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FISHERIES**

Oceanic whitetip and silky shark in longline fisheries between 20°N and 20°S and outside the area to evaluate CMM 2022-04

WCPFC-SC20-2024/EB-WP-05

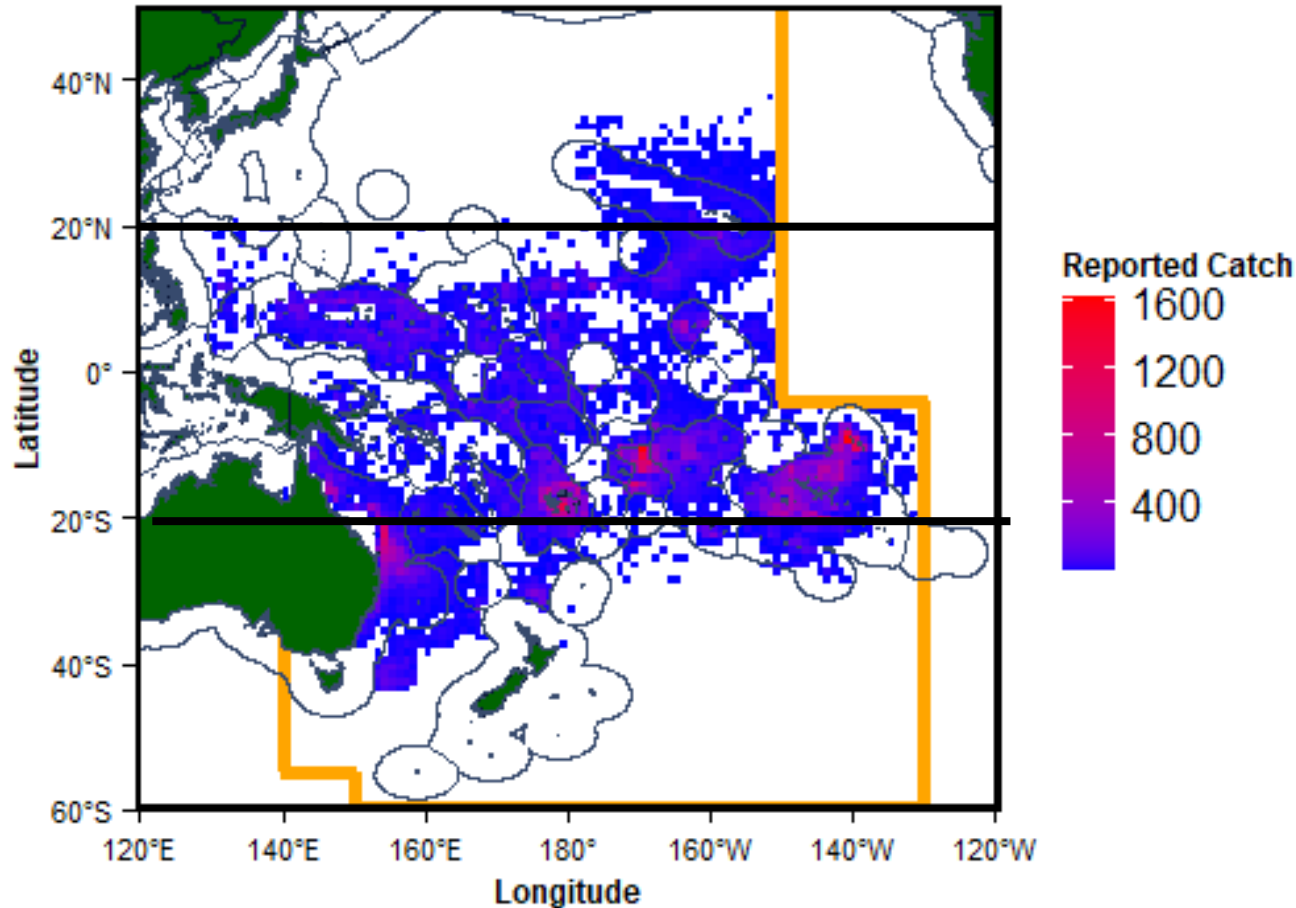
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# CMM 2022-04: CONSERVATION AND MANAGEMENT MEASURE FOR SHARKS

- Full utilization of shark and prohibition of finning
- Minimizing bycatch and practicing safe release
- Starting on January 1, 2024, between 20 N and 20 S, CCMs shall ensure that their longline vessels, targeting tuna and billfish do not use, or if carrying, must stow wire trace as branch lines or leaders and do not use shark lines or branch lines running directly off of the longline floats or drop lines

Paragraph 28. In 2024, and commencing periodically thereafter, the SC shall review the impact of fishing gear on sharks that are not retained, including oceanic whitetip shark and silky shark, inside and outside of the area between 20 N and 20 S, and provide advice on potential mitigation measures that would benefit such shark species.

Objective: Estimate CPUE from 2010 to 2023 for three spatial areas: 1) to the north of 20°N, 2) between 20°S and 20°N and 3) south of 20°S.



**WCPFC-SC20-2024/SA-IP-23**  
**(Brouwer et al.).** Longline oceanic whitetip shark catch in tonnes as reported on the available logsheets in the WCPFC Convention area 1995-2023.

# ROP data – 2010 – 2023, 16 members

## 116,153 sets

	Deep (hooks between floats =>15)			Shallow (hooks between floats <15)		
	Sets	OCS (number)	FAL (number)	Sets	OCS (number)	FAL (number)
north of 20°N	16,721	274	100	9,956	146	40
between 20°N and 20°S	75,820	6,929	25,970	4,076	167	1,321
south of 20°S	4,768	39	48	4,812	2	3
<b>Total</b>	<b>97,309</b>	<b>7,242</b>	<b>26,118</b>	<b>18,844</b>	<b>315</b>	<b>1,364</b>

Imbalance between observer coverage and longline effort.

**80.9% observed sets** are from China (12.1%), Taiwan (38.0%) and the USA (30.8%).

In contrast, these three flags represent **38.8% of longline effort (hooks)**. China (13.8%), Taiwan (20.4) and the USA (4.6%).

# Methods

- Data filtering removed 192 sets
- Estimated aggregate (2010-2023) CPUE (number per 1,000 hooks)

The objective of CMM 2022-04 is for the WCPFC Scientific Committee to review the impact of fishing gear on sharks inside and outside of the area between 20°N and 20°S. Given that the stratification of Peatman and Nicol (2020) is at 10°N and 10°S, the estimated catches from north of 20°N, 20°S-20°N and south 20°S are unknown.

- Annual nominal CPUE of OCS and FAL for the deep-set longline fisheries were applied to aggregated longline effort for all fleets in the L\_BEST strata to estimate OCS and FAL catches from north of 20°N, 20°N-20°S and south 20°S.
- Note that there is substantial variation in time, space, observer coverage, fleet and longline operational characteristics in the ROP data which results in uncertainty in catch estimation in using nominal or even a standardized CPUE analysis.

# Results – higher OCS & FAL CPUE in the spatial area 20°N to 20°S

## Times higher CPUE in 20°N to 20°S

	Deep	Shallow
OCS - north of 20°N	6.7	2.4
OCS - south of 20°S	12.2	Non-informative
FAL - north of 20°N	68.8	71.9
FAL - south of 20°S	37.1	Non-informative

- Relatively little trend in annual nominal CPUE from 2010 to 2023.

# Results – OCS comparison with Peatman & Nicol (2023) with CPUE and longline effort for all fleets

Year	OCS_nominal >20N	OCS_nominal_20N_20S	OCS_nominal >20S	Total	OCS_Peatman and Nicol 2023
2010	597	83,024		<b>83,621</b>	<b>59,500</b>
2011	1,103	56,232	0	<b>57,335</b>	<b>61,500</b>
2012	190	37,015	0	<b>37,205</b>	<b>63,200</b>
2013	330	40,640	0	<b>40,970</b>	<b>41,300</b>
2014	1,008	43,357	364	<b>44,728</b>	<b>35,700</b>
2015	803	52,744	1,908	<b>55,454</b>	<b>42,800</b>
2016	578	58,490	0	<b>59,069</b>	<b>33,800</b>
2017	371	35,854	84	<b>36,309</b>	<b>28,200</b>
2018	618	22,127	187	<b>22,931</b>	<b>26,200</b>
2019	2,077	28,531	338	<b>30,946</b>	<b>32,300</b>
2020	1,335	29,269	632	<b>31,236</b>	<b>33,600</b>
2021	609	36,214	0	<b>36,823</b>	<b>26,700</b>
2022	776	36,647	528	<b>37,950</b>	
2023	590	22,510	84	<b>23,185</b>	

- Average annual difference between methodologies was 4,319 higher OCS in this study.

# Results – FAL comparison with Peatman & Nicol (2023) with CPUE and longline effort for all fleets

Year	FAL_nominal_20N	FAL_nominal_20N_20S	FAL_nominal_20S	Total	FAL_Peatman and Nicol 2023
2010	0	74,721	0	<b>74,721</b>	<b>346,000</b>
2011	92	335,496	0	<b>335,588</b>	<b>369,000</b>
2012	63	178,568	0	<b>178,632</b>	<b>381,000</b>
2013	0	162,658	359	<b>163,018</b>	<b>162,000</b>
2014	48	146,707	727	<b>147,482</b>	<b>113,000</b>
2015	178	299,556	0	<b>299,735</b>	<b>152,000</b>
2016	170	328,863	0	<b>329,033</b>	<b>149,000</b>
2017	309	207,444	925	<b>208,677</b>	<b>134,000</b>
2018	238	156,907	653	<b>157,798</b>	<b>116,000</b>
2019	1,129	108,865	304	<b>110,299</b>	<b>123,000</b>
2020	377	61,306	194	<b>61,877</b>	<b>105,000</b>
2021	394	79,154	134	<b>79,682</b>	<b>69,700</b>
2022	148	62,295	0	<b>62,443</b>	
2023	433	33,912	168	<b>34,513</b>	

- The average annual difference between methodologies was 6,097 higher FAL in Peatman and Nicol (2023).



# Conclusions

- The area between 20°S to 20°N has higher nominal CPUE for both oceanic whitetip shark and silky shark which reflects the tropical habitat preference of each species.
- The higher silky shark CPUE between 20°S to 20°N reflects a latitudinal preference for a tropical habitat compared to an oceanic whitetip shark which has additional habitat to the north of 20°N and south of 20°S.
- If CMM 2022-04 were revised to extend to the north of 20°N and/or south of 20°S, the OCS population would benefit more than the FAL population.

# Recommendations – Future work

- There are several fleets that are not represented in the ROP data. The EU (Spanish) fleet should be informative for the south of 20°S stratum as the fleet has a shallow-set longline fishery that targets swordfish and blue shark. Currently the longline data format from the Spanish fleet requires additional work in order to be incorporated into the WCPFC database.
- Catches of OCS and FAL to the north of 20°N, 20°N-20°S and south 20°S were estimated from nominal CPUE. It would be advantageous to use the estimation procedures of Peatman and Nicol (2020, 2023) to stratify to the north of 20°N, 20°N-20°S and south 20°S for comparison with estimates in the current study. An alternative estimation procedure would provide catches in areas in order to assess impacts of additional spatial management.

# Recommendations – Future work

- Paragraph 28. In 2024, and commencing periodically thereafter, the SC shall **review the impact of fishing gear on sharks that are not retained**, including oceanic whitetip shark and silky shark, inside and outside of the area between 20 N and 20 S, and provide advice on potential mitigation measures that would benefit such shark species.
- If an analysis of impact is desired with a latitudinal extension of CMM 2022-04:
- 1) Use the anticipated 2025 OCS assessment and the variety of structural hypotheses and,
- 2) Update the projections (Rice et al. 2021, Bigelow et al. 2022) to assess the impacts and future fishing mortality on recovery timelines, with using catches from 20°N-20°S with mitigation (CMM 2022-04) and catches from the north of 20°N and south 20°S with and without mitigation.