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**Interactions with marine mammals, seabirds, reptiles,
other species of concern**

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Interactions with marine mammals, seabirds, reptiles (turtles), and other species of concern in bottom fisheries to 2019

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1. Purpose of paper

This paper summarises information available on interactions with marine mammals, seabirds, reptiles, and other species of concern in bottom fisheries to meet the requirements of CMM-03-2020. Possible advice to the Commission is proposed.

2. Requirements of CMM-03-2020 and CMM-02-2020

CMM-03-2020 has two paragraphs related to interactions with marine mammals, seabirds, reptiles, and other species of concern:

18. *Members and CNCPs shall require vessels flying their flag and undertaking bottom fishing to implement seabird mitigation measures in accordance with CMM 09-2017 (Seabirds), and shall report annually to the Commission on bycatch rates and total bycatch estimates in accordance with CMM 02-2020 (Data Standards) and the Guidelines for Annual National Reports to the SPRFMO Scientific Committee.*
19. *The Scientific Committee shall provide advice biennially to the Commission on:*
- a) Direct and indirect interactions between bottom fishing and marine mammals, seabirds, reptiles and other species of concern;*
 - b) Any recommended spatial or temporal closures or spatially/temporally limited gear prohibitions for any identified hotspots of these species; and*
 - c) Any recommended bycatch limits and/or measures for an encounter protocol for any of these species.*

The categories marine mammal, seabird and reptile are straightforward and CMM-02-2020 (at Annex 14) specifies other species of concern for the purpose of data collection (Table 1).

Table 1: Taxa specified as “other species of concern” for the purpose of data collection (as of January 2017) by Annex 14 of CMM02-2020.

Scientific name	English name	3-alpha (FAO) code
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	OCS
<i>Carcharodon carcharias</i>	Great white shark	WSH
<i>Cetorhinus maximus</i>	Basking shark	BSK
<i>Lamna nasus</i>	Porbeagle shark	POR
<i>Manta</i> spp.	Manta rays	MNT
<i>Mobula</i> spp.	Mobula nei	RMV
<i>Rhincodon typus</i>	Whale shark	RHN

3. Reported interactions

During the development of the cumulative bottom fishery impact assessment, Australia and New Zealand jointly requested information held by the Secretariat on reported interactions with marine mammals, seabirds, reptiles, and other species of concern. The extract was provided on 8 July 2020 and included observer data from 2007 to 2018 (except 2011 to 2015)

for Australia and from 2013 to 2018 for New Zealand, and fishing activity data from 2007 to 2019. Reporting or coding errors were identified in the data by checking detailed records and any photographs held by Australia and New Zealand and corrected. The remaining reported interactions are summarised in Table 2 with more detail in the Appendix on the changes made to the records held by SPRFMO.

Table 2: Summary (after detailed checking and correction) of seabirds, marine mammals, reptiles, and other species of concern reported or observed captured in bottom fisheries in the SPRFMO Area together with their IUCN threat classification categories. Reports from fishers (2007–2019) and observers (Australia 2007–2010 and 2016–2018, New Zealand 2013–2019) combined.

Common name	Scientific name	No. captures	IUCN category
Great-winged petrel	<i>Pterodroma macroptera gouldi</i>	4	Least Concern
Flesh-footed shearwater	<i>Puffinus carneipes</i>	3	Near Threatened
White-chinned petrel	<i>Procellaria aequinoctialis</i>	1	Vulnerable
Black petrel	<i>Procellaria parkinsoni</i>	1	Vulnerable
NZ white-faced storm petrel	<i>Pelagodroma marina maoriana</i>	1	Least Concern #
Gould's petrel	<i>Pterodroma leucoptera</i>	1	Vulnerable
Petrels & shearwaters nei	Procellariidae	2	NA
Black-browed or Campbell Island albatross	<i>Thalassarche melanophris</i> or <i>T. impavida</i>	1	Least Concern or Vulnerable #
Green turtle	<i>Chelonia mydas</i>	1	Endangered
Sea snakes nei	Elapidae	1	NA
Great white shark	<i>Carcharodon carcharias</i>	4	Vulnerable
Basking shark	<i>Cetorhinus maximus</i>	1	Endangered
Porbeagle shark	<i>Lamna nasus</i>	1	Vulnerable

IUCN threat classification based on a broader definition of the species than assumed in this table.

Marine mammals

The only record of any interaction with a marine mammal was the capture of 700 kg of decomposing bones from a dead baleen whale in a New Zealand bottom trawl.

Seabirds

Fourteen seabirds were reported as being captured by Australia and New Zealand combined. Of the 10 seabirds reported by observers, 7 were recorded as released alive (but with unknown prognosis). The life status of captures reported by fishers was not included in the extract. One of the two captures classified by an observer as a black (Parkinson's) petrel was later identified from a photograph as a white-chinned petrel by an expert. No photographs of the second were taken so there remains some uncertainty over its identification. One of the seabirds not identified to species was an albatross caught by bottom longline. The New Zealand code used to report this bird was XKM which denotes an unidentified "black-browed" albatross, i.e. either a black-browed albatross (IUCN threat classification Least Concern) or a Campbell Island albatross (IUCN threat classification Vulnerable). Three of the captured seabirds, possibly four (depending on the actual species of the albatross), were of species classified as Vulnerable by IUCN, the rest were either Near-Threatened or of Least Concern, or not identified to species level.

Reptiles

One sea snake and one turtle were recorded as captured. The turtle was recorded in the data extract as having been retained (weight 2 kg) but it is believed that it was actually discarded. The green turtle is classified as Endangered.

Other species of concern

Twelve sharks classified as being other species of concern were reported by fishers, five being discarded and seven being reported as retained. However, detailed inspection of records concluded that four reports of oceanic whitetip sharks (classified by IUCN as Critically Endangered) in 2018 and two reports of basking sharks (classified by IUCN as Endangered) in 2010 were erroneous. The oceanic whitetip sharks were miscoded reports of whitetip reef shark (*Triaenodon obesus*) and the basking sharks were miscoded or mis-punched reports of seal shark (*Dalatias licha*, New Zealand code BSH which is easily confused on hand-written forms with BSK for basking shark). Neither whitetip reef shark nor seal shark are classified as other species of concern. Of the remaining captures of other species of concern, basking sharks are classified Endangered and great white and porbeagle sharks are classified as Vulnerable.

4. Discussion of seabird interactions

No formal estimates of the total number of interactions have been made for either bottom line fisheries or trawl fisheries within the SPRFMO Area, but the frequency of bottom fishery interactions for all categories of marine mammals, seabirds, reptiles, and other species of concern are low. However, the numbers of interactions reported here cannot be interpreted as the total number of interactions or fatalities because only 10% observer coverage is required in line fisheries and fishers may not report all interactions.

To put these numbers of interactions in context, we compared them with recent estimates of the number of captures in surface longline fisheries in the southern hemisphere. Abraham et al. (2019) used surface longline data from Japan, South Africa, Australia and New Zealand together with seabird tracking data and separate estimates of catchability for each fleet to make preliminary estimates of seabird fatalities of 41,078 each year (95% c.i.: 39,432–42,746). Abraham et al.'s (2019) estimates did not include any estimates of cryptic mortality or survival of released seabirds. Based on these estimates, the total number of seabirds killed in SPRFMO bottom fisheries (line and trawl combined) would be orders of magnitude smaller than the numbers killed in pelagic longline fisheries.

New Zealand has been working on a spatial-overlap risk assessment for seabirds since 2013 (Richard & Abraham 2013, Sharp et al. 2013, Richard et al. 2020). The initial implementations of this risk assessment included commercial fisheries within New Zealand's EEZ but the analysis is being progressively extended to include commercial fishing elsewhere in the southern hemisphere (Abraham et al. 2017), starting with the much larger tuna longline fisheries. The spatial-overlap approach should allow better estimates of fatalities and risk to seabirds associated with bottom fisheries, including for species of serious conservation concern such as Antipodean albatross. It is envisaged that information from SPRFMO bottom

fisheries will be included in the southern hemisphere risk assessment for seabirds in the coming 2–3 years.

The cumulative bottom fishery impact assessment (Australia and New Zealand 2020) notes that CMM 09-2017 specifies measures that are close to global best practice for mitigating interactions with seabirds and it is encouraging that the numbers of seabirds reported by fishers and observers is low. However, given that these fisheries overlap the foraging distributions of so many highly vulnerable seabirds, it is important to continue observation and monitoring to ensure the measure is complied with and updated as new information on best practice mitigation is developed.

5. Processes for verifying records and updating databases

The 27 records in the extract of SPRFMO's databases covered 29 reported captures of marine mammals, seabirds, reptiles or other species of concern. Of these 27 records, eight (30%) were found through detailed inspection of Australian or New Zealand records to be erroneous or potentially misleading. The one record of a marine mammal interaction was found to entail the capture of a large weight of decomposing remains and should not be considered as a capture of a marine mammal in the fishery. Two seabird captures were reclassified to another species or group with no impact on the total number of marine mammals, seabirds, reptiles and other species of concern assessed as having been captured. Six reported captures of sharks of concern were reclassified as other species, and these appear to be mis-coding errors.

The relatively high proportion of differences between SPRFMO and Members' data holdings and records on bottom fisheries interactions with marine mammals, seabirds, reptiles or other species of concern suggests that processes for verification of records and updating of databases need to be strengthened. Members conducting bottom fisheries are probably best equipped to undertake this verification and checking because they have direct access to the necessary logbooks, observer reports, and photographs not available to the SPRFMO secretariat. Both Australia and New Zealand already carry out substantial checking and correction of errors in data from vessels flying their flag, but some errors probably remain. One possible process for identifying and correcting errors in records of captures of marine mammals, seabirds, reptiles or other species of concern would be for the secretariat to periodically provide an extract of their relevant data holdings to Members who could conduct the types of checks described in this paper and communicate any necessary corrections back to the secretariat.

6. Acknowledgments

We thank Australia for permission to use their data in this paper.

7. Recommendations

It is recommended that the Scientific Committee:

- **Notes** that interactions with marine mammals, seabirds, reptiles, and other species of concern are rare in bottom fisheries;
- **Agrees** that no further actions or management measures are required at this time;
- **Agrees** that monitoring of the implementation and effectiveness of mitigation approaches should continue, including periodic review of mitigation measures applied by other RFMOs and CCAMLR or advised by ACAP, to ensure best practice and consistent or complementary arrangements;
- **Agrees** that periodic exchanges of information held in SPRFMO databases with Members who submitted the data would assist in the maintenance of an accurate record of captures of marine mammals, seabirds, reptiles or other species of concern in fisheries in the SPRFMO Convention Area;
- **Agrees** that information collection and checking should continue with a view to including information from SPRFMO bottom fisheries in the Southern Hemisphere Seabird Risk Assessment.

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Appendix: reported interactions (SPRFMO database) of bottom fisheries with marine mammals, seabirds, reptiles and other species of concern

Flag	Method	Date	Area	Target	Capture	Scientific name	Common name (no. discarded or kg retained)	Revised classification
AU (F)	Line	Apr-2015	Gascoyne	MZZ	PRX	Procellariidae	Petrels and shearwaters nei (1 discarded)	No change
AU (F)	Line	Oct-2016	Gascoyne	MZZ	PFC	<i>Puffinus carneipes</i>	Flesh-footed shearwater (1 discarded)	No change
AU (F)	Line	Jun-2016	Capel Bank	MZZ	TUG	<i>Chelonia mydas</i>	Green turtle (2 kg retained)	No change
AU (F)	Line	Jul-2016	Capel Bank	MZZ	EZZ	Elapidae	Sea snakes nei (1 discarded)	No change
NZ (F)	Trawl	May-2010	Challenger	ORY	BSK	<i>Cetorhinus maximus</i>	Basking shark (60 kg retained)	Deleted, seal shark
NZ (F)	Trawl	Nov-2010	Challenger	ORY	BSK	<i>Cetorhinus maximus</i>	Basking shark (180 kg retained)	Deleted, seal shark
NZ (F)	Line	Oct-2015	Challenger	BWA	POR	<i>Lamna nasus</i>	Porbeagle (20 kg retained)	No change
AU (F)	Line	Jun-2016	Capel Bank	MZZ	WSH	<i>Carcharodon carcharias</i>	Great white shark (1 discarded)	No change
AU (F)	Line	Jun-2016	Capel Bank	MZZ	WSH	<i>Carcharodon carcharias</i>	Great white shark (1 discarded)	No change
AU (F)	Line	Aug-2016	Capel Bank	MZZ	WSH	<i>Carcharodon carcharias</i>	Great white shark (1 discarded)	No change
AU (F)	Line	Aug-2017	Capel Bank	MZZ	WSH	<i>Carcharodon carcharias</i>	Great white shark (1 discarded)	No change
AU (F)	Line	Jul-2018	Capel Bank	MZZ	OCS	<i>Carcharhinus longimanus</i>	Oceanic whitetip shark (5 kg retained)	Deleted, white-tip reef shark
AU (F)	Line	Jul-2018	Capel Bank	MZZ	OCS	<i>Carcharhinus longimanus</i>	Oceanic whitetip shark (5 kg retained)	Deleted, white-tip reef shark
AU (F)	Line	Aug-2018	Capel Bank	MZZ	OCS	<i>Carcharhinus longimanus</i>	Oceanic whitetip shark (7 kg retained)	Deleted, white-tip reef shark
AU (F)	Line	Aug-2018	Capel Bank	MZZ	OCS	<i>Carcharhinus longimanus</i>	Oceanic whitetip shark (9 kg retained)	Deleted, white-tip reef shark
AU (F)	Trawl	Sep-2019	Challenger	MZZ	BSK	<i>Cetorhinus maximus</i>	Basking shark (1 discarded)	No change
AU (O)	Line	Mar-2008	Capel Bank	LHI	PFC	<i>Puffinus carneipes</i>	Flesh-footed shearwater (2 discarded)	No change
NZ (O)	Line	Oct-2014	Three Kings	BWA	PWA	<i>Pterodroma leucoptera</i>	Gould's Petrel (1 discarded)	No change
NZ (O)	Trawl	Dec-2015	Lord Howe	EPI	PDM	<i>Pterodroma macroptera</i>	Great-winged petrel (2 discarded)	No change
NZ (O)	Trawl	Mar-2016	Challenger	ORY	WFS	<i>Pelagodroma marina</i>	White-faced storm petrel (1 discarded)	No change
NZ (O)	Trawl	Jul-2017	Louisville	ORY	PRX	Procellariidae	Petrels and shearwaters nei (1 discarded)	No change
NZ (O)	Trawl	Nov-2017	Lord Howe	ALF	PDM	<i>Pterodroma macroptera</i>	Great-winged petrel (1 discarded)	No change
NZ (O)	Trawl	Oct-2018	Lord Howe	ALF	PDM	<i>Pterodroma macroptera</i>	Great-winged petrel (1 discarded)	No change
NZ (O)	Line	Nov-2018	West Norfolk	HAU	PRK	<i>Procellaria parkinsoni</i>	Parkinson's petrel (1 discarded)	White-chinned petrel
NZ (O)	Line	Nov-2018	West Norfolk	HAU	ALZ	Diomedidae	Albatrosses nei (1 discarded)	Unidentified "black-browed"
NZ (O)	Line	Nov-2018	West Norfolk	HAU	PRK	<i>Procellaria parkinsoni</i>	Parkinson's petrel (1 discarded)	No change
NZ (O)	Trawl	Dec-2015	Challenger	ORY	MYS	Mysticeti	Baleen whales nei	Deleted, decomposing

O = reported by observer, F = reported by fisher