}= 25$, $P<0.01$). The equation for the line of fit through the points was $SWO = 160 + 2.06 SMA$ which accounted for 40.0% (R^2) of the variation in the Y-variable in 2020 (Task II).

As presented in [Box 1](#) and [Tables 23-25](#), there appears to be a notable relationship between catch of SWO and SMA overall, and particularly in longline fisheries in the ICCAT region. Reported catch weights in [Tables 23-25](#) indicate that catch from longline gears as a percentage of total catch for

both SWO and SMA was generally consistent across both Task I and Task II data. However, several Task I to Task II reporting dissimilarities (see also [Section 3](#)) were further visualised by the comparison of SWO and SMA catch, such as EU-Spain (2018, [Table 23](#)) and Tunisia (2019, [Table 24](#)). Furthermore, additional incidences of absence of available Task II data (for any species) were identified, including the flag-states Algeria, Libya and Tunisia.

The relationship between catches of SWO and SMA was conspicuously apparent for several fleets over the period 2018-2020, such as EU-Spain (Task I only), EU-Portugal, Canada and Taiwan. However, despite the apparent association of SMA with SWO catch, and particularly within longline gears, several flag-states reported zero SMA catch in Task I data, despite considerable catch of SWO. Such flag-states included Algeria, P.R. China, EU-Italy, Tunisia, and Turkey, during the 2018-2020 period. It is possible that these incidences represent underreporting of SMA catch, although clarification from the flag-state(s) and/or ICCAT may be beneficial in interpreting these reports.

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Table 23: Task I (nominal catch) and Task II SWO catch total (MT) SMA catch total (MT), with subtotal reported from longline gear type, per flag-state 2018. Flag-states with zero Task I and Task II SMA and SWO catch are omitted from analysis. Flag-states which reported Task II by number are omitted from the table.

Flag-state	Task I				Task II			
	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)
Algeria	725.05	725.05	0	0	-	-	-	-
Barbados	18.09	16.18	0	0	16.19	16.19	0	0
Belize	260.53	260.53	26.62	26.62	257.71	257.71	26.60	26.60
Canada	786.80	753.13	54.70	53.69	736.07	702.40	49.23	48.21
P.R. China	441.34	441.34	0	0	441.34	441.34	0	0
Côte d'Ivoire	57.39	46.93	3.88	0	-	-	-	-
EU-Croatia	28.16	25.97	0	0	28.16	25.97	0	0
EU-Cyprus	45.42	45.42	0	0	45.42	45.42	0	0
Egypt	4.00	4.00	0	0	0	0	0	0
EU-France	170.51	88.68	1.44	0.10	0	0	0	0
Ghana	6.10	0	0	0	6.10	0	0	0
EU-Greece	350.17	350.17	0	0	353.19	353.19	0	0
Grenada	35.88	35.88	0	0	-	-	-	-
Guyana	4.50	4.50	0	0	-	-	-	-
EU-Ireland	13.23	0	0	0	12.90	0	0	0
EU-Italy	2,313.88	2,288.53	0.90	0	-	-	-	-
Liberia	4.55	0	0	0	-	-	-	-
Libya	70.00	70.00	0	0	-	-	-	-
EU-Malta	307.65	307.65	0	0	300.78	300.78	0	0

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Flag-state	Task I				Task II			
	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)
Mexico	44.53	44.53	2.48	2.48	44.44	44.44	2.44	2.44
Morocco	2,317.81	2,317.81	594.10	422.50	1,321.75	1,321.75	244.91	244.91
Namibia	880.63	880.63	980.21	980.21	224.85	224.85	606.26	606.26
Norway	0.001	0	0	0	0	0	0	0
EU-Portugal	2,059.88	2,038.23	571.91	567.98	2081.92	2038.23	575.88	567.98
Russian Federation	0	0	0.006	0	0	0	0	0
Sao Tome & Principe	1.00	0	0	0	-	-	-	-
St Kitts & Nevis	1.97	0	0	0	1.97	0	0	0
Senegal	135.90	92.35	72.09	4.07	0	0	0	0
South Africa	188.68	188.68	244.38	244.38	188.68	188.68	244.38	244.38
South Korea	26.25	26.25	13.36	13.36	23.73	23.73	13.36	13.36
EU-Spain	9,059.80	9,059.54	2,209.08	2,209.08	1386.56	1386.30	0	0
St Vincent & Grenadines	30.45	29.94	0	0	29.94	29.94	0.14	0.14
Taiwan	641.31	641.31	68.81	68.81	614.10	614.10	63.89	63.89
Trinidad and Tobago	3.01	3.01	2.30	2.30	3.01	3.01	2.25	2.25
Tunisia	1,337.50	1,337.50	0	0	0	0	0	0
Turkey	574.97	544.47	0	0	427.00	396.50	0	0
United Kingdom	1.61	1.61	0.17	0	0	0	0.16	0
Venezuela	30.79	30.79	7.48	7.48	30.79	30.79	7.48	7.48

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Table 24: Task I (nominal catch) and Task II SWO catch total (MT) SMA catch total (MT), with subtotal reported from longline gear type, per flag-state 2019. Flag-states with zero Task I and Task II SMA and SWO catch are omitted from analysis. Flag-states which reported Task II by number are omitted from the table.

Flag-state	Task I				Task II			
	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)
Algeria	517.49	517.49	0	0	517.49	517.49	0	0
Barbados	9.94	9.06	0	0	9.06	9.06	0	0
Belize	172.12	172.12	9.05	9.05	172.12	172.12	9.05	9.05
Canada	997.23	964.54	63.75	62.45	997.23	964.54	63.75	62.45
P.R. China	302.46	302.46	20.29	20.29	302.46	302.46	27.64	27.64
Côte d'Ivoire	123.26	106.41	7.65	0	123.26	106.41	7.65	0
EU-Croatia	33.43	30.46	0	0	33.43	30.46	0	0
EU-Cyprus	24.07	24.07	0	0	24.07	24.07	0	0
Dominica	0.34	0.22	0	0	0	0	0	0
EU-France	152.38	79.50	2.32	0.04	72.96	2.56	1.46	0.04
EU-Greece	744.79	744.79	0	0	524.21	524.21	0	0
Grenada	21.86	21.86	0	0	0	0	0	0
Guyana	1.72	1.72	0	0	-	-	-	-
EU-Ireland	3.23	0	0	0	3.01	0	0	0
EU-Italy	2,472.87	2,460.98	0.02	0.008	34.42	34.42	0	0
Liberia	6.75	0	0	0	-	-	-	-
Libya	26.00	26.00	0	0	-	-	-	-
EU-Malta	406.93	406.81	0	0	400.20	400.20	0	0
Mexico	29.95	29.95	2.05	2.05	29.85	29.85	2.05	2.05
Morocco	1,932.26	1,932.26	501.10	357.10	1,446.45	1,446.45	188.92	188.92

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Flag-state	Task I				Task II			
	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)
Namibia	811.27	811.27	0	0	418.47	418.47	634.14	634.14
EU-Portugal	2,714.97	2,669.86	531.57	526.24	2,714.97	2,671.27	531.57	526.75
Russian Federation	0	0	0.20	0	0	0	0	0
Sao Tome & Principe	3.23	0	0	0	-	-	-	-
Senegal	223.27	166.09	33.07	6.67	0	0	0	0
South Africa	251.19	251.19	110.17	110.17	251.19	251.19	110.17	110.17
South Korea	18.06	18.06	9.73	9.73	18.06	18.06	9.73	9.73
EU-Spain	8,885.52	8,884.82	1,955.80	1,955.80	1,548.90	1,548.20	0.01	0.01
St Vincent & Grenadines	27.12	27.04	3.29	0	27.04	27.04	0	0
Taiwan	517.56	517.56	45.07	45.07	591.95	591.95	49.33	49.33
Trinidad and Tobago	5.90	5.90	1.16	1.16	5.90	5.90	1.16	1.16
Tunisia	934.00	934.00	0	0	0	0	0	0
Turkey	414.00	386.14	0	0	414.00	386.14	0	0
United Kingdom	1.91	1.86	0.44	0	0.54	0.49	0.224	0
Venezuela	31.39	31.39	8.26	8.26	31.39	31.39	8.26	8.26

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Table 25: Task I (nominal catch) and Task II SWO catch total (MT) SMA catch total (MT), with subtotal reported from longline gear type, per flag-state 2020. Flag-states with zero Task I and Task II SMA and SWO catch are omitted from analysis. Flag-states which reported Task II by number are omitted from the table.

Flag-state	Task I				Task II			
	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)
Algeria	500.95	500.95	0	0	500.85	500.85	0	0
Barbados	11.79	11.66	0	0	11.66	11.66	0	0
Belize	112.85	112.85	1.92	1.92	112.85	112.85	1.92	1.92
Canada	1,335.83	1,285.99	20.20	17.91	1,336.75	1,285.99	20.20	17.91
P.R. China	184.70	184.70	2.51	2.51	184.70	184.70	6.28	6.28
Côte d'Ivoire	44.77	33.62	13.59	0	13.65	13.65	0	0
EU-Croatia	23.15	22.32	0	0	23.15	22.32	0	0
EU-Cyprus	30.27	30.27	0	0	29.92	29.92	0	0
Dominica	0.11	0.06	0	0	0.002	0.001	0	0
Egypt	4.00	4.00	0	0	0	0	0	0
EU-France	200.04	106.83	0.22	0	0.41	0	0.08	0
EU-Germany	0.15	0	0	0	0	0	0	0
EU-Greece	657.08	657.08	0	0	645.78	645.78	0	0
Grenada	15.36	15.36	0	0	-	-	-	-
Guyana	4.51	4.51	0	0	-	-	-	-
Iceland	0.03	0	0	0	0.03	0	0	0
EU-Ireland	23.61	0	0	0	23.73	0	0	0
EU-Italy	2,249.75	2,231.32	0	0	27.03	27.03	0	0
Liberia	3.45	0	0	0	-	-	-	-
Libya	22.00	22.00	0	0	0	0	0	0

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Flag-state	Task I				Task II			
	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)	SWO total (MT)	SWO Longline total (MT)	SMA total (MT)	SMA Longline total (MT)
EU-Malta	361.29	361.29	0	0	386.72	386.72	0	0
Mexico	21.44	21.44	2.19	2.19	21.21	21.21	2.19	2.19
Morocco	1,886.80	1,886.80	382.40	382.40	603.53	603.53	153.86	153.86
Namibia	789.23	773.77	945.12	929.38	376.73	376.73	563.88	563.88
EU-Portugal	2,405.15	2,378.47	791.10	787.67	2,406.28	2,378.31	791.20	787.20
Sao Tome & Principe	30.00	0	0	0	-	-	-	-
St Kitts & Nevis	1.17	0	0	0	1.17	0	0	0
South Africa	149.46	149.46	45.83	45.83	149.46	149.46	45.83	45.83
South Korea	28.85	28.85	0	0	12.09	12.09	0	0
EU-Spain	9,462.45	9,454.13	1,668.91	1,668.91	1,433.76	1,425.44	0	0
St Vincent & Grenadines	6.70	5.98	0	0	5.80	5.80	0	0
Taiwan	581.80	581.80	54.43	54.43	582.66	582.66	37.67	37.67
Trinidad and Tobago	7.76	7.76	1.23	1.23	0	0	1.23	1.23
Tunisia	917.92	917.92	0	0	58.19	58.19	0	0
Turkey	402.40	375.96	0	0	402.40	375.96	0	0
United Kingdom	5.92	5.92	0.01	0	0.03	0.027	0	0
Venezuela	14.35	14.35	7.66	7.66	14.35	14.35	7.66	7.66

7 Conclusion

Across all fleets, 1,837.03 MT of SMA was reported from Task II catch-effort data in 2018, 1,655.23 MT in 2019 and 1,632.045 MT in 2020. For fleets which reported SMA catch by number only, a total of 15,280 SMA in 2018, 2,721 in 2019, and 2,160 in 2020 were reported. Across the period 2018-2020, SMA catch by weight was highest in the southeast quadrant of the ICCAT area. However, more variability was observed with SMA catch by number (this being reported by 3 flag-states), with the southwest quadrant having the highest reported SMA catch in 2018, switching to the northwest quadrant in 2019. It is likely that the considerable reduction in SMA catch (by number) reported by the flag-state Brazil over this period was the principal driver of this quadrant shift.

Multiple flag-states (20) reported catch of SMA in grid cells both intersecting EEZs and entirely on the high seas in the period 2018-2020. Due to the majority of SMA catch data being at 5°x5° gridded resolution, it was not possible to definitively calculate SMA catch within coastal-state EEZs, instead providing only an indication. Where concern is raised over possible SMA catch in association with specific coastal-state jurisdictions, and there is no presence of access agreements for reporting flag-states, more detailed data sources are required. Access to logbook data for accurate position of catch-effort and de-anonymising of catch data, together with VMS for ascertaining vessel position is potentially of use for coastal-states desiring to assess effort within their national boundaries.

Longline gears were the most frequently associated gears with SMA catch in the ICCAT area over the period 2018-2020, although several other gears were also reported such as bait boat, handline, gillnet, purse seine, trawl and trap. The flag-states Belize and South Africa reported SMA catch from grid cells entirely on land during the analysis years 2018 and 2019. It is unclear as the cause of this likely coordinates error; clarification should be sought from these flag-states.

When evaluating the comparability for trends shown between Task I and Task II data for SMA catch, data from 2018-2020 broadly indicated that Task II was an appropriate representative dataset for SMA catch in Task I data. However, on an individual flag-state level, some possible issues may be present, with Task II SMA being over- or underestimated. A more substantial issue was presented in 2018 by EU-Italy and Côte d'Ivoire, with no Task II data being available for these fleets in this year. It may be beneficial to seek clarification of the status of Task II data for these

fleets in 2018, and to establish reporting requirements for flag-states in general.

Some uncertainty was raised by Task II SMA catch reported by several flag-states (P.R. China, EU-Spain, EU-France), where fleets of considerable size reported very low SMA catch weight, particularly when compared against fleets of smaller or similar size which had reported much higher SMA catch (such as Canada and Côte d'Ivoire). While this very limited SMA catch may be due to variances in fishing practices between fleets, such as set depth for longline gears, this trend may also be a possible result of differences in reporting e.g. SMA being alternatively reported under "Other sharks". A similar set of circumstances may also underlie the considerable decrease in SMA catch, as reported by Brazil (12,298 in 2018 down to 1,025 in 2019), therefore clarification from flag-states as to changes in fishing practices or data collection may be of considerable benefit.

Absence of SMA catch in Task II data, or considerable under-representation, by some flag-states, as shown in the presented analysis was not indicative of non-compliant reporting. As stated by ICCAT regarding Task II data⁶, Task II catch and effort statistics (t2ce)

- The species catch coverage (proportion of the overall Task I catch represented by T2CE) can range from a minimum of 5% to almost 100% depending on many factors.
- In many datasets, there may be misreporting of the entire species composition (where bycatch species may be underrepresented) obtained by a given effort amount of fishing effort.
- Various datasets have already extrapolated (raised) species catches to the overall Task I catch, such that the original sampling coverage cannot be determined.

As a consequence, there are opportunities for considerable variability in the reporting of SMA catch between flag-states and across time periods, with implications for continued monitoring and assessment. Accordingly, it may be beneficial for Task II and individual-species reporting requirements to be tightened, with increased alignment within, and between, flag-states in the ICCAT region.

⁶ Information published on Task II - Catch & Effort (T2CE) <https://www.iccat.int/data/t2ce-eng.pdf>

Based on the presented analysis, the following recommendations are made:

- It is recommended that clarification be sought from ICCAT as to the differences in Task II annual data between dataset t2ce_20201218web, covering data up to and including 2019, and dataset t2ce_20220131we, containing data up to and including 2020.
- Where considerable increases or decreases in SMA catch are reported by flag-states, it is recommended that clarification be sought from flag-states as to whether this accurately represents a change in practice e.g. fishing depth, bycatch recording etc., or potentially catch by weight (in kilograms) being erroneously reported as number.
- It is recommended to seek clarification of the status of Task II data for several fleets. At the time of analysis, no Task II data was publicly available for some fleets from 2018 (Algeria, EU-Italy, Côte d'Ivoire, Grenada, Guyana, Liberia, Libya, Sao Tome & Principe), 2019 (Guyana, Liberia, Libya, Sao Tome & Principe) and 2020 (Grenada, Guyana, Liberia, St Kitts & Nevis). It is also recommended to seek clarification on reporting requirements for flag-states in general (Task I and Task II).
- For flag-states with unexpectedly low reported weights or numbers of SMA catch, it is recommended that checks be made as to how SMA is recorded by flag-states e.g. SMA reported under species code oSks ("Other sharks"). Appropriate sources of such information may include vessel log books.
- It is recommended to investigate the possible factors leading to the disparity in the relationship between SWO and SMA catch reported from longline gear by different flag-states. Further information such as catch area (to differentiate fishing grounds), and gear variations may provide information of additional trends and relationships.
- It is recommended that a review of reporting requirements for Task II data be considered, to increase alignment in reporting practices between flag-states.
- Where discrepancies appear in the form of grid cells entirely on land, in the case of flag-states Belize, and South Africa, it is recommended to seek clarification from flag-states as to the true location of this SMA catch in the ICCAT AOI. Appropriate sources may include vessel logbooks.
- Where SMA catch has been reported for grid cells entirely or partially within coastal-state EEZs, coastal-states may wish to review access agreements for relevant flag-state during the period 2018-2019.