Agreement on the Conservation of Albatrosses and Petrels

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Developing Ocean Zones for the Seabird-Safe Fishing Toolkit

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SUMMARY

The Seabird-Safe Fishing Toolkit aims to make evidence-based information available to assist tuna companies and those supporting them. This includes zoning of the world's oceans according to the seabird species present, their threat status, and vulnerability to longline fishing bycatch. We provide an update on work undertaken to develop these ocean zones and describe the methods used. Results are presented for the Pacific Ocean on constituent layers to identify areas where i) birds of high conservation status are present (threaten species layer), ii) high species diversity occurs (species diversity layer) and, iii) where *Procellaria* petrels are present (*Procellaria* petrel layer). We also present initial overall ocean zones, which provide a comprehensive yet simple assessment and categorisation of relative risk of bycatch to ACAP species across the Pacific. We further outline the range of current limitations with the data and methods and discuss future potential development to enhance the assessment. We intend to continually improve the input data and methods used to describe ocean zones and welcome active collaboration with researchers and others involved in the collection and analysis of seabird distribution data.

1. INTRODUCTION

This paper describes part of the work undertaken to develop the Seabird-Safe Fishing Toolkit (hereafter "the toolkit") by the Southern Seabirds Trust in partnership with the New Zealand Department of Conservation, as described by Molloy et al (2024) in SBWG12 Doc 14. The toolkit was developed in recognition that there are solutions available to reduce captures of seabirds, but that these solutions are not being widely adopted on the water. Initial research revealed that a key challenge is that the best available information about how to reduce bycatch and verify good practices is fairly inaccessible for tuna businesses. The objective of the toolkit was therefore to make evidence-based information available to assist tuna companies and those supporting them.

The scope of the toolkit focuses on large vessel pelagic longline fisheries and threatened seabirds globally. To operationalise the scope of the toolkit in terms of seabird species considered this was defined as all ACAP-listed species. One element of the information to be provided by the toolkit was zoning of the world's oceans according to the seabird species present, their threat status, and vulnerability to longline fishing.

This paper provides an update on work undertaken to develop these ocean zones, describes the methods used, outlines the range of current limitations with the data and methods, and discusses future potential development to enhance the assessment. The ocean zones form a critical component of the toolkit as the seabird-safe level of different bycatch mitigation options are assessed according to the ocean zone of a fishing operation. To understand how seabird-safe their fishing is, fishing companies can use the toolkit maps to identify the ocean zone in which their fishing operations occur and what practices will achieve seabird-safety in their ocean zone.

At the time of writing, toolkit project development is active, and it is important to note that the methods we describe here, in particular the criteria for categorising threatened species occurrence, species diversity and *Procellaria* petrel occurrence are still working definitions and subject to improvement.

Input from PaCSWG and SBWG is welcomed as we continue to refine our work to provide simple, robust and comprehensive information on these ocean zones.

2. METHODS

The toolkit ocean zones provide a simple delineation of ocean areas into zones of high, medium and low risk of bycatch of ACAP-listed species by large vessel pelagic longline fisheries. These zones were defined around three separate aims to identify areas where i) birds of high conservation status are present (threaten species layer), ii) high species diversity occurs (species diversity layer) and, iii) where *Procellaria* petrels are present (*Procellaria* petrel layer). The *Procellaria* petrel layer was included due to the important role that *Procellaria* petrels can play, through their aggressive feeding and diving capabilities, in increasing the availability of baited hooks available to other seabirds such as albatross species (Jiménez et al 2012).

A key over-arching objective of the toolkit is to make information readily available and easy to understand. To achieve this for the complex spatial data used, each constituent layer was categorised into simple high, medium and low categories using the criteria outlined below.

In order to share the resulting spatial data with toolkit users a dedicated SeaSketch (https://www.seasketch.org/) project was developed. This platform was chosen for its simple and intuitive user experience, flexibility and ease of adding additional relevant data layers such as boundaries of fisheries management areas.

Table 1. The seabird species in scope of the toolkit, their IUCN Red List status and the number of island groups for which tracking data was available to us compared to the total number of Island Groups where that species breed. CR = Critically Endangered, EN = Endangered; VU = Vulnerable; NT = Near Threatened, LC = Least Concern. Island groups are as defined by ACAP (https://data.acap.aq/). Island groups with breeding populations of <10 pairs were excluded from totals. Data from species in bold are included in the ocean zones illustrated in this paper.

Species	IUCN status	*n* tracked island groups		Total island groups
		Adult	Juv/Imm	
Northern Royal Albatross	**EN**	**2**	**1**	**2**
Southern Royal Albatross	**VU**	**1**	**0**	**2**
Wandering Albatross	VU	4	0	4
Antipodean Albatross	**EN**	**1**	**1**	**1**
Gibson's Albatross	**EN**	**1**	**1**	**1**
Amsterdam Albatross	**EN**	**1**	**1**	**1**
Tristan Albatross	CR	1	1	1
Sooty Albatross	EN	3	2	5
Light-mantled Albatross	NT	4	0	9
Waved Albatross	**CR**	**1**	**0**	**1**
Black-footed Albatross	**NT**	**1**	**1**	**5**
Laysan Albatross	**NT**	**1**	**0**	**5**
Short-tailed Albatross	**VU**	**1**	**0**	**2**
Atlantic Yellow-nosed Albatross	EN	2	0	2
Indian Yellow-nosed Albatross	EN	2	0	4
Grey-headed Albatross	**EN**	**5**	**1**	**7**
Black-browed Albatross	**LC**	**7**	**2**	**14**
Campbell Albatross	**VU**	**1**	**0**	**1**
Northern Buller's Albatross	**NT**	**1**	**1**	**1**
Southern Buller's Albatross	**NT**	**2**	**1**	**2**
Shy Albatross	**NT**	**1**	**1**	**1**
White-capped Albatross	**NT**	**1**	**0**	**2**
Chatham Albatross	**VU**	**1**	**0**	**1**
Salvin's Albatross	**VU**	**1**	**0**	**2**
Southern Giant Petrel	**LC**	**6**	**3**	**22**
Northern Giant Petrel	**LC**	**2**	**3**	**9**
White-chinned Petrel	**VU**	**6**	**2**	**8**
Spectacled Petrel	VU	1	0	1
Black Petrel	**VU**	**1**	**0**	**1**
Westland Petrel	**EN**	**1**	**0**	**1**
Grey Petrel	**NT**	**3**	**0**	**8**
Pink-footed shearwater	VU	0	0	2
Balearic Shearwater	CR	1	1	1

2.1. Species distributions

The species distributions used to develop the ocean zones were based on tracking data deposited in the BirdLife Seabird Tracking Database (http://seabirdtracking.org/) as requested and downloaded by ACAP and BirdLife International (BLI) in late 2023 for the primary purpose of updating the ACAP Species Assessment distribution maps. The request to data owners specified the intended use of resulting maps in the toolkit, and a further update on the development of the toolkit has been provided to data owners for species listed in bold in Table 1. The tracks included data collected by a variety of devices, including Global Positioning System (GPS) loggers, Platform Terminal Transmitters (PTTs) and Global Location Sensor (GLS) loggers. The data obtained is summarised in Appendix 1. Further to this data request we have worked to add additional recent tracking data for a range of New Zealand breeding species.

All 31 ACAP-listed species are shown in Table 1. We treated Antipodean (*Diomedea antipodensis antipodensis*), Gibson's (*D. a. gibsoni*), Southern Buller's (*Thalassarche bulleri bulleri*) and Northern Buller's (*T. b. platei*) albatrosses as separate taxa, giving a total of 33 taxa in Table 1. Individual species maps that combined all available data for each species were developed using the methodology described by Fischer et al (2024) in PaCSWG Doc 03. To prioritise our workload, we initially focussed on species found in the Pacific Ocean, and at the time of writing those species shown in bold in Table 1 have been processed and included in the resulting ocean zone maps shown here. We therefore only illustrate the ocean zones for the Pacific Ocean while we continue to expand processing data for the remaining species necessary to generate global ocean zones.

Whilst the data used represents the most complete input data set we could access within the time bounds of the project, it is important to note that there are other existing data sets (mostly data sets that have not yet been deposited in the BirdLife Seabird Tracking Database) and that there remain gaps in collective tracking effort. In particular, there remain colonies of some species which have never been tracked, and life-history states that have not been tracked at numerous colonies, particularly juvenile and immature birds. The availability of data to us by island group and life-history stage is summarised in Table 1.

2.2. Threatened species layer

Using the individual distributions of all species, each species was classified according to its IUCN Red List status (Table 1). To identify where threatened species occur, areas were classified according to the following working definitions:

a. High occurrence – ocean areas within the combined 95% distribution kernels of all critically endangered species, 75% distribution kernels of all endangered species and 50% distribution kernels of vulnerable species.

b. Medium occurrence – ocean areas outside of the high occurrence areas and within the combined area of 99% distribution kernels of critically endangered species, 95% distribution kernels of endangered species and 75% distribution kernels of vulnerable species.

c. Low occurrence – ocean areas outside of high and medium occurrence areas.

2.3. Species diversity layer

Using the individual distributions of all species, areas of high diversity were classified according to the following working definitions:

a. High diversity – ocean areas where either the 50% distribution kernels of two or more species overlap, the 75% distribution kernels of three or more species overlap or the 95% distribution kernels of four or more species overlap.

b. Medium diversity – ocean areas outside of high diversity areas where ether the 75% distribution kernels of two or more species overlap, the 95% distribution kernels of three or more species overlap or the 99% distribution kernels of four or more species overlap.

c. Low diversity – ocean areas outside of high and medium diversity areas.

2.4. *Procellaria* petrel layer

Individual utilization distributions of the four *Procellaria* petrel species were merged into a single utilization, with each component species contribution weighted according to population size. The resulting distribution shows the relative occurrence of *Procellaria* petrels of any species and was classified according to the following working definitions:

a. High *Procellaria* occurrence – ocean areas within the 75% distribution kernel of combined *Procellaria* species.

b. Medium *Procellaria* occurrence – ocean areas outside of high *Procellaria* occurrence and within the 75% distribution kernel of combined *Procellaria* species.

c. Low *Procellaria* occurrence – ocean areas outside of high and medium *Procellaria* occurrence.

2.5. Ocean zones

The overall ocean zones, indicative of relative risk of bycatch of ACAP species, were then developed by merging each of the three component layers, and classified accordingly:

a. High risk zone – ocean areas where there is high threatened species occurrence, high species diversity or high *Procellaria* occurrence.

b. Medium risk zone – ocean areas outside of high risk areas where there is medium threatened species occurrence, medium species diversity or medium *Procellaria* occurrence.

c. Low risk zone – ocean areas outside of high and medium risk areas.

3. RESULTS

All key spatial layers will be available for users to access in the SeaSketch mapping tool. An example species distribution is shown in Fig 1, with three levels of occurrence likelihood based on the 75%, 95% and 99% kernel distributions.

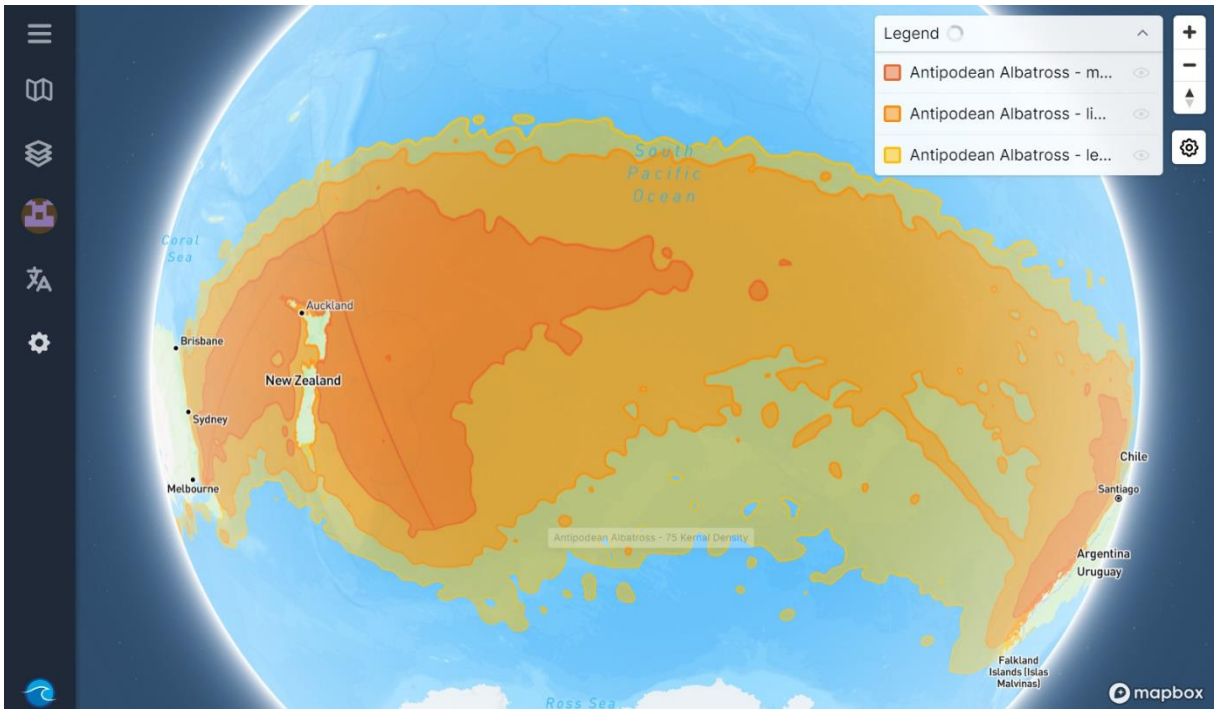

Figure 1. Distribution of Antipodean albatross as shown in the SeaSketch mapping tool.

Example views of the component layers of threatened species occurrence, species diversity and *Procellaria* petrel occurrence are shown in Figures 2-4.

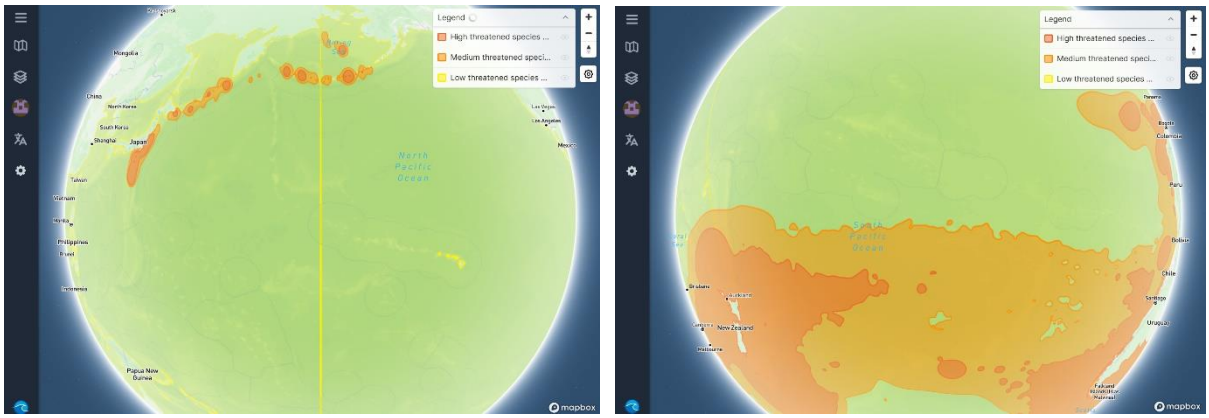

Figure 2. Threatened species occurrence for the North (left) and South (right) Pacific Ocean, as shown in the SeaSketch mapping tool.

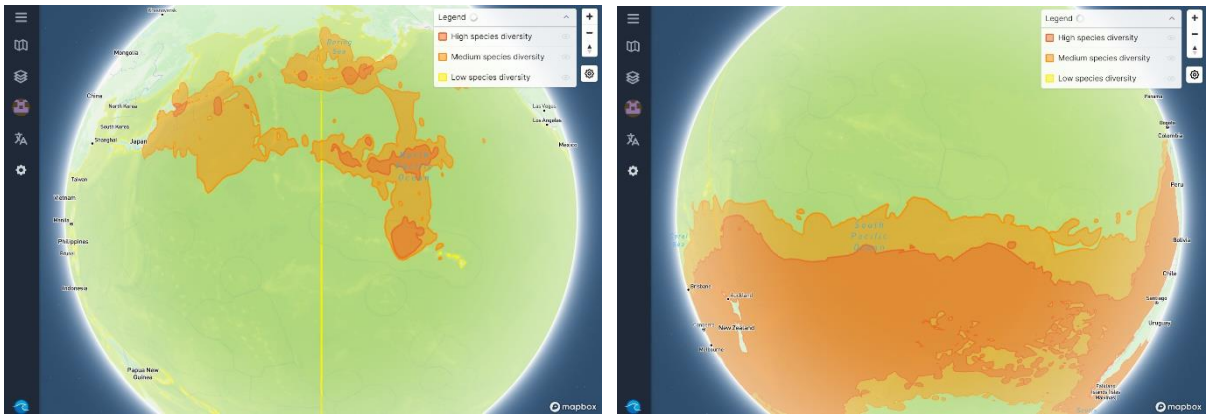

Figure 3. Species diversity for the North (left) and South (right) Pacific Ocean, as shown in the SeaSketch mapping tool.

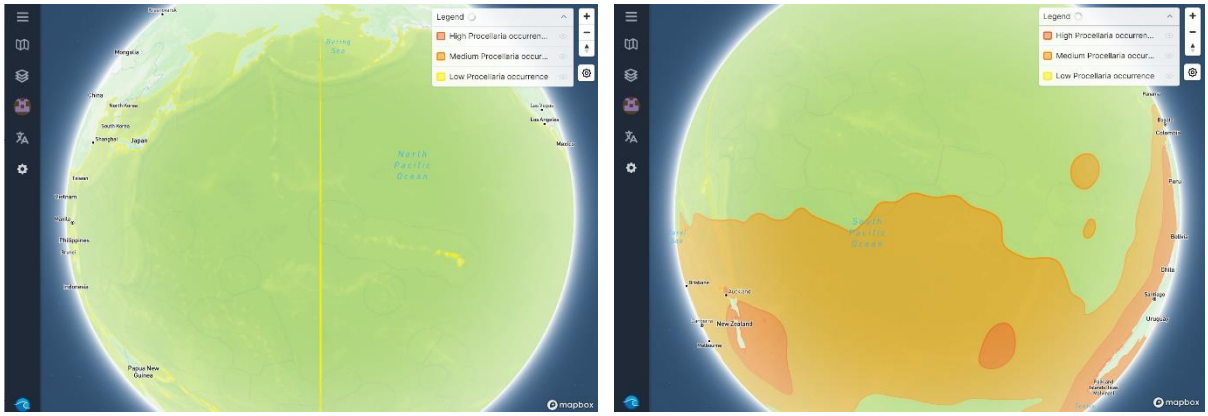

Figure 4. *Procellaria* petrel occurrence for the North (left) and South (right) Pacific Ocean, as shown in the SeaSketch mapping tool.

The component layers shown in Figures 2-4 are clearly related and dependent, with certain core ocean areas having high threatened species occurrence, high species diversity and high *Procellaria* petrel occurrence. This provides confidence in identifying overall ocean risk zones. The use of multiple component layers will to some extent also help overcome limitations in each layer due to data gaps, although due to the dependency between layers certain data gaps will affect multiple input layers.

Whilst at the time of writing we are still working to complete data compilation, Fig 5 shows example views of the overall risk zones for the Pacific Ocean obtained through combination of the component layers.

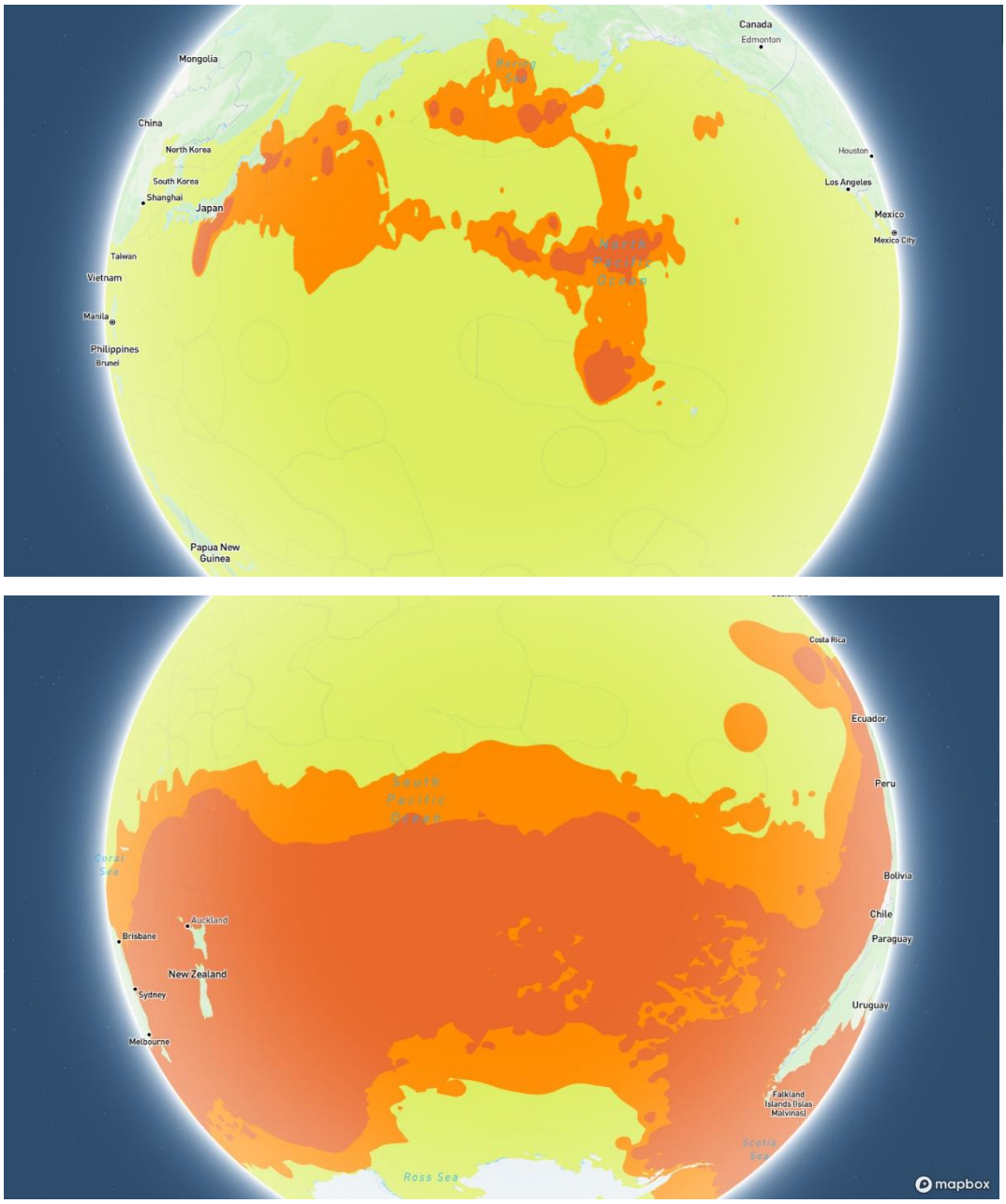

Figure 5. Ocean risk zones for the North (top) and South (bottom) Pacific Ocean, as shown in the SeaSketch mapping tool. Red = high risk, orange = medium risk, yellow = low risk.

4. FUTURE CONSIDERATIONS

Providing a comprehensive yet simple assessment of where there is highest risk of bycatch of threatened and vulnerable seabirds is challenging. In developing our initial ocean zones we have identified a number of considerations for potential ways to further improve such outputs.

4.1. Species considered

We have chosen to use ACAP-listed species as the foundation. These species have been listed by ACAP due to international concern for their conservation and they share the common threat of fisheries bycatch. However, there are other seabird species which share similar levels of concern and vulnerability to fisheries bycatch. For example, the flesh-footed shearwater of

the Western Pacific is known to be highly vulnerable to bycatch in longline fisheries (e.g. Edwards et al 2023), has been identified as a candidate species for listing under ACAP (ACAP 2019) and is closely related to the Eastern Pacific pink-footed shearwater already listed by ACAP. Consideration should be given to including data from such species in addition to those species currently listed by ACAP. An additional consideration is that some species have populations of particular concern, such the ACAP recognised High Priority Populations. Our methods would allow for distributions of these populations to be generated and considered as separate, highly threatened taxa.

4.2. Missing data

It is clear from Table 1 that data was not available to us for all species and from the full range of breeding locations. Identifying additional existing data sets and securing access to those to improve the underlying species distributions is an obvious priority and we encourage collaboration with any such data owners.

4.3. Data gaps

Many of the data gaps identified in Table 1 are due to a lack of tracking data from certain breeding locations and, in particular, for juvenile and immature life-history stages. In addition to encouraging researchers to undertake tracking studies for these birds, it is also possible to use assumptions based on the data from tracked sites to extrapolate or predict the distribution of birds from breeding sites that have not been tracked. This could involve using distribution modelling techniques. Investigating such options and assessing the impact of using such generated data sets is another area for improving the underlying species distributions.

4.4. Relative criteria

The criteria we have developed to categorise ocean zones for the occurrence of threatened species, species diversity and the occurrence of *Procellaria* petrels all use relative kernels of the underlying utilization distributions of the relevant species. The choice of kernels will influence how precautionary the resulting zones are. We intend to investigate the influence of using a range of different kernel densities and are cognisant of the need for a precautionary approach when the current underlying species distributions are known to limited by the availability of tracking data across breeding locations and life-history stages.

4.5. Temporal resolution

The species distribution we have developed are all single year-round distributions, and hence the ocean zones are also single year-round zones. ACAP species are typically highly migratory, so the areas where they occur, and thus ocean zones of relative risk, will vary by season. However, the nature and synchronisation of the migrations vary markedly between species, and little is known about the distribution of juvenile and immature birds. Using single year-round distributions can be considered more precautionary when our understanding of migratory pathways of all birds is poorly understood, though it may also under-estimate high occurrence of birds in some areas at some times of year. The merits or otherwise of presenting data in seasonal strata could be considered further.

4.6. Visual presentation

The species distributions and resulting ocean zones are based directly on input tracking data and hence in some instances result in complex shapes when plotted. End users may find it

easier to use smoother, more contiguous shapes to assess which ocean zone their fishing effort occurs in. Consideration should be given to increased smoothing of ocean zones, in particular the overall ocean risk zones and we intend to seek feedback from potential end users on their preferences.

5. CONCLUSION

Our initial ocean risk zones described and illustrated here provide a comprehensive yet simple assessment and categorisation of where birds of high conservation status are present, where high species diversity occurs and where *Procellaria* petrels are present. Whilst acknowledging that there are numerous gaps in the data required to fully assess which ocean zones pose highest risk of bycatch to seabirds, using the full range of tracking data available to us provides a useful starting point. We intend to continually improve the input data and methods used to describe ocean zones and welcome active collaboration with researchers and others involved in the collection and analysis of seabird distribution data.

ACKNOWLEDGEMENTS

Albatross and petrel tracking data presented here are from the Seabird Tracking Database (http://seabirdtracking.org/), which exists thanks to the collaboration of scientists worldwide. We would like to thank the data contributors that provided data to estimate the distribution of albatrosses and petrels listed under the Agreement, including Alastair Baylis, Andrew Stanworth, April Hedd, Aurore Ponchon, Azwianewi Makhado, Ben Dilley, Bill Henry, Bindi Thomas, British Antarctic Survey, Carlo Catoni, Christopher Robertson, Conservation Services Programme, Daniel Costa, Dave Anderson, Dave Watts, David Gremillet, David Nicholls, David Thompson, Deon Nel, Dominic Rollinson, Elizabeth Bell, Ewan Wakefield, Falklands Conservation, Flavio Quintana, Graeme Elliott, Graeme Taylor , Graham Robertson, Henri Weimerskirch, Jacob Gonzalez-Solis, Javier Arata, Jean-Claude Stahl, Jill Awkerman, John Arnould, John Arnould, Jose Pedro Granadeiro, Kalinka Rexer-Huber, Kath Walker, Kris Carlyon, Leigh Torres, Leigh Torres, Letizia Campioni, Lorna Deppe, Melinda Conners, Melinda Conners, Michelle Antolos, Paul Sagar, Paul Scofield, Paulo Catry, Peter Ryan, Pierre Pistorius, Rachael Orben, Richard Phillips, Rob Suryan, Rosemary Gales, Scott Shaffer, Susan Waugh, Timothée Poupart, Todd Landers, Wildlife Management International Ltd and William Montevecchi.

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APPENDIX 1. Summary of data available from the ACAP and BLI 2023 data request after data cleaning and standardisation.

Common name	Island group	Scientific name	Device type	Age class	Breeding status	N tracks	N positions
Northern Royal Albatross	Chatham Island	*Diomedea sanfordi*	GPS or PTT	adult	breeding	39	59,734
Northern Royal Albatross	Chatham Island	*Diomedea sanfordi*	GPS or PTT	adult	non-breeding	21	56,879
Northern Royal Albatross	New Zealand	*Diomedea sanfordi*	GPS or PTT	adult	breeding	55	16,254
Northern Royal Albatross	New Zealand	*Diomedea sanfordi*	GPS or PTT	juv/imm	non-breeding	5	18,734
Northern Royal Albatross	Chatham Island	*Diomedea sanfordi*	GLS	adult	non-breeding	5	1,855
Southern Royal Albatross	Campbell Islands	*Diomedea epomophora*	GPS or PTT	adult	breeding	17	5,732
Wandering Albatross	Crozet	*Diomedea exulans*	GPS or PTT	adult	breeding	448	94,615
Wandering Albatross	Crozet	*Diomedea exulans*	GPS or PTT	adult	non-breeding	5	8,784
Wandering Albatross	Crozet	*Diomedea exulans*	GPS or PTT	juv/imm	non-breeding	37	139,197
Wandering Albatross	Kerguelen	*Diomedea exulans*	GPS or PTT	adult	breeding	41	6,733
Wandering Albatross	Kerguelen	*Diomedea exulans*	GPS or PTT	juv/imm	non-breeding	22	107,393
Wandering Albatross	Prince Edward Islands	*Diomedea exulans*	GPS or PTT	adult	breeding	103	45,898
Wandering Albatross	South Georgia (Islas Georgias del Sur)*	*Diomedea exulans*	GPS or PTT	adult	breeding	635	169,940
Wandering Albatross	South Georgia (Islas Georgias del Sur)*	*Diomedea exulans*	GPS or PTT	adult	non-breeding	91	43,214
Wandering Albatross	South Georgia (Islas Georgias del Sur)*	*Diomedea exulans*	GPS or PTT	juv/imm	non-breeding	133	107,036
Wandering Albatross	Crozet	*Diomedea exulans*	GLS	adult	breeding	98	21,594
Wandering Albatross	Crozet	*Diomedea exulans*	GLS	adult	non-breeding	98	45,313
Wandering Albatross	Kerguelen	*Diomedea exulans*	GLS	adult	breeding	23	2,187
Wandering Albatross	Kerguelen	*Diomedea exulans*	GLS	adult	non-breeding	23	11,013
Wandering Albatross	South Georgia (Islas Georgias del Sur)*	*Diomedea exulans*	GLS	adult	breeding	62	9,331
Wandering Albatross	South Georgia (Islas Georgias del Sur)*	*Diomedea exulans*	GLS	adult	non-breeding	107	41,815
Wandering Albatross	South Georgia (Islas Georgias del Sur)*	*Diomedea exulans*	GLS	juv/imm	non-breeding	86	27,725
Antipodean Albatross	Antipodes Islands	*Diomedea antipodensis*	GPS or PTT	adult	breeding	155	389,456
Antipodean Albatross	Antipodes Islands	*Diomedea antipodensis*	GPS or PTT	adult	non-breeding	101	340,147
Antipodean Albatross	Antipodes Islands	*Diomedea antipodensis*	GPS or PTT	juv/imm	non-breeding	63	420,609
Antipodean Albatross	Auckland Islands	*Diomedea antipodensis*	GPS or PTT	adult	breeding	41	38,484
Antipodean Albatross	Auckland Islands	*Diomedea antipodensis*	GPS or PTT	adult	non-breeding	22	64,205
Antipodean Albatross	Antipodes Islands	*Diomedea antipodensis*	GLS	adult	breeding	11	3,731
Antipodean Albatross	Antipodes Islands	*Diomedea antipodensis*	GLS	adult	non-breeding	47	14,921

Antipodean Albatross	Auckland Islands	*Diomedea antipodensis*	GLS	adult	breeding	13	2,722
Common name	**Island group**	**Scientific name**	**Device type**	**Age class**	**Breeding status**	**N tracks**	**N positions**
Antipodean Albatross	Auckland Islands	*Diomedea antipodensis*	GLS	adult	non-breeding	73	26,722
Amsterdam Albatross	Amsterdam and St Paul	*Diomedea amsterdamensis*	GPS or PTT	adult	breeding	312	46,303
Amsterdam Albatross	Amsterdam and St Paul	*Diomedea amsterdamensis*	GPS or PTT	juv/imm	non-breeding	14	37,692
Amsterdam Albatross	Amsterdam and St Paul	*Diomedea amsterdamensis*	GLS	adult	non-breeding	14	121,362
Amsterdam Albatross	Amsterdam and St Paul	*Diomedea amsterdamensis*	GLS	juv/imm	non-breeding	5	39,217
Tristan Albatross	Gough	*Diomedea dabbenena*	GPS or PTT	adult	breeding	241	41,898
Tristan Albatross	Gough	*Diomedea dabbenena*	GPS or PTT	juv/imm	non-breeding	28	78,605
Tristan Albatross	Gough	*Diomedea dabbenena*	GLS	adult	breeding	23	2,161
Tristan Albatross	Gough	*Diomedea dabbenena*	GLS	adult	non-breeding	26	15,609
Sooty Albatross	Amsterdam and St Paul	*Phoebetria fusca*	GPS or PTT	adult	breeding	7	12,740
Sooty Albatross	Amsterdam and St Paul	*Phoebetria fusca*	GPS or PTT	juv/imm	non-breeding	9	42,299
Sooty Albatross	Crozet	*Phoebetria fusca*	GPS or PTT	adult	breeding	38	45,362
Sooty Albatross	Crozet	*Phoebetria fusca*	GPS or PTT	juv/imm	non-breeding	9	16,452
Sooty Albatross	Gough	*Phoebetria fusca*	GPS or PTT	adult	breeding	13	7,544
Sooty Albatross	Prince Edward Islands	*Phoebetria fusca*	GPS or PTT	adult	breeding	158	42,962
Sooty Albatross	Prince Edward Islands	*Phoebetria fusca*	GPS or PTT	adult	non-breeding	12	20,210
Sooty Albatross	Gough	*Phoebetria fusca*	GLS	adult	breeding	29	2,028
Sooty Albatross	Gough	*Phoebetria fusca*	GLS	adult	non-breeding	21	4,976
Light-mantled Albatross	Heard and McDonald Islands	*Phoebetria palpebrata*	GPS or PTT	adult	breeding	6	5,266
Light-mantled Albatross	Macquarie Island	*Phoebetria palpebrata*	GPS or PTT	adult	breeding	14	5,152
Light-mantled Albatross	Prince Edward Islands	*Phoebetria palpebrata*	GPS or PTT	adult	breeding	46	37,363
Light-mantled Albatross	Prince Edward Islands	*Phoebetria palpebrata*	GPS or PTT	adult	non-breeding	6	15,745
Light-mantled Albatross	South Georgia (Islas Georgias del Sur)*	*Phoebetria palpebrata*	GPS or PTT	adult	breeding	62	9,094
Waved Albatross	Galapagos	*Phoebastria irrorata*	GPS or PTT	adult	breeding	59	23,547
Black-footed Albatross	Hawaii	*Phoebastria nigripes*	GPS or PTT	adult	breeding	129	44,145
Black-footed Albatross	Hawaii	*Phoebastria nigripes*	GPS or PTT	juv/imm	non-breeding	10	14,596
Black-footed Albatross	Hawaii	*Phoebastria nigripes*	GLS	adult	non-breeding	85	14,860
Laysan Albatross	Hawaii	*Phoebastria immutabilis*	GPS or PTT	adult	breeding	134	49,728
Laysan Albatross	Hawaii	*Phoebastria immutabilis*	GPS or PTT	adult	non-breeding	12	16,592
Common name	**Island group**	**Scientific name**	**Device type**	**Age class**	**Breeding status**	**N tracks**	**N positions**

Laysan Albatross	Isla Guadalupe	*Phoebastria immutabilis*	GPS or PTT	adult	breeding	124	31,860
Laysan Albatross	Hawaii	*Phoebastria immutabilis*	GLS	adult	non-breeding	110	23,684
Short-tailed Albatross	Izu Shoto	*Phoebastria albatrus*	GPS or PTT	adult	breeding	21	38,155
Short-tailed Albatross	Izu Shoto	*Phoebastria albatrus*	GPS or PTT	adult	non-breeding	29	49,374
Atlantic Yellow-nosed Albatross	Gough	*Thalassarche chlororhynchos*	GPS or PTT	adult	breeding	81	18,138
Atlantic Yellow-nosed Albatross	Tristan da Cunha	*Thalassarche chlororhynchos*	GPS or PTT	adult	breeding	46	22,342
Atlantic Yellow-nosed Albatross	Gough	*Thalassarche chlororhynchos*	GLS	adult	breeding	71	4,606
Atlantic Yellow-nosed Albatross	Gough	*Thalassarche chlororhynchos*	GLS	adult	non-breeding	39	11,189
Indian Yellow-nosed Albatross	Amsterdam and St Paul	*Thalassarche carteri*	GPS or PTT	adult	breeding	136	57,380
Indian Yellow-nosed Albatross	Prince Edward Islands	*Thalassarche carteri*	GPS or PTT	adult	breeding	8	8,053
Indian Yellow-nosed Albatross	Prince Edward Islands	*Thalassarche carteri*	GPS or PTT	adult	non-breeding	10	6,465
Grey-headed Albatross	Campbell Islands	*Thalassarche chrysostoma*	GPS or PTT	adult	breeding	29	9,758
Grey-headed Albatross	Islas Diego Ramirez	*Thalassarche chrysostoma*	GPS or PTT	adult	breeding	66	20,872
Grey-headed Albatross	Macquarie Island	*Thalassarche chrysostoma*	GPS or PTT	adult	breeding	14	3,392
Grey-headed Albatross	Prince Edward Islands	*Thalassarche chrysostoma*	GPS or PTT	adult	breeding	219	55,117
Grey-headed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche chrysostoma*	GPS or PTT	adult	breeding	365	61,208
Grey-headed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche chrysostoma*	GPS or PTT	juv/imm	non-breeding	28	52,397
Grey-headed Albatross	Prince Edward Islands	*Thalassarche chrysostoma*	GLS	adult	non-breeding	25	20,551
Grey-headed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche chrysostoma*	GLS	adult	non-breeding	22	16,555
Black-browed Albatross	Diego de Almagro	*Thalassarche melanophris*	GPS or PTT	adult	breeding	12	2,904
Black-browed Albatross	Falkland Islands (Islas Malvinas)*	*Thalassarche melanophris*	GPS or PTT	adult	breeding	740	82,787
Black-browed Albatross	Falkland Islands (Islas Malvinas)*	*Thalassarche melanophris*	GPS or PTT	juv/imm	non-breeding	262	13,547
Black-browed Albatross	Islas Diego Ramirez	*Thalassarche melanophris*	GPS or PTT	adult	breeding	122	25,966
Black-browed Albatross	Islas Ildefonso	*Thalassarche melanophris*	GPS or PTT	adult	breeding	26	6,281
Black-browed Albatross	Kerguelen	*Thalassarche melanophris*	GPS or PTT	adult	breeding	58	14,798
Black-browed Albatross	Macquarie Island	*Thalassarche melanophris*	GPS or PTT	adult	breeding	12	3,582
Black-browed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche melanophris*	GPS or PTT	adult	breeding	578	50,086
Black-browed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche melanophris*	GPS or PTT	juv/imm	non-breeding	11	10,087
Black-browed Albatross	Falkland Islands (Islas Malvinas)*	*Thalassarche melanophris*	GLS	adult	breeding	107	6,119
Common name	**Island group**	**Scientific name**	**Device type**	**Age class**	**Breeding status**	**N tracks**	**N positions**
Black-browed Albatross	Falkland Islands (Islas Malvinas)*	*Thalassarche melanophris*	GLS	adult	non-breeding	132	29,202
Black-browed Albatross	Falkland Islands (Islas Malvinas)*	*Thalassarche melanophris*	GLS	juv/imm	non-breeding	17	6,070

Black-browed Albatross	Islas Diego Ramirez	*Thalassarche melanophris*	GLS	adult	non-breeding	5	1,141
Black-browed Albatross	Kerguelen	*Thalassarche melanophris*	GLS	adult	breeding	200	36,572
Black-browed Albatross	Kerguelen	*Thalassarche melanophris*	GLS	adult	non-breeding	202	36,836
Black-browed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche melanophris*	GLS	adult	breeding	77	1,717
Black-browed Albatross	South Georgia (Islas Georgias del Sur)*	*Thalassarche melanophris*	GLS	adult	non-breeding	112	13,838
Campbell Albatross	Campbell Islands	*Thalassarche impavida*	GPS or PTT	adult	breeding	10	2,702
Buller's Albatross	Solander Islands	*Thalassarche bulleri*	GPS or PTT	adult	breeding	119	11,406
Buller's Albatross	Solander Islands	*Thalassarche bulleri*	GPS or PTT	adult	non-breeding	129	9,792
Buller's Albatross	The Snares	*Thalassarche bulleri*	GPS or PTT	adult	breeding	241	31,310
Buller's Albatross	The Snares	*Thalassarche bulleri*	GPS or PTT	adult	non-breeding	42	2,550
Buller's Albatross	The Snares	*Thalassarche bulleri*	GPS or PTT	juv/imm	non-breeding	68	7,069
Buller's Albatross	Chatham Island	*Thalassarche bulleri*	GLS	adult	breeding	69	16,807
Buller's Albatross	Chatham Island	*Thalassarche bulleri*	GLS	adult	non-breeding	69	14,955
Buller's Albatross	The Snares	*Thalassarche bulleri*	GLS	adult	breeding	95	15,822
Buller's Albatross	The Snares	*Thalassarche bulleri*	GLS	adult	non-breeding	63	15,169
Shy Albatross	Tasmania	*Thalassarche cauta*	GPS or PTT	adult	breeding	194	40,300
Shy Albatross	Tasmania	*Thalassarche cauta*	GPS or PTT	adult	non-breeding	5	6,328
Shy Albatross	Tasmania	*Thalassarche cauta*	GPS or PTT	juv/imm	non-breeding	38	45,322
White-capped Albatross	Auckland Islands	*Thalassarche steadi*	GPS or PTT	adult	breeding	154	20,765
White-capped Albatross	Auckland Islands	*Thalassarche steadi*	GLS	adult	breeding	48	7,580
White-capped Albatross	Auckland Islands	*Thalassarche steadi*	GLS	adult	non-breeding	30	12,055
Chatham Albatross	Chatham Island	*Thalassarche eremita*	GPS or PTT	adult	breeding	37	41,281
Chatham Albatross	Chatham Island	*Thalassarche eremita*	GPS or PTT	adult	non-breeding	16	34,474
Chatham Albatross	Chatham Island	*Thalassarche eremita*	GLS	adult	non-breeding	15	3,573
Salvin's Albatross	Bounty Islands	*Thalassarche salvini*	GPS or PTT	adult	breeding	29	54,083
Salvin's Albatross	Bounty Islands	*Thalassarche salvini*	GPS or PTT	adult	non-breeding	19	26,632
Salvin's Albatross	Bounty Islands	*Thalassarche salvini*	GLS	adult	breeding	31	8,551
Common name	**Island group**	**Scientific name**	**Device type**	**Age class**	**Breeding status**	**N tracks**	**N positions**
Salvin's Albatross	Bounty Islands	*Thalassarche salvini*	GLS	adult	non-breeding	31	6,004
Salvin's Albatross	The Snares	*Thalassarche salvini*	GLS	adult	breeding	45	5,498
Salvin's Albatross	The Snares	*Thalassarche salvini*	GLS	adult	non-breeding	23	5,375
Southern Giant Petrel	Crozet	*Macronectes giganteus*	GPS or PTT	juv/imm	non-breeding	5	12,238

Southern Giant Petrel	Isla de los Estados	*Macronectes giganteus*	GPS or PTT	adult	breeding	7	3,373
Southern Giant Petrel	Macquarie Island	*Macronectes giganteus*	GPS or PTT	adult	breeding	6	1,874
Southern Giant Petrel	Macquarie Island	*Macronectes giganteus*	GPS or PTT	juv/imm	non-breeding	7	8,762
Southern Giant Petrel	North Patagonia	*Macronectes giganteus*	GPS or PTT	adult	breeding	12	14,968
Southern Giant Petrel	North Patagonia	*Macronectes giganteus*	GPS or PTT	adult	non-breeding	6	17,908
Southern Giant Petrel	North Patagonia	*Macronectes giganteus*	GPS or PTT	juv/imm	non-breeding	11	16,254
Southern Giant Petrel	Prince Edward Islands	*Macronectes giganteus*	GPS or PTT	adult	breeding	49	8,669
Southern Giant Petrel	South Georgia (Islas Georgias del Sur)*	*Macronectes giganteus*	GPS or PTT	adult	breeding	92	11,423
Southern Giant Petrel	South Shetland Islands	*Macronectes giganteus*	GPS or PTT	adult	breeding	132	12,601
Southern Giant Petrel	South Shetland Islands	*Macronectes giganteus*	GPS or PTT	adult	non-breeding	24	754
Southern Giant Petrel	Prince Edward Islands	*Macronectes giganteus*	GLS	adult	breeding	10	1,594
Southern Giant Petrel	Prince Edward Islands	*Macronectes giganteus*	GLS	adult	non-breeding	10	2,787
Southern Giant Petrel	South Georgia (Islas Georgias del Sur)*	*Macronectes giganteus*	GLS	adult	breeding	77	4,867
Southern Giant Petrel	South Georgia (Islas Georgias del Sur)*	*Macronectes giganteus*	GLS	adult	non-breeding	37	11,739
Northern Giant Petrel	Crozet	*Macronectes halli*	GPS or PTT	juv/imm	non-breeding	5	12,396
Northern Giant Petrel	Kerguelen	*Macronectes halli*	GPS or PTT	juv/imm	non-breeding	5	15,736
Northern Giant Petrel	Macquarie Island	*Macronectes halli*	GPS or PTT	juv/imm	non-breeding	5	4,611
Northern Giant Petrel	Prince Edward Islands	*Macronectes halli*	GPS or PTT	adult	breeding	61	13,478
Northern Giant Petrel	South Georgia (Islas Georgias del Sur)*	*Macronectes halli*	GPS or PTT	adult	breeding	92	7,424
Northern Giant Petrel	Prince Edward Islands	*Macronectes halli*	GLS	adult	breeding	27	3,487
Northern Giant Petrel	Prince Edward Islands	*Macronectes halli*	GLS	adult	non-breeding	27	7,021
Northern Giant Petrel	South Georgia (Islas Georgias del Sur)*	*Macronectes halli*	GLS	adult	breeding	77	4,223
Northern Giant Petrel	South Georgia (Islas Georgias del Sur)*	*Macronectes halli*	GLS	adult	non-breeding	31	9,268
White-chinned Petrel	Crozet	*Procellaria aequinoctialis*	GPS or PTT	adult	breeding	21	11,944
White-chinned Petrel	Kerguelen	*Procellaria aequinoctialis*	GPS or PTT	adult	breeding	21	12,707
Common name	**Island group**	**Scientific name**	**Device type**	**Age class**	**Breeding status**	**N tracks**	**N positions**
White-chinned Petrel	Kerguelen	*Procellaria aequinoctialis*	GPS or PTT	juv/imm	non-breeding	9	28,341
White-chinned Petrel	Prince Edward Islands	*Procellaria aequinoctialis*	GPS or PTT	adult	breeding	21	8,689
White-chinned Petrel	South Georgia (Islas Georgias del Sur)*	*Procellaria aequinoctialis*	GPS or PTT	adult	breeding	38	15,494
White-chinned Petrel	South Georgia (Islas Georgias del Sur)*	*Procellaria aequinoctialis*	GPS or PTT	juv/imm	non-breeding	13	8,218
White-chinned Petrel	Antipodes Islands	*Procellaria aequinoctialis*	GLS	adult	breeding	33	2,273
White-chinned Petrel	Antipodes Islands	*Procellaria aequinoctialis*	GLS	adult	non-breeding	28	6,672

White-chinned Petrel	Auckland Islands	*Procellaria aequinoctialis*	GLS	adult	breeding	37	5,884
White-chinned Petrel	Auckland Islands	*Procellaria aequinoctialis*	GLS	adult	non-breeding	35	7,703
White-chinned Petrel	Falkland Islands (Islas Malvinas)*	*Procellaria aequinoctialis*	GLS	adult	breeding	14	2,885
White-chinned Petrel	Falkland Islands (Islas Malvinas)*	*Procellaria aequinoctialis*	GLS	adult	non-breeding	14	3,126
White-chinned Petrel	South Georgia (Islas Georgias del Sur)*	*Procellaria aequinoctialis*	GLS	adult	breeding	25	905
White-chinned Petrel	South Georgia (Islas Georgias del Sur)*	*Procellaria aequinoctialis*	GLS	adult	non-breeding	34	8,293
Spectacled Petrel	Tristan da Cunha	*Procellaria conspicillata*	GPS or PTT	adult	breeding	8	21,461
Spectacled Petrel	Tristan da Cunha	*Procellaria conspicillata*	GPS or PTT	adult	non-breeding	5	2,362
Black Petrel	New Zealand	*Procellaria parkinsoni*	GPS or PTT	adult	breeding	33	2,475
Black Petrel	New Zealand	*Procellaria parkinsoni*	GLS	adult	breeding	63	1,482
Black Petrel	New Zealand	*Procellaria parkinsoni*	GLS	adult	non-breeding	15	1,361
Westland Petrel	New Zealand	*Procellaria westlandica*	GPS or PTT	adult	breeding	180	17,032
Westland Petrel	New Zealand	*Procellaria westlandica*	GLS	adult	breeding	8	1,708
Westland Petrel	New Zealand	*Procellaria westlandica*	GLS	adult	non-breeding	8	1,812
Grey Petrel	Gough	*Procellaria cinerea*	GPS or PTT	adult	breeding	15	7,402
Grey Petrel	Kerguelen	*Procellaria cinerea*	GPS or PTT	adult	breeding	7	7,902
Grey Petrel	Antipodes Islands	*Procellaria cinerea*	GLS	adult	breeding	25	4,153
Grey Petrel	Antipodes Islands	*Procellaria cinerea*	GLS	adult	non-breeding	24	5,771
Balearic Shearwater	Balearic Archipelago	*Puffinus mauretanicus*	GPS or PTT	adult	breeding	113	19,913
Balearic Shearwater	Balearic Archipelago	*Puffinus mauretanicus*	GPS or PTT	adult	non-breeding	9	3,035
Balearic Shearwater	Balearic Archipelago	*Puffinus mauretanicus*	GPS or PTT	juv/imm	non-breeding	6	2,999

* A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur e Islas Sándwich del Sur) and the surrounding maritime areas.