Fisheries New Zealand
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Analysis of differences in bycatch rates between fleets

New Zealand

Prepared for the 13th Meeting of the Ecologically Related Species Working Group (ERSWG13) of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

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Contents

1 Background

During the last Ecologically Related Species Working Group (ERSWG12), participants agreed there was a need for collaborative analysis to identify the reasons for large differences in seabird bycatch rates between fleets. The need for the analysis was identified during the discussion on Members' Annual Reports.[1]

> ***There were large differences in bycatch rates among fleets. Participants agreed there was a need for collaborative analysis to identify the reasons for these differences, including the effects of different areas and seasons.***

Birdlife International reported that the need for this analysis had also been identified in a Common Oceans workshop during 2017.[2]

> ***The workshop also identified that where fleets differ in their bycatch rates, it would be highly valuable to have collaborative analyses to identify the factors causing these differences.***

2 Introduction

At ERSWG12, New Zealand agreed to lead this workplan item, with collaboration from all Members, prior to the 13th Ecologically Related Species Working Group (ERSWG13) meeting.

On 8 February 2019, New Zealand, via the Secretariat, circulated a request to Members to populate an expanded version of Table 1 of the ERSWG report template for seabirds (provided in the Appendix).

Table 1 of the ERSWG report template already captures potential effects of area upon seabird bycatch rates based on CCSBT statistical area[3]. In order to capture potential effects of seasons and mitigation measures, New Zealand requested additional information that attributed seabird captures to yearly quarters and mitigation measures set up.

3 Results and discussion points

The additional information requested was for the three most recent completed calendar years (2016, 2017, and 2018). The information was provided by the fishing entity of Taiwan, Australia, Indonesia, and New Zealand.

The data received was collated and summarised in terms of areas, seasons, and mitigation measures set-up (see section 5.3 in the Appendix). General observations and discussion points are provided below based on the information received.

3.1 THE EFFECTS OF DIFFERENT AREAS

The potential effects of different areas can be observed by attributing observed seabird captures to the areas of capture (see Appendix 5.2, **Table 1**, **Table 2**, and **Table 3**). Seabird bycatch per unit effort (BPUE), in terms of observed captures and observed effort, was calculated in order to standardise capture numbers for comparison.

[1] Paragraph 8, agenda item 2, 'Report of The Twelfth Meeting of the Ecologically Related Species Working Group', 21-24 March 2017 Wellington, New Zealand
[2] Paragraph 12, agenda item 3, 'Report of The Twelfth Meeting of the Ecologically Related Species Working Group', 21-24 March 2017 Wellington, New Zealand
[3] A map of the CCSBT statistical areas is provided in the appendix, in section 5.2.

Analysis was restricted to areas where fishing takes place by Members who were able to provide the information requested. Based on this information, there is indication that there is higher risk of seabird capture in area 6.

3.2 THE EFFECTS OF DIFFERENT SEASONS

The potential effects of different seasons can be observed by attributing observed seabird captures to yearly quarter of capture (see **Table 4**, **Table 5**, and **Table 6**).

Members were not asked to attribute observed effort to yearly quarters as part of the initial request. However, calculating seabird BPUE, in terms of observed captures and observed effort, would be beneficial in order to standardize capture numbers for comparison.

Analysis was restricted to capture data provided by Members who were able to provide the information requested. Based on this information, there is indication that there is higher risk of seabird capture in quarter 2 (April, May, June).

3.3 THE EFFECTS OF MITIGATION MEASURES

The potential effects of different mitigation measures can be observed by attributing observed effort and observed seabird captures to each mitigation measure set up (see **Table 7**, **Table 8**, and **Table 9**). Seabird BPUE was calculated in order to standardise capture numbers for comparison.

One submitter did not attribute proportion of observed effort to mitigation set ups, and therefore this analysis only includes information from three Members.

Based on the information provided, there is indication that there is higher risk of seabird capture when night setting only is used.

4 Conclusion

Although patterns were seen in the data provided, New Zealand is not in a position to provide a strong hypothesis on the potential drivers behind the large differences in capture rates between all fleets based on the data available. Regretfully, it is acknowledged that the analysis was severely restricted by the missing data, to the point where meaningful conclusions could not be drawn.

New Zealand wishes to thank the Members that were able to provide the additional information requested. New Zealand continues to support the conclusion reached at ERSWG12 that this sort of analysis would benefit future conversations on seabird bycatch management.

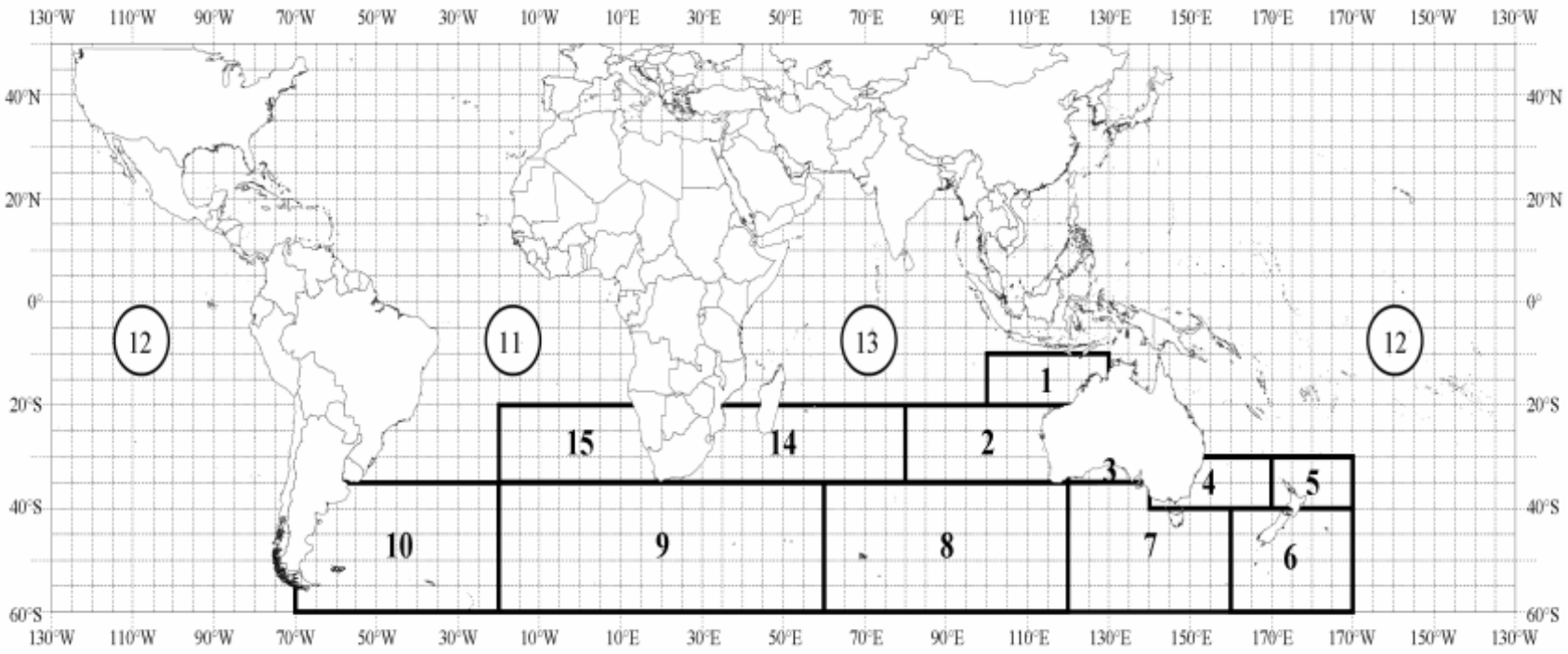
5 Appendix

5.1 EXPANDED VERSION OF TABLE 1 OF THE ERSWG REPORT TEMPLATE

	Fishing effort and seabird captures in CCSBT longline fisheries.						Member:		Calendar year: [1]								
	Total & observed effort			Observed seabird captures					Proportion of observed effort with specific mitigation measures [6]					Number of observed captures with specific mitigation measures [6]			
Stratum *(CCSBT statistical areas or finer scale)*	Total effort[2]	Total observed effort [3]	Observer coverage *(percentage of effort observed)*	Captures *(number)*	Captures per yearly quarter [4]				TP + NS	TP + WB	NS + WB	TP + WB + NS	Others[7]	TP + NS	TP + WB	NS + WB	TP + WB + NS	Others[7]
					Q1	Q2	Q3	Q4										
TOTAL																		

[1] Please provide information for the three most recent calendar years that data is available for.
[2] Provide longline effort by number of hooks.
[3] Provide observed longline effort by number of hooks observed.
[4] Provide captures per yearly quarter, Q1: January to March, Q2: April to June, Q3: July to September, Q4: October to December
[5] Total mortalities should be estimated using either a simple ratio or another approach such as modeling. If using an approach other than a simple ratio, the method used to estimate total mortalities should be described in detail within the report and
[6] TP = tori poles, NS = night setting, WB = weighted branchline.
[7] Add extra columns for other categories of mitigation measures, including use of no mitigation measures, if required.

5.2 MAP OF CCSBT STATISTICAL AREAS



5.3 TABLES

Table 1: Potential effect of areas on seabird captures during 2016. For each area where there was observed effort, total observed effort and total observed seabird captures have been used to calculated bycatch per unit effort (BPUE) (in terms of 1000s of hooks). The table does not include information from Japan, Korea, South Africa, and the European Union.

Area	Total observed effort	Total observed seabird captures	BPUE
1	95167	0	0
2	865523	6	0.007
4	44795	0	0
5	138694	5	0.036
6	129930	110	0.847
7	7277	0	0
8	338272	10	0.030
9	16762	1	0.060
14	617700	2	0.003

Table 2: Potential effect of areas on seabird captures during 2017. For each area where there was observed effort, total observed effort and total observed seabird captures have been used to calculated BPUE (in terms of 1000s of hooks). The table does not include information from Japan, Korea, South Africa, and the European Union.

Area	Total observed effort	Total observed seabird captures	BPUE
1	32212	0	0
2	929483	24	0.026
4	37420	0	0
5	149174	5	0.034
6	127997	39	0.305
7	13981	2	0.143
8	338272	4	0.012
9	16762	0	0
14	617700	2	0.003

Table 3: Potential effect of areas on seabird captures during 2018. For each area where there was observed effort, total observed effort and total observed seabird captures have been used to calculated BPUE (in terms of 1000s of hooks). The table does not include information from Japan, Korea, South Africa, and the European Union.

Area	Total observed effort	Total observed seabird captures	BPUE
1	160686	6	0.037
2	677344	4	0.006
4	69599	1	0.014
5	155323	1	0.006
6	76580	80	1.045
7	900	0	0
8	573532	10	0.017
9	231148	2	0.009
14	752571	1	0.001

Table 4: Potential effect of seasons on seabird captures during 2016. Total observed seabird captures have been apportioned to their area and yearly quarter of capture. The table does not include information from Japan, Korea, South Africa, and the European Union. There was no observed effort in areas 3, 10, 11, 12, and 13.

Area	Total observed seabird captures in quarter 1	Total observed seabird captures in quarter 2	Total observed seabird captures in quarter 3	Total observed seabird captures in quarter 4
1	0	0	0	0
2	0	3	3	0
4	0	0	0	0
5	0	5	0	0
6	0	110	0	0
7	0	0	0	0
8	0	10	0	0
9	0	1	0	0
14	0	1	1	0

Table 5: Potential effect of seasons on seabird captures during 2017. Total observed seabird captures have been apportioned to their area and yearly quarter of capture. The table does not include information from Japan, Korea, South Africa, and the European Union. There was no observed effort in areas 3, 10, 11, 12, and 13.

Area	Total observed seabird captures in quarter 1	Total observed seabird captures in quarter 2	Total observed seabird captures in quarter 3	Total observed seabird captures in quarter 4
1	0	0	0	0
2	0	5	0	19
4	0	0	0	0
5	1	4	0	0
6	0	39	0	0
7	0	0	0	2
8	0	4	0	0
9	0	0	0	0
14	0	1	1	0

Table 6: Potential effect of seasons on seabird captures during 2017. Total observed seabird captures have been apportioned to their area and yearly quarter of capture. The table does not include information from Japan, Korea, South Africa, and the European Union. There was no observed effort in areas 3, 10, 11, 12, and 13.

Area	Total observed seabird captures in quarter 1	Total observed seabird captures in quarter 2	Total observed seabird captures in quarter 3	Total observed seabird captures in quarter 4
1	0	0	2	4
2	1	0	2	1
4	0	0	1	0
5	0	1	0	0
6	0	80	0	0
7	0	0	0	0
8	6	4	0	0
9	0	2	0	0
14	0	0	1	0

Table 7: Potential effect of mitigation measures on seabird captures during 2016. For each mitigation method, total observed effort and total observed seabird captures have been used to calculated BPUE (in terms of 1000s of hooks). The table does not include information from Japan, Korea, South Africa, and the European Union, and does not include effort information from one submitter due to observed effort not being apportioned to mitigation set up.

Mitigation set up*	Total observed effort	Total observed seabird captures	BPUE
TP + NS	1788439	72	0.040
TP + WB	187265	2	0.011
NS + WB	0	0	0
TP + WB + NS	1032227	13	0.013
TP only	5894	0	0
NS only	69107	47	0.680
NIL	971	0	0

*TP = tori poles, NS = night setting, WB = weighted branch lines, NIL is no mitigation measures.

Table 8: Potential effect of mitigation measures on seabird captures during 2017. For each mitigation method, total observed effort and total observed seabird captures have been used to calculated BPUE (in terms of 1000s of hooks). The table does not include information from Japan, Korea, South Africa, and the European Union, and does not include effort information from one submitter due to observed effort not being apportioned to mitigation set up.

Mitigation set up	Total observed effort	Total observed seabird captures	BPUE
TP + NS	1777735	51	0.029
TP + WB	65977	0	0
NS + WB	0	0	0
TP + WB + NS	306558	5	0.016
TP only	11040	0	0
NS only	5519	1	0.181
NIL	0	0	0

Table 9: Potential effect of mitigation measures on seabird captures during 2018. For each mitigation method, total observed effort and total observed seabird captures have been used to calculated BPUE (in terms of 1000s of hooks). The table does not include information from Japan, Korea, South Africa, and the European Union, and does not include effort information from one submitter due to observed effort not being apportioned to mitigation set up.

Mitigation set up	Total observed effort	Total observed seabird captures	BPUE
TP + NS	2032910	61	0.030
TP + WB	53988	1	0.019
NS + WB	4109	0	0
TP + WB + NS	403927	35	0.087
TP only	932	0	0
NS only	6679	0	0
NIL	0	0	0
Other	14252	0	0