SCIENTIFIC COMMITTEE
SIXTH REGULAR SESSION

10-19 August 2010
Nukualofa, Tonga

REVISED SPATIAL RISK INDICATORS FOR SEABIRD INTERACTIONS WITH LONGLINE FISHERIES IN THE WESTERN AND CENTRAL PACIFIC

WCPFC-SC6-2010/EB- IP 01

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Abstract

In this paper we assess the risk of interactions between longline fisheries and seabirds in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area. Efforts to reduce fishing-induced mortality are especially important for Procellariiform seabirds, particularly albatrosses and gadfly petrels, which are at particularly high risk of species extinction. We use a spatially explicit *Productivity-Susceptibility Analysis* (PSA) to determine (a) the probability of seabird-fisheries interactions occurring, by comparison of fishing effort and species range distributions, and (b) the risk of adverse effects of fishing-induced mortality on populations of seabirds. Compared to our previous analysis, this new analysis has been computed seasonally and takes into account more population data including spatially explicit data on seabird breeding colonies. In effort to have a better estimation of the species at risk, the susceptibility of the PSA is weighted by the vulnerability of a species caught per hook. We also identified areas of high seabird diversity as well as areas with the potential for fisheries interactions if fishing effort were to increase in those areas.

Introduction

In this paper we assess the risk of interactions between longline fisheries and seabirds in the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area. We further develop and apply methods discussed by Kirby and Hobday (2006), Waugh et al (2008), and Kirby et al (2009) for a suite of seabird species known to be vulnerable to capture in longline fisheries.

Many albatross and petrel species are threatened with extinction, and are highly susceptible to population effects due to life-history characteristics which result in late age-at-maturity and low productivity. Therefore, additional mortality, such as that from fisheries captures can put severe strain on populations. Albatrosses are the most threatened family of species in the world, with 19 of the 22 species globally threatened. The WCPFC fisheries covers a large proportion of these species ranges. Therefore it is incumbent upon the fisheries commission to consider these species risk of extinction when conducting fisheries in the region.

We used a spatially explicit version of a *Productivity-Susceptibility Analysis* (PSA) to determine the probability of seabird-fisheries interactions and the potential for adverse effects of fisheries mortality on populations of seabirds. 'Risk' in this analysis refers to the probability of adverse effects on seabird populations as a result of fishing mortality. Key inputs include longline fishing distribution, species distribution information, population parameters (population sizes, survivorship and age-at-maturity), and novel compared with previous analyses, species-specific catchability coefficients (Vulnerabilities). Results are discussed in terms of the overall annual outputs and four seasonal risk outputs.

We step through the development of the *Susceptibility* axis, mapping the results at each stage back onto a 5×5 degree grid across the entire Convention Area, thereby incorporating multiple perspectives on 'risk', i.e. to particular species, from particular flags and in particular areas. This allows the monitoring and management implications by species/flag/area to be easily understood.

We also present the data to show 'biodiversity hotspots' as well as areas where the potential for fisheries interactions with seabirds of any species is highest.

Methods

Longline fishing efforts and its distribution

Longline fishing effort data for vessels targeting tunas and swordfish was extracted from SPC databases. These data were number of hooks stratified by flag state per 5 degree square per month for the period 2002 to 2009. We plotted fishing effort density, within 5-degree squares of latitude and longitude, as thousands of hooks per square km and summed the fishing effort within each square across the 8 years of data (Fig. 1). The fishing effort data has been also sorted by season and plotted (Fig. 2). Seasons in this document follow Northern hemisphere convention (Winter: Dec-Feb, Spring: Mar-May, Summer: Jun-Aug, Autumn: Sep-Nov)

Figure 1. Fishing effort density for WCPFC longline fisheries by 5-degree square (2002-2009) (hundred hooks/km^2)

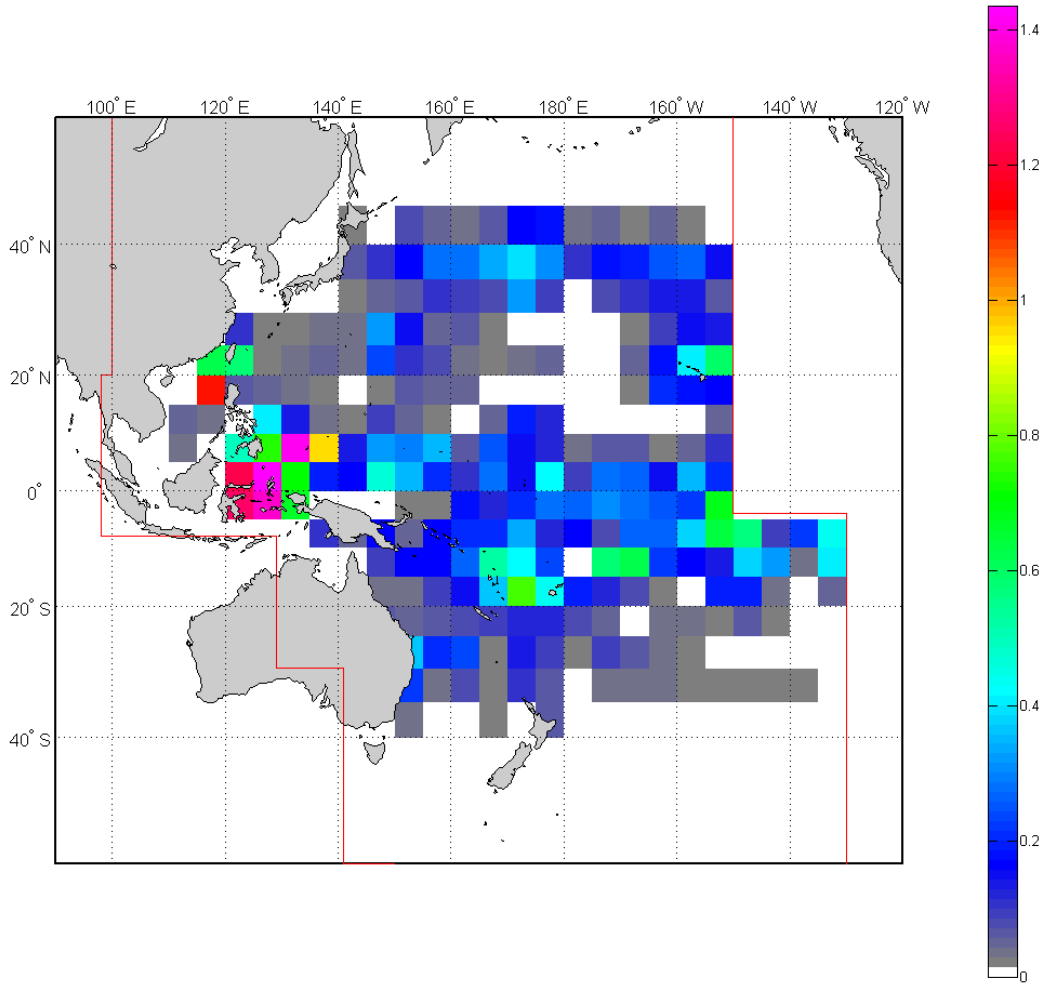
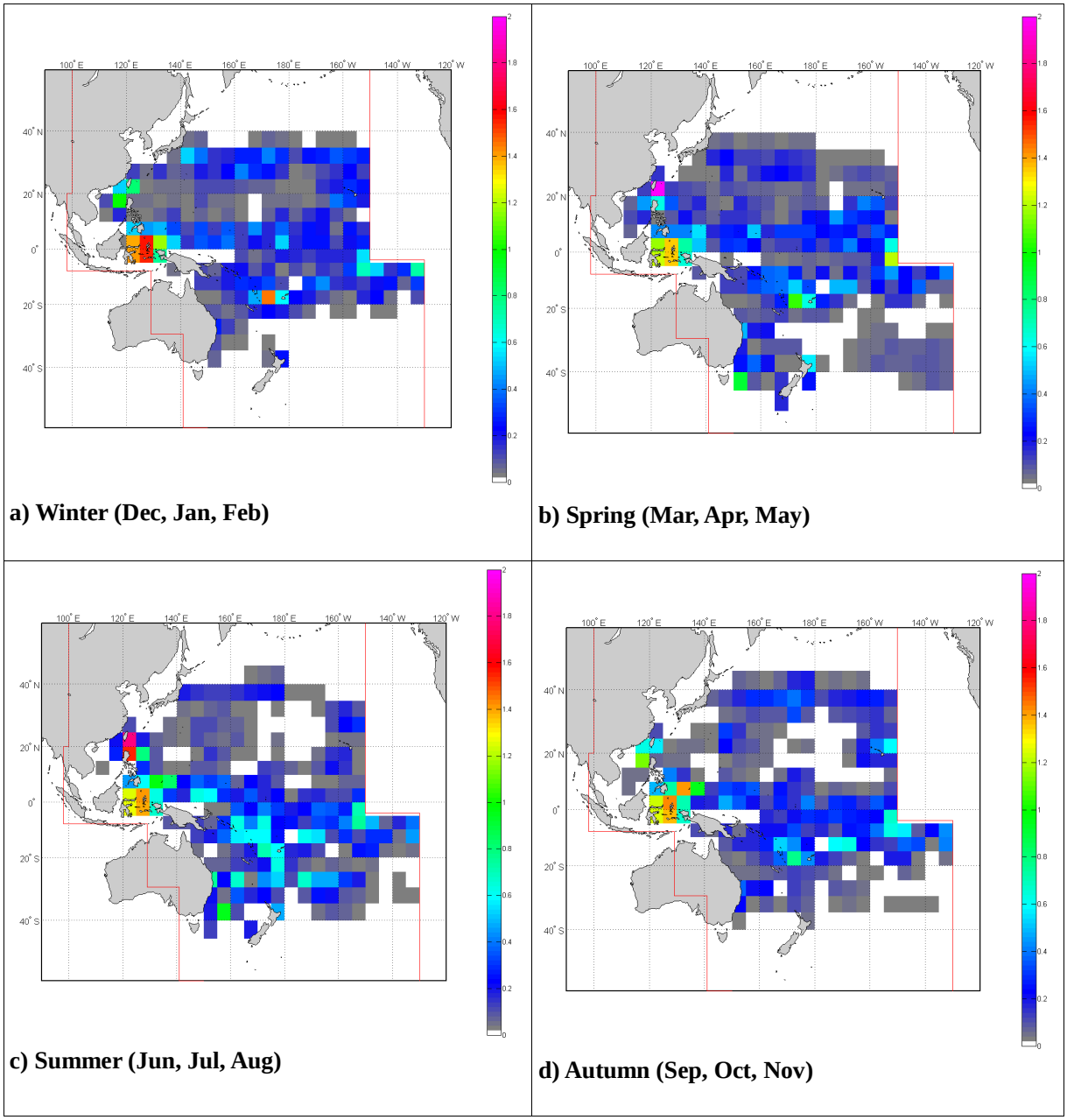


Figure 2. Seasonal fishing effort density for WCPFC longline fisheries by 5-degree square (2002-2009) (hundred hooks/km^2)



a) Winter (Dec, Jan, Feb)

b) Spring (Mar, Apr, May)

c) Summer (Jun, Jul, Aug)

d) Autumn (Sep, Oct, Nov)

Study species and their distributions

As in the previous analysis, we examined the range of seabird species occurring in the WCPFC Convention Area, whose families or genera are known to be captured in longline fishing. In order to reduce the scope of the study to a manageable size, we excluded 192 other seabird species outside the order Procellariiformes, despite information to suggest that some level of incidental mortality may also occur for some of these species (Gales et al. 1999. Waugh et al. 2008, Huang et al. 2008). We excluded several species of diving petrel and storm petrel due to lack of detailed data on their population ecology, as well as expert opinion that indicated lower likelihood of fisheries interactions with these species. We also excluded species for which there was no information about their distribution at sea. We therefore analysed data for a group of 67 species, which included albatrosses, petrels, and shearwaters occurring in both tropical and temperate oceanic systems. Seven species have been removed from the previous analysis as no overlap exists between fishing effort and seabirds distribution. See Table 1 for the species list, including biological attributes used to calculate *Productivity* (see below).

Of the 67 species included, 23 have previously been recorded captured in western Pacific longline fisheries by fisheries observers during the entire history of the national and regional observer programmes contributing to the SPC database (mostly mid-1990s onwards; Table 1). This list is the best available data but is nonetheless unlikely to be comprehensive for two main reasons: firstly not all species included in this analysis would have been recorded by fisheries observers even if they had been caught, because of the difficulties in correctly identifying hooked seabirds, and especially those that have been soaking underwater for several hours. The observer data therefore include a large number of “unidentified seabirds”, around 1/3 of the total records held by SPC. Secondly, the representativeness of the observer data is compromised by the low overall coverage of Pacific longline fleets by scientific observers, which is <1% for all fleets combined. The fact that in many parts of the region seabird bycatch is a statistically rare event implies that a much higher percentage of observer coverage is needed in order to reliably estimate catches, by comparison to target or bycatch fish species (Lawson 2006).

The range data available were limited to average annual distributions for all species. However we established seasonal distribution map for 62 species by taking into account all the breeding colonies at a global scale and the breeding period. For each season, we compute a composite map which is the addition of the seasonal breeder layer and the seasonal non-breeder layer on a global scale (i.e. including outside the WCPFC Convention Area) assuming that 100% of the population of the species was distributed within the BirdLife Range Map (Fig. 3 for species example). We estimated

the proportion of the global population that is within the WCPFC Convention Area based on the proportion of a species' total range within this zone and birds.

We then defined areas within the global range of a species where a higher proportion of birds from each species could be found relative to the surrounding area (Hotspots), using either:

a. Species foraging radius approach – for 50 species where remote-tracking data were unavailable, colony locations and average foraging radius of the birds were used based on published estimates of foraging activity. Whereas the non-breeders birds occupy the full distribution range, the breeder birds are only spread around their breeding colonies following an exponential decay function which extend up to their maximum foraging range radius.

The density of birds at a distance r from the colony following an exponential decay is defined as follows with r representing the distance at the colony (Eq 1)

If r>range_max then breeder_density(r)=0

For r <= range_max:

$$\text{breeder\_density}(r) = \int_{r\_\max} -a \times \exp(\ln(-\frac{0.01}{r\_\max}) \times r)$$

The parameter *a* solves the following equation (Eq 2):

$$\int_{r\_\max} \text{breeder\_density}(r) \times \text{land}(r) = breeding\_bird$$

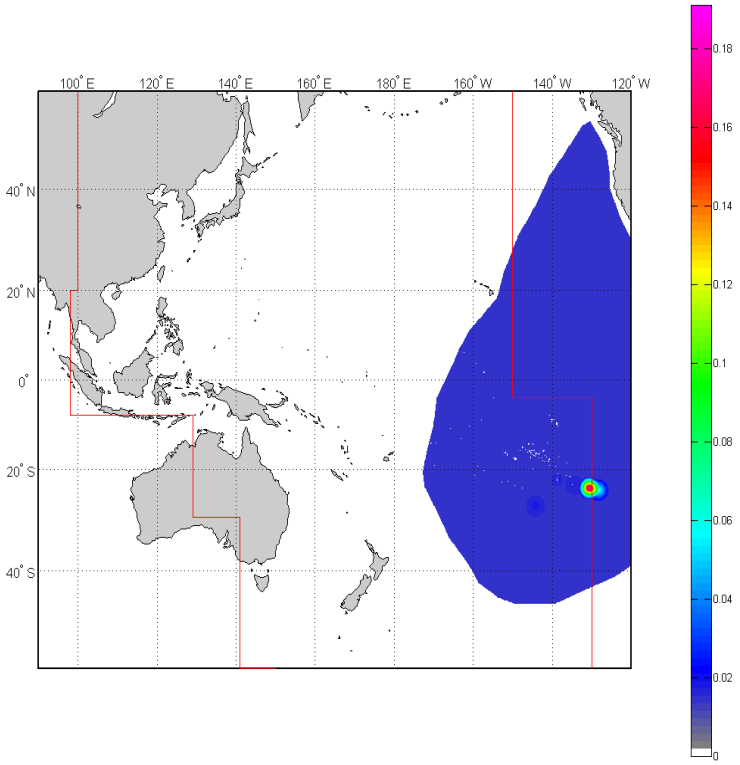
land(r) is a boolean function which is equal to 0 on land and 1 at sea.

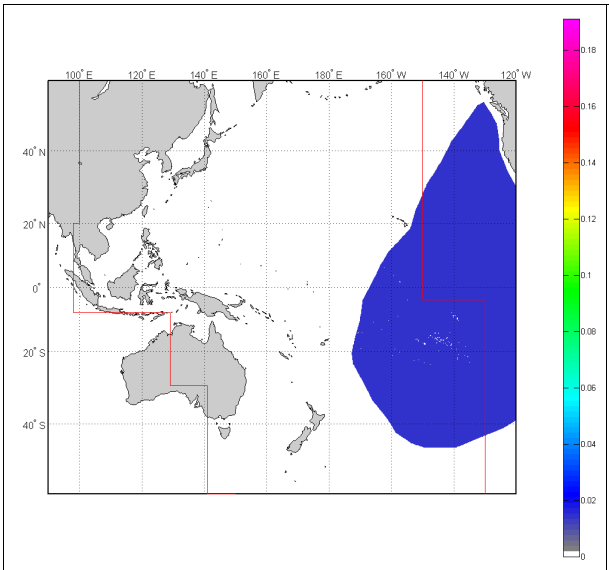
b. Remote-tracking data layers, with 50, 75, 90, 95% utility distribution for 12 species (see BirdLife 2005 for methods in determining kernel distributions of birds on the basis of these data used for 16 species), for non-breeding and breeding range. The breeding layers have been improved by taking into account the breeding colonies and the distribution of breeders around their colonies to cover region where no GPS/GLS/Argos loggers have been deployed. The maximum density between the foraging radius approach breeder layer and the GPS breeder layer has been chosen to establish the species distribution map.

c. Where data on concentrations of foraging activity were not available (5 species), we only used the BirdLife Range Maps to describe the species ranges, with an even distribution of the species attributed to its range within the Convention Area.

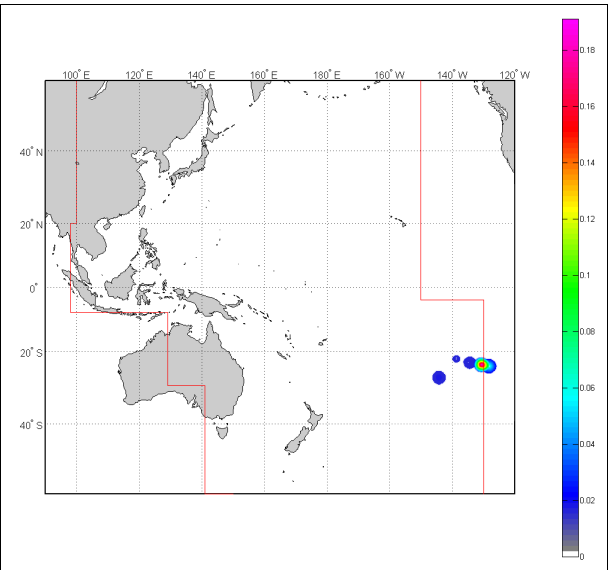
Figure 3. Example of composite bird density. PTU *Pterodroma ultima* in spring [birds/km2]

a) Spring distribution map of PTU which is a combination of the spring non-breeder distribution layer and spring breeders distribution layer





b) Spring distribution of PTU non-breeder



c) Spring distribution of PTU breeders

Productivity-Susceptibility Analyses (PSAs)

We used the maps of longline fishing effort in the WCPFC Convention Area and those of species distributions to calculate seasonal and year risk scores based on (a) *Susceptibility* indicator and (b) *Productivity* indicator.

The *Susceptibility* indicator is calculated as the product of fishing effort and normalised species distributions (i.e. proportion of a species' range) weighted with the vulnerability of the species which relates to the catchability of birds at a certain density exposed to an equal amount of fishing effort (Eq. 3):

$$\text{susceptibility}(sp, f, se) = \text{vulnerability}(sp) \times \int_{pacific} \text{normal\_bird\_density}(sp, se) \times \text{effort\_density}(f)$$

with sp, f, se defined respectively as the species, the flag and the season. The normal_bird_density function is defined as (Eq. 4) :

$$\text{normal\_bird\_density}(sp, se) = \frac{\left(\int_{pacific} \text{bird\_density}(sp, se) \right)}{\text{pacific\_population}(sp, se)} = 1$$

Relative to previous studies, we included a further step and used information about relative catchability (here called 'Vulnerability') which comes from direct measures from observed fishing sets from New Zealand, for surface longline fishing. This has the effect of weighting the amount of birds caught by their species-specific propensity to interact with longline gear. We developed a metric for different species groups (e.g. large albatrosses), and apply this metric to all birds in that group, regardless of whether we have data for all species or not.

The vulnerability represents the probability of a bird being caught by a longline fishing, for one bird present, and one set (it is an instantaneous rate – it has no spatial component).

Vulnerabilities of petrels and albatrosses have been calculated for small and large surface long-liners fishing for tunas and sword fish of the NZEEZ from NZ 2004 to 2008 observer data (Waugh & al 2009). For the purpose of our PSA analysis, we used average value of those vulnerabilities and extended them to the 67 species.

The bird groups defined were large albatrosses (*Diomedea* and *Phoebastria* spp), small albatrosses

(*Thalassarche* spp), large shearwaters (*Puffinus* spp), large *Pterodroma* spp and other petrels.

The *Productivity* indicator, defined as the maximum reproductive rate. In previous PSA analyses, *Productivity* estimates have been generated using a collection of variables that determine reproductive output, standardised and averaged in order to provide a scale-free indicator that approximates the intrinsic rate of population increase. This methodology was developed to deal with information across a wide range of taxon groups, including fish, turtles, mammals and seabirds, where population parameters that are not directly measureable are unknown.

For this study, where all study species are within a single taxonomic order, we were able to use a more harmonious set of life-history parameters to approximate $R_{max,}$ the maximum rate of increase of a population with no resource limitation, predation or competition (Sibly & Hone 2003). Niel & Lebreton (2005) demonstrated that for birds there is a constant relationship between generation length and population growth rate. They established that maximum annual growth rate λ_{max} can be estimated for long-lived species using estimates of age at first reproduction α and adult annual survival s.

We solved for λ_{max}, to derive the index of *Productivity*, based on the relationship between this parameter and age at first breeding and annual adult survival, (Eq. 5):

$$\lambda_{\max} = \exp\left[\left(\alpha + \frac{s}{\lambda_{\max} - s}\right)^{-1}\right]$$

R_{max} was calculated from λ_{max} thus: $R_{max} = \lambda_{max} - 1$

We estimated α and s values for each species based on parameter values found in the scientific literature. Where more than one value was available for a species, the value from the study likely to provide the most robust estimation of R_{max} was used, i.e.. that with the largest sample size, or a longer-term study. Where severe colony-based threats (i.e. from factors other than fishing mortality) were apparent, which are likely to result in depressed s values, we excluded these values from the study. For species where data were absent, we substituted a value from a closely-related species. R_{max} values were normalized, with a maximum value set at 1.

Overall seasonal risks of adverse effects on seabirds populations are then calculated by combining both *Productivity* and *Susceptibility* indicators. In the previous analysis the risk was defined as below (Eq. 6)

$$risk = (Productivity^2 + Susceptibility^2)^{1/2}$$

Following this formula, seabirds species with high-productivity and low susceptibility are highly ranked shadowing the importance of their vulnerability. To overcome this problem, the risk is now defined as the product of the two indicators (Eq. 7)

$$risk = Productivitity \times Susceptibility$$

We normalized outputs of the overall seasonal PSA, combining both *Susceptibility* and *Productivity* indicators, so that values fell between 0 and 1. Values plotted were square-root transformed twice to normalize the distribution of the data. Five levels were attributed to the outputs based on the actual frequency distribution of the PSA scores, in order to ease interpretation. Negligible levels of risk (0 – 0.001): white; Low (0.001 – 0,2): royal blue; Low to Medium (0.2 – 0.4): pale blue; Medium (0.4 – 0.6): green; Medium to High (0.6 – 0.8): orange; High (0.8 – 1.0): pink. Risk scores by 5×5 degree area were calculated as (Eq. 8):

$$Risk(area, season) = \sum_{all\_species} \sum_{all\_flags} Risk(species, flag, season)$$

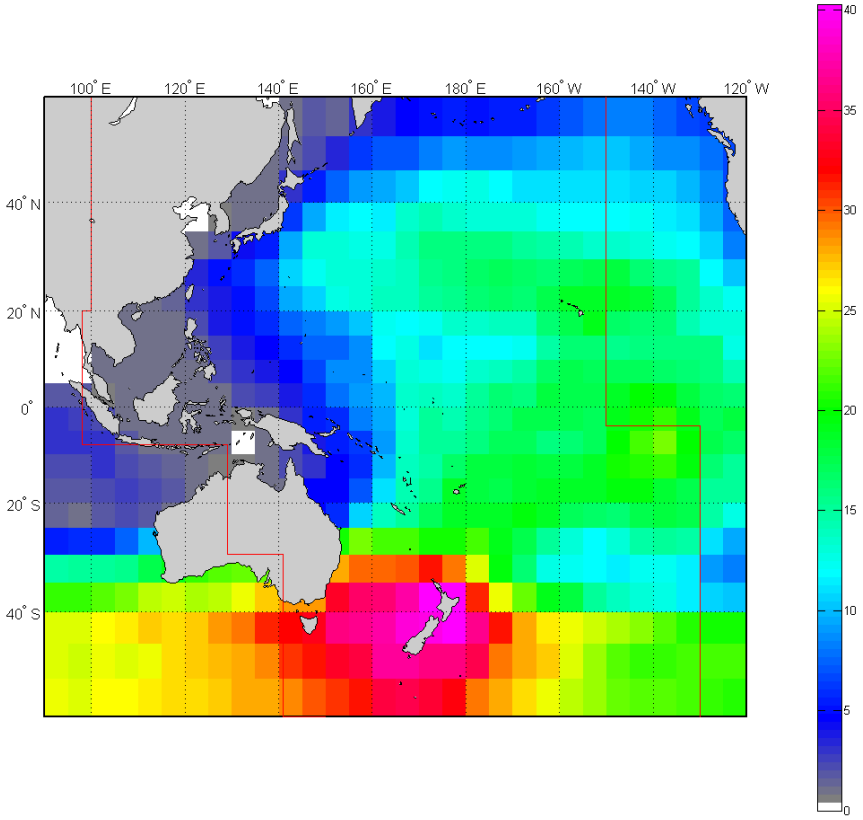
Results & Discussion

Risk indicators for seabird-fisheries interactions based on spatial overlap

The maps for risk indicators for seabird-fisheries interactions based on spatial overlap can be seen in Figs. 4, 5 & 6. We have included Figs. 4 & 5 for information in their own right, while Fig. 6 is also used as the *Susceptibility* indicator in the subsequent *Productivity-Susceptibility Analysis* (PSA).

In Fig. 4we can see which areas are frequented by more/less species of seabird. This tells us what areas might be considered 'biodiversity hotspots' for seabirds and which other areas are frequented by only one or two species. This information is useful as it illustrates, for example, the extent to which scientific observers must be trained in identifying numbers of different species depending on the area in which they are working. The results show that highest seabird diversity occurs around New Zealand and in the Tasman Sea, to south of Tasmania

Figure 4. Plot of seabird diversity (number of species per 5×5 degree area) for 67 species of albatross and petrel found in the WCPFC Convention Are



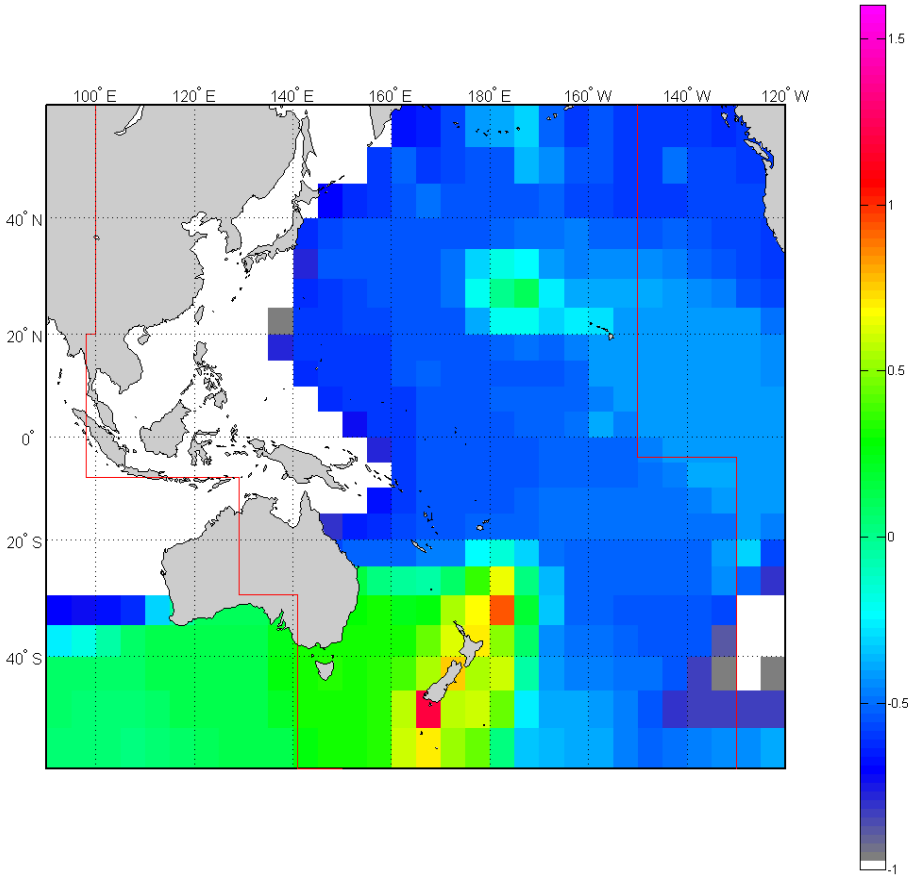
Compared to the previous analysis, fine scaled data on coastal and colonies has improved, but these improvements are not discernible at the map scale shown here for a multiple species composite

map.

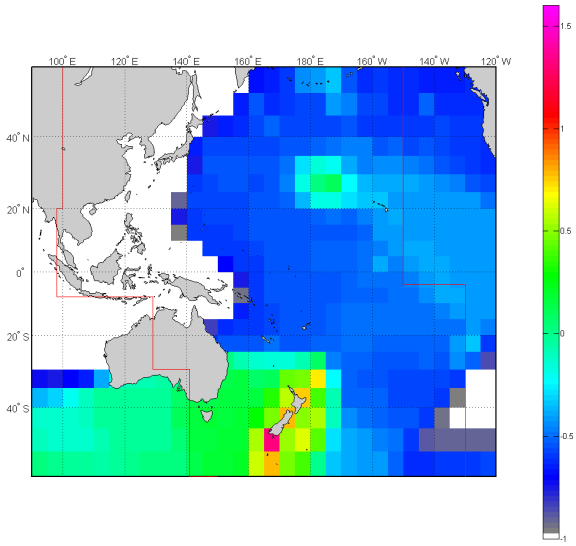
In Fig. 5. we have scaled the number of species present (Fig. 4) by their respective population sizes to give the expected numbers of seabirds in each area. The results show that waters around New Zealand and west into the Tasman Sea and Southern Ocean have the highest absolute numbers of seabirds. By including all the breeding colonies for most of seabirds species, the density of seabirds around New Zealand has increased by an order of magnitude compared to the previous analysis. It also highlights the high density of birds around Midway Islands. As expected, the seabirds are more present in the North Pacific during the summer season (fig 5.d)

While this is an intermediate step, as it is the combined presence of fishing effort and seabirds that results in risk of capture, this map indicates areas where use of mitigation measures would be necessary in order to minimize the number of seabird interactions if these areas are actually fished now or in the future.

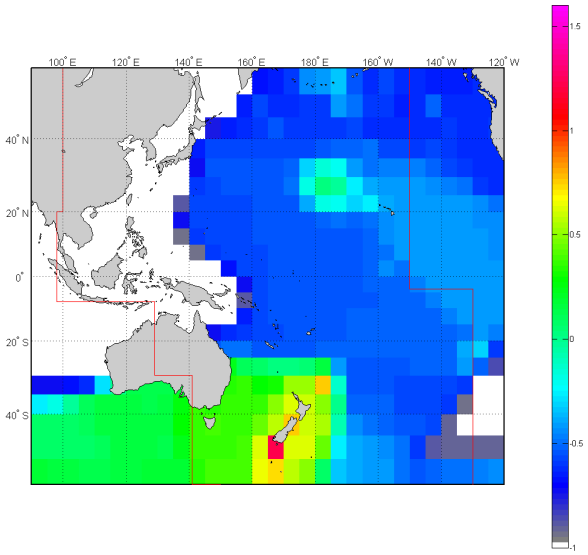
Figure 5. Year and seasonal plots of seabird numbers (individuals per 5×5 degree area) for 67 species of albatross and petrel found in the WCPFC Convention Area [log10(birds/km^2)]



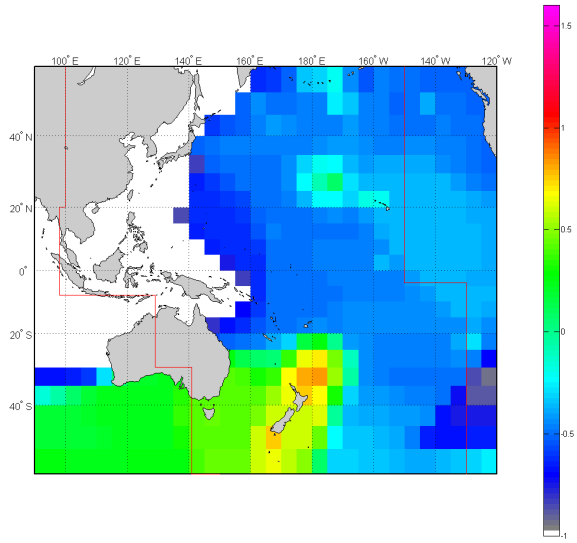
a) Annual



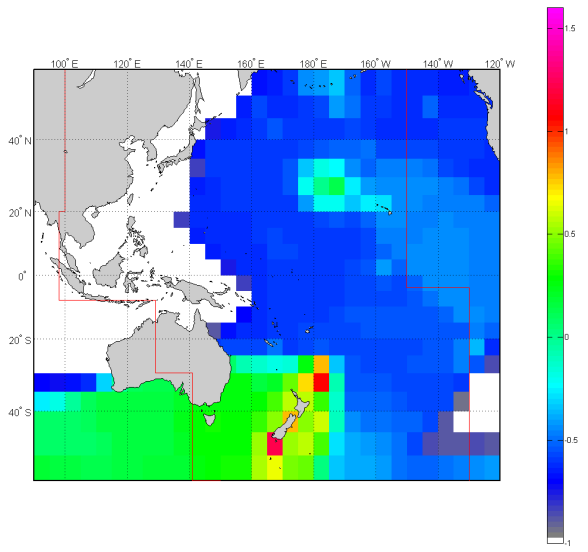
b) Winter



c) Spring



d) Summer



e) Autumn

We have added a new component by introducing a species specific vulnerability factor. This factor was added to modify the Susceptibility factor from the previous analysis, so that species have differential catchability in the analysis.

Vulnerability V relates the density of each species at the location where fishing is taking place, to the number of kills that occur. Depending on the behaviour of the birds, which differs between species (or species groups), different numbers of mortalities are expected for the same seabird density. If there are, on average, K birds killed on a fishing event then the vulnerability is

$$K = V D$$

Vulnerability have been estimated for representative seabirds species of the New Zealand EEZ (NZ Ministry of Fisheries)

The New Zealand Ministry of Fisheries' observer data provides a consistent data source that can be used to determine the number of birds killed per fishing event in the NZEEZ. Here captured birds were used (excluding deck captures) and no account is taken of whether or not the birds were released alive. The observers recorded birds that were either brought on board the vessel, or that the observers clearly saw being killed. This follows the methods used for estimating seabird captures in New Zealand fisheries (Waugh et al. 2008b, Abraham and Thompson 2008). Observer data from fishing years 2004-05, 2005-06 and 2006-07 were used to estimate V.

In order to calculate V, the species were first grouped together in groups of similar behaviours and propensities to be captured in fishing gear, with the following groups: large albatrosses, small albatrosses, small shearwaters, large shearwaters, Procellaria petrels; large Pterodroma petrels and other petrels. The species grouping was necessary to reduce the sparseness of the capture dataset.

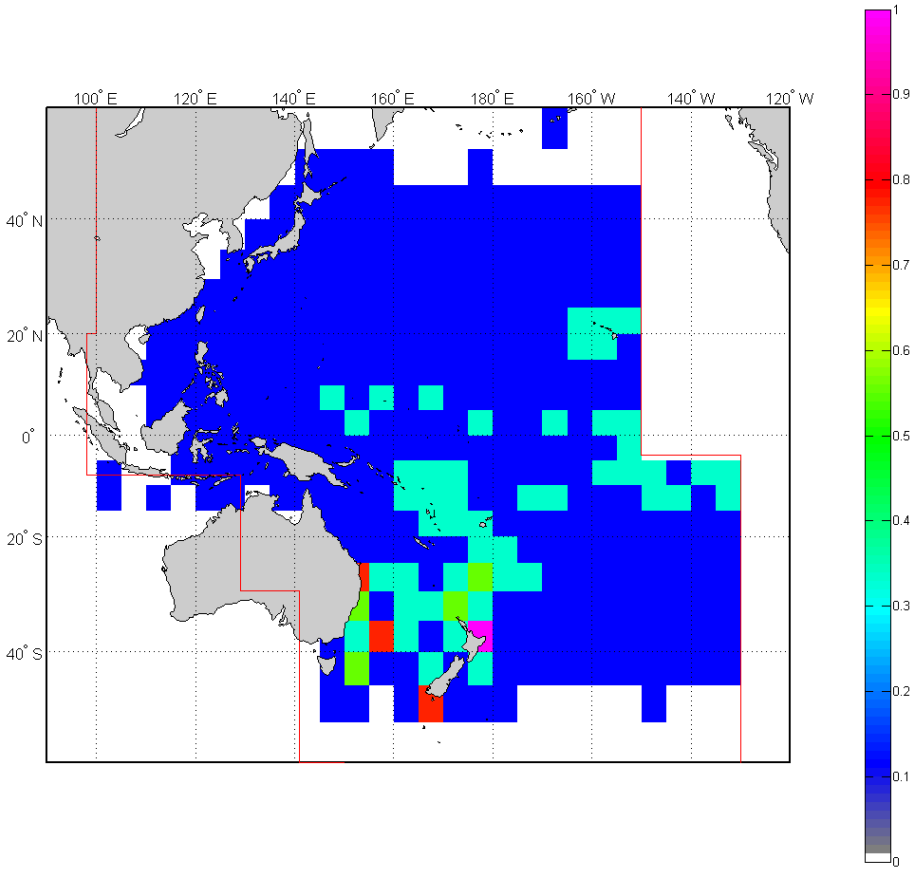
The vulnerability, V, was then estimated for each species group and fishing group (bottom long liner, surface long liner, inshore trawl...), by fitting a generalized linear model to the captures and density data, for observed fishing events from that fishery. Although capture data are typically over-dispersed, in many of the species-fisheries combinations there were few captures. To increase the stability of the fitting, the observed captures were assumed to be drawn from a Poisson distribution, with a mean proportional to the seabird density at the location of the fishing event. V was given by the constant of proportionality. No other covariates were included in the models. An exploration of the model fitting found that neglecting the possibility of over-dispersion had little effect on the model fit. The models were fitted using standard Bayesian methods (e.g., Gelman and Hill 2006), with a diffuse lognormal distribution being assumed as the prior for V.

In order to inform management decision making in relation to the species for which V were not estimated, as captures were too few for the dataset used, arbitrary values were used, of 0.1 V (large shearwaters) for small shearwaters and other petrels, and 0.1 V (small albatrosses) for two species of albatross known infrequently to attend vessels compared to others in that group: grey-headed albatross and light-mantled albatross. These values were included to assess the potential for interactions of these species as they were all known to very occasionally occur in small numbers in bycatch in trawl and longline fisheries.

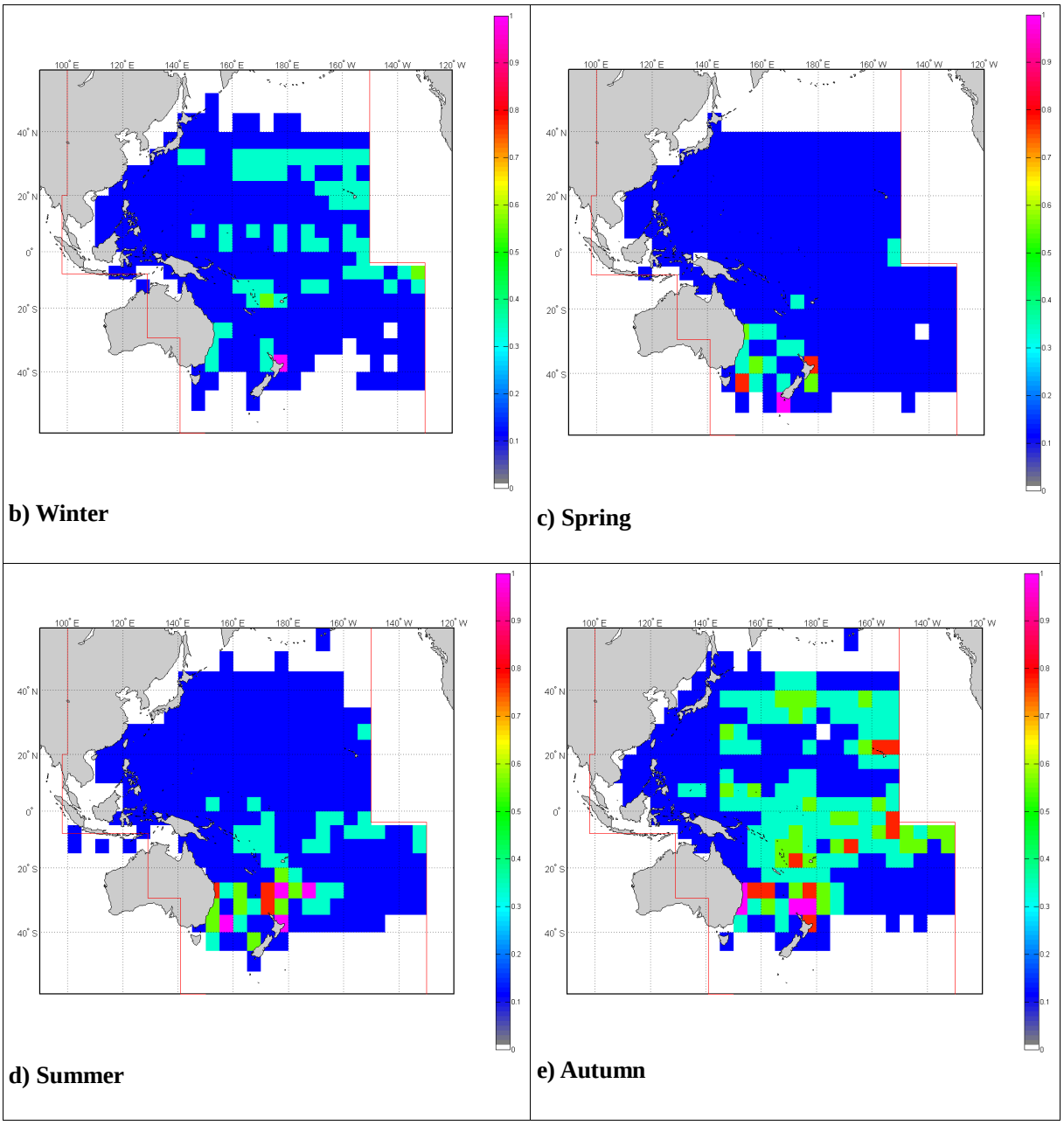
In Fig. 6. we have combined the estimate of absolute number of seabirds (Fig. 5), fishing effort (Fig. 1) and species vulnerabilities, in order to plot where fishing-induced mortality of vulnerable seabirds are most likely to have been occurring over the study period (2002–2009). These values are used as the *Susceptibility* index in the PSA described below. The results show the highest risk of vulnerable seabird interactions to be in the Tasman Sea and east of New Zealand most of the year, but the risk landscape extends to the central tropical and up to the north-east Pacific in Autumn and Winter. There are also some permanent areas in tropical regions where medium to low interactions are expected. These areas are certainly worthy of increased monitoring and possible application of mitigation measures.

Risk is at a higher and more wide-spread level in autumn and highly concentrated in Southern temperate areas in summer.

Figure 6. Annual and seasonal zones of greatest likelihood of capture of vulnerable seabirds, based on distributions of fishing effort (Fig. 1), seabird numbers (Fig. 5) and species vulnerability. Highest risk areas: pink; Medium to high: orange; Medium: green; Medium to low: pale blue; Low: dark blue; Negligible: white



a) Annual



b) Winter **c) Spring**

d) Summer **e) Autumn**

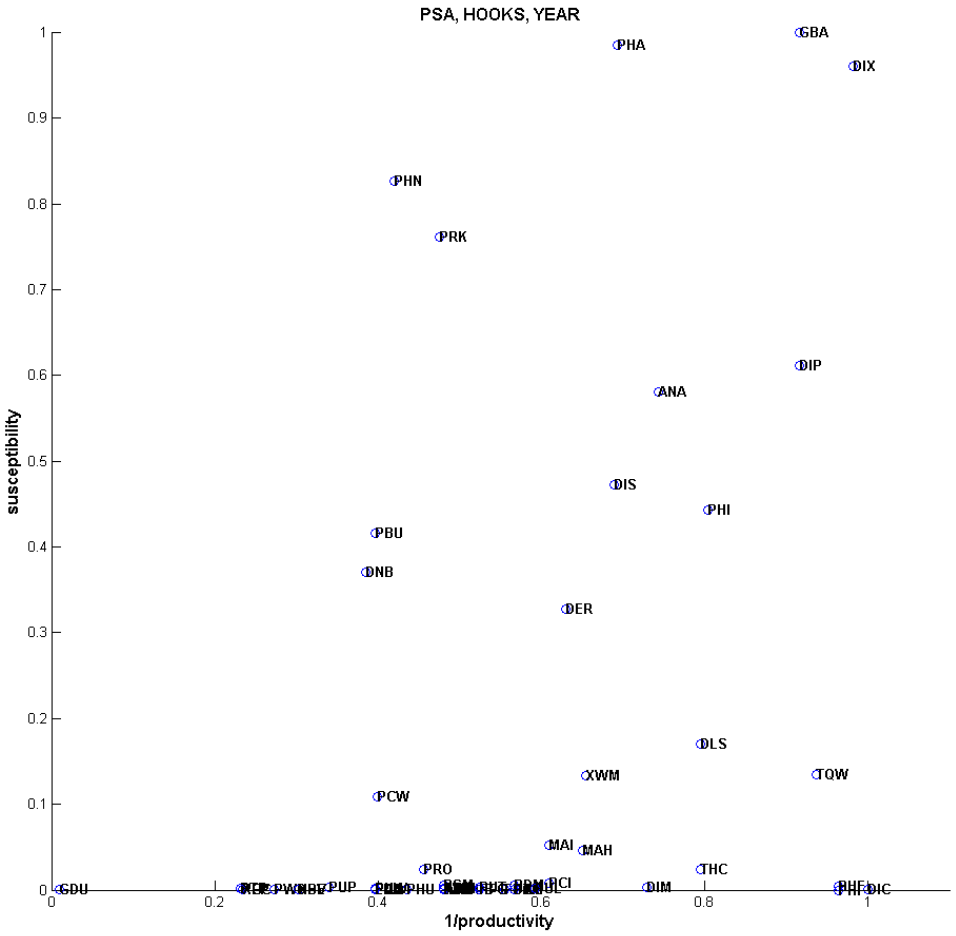
Productivity-Susceptibility Analyses (PSAs) for risk of species-level effects

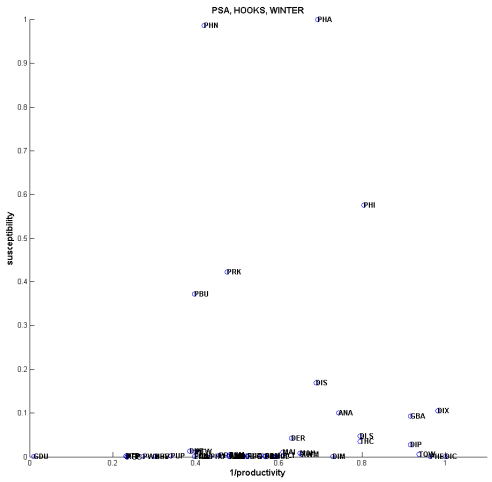
We calculated Productivity-Susceptibility (PSA) scores for all species included in the analysis (Fig. 7). Values expressed in subsequent maps and in tables are generated on the basis of the distance from the origin of this plot.

Species were spread along the *Productivity* axis in relation to their R_{max} value, a measure of their ability to rebuild populations. The grouping of species along this axis that is apparent in Fig. 7.

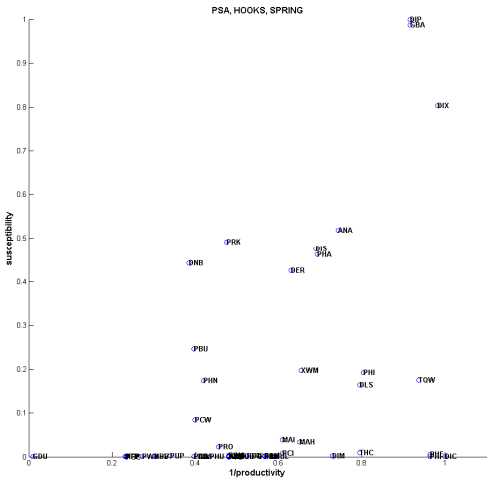
indicates where species-specific values were lacking, and substitute values were used for several species from the same genus. Values ranged from near to 0.9 for species that are common and rapidly-breeding (e.g. Bulwers' petrel, Cape petrel) to close to 0.05 for the slowest-breeding species (e.g. some long-lived and biennially-breeding albatrosses). The R_{max} values used for this study are in Table 1. They are plotted as inverse Rmax values so that highest risk life histories are furthest from the origin.

Figure 7. PSA outputs for 67 species of albatross and petrel included in the analyses. *Susceptibility*: degree of overlap of vulnerable species with fishing effort; *Productivity*: maximum population growth rate for each species.

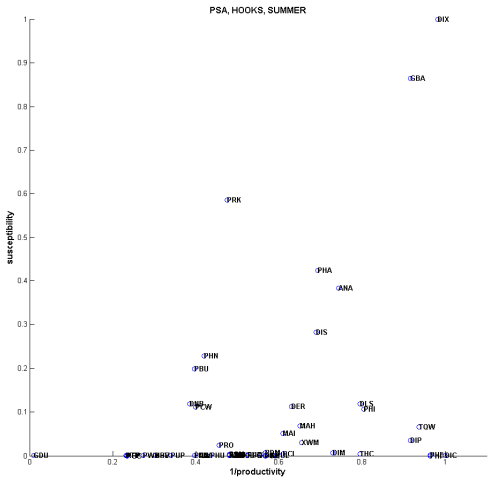




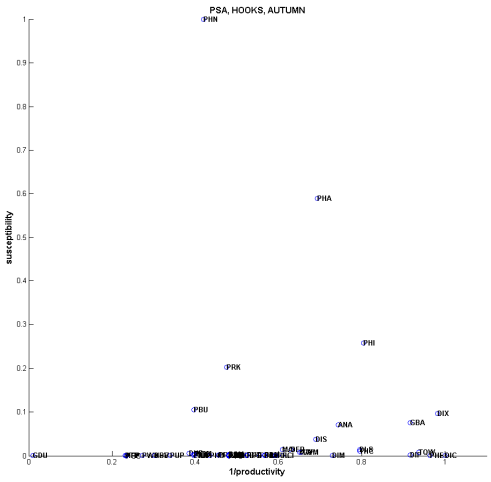
b) Winter



c) Spring



d) Summer



e) Autumn

We have tabulated the outputs of the PSAs to examine them in more detail in relation to the likely effect of combined fishing effort (i.e. aggregated across areas and flags) for each species (Table 2), and the proportion of risk at a species level attributed to each flag (see outputs for each species in Table 3). We have then mapped the PSA results back to the 5×5 grid across the WCPFC Convention Area (Fig. 8). Thus the outputs are defined in relation to three questions, discussed in more detail below:

Q1. Which species are most at risk of adverse effects from WCPFC longline fishing?

Q2. In which areas is there greatest risk of adverse effects on seabird species?

Q3. Which flags are posing the greatest risk of adverse effects on seabird species?

Which species are most at risk of adverse effects from WCPFC longline fishing?

Southern greater albatrosses are among the species the most at risk during the whole year (Northern Royal Albatross, Wandering Albatross, Antipodean Albatross (both subspecies) and Salvin's Albatross).

Depending on the season southern or northern species can be at risk. During Autumn and Winter northern albatrosses are the most at risk (Short-tailed Albatross, Laysan Albatross and Black-footed Albatross) followed by large petrels (Parkinson's petrel and Buller's shearwater) and a few southern greater albatrosses (Antipodean Albatrosses from both sub-species).

During Spring and Summer, southern greater albatrosses are most at risk, (Wandering, Antipodean (both sub-species) and southern royal albatross), but also short-tailed albatross. Parkinson's petrel is also ranked highly among the most at risk species in this season.

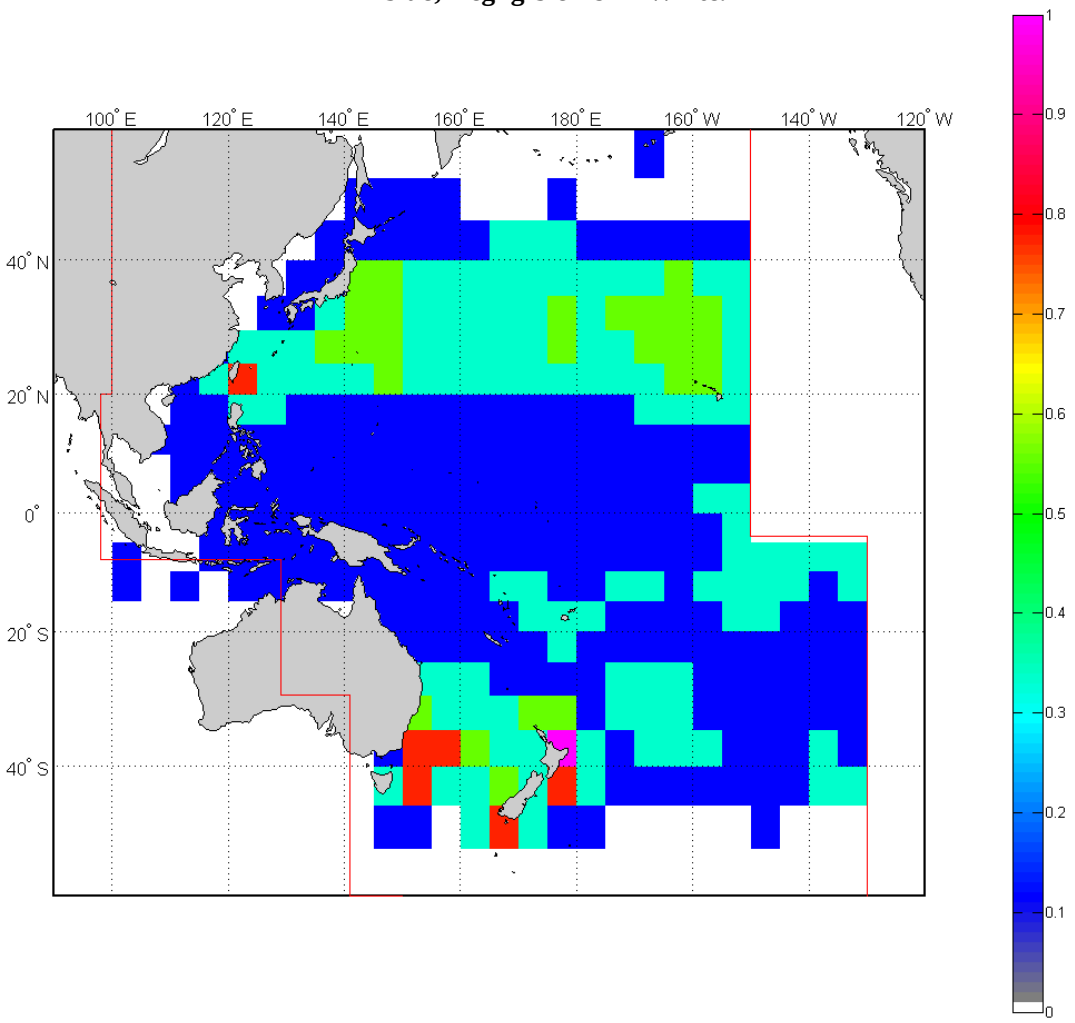
Depending on the season, some smaller albatrosses become more likely to incur adverse effects, particularly Salvin's, Buller's and Chatham albatrosses.

In which areas is there most risk of adverse effects on seabird species?

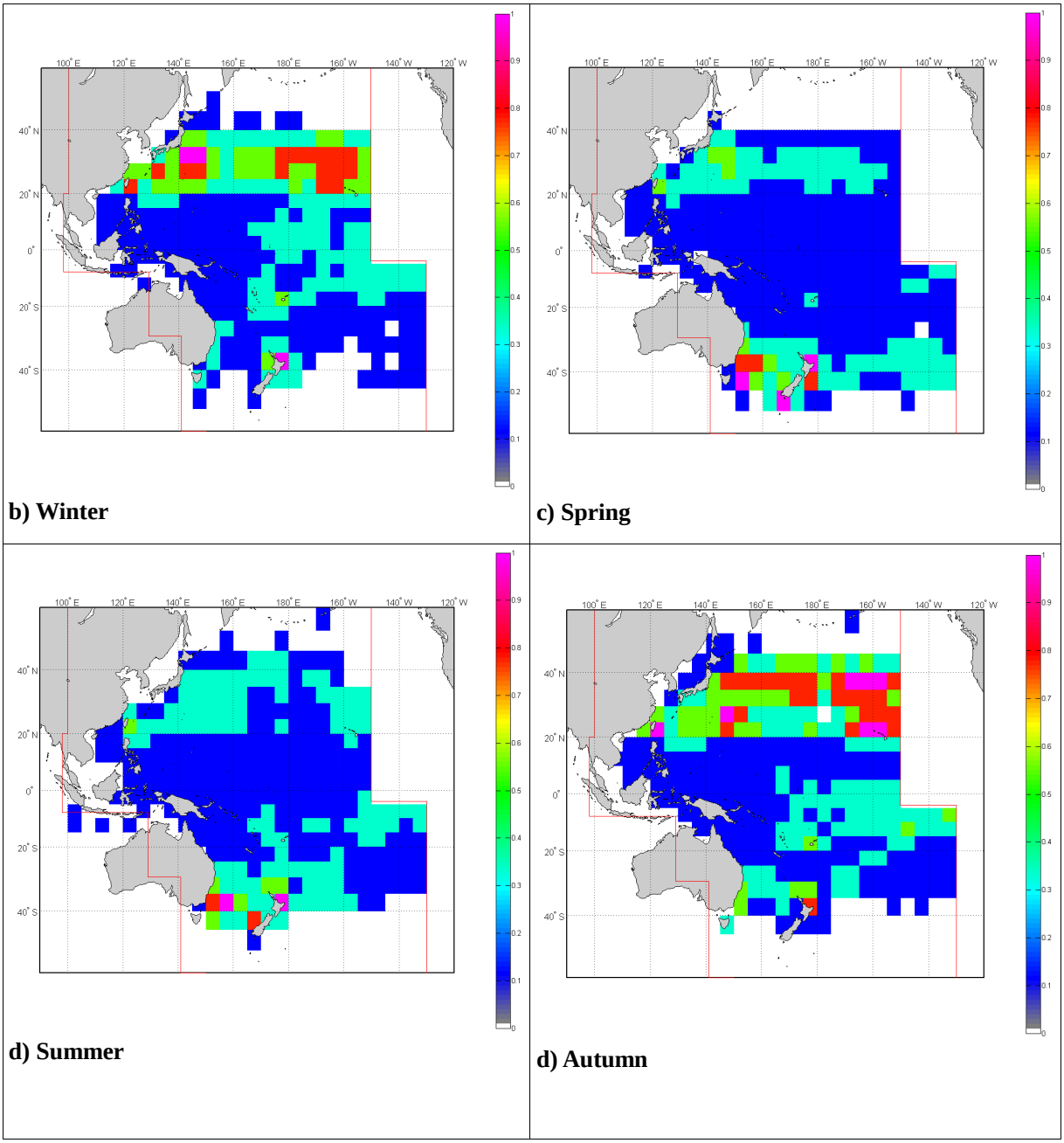
The **a**reas **w**ith **h**ighest **l**ikelihood of **s**pecies-**l**evel **p**opulation **e**ffects (awhlslpe, defined in Eq. 9) occur in the Tasman Sea, and around the coasts of New Zealand during Spring and Summer seasons (Fig. 8, pink areas). The northern Pacific shows highest risk areas, around Midway Islands, Hawaï, Japan and Taiwan during the Autumn and Winter seasons. Moderate-to-high risk levels (red) occur in the same areas but at a larger scale. Medium risk areas (green) surround the high risk areas, mostly in the northern and southern temperate latitudes, and in addition, some area show medium-risk in the central-Pacific, around Fiji and French Polynesia in Autumn and Winter.

$$\text{awhlslpe} = \sum_{species} \sum_{flag} \text{risk}(species, flag) \times \frac{\text{bird\_density}(species) \otimes \text{effort\_density}(flag)}{\text{bird\_population}(species)} \quad \text{(Eq. 9)}$$

Figure 8. Areas of likely species-level effects of fishing in the WCPFC Convention Area. Highest risk areas - pink, Medium-high - orange; Medium – green; Medium-low – pale blue; Low – dark blue; Negligible risk – White.



a) Annual



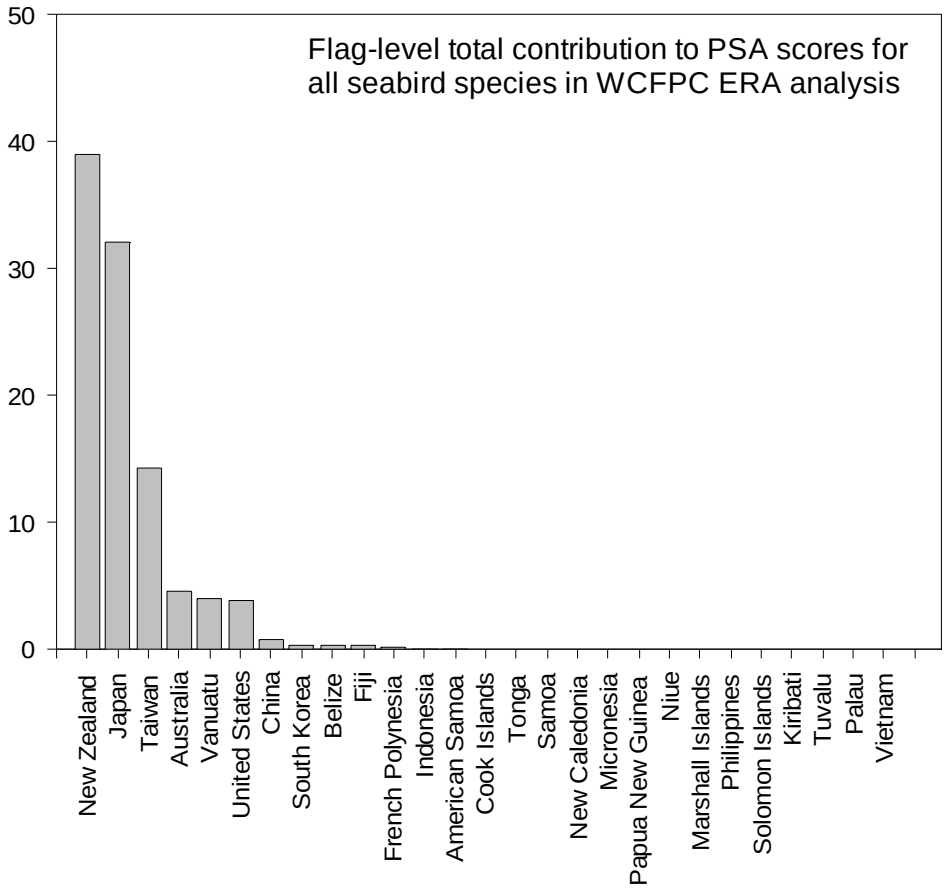
Which flags are posing the most risk of adverse effects on seabird species?

Six flags contribute over 98% of the combined risk to seabirds in the WCPFC (Fig. 9). Of these, only 2 contribute over 50% of the total risk. These are New Zealand (39%) and Japan (32%). In the case of New Zealand, this outcome is due to the distribution of a moderate fishing effort in the breeding areas of numerous vulnerable sub-Antarctic species during all the year, specially albatrosses which have the lowest productivity of the species studied. Japan has a significantly higher effort, more widely distributed across Convention area, which overlaps locally with several vulnerable species, for example in the Tasman sea, New Zealand and North-West Pacific areas.

Southern species most at risk (large albatrosses and Parkinson's petrel) are mostly linked to New Zealand and Japan flags. Northern species most at risk (northern albatrosses) are associated with Taiwan, Japan and United Sates flags. The PSA scores for each flag by species is set out in Table 3, as are the contributions of each flag to the risk score for each species.

The analysis assumes that all flags use similar mitigation throughout the zone, and doesn't take into account conservation measures that are in place within some EEZs. For example, specific mitigation measures for the New Zealand and Hawaiian areas may reduce the level of risk, compared with the measures applied more generally throughout the Convention Area.

Figure 9. Sum of PSA scores for all species in the analysis, attributed to flag



Conclusions and Recommendations

The analysis demonstrates that there are discrete areas within the Convention area where risk is higher than others. These are in particular in the Tasman Sea, around the New Zealand area, and in the mid-Pacific in an arch across the tropics and around the Hawaiian Islands. The outputs show that risk at a regional scale varies by season, in relation to fishing effort, but it must be borne in mind that seabird seasonal distributions used in this study are very rudimentary.

The information on flag contributions to risk indicates that few flags contribute most of the risk. These are principally New Zealand, Japan, but seasonally Taiwan, and USA contribute a considerable proportion of the risk.

At a species level, the species most susceptible to population effects are the greater albatrosses (*Diomedia* and *Phoebastria* spp). However, temperate petrels (Parkinson's petrel and Buller's shearwater) also show high risk levels compared to other species. Seasonally, some smaller albatrosses become more likely to incur adverse effects, particularly Buller's, Chatham and Salvin'salbatrosses.

Our recommendations are:

To reinforce the existing conservation measures with a greater level of monitoring in areas indicated as high to medium risk in the analysis, to enable finer-scaled assessment any adverse effects of fishing mortality in areas where fishing is likely to have greatest effect on species global conservation.

To review the use of mitigation measures in areas of high to medium risk to ensure that best pratice measures are in place to avoid captures of seabird species

To consider monitoring and mitigation measures in relation to flag, to ensure that those flags likely to contribute most to risk are adequately monitored.

Acknowledgements:

We are grateful to the following organizations for supporting the study: Western and Central Pacific Fisheries Commission; Secretariat for the Pacific Community; BirdLife International. We are particularly grateful to the many contributors of data which assisted the study, in particular: British Antarctic Survey, Javier Arata, Christopher Robertson, David Nicholls, Dave Anderson, Jill Awkerman, David Hyrenbach, David Nicholls, Amanda Freeman, David Nicholls, Christopher Robertson, Peter Ryan, Deon Nel, Graham Robertson, Henri Weimerskirch, Jean-Claude Stahl, Paul Sagar, Kath Walker, Michelle Hester, Nic Huin, Nic Klomp, Mark Schultz, Rachael Alderman, Richard Cuthbert, Rosemary Gales, Ross Wanless, Samantha Petersen, Scott Shaffer, Michelle Antals, Michelle Kappes, Akira Suzuki. We thank the BirdLife International staff who assisted in the preparation of species distributional layers: Ian May; Mark Balman; Ben Lascelles; Phil Taylor; Cleo Small and Steve Cranwell; the staff at SPC, Tim Lawson and Peter Williams, who assisted with data extracts for the study; Frances Taylor for technical advice, and to Richard Phillips and Nathan Walker for commentary on the methods. Thanks to Ed Abraham for contributions to the Vulnerability analyses.

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Table 1. Estimated *Productivity* (R_{max}) values, derived from Age-at-maturity and Annual Adult Survival rates, for 75 species of albatrosses and petrels found in the WCPFC Convention Area and which are vulnerable to capture on longline fisheries. Scientific name follows BirdLife International taxonomy (www.birdlife.org). 'Code' is generally FAO Code but may include other national standard codes. Whether as species has been observed captured in the region is noted (Y: yes), as is threat status for species as defined by the International Union for the Conservation Nature (IUCN; www.iucnredlist.org). World population (number of individuals) estimated by BirdLife International. Where a population size range was provided, we have taken the mid-point of that range to use in analyses). Species are listed in alphabetical order of their scientific name.

Code	BLI Scientific name	BLI Common name	Rmax	Age-at-maturity average	Survival average	Threat status	Global population	BLI tracking data	Recorded bycatch	Vulnerability
BUB	*Bulweria bulwerii*	Bulwer's Petrel	0.898	5	94.7	LC	750000			0.000344
DAC	*Daption capense*	Cape Petrel	0.827	6	94	LC	2000000			0.000344
ANA	*Diomedea antipodensis*	Antipodean Albatross	0.564	7	95.4	VU	22000	Y		1.000000
DIP	*Diomedea epomophora*	Southern Royal Albatross	0.056	7	97	VU	27650	Y	Y	1.000000
DIX	*Diomedea exulans*	Wandering Albatross	0.053	9	96	VU	28175	Y	Y	1.000000
GBA	*Diomdea Gibsoni*	Gibson Albatross	0.056	7	97	VU	18428	(same as ANA)		1.000000
DIS	*Diomedea sanfordi*	Northern Royal Albatross	0.071	7	94.6	EN	20412	Y		1.000000
FUG	*Fulmarus glacialoides*	Southern Fulmar	0.084	5	95.5	LC	4000000			0.001100
HBE	*Halobaena caerulea*	Blue Petrel	0.127	5.4	84	LC	4754000			0.000344
LUB	*Lugensa brevirostris*	Kerguelen Petrel	0.107	5.5	90	LC	1000000			0.000344
MAI	*Macronectes giganteus*	Southern Giant-petrel	0.078	7	93	LC	150510		Y	0.307899
MAH	*Macronectes halli*	Northern Giant-petrel	0.074	7.5	93	LC	35400		Y	0.307899
PAB	*Pachyptila belcheri*	Thin-billed Prion	0.107	6.7	84	LC	7000000			0.000344
PWD	*Pachyptila desolata*	Antarctic Prion	0.136	5	84	LC	75150000			0.000344
XFP	*Pachyptila turtur*	Fairy Prion	0.149	4.5	84	LC	5100000			0.000344
XPV	*Pachyptila vittata*	Broad-billed Prion	0.128	5.4	84	LC	15000000			0.000344
GDU	*Pelecanoides urinatrix*	Diving Petrel		2	81	LC	16000000			0.000344
PHA	*Phoebastria albatrus*	Short-tailed Albatross	0.071	6.7	95	VU	1410			0.307899
PHI	*Phoebastria immutabilis*	Laysan Albatross	0.063	8	95	VU	1774068	Y	Y	0.307899
PHN	*Phoebastria nigripes*	Black-footed Albatross	0.103	4	95	EN	183921	Y	Y	0.307899
PHF	*Phoebetria fusca*	Sooty Albatross	0.054	7	97.3	EN	41670			0.307899
PHE	*Phoebetria palpebrata*	Light-mantled Albatross	0.054	7	97.3	NT	67830		Y	0.307899
PRO	*Procellaria aequinoctialis*	White-chinned Petrel	0.097	6.5	89	VU	3723000			0.151234

PCI	*Procellaria cinerea*	Grey Petrel	0.079	7	93	NT	335052			Y	0.151234
PRK	*Procellaria parkinsoni*	Parkinson's Petrel	0.094	7	88	VU	10000	Y		Y	0.151234
PCW	*Procellaria westlandica*	Westland Petrel	0.106	6	88	VU	12000	Y		Y	0.151234
PSB	*Pseudobulweria becki*	Beck's Petrel	0.094	5.5	93	CR	150				0.000344
PSM	*Pseudobulweria macgillivrayi*	Fiji Petrel	0.094	5.5	93	CR	25				0.000344
PSR	*Pseudobulweria rostrata*	Tahiti Petrel	0.094	5.5	93	NT	20000				0.000344
PLB	*Pterodroma alba*	Phoenix Petrel	0.094	5.5	93	EN	30000				0.000344
PTT	*Pterodroma atrata*	Henderson Petrel	0.094	5.5	93	EN	75000				0.000344
PTA	*Pterodroma axillaris*	Chatham Petrel	0.094	5.5	93	EN	900				0.000344
PTB	*Pterodroma brevipes*	Collared Petrel	0.094	5.5	93	NT	5500				0.000344
WNP	*Pterodroma cervicalis*	White-necked Petrel	0.094	5.5	93	VU	450000				0.000344
PTC	*Pterodroma cookii*	Cook's Petrel	0.094	5.5	93	VU	2100000				0.000344
PTE	*Pterodroma externa*	Juan Fernandez Petrel	0.094	5.5	93	VU	3000000				0.000344
PTH	*Pterodroma heraldica*		0.094	5.5	93	VU	332640				0.000344
XMP	*Pterodroma inexpectata*	Mottled Petrel	0.094	5.5	93	NT	1230000				0.000344
XWH	*Pterodroma lessonii*	White-headed Petrel	0.094	5.5	93	LC	660000				0.006256
PTL	*Pterodroma leucoptera*	Gould's Petrel	0.094	5.5	93	VU	12000				0.000344
PTO	*Pterodroma longirostris*	Stejneger's Petrel	0.094	5.5	93	VU	400000				0.000344
PDM	*Pterodroma macroptera*	Great-winged Petrel	0.083	6.5	93	LC	1500000			Y	0.006256
PTM	*Pterodroma magentae*	Magenta Petrel	0.083	6.5	93	CR	135				0.000344
PTS	*Pterodroma mollis*	Soft-plumaged Petrel	0.094	5.5	93	LC	4980000				0.006256
PVB	*Pterodroma neglecta*	Kermadec Petrel	0.094	5.5	93	LC	175000				0.000344
PTN	*Pterodroma nigripennis*	Black winged Petrel	0.094	5.5	93	LC	9000000				0.000344
PTP	*Pterodroma pycrofti*	Pycroft's Petrel	0.087	5.5	72	VU	15000				0.000344
PTW	*Pterodroma sandwichensis*	Hawaiian Petrel	0.094	5.5	93	VU	20000				0.000344
PTI	*Pterodroma solandri*	Providence Petrel	0.094	5.5	93	VU	100000				0.000344
PTU	*Pterodroma ultima*	Murphy's Petrel	0.094	5.5	93	NT	900000				0.000344
PUA	*Puffinus assimilis*	Little Shearwater	0.107	5.5	90	LC	900000				0.000344
PBU	*Puffinus bulleri*	Buller's Shearwater	0.107	5.5	90	VU	900000				0.151234
PFC	*Puffinus carneipes*	Flesh-footed Shearwater	0.094	5.5	93	LC	648000			Y	0.001100
PFG	*Puffinus griseus*	Sooty Shearwater	0.088	6	93	NT	20000000	Y		Y	0.001100
PUN	*Puffinus heinrothi*	Heinroth's Shearwater	0.094	5.5	93	VU	625				0.000344
PHU	*Puffinus huttoni*	Hutton's Shearwater	0.115	5	93	EN	282000				0.000344

PUL	*Puffinus lherminieri*	Audubon's Shearwater	0.080	8	90	LC	500000			0.000344
PNT	*Puffinus nativitatis*		0.094	5.5	93	LC	22388			0.000344
PUW	*Puffinus newelli*	Newell's Shearwater	0.107	5.5	90	EN	38600			0.000344
PUB	*Puffinus pacificus*	Wedge-tailed Shearwater	0.118	4	93	LC	5200000		Y	0.001100
PUT	*Puffinus tenuirostris*	Short-tailed Shearwater	0.088	6	93	LC	23000000		Y	0.001100
DNB	*Thalassarche bulleri*	Buller's Albatross	0.109	5	91.3	NT	91380	Y	Y	0.307899
THC	*Thalassarche cauta*	Shy Albatross	0.063	9	93.5	NT	37755	Y		0.307899
DIC	*Thalassarche chrysostoma*	Grey-headed Albatross	0.052	10	95.3	VU	335118	Y	Y	0.307899
DER	*Thalassarche eremita*	Chatham Albatross	0.076	7	93.5	CR	13725	Y	Y	0.307899
TQW	*Thalassarche impavida*	Campbell Albatross	0.055	10	94.5	VU	63000	Y		0.030790
DIM	*Thalassarche melanophrys*	Black-browed Albatross	0.068	9	92	EN	1805058	Y	Y	0.307899
DLS	*Thalassarche salvini*	Salvin's Albatross	0.063	9	93.5	VU	95841		Y	0.307899
XWM	*Thalassarche steadi*	White-capped Albatross	0.063	9	93.5	NT	291000		Y	0.307899

Table 2. Species rankings in relation to PSA score. Species are listed in descending order of PSA score, and are listed with their common and scientific name and IUCN threat status, and with the mid-point of the estimated population size in numbers of individuals. The listed species are split into four groups: Highest risk (red) for the top 10 species, High Risk for those ranked 11- 25, (orange) Medium Risk (yellow) for those ranked 26-50, and Lowest Risk (green) for those ranked above 51.

a)Year

Scientific name	Common name	Code	Threat status	Population	Rank
Diomedea_exulans	Wandering Albatross	DIX	VU	28175	1
Diomedea_gibsoni	Gibson's Albatross	GBA	VU	18400	2
Phoebastria_albatrus	Short-tailed Albatross	PHA	VU	1410	3
Diomedea_epomophora	Southern Royal Albatross	DIP	VU	27650	4
Diomedea_antipodensis	Antipodean Albatross	ANA	VU	22022	5
Procellaria_parkinsoni	Parkinson's Petrel	PRK	VU	9999	6
Phoebastria_immutabilis	Laysan Albatross	PHI	VU	1774068	7
Phoebastria_nigripes	Black-footed Albatross	PHN	EN	183921	8
Diomedea_sanfordi	Northern Royal Albatross	DIS	EN	20412	9
Thalassarche_eremita	Chatham Albatross	DER	CR	13725	10
Puffinus_bulleri	Buller's Shearwater	PBU	VU	900000	11
Thalassarche_bulleri	Buller's Albatross	DNB	NT	91380	12
Thalassarche_salvini	Salvin Albatross	DLS	VU	95841	13
Thalassarche_impavida	Campbell Albatross	TQW	VU	63000	14
Thalassarche_steadi	White-capped Albatross	XWM	NT	291333	15
Procellaria_westlandica	Westland Petrel	PCW	VU	12000	16
Macronectes_giganteus	Southern Giant Petrel	MAI	LC	150510	17
Macronectes_halli	Northern Giant Petrel	MAH	LC	35400	18
Thalassarche_cauta	Shy Albatross	THC	NT	37755	19
Procellaria_aequinoctialis	White-chinned Petrel	PRO	VU	3723000	20
Procellaria_cinerea	Grey Petrel	PCI	NT	335052	21
Phoebetria_palpebrata	Light-mantled Sooty Albatross	PHE	NT	79100	22
Pterodroma_macroptera	Great-winged Petrel	PDM	LC	1500000	23
Pseudobulweria_macgillivrayi	Fiji Petrel	PSM	CR	26	24
Thalassarche_melanophrys	Black-browed Albatross	DIM	EN	1805058	25
Puffinus_tenuirostris	Short-Tailed Shearwater	PUT	LC	23000000	26
Pterodroma_alba	Phoenix Petrel	PLB	EN	30000	27
Pseudobulweria_becki	Beck's Petrel	PSB	CR	150	28
Puffinus_carneipes	Flesh-footed Shearwater	PFC	LC	648000	29
Puffinus_pacificus	Wedge-tailed Shearwater	PUP	LC	5200000	30
Pseudobulweria_rostrata	Tahiti Petrel	PSR	NT	20000	31
Pterodroma_lessonii	White-headed Petrel	XWH	LC	660000	32
Puffinus_lherminieri	Audubon's Shearwater	PUL	LC	500000	33
Pterodroma_solandri	Providence Petrel	PTI	VU	100000	34
Pterodroma_brevipes	Collared Petrel	PTB	NT	5500	35

Thalassarche_chrysostoma	Grey-Headed Albatross	DIC	VU	335118	36
Puffinus_nativitatis	Christmas Shearwater	PNT	LC	22388	37
Pterodroma_leucoptera	Gould's Petrel	PTL	VU	12000	38
Pterodroma_sandwichensis	Hawaiian Petrel	PTW	VU	20000	39
Puffinus_newelli	Newell's Shearwater	PUW	EN	38600	40
Puffinus_griseus	Sooty Shearwater	PFG	NT	18000000	41
Bulweria_bulwerii	Bulwer's Petrel	BUB	LC	750000	42
Pterodroma_longirostris	Stejneger's Petrel	PTO	VU	400000	43
Pterodroma_pycrofti	Pycroft's Petrel	PTP	VU	15000	44
Pterodroma_mollis	Soft-plumaged Petrel	PTS	LC	4980000	45
Pterodroma_inexpectata	Mottled Petrel	XMP	NT	1230000	46
Puffinus_huttoni	Hutton's Shearwater	PHU	EN	282000	47
Puffinus_heinrothi	Heinroth's Shearwater	PUN	VU	625	48
Pterodroma_cookii	Cook's Petrel	PTC	VU	2100000	49
Pterodroma_cervicalis	White-necked Petrel	WNP	VU	450000	50
Pterodroma_ultima	Murphy's Petrel	PTU	NT	900000	51
Pterodroma_neglecta	Kermadec Petrel	PVB	LC	174900	52
Pterodroma_atrata	Henderson Petrel	PTT	EN	75000	53
Pterodroma_axillaris	Chatham Petrel	PTA	EN	900	54
Pterodroma_nigripennis	Black-winged Petrel	PTN	LC	9000000	55
Pterodroma_externa	Juan Fernàndez Petrel	PTE	VU	3000000	56
Pterodroma_magentae	Magenta Petrel	PTM	CR	135	57
Daption_capense	Cape Pigeon	DAC	LC	1998000	58
Puffinus_assimilis	Little Shearwater	PUA	LC	900000	59
Fulmarus_glacialoides	Antarctic Fulmar	FUG	LC	4000000	60
Pachyptila_turtur	Fairy Prion	XFP	LC	5100000	61
Pachyptila_vittata	Broad-billed Prion	XPV	LC	15000000	62
Pachyptila_belcheri	Thin-billed Prion	PAB	LC	7000000	63
Lugensa_brevirostris	Kerguelen Petrel	LUB	LC	1000000	64
Pachyptila_desolata	Antarctic Prion	PWD	LC	75150000	65
Pterodroma_heraldica	Herald Petrel	PTH	VU	110880	66
Halobaena_caerulea	Blue Petrel	HBE	LC	4764000	67
Pelecanoides_urinatrix	Common Diving-Petrel	GDU	LC	15999999	68
Pachyptila_crassirostris	Fulmar Prion	PCC	LC	225000	69
Phoebetria_fusca	Sooty Albatross	PHF	EN	48615	70

b) Winter

Scientific name	Common name	Code	Threat status	Population	Rank
Phoebastria_albatrus	Short-tailed Albatross	PHA	VU	1410	1
Phoebastria_immutabilis	Laysan Albatross	PHI	VU	1774068	2
Phoebastria_nigripes	Black-footed Albatross	PHN	EN	183921	3
Procellaria_parkinsoni	Parkinson's Petrel	PRK	VU	9999	4
Puffinus_bulleri	Buller's Shearwater	PBU	VU	900000	5
Diomedea_sanfordi	Northern Royal Albatross	DIS	EN	20412	6
Diomedea_exulans	Wandering Albatross	DIX	VU	28175	7
Diomedea_gibsoni	Gibson's Albatross	GBA	VU	18400	8
Diomedea_antipodensis	Antipodean Albatross	ANA	VU	22022	9

Thalassarche_salvini	Salvin Albatross	DLS	VU	95841	10
Thalassarche_cauta	Shy Albatross	THC	NT	37755	11
Thalassarche_eremita	Chatham Albatross	DER	CR	13725	12
Diomedea_epomophora	Southern Royal Albatross	DIP	VU	27650	13
Macronectes_giganteus	Southern Giant Petrel	MAI	LC	150510	14
Thalassarche_impavida	Campbell Albatross	TQW	VU	63000	15
Thalassarche_bulleri	Buller's Albatross	DNB	NT	91380	16
Macronectes_halli	Northern Giant Petrel	MAH	LC	35400	17
Procellaria_westlandica	Westland Petrel	PCW	VU	12000	18
Thalassarche_steadi	White-capped Albatross	XWM	NT	291333	19
Pseudobulweria_macgillivrayi	Fiji Petrel	PSM	CR	26	20
Procellaria_aequinoctialis	White-chinned Petrel	PRO	VU	3723000	21
Procellaria_cinerea	Grey Petrel	PCI	NT	335052	22
Pterodroma_macroptera	Great-winged Petrel	PDM	LC	1500000	23
Puffinus_tenuirostris	Short-Tailed Shearwater	PUT	LC	23000000	24
Puffinus_pacificus	Wedge-tailed Shearwater	PUP	LC	5200000	25
Pterodroma_alba	Phoenix Petrel	PLB	EN	30000	26
Pseudobulweria_becki	Beck's Petrel	PSB	CR	150	27
Puffinus_carneipes	Flesh-footed Shearwater	PFC	LC	648000	28
Pterodroma_cookii	Cook's Petrel	PTC	VU	2100000	29
Pterodroma_solandri	Providence Petrel	PTI	VU	100000	30
Pseudobulweria_rostrata	Tahiti Petrel	PSR	NT	20000	31
Puffinus_lherminieri	Audubon's Shearwater	PUL	LC	500000	32
Pterodroma_brevipes	Collared Petrel	PTB	NT	5500	33
Puffinus_nativitatis	Christmas Shearwater	PNT	LC	22388	34
Bulweria_bulwerii	Bulwer's Petrel	BUB	LC	750000	35
Pterodroma_longirostris	Stejneger's Petrel	PTO	VU	400000	36
Pterodroma_pycrofti	Pycroft's Petrel	PTP	VU	15000	37
Pterodroma_cervicalis	White-necked Petrel	WNP	VU	450000	38
Pterodroma_sandwichensis	Hawaiian Petrel	PTW	VU	20000	39
Phoebetria_palpebrata	Light-mantled Sooty Albatross	PHE	NT	79100	40
Pterodroma_leucoptera	Gould's Petrel	PTL	VU	12000	41
Thalassarche_melanophrys	Black-browed Albatross	DIM	EN	1805058	42
Puffinus_newelli	Newell's Shearwater	PUW	EN	38600	43
Pterodroma_atrata	Henderson Petrel	PTT	EN	75000	44
Puffinus_heinrothi	Heinroth's Shearwater	PUN	VU	625	45
Pterodroma_ultima	Murphy's Petrel	PTU	NT	900000	46
Pterodroma_externa	Juan Fernàndez Petrel	PTE	VU	3000000	47
Pterodroma_inexpectata	Mottled Petrel	XMP	NT	1230000	48
Pterodroma_neglecta	Kermadec Petrel	PVB	LC	174900	49
Pterodroma_mollis	Soft-plumaged Petrel	PTS	LC	4980000	50
Puffinus_griseus	Sooty Shearwater	PFG	NT	18000000	51
Pterodroma_axillaris	Chatham Petrel	PTA	EN	900	52
Puffinus_huttoni	Hutton's Shearwater	PHU	EN	282000	53
Pterodroma_lessonii	White-headed Petrel	XWH	LC	660000	54
Daption_capense	Cape Pigeon	DAC	LC	1998000	55
Pterodroma_magentae	Magenta Petrel	PTM	CR	135	56
Thalassarche_chrysostoma	Grey-Headed Albatross	DIC	VU	335118	57

Pachyptila_vittata	Broad-billed Prion	XPV	LC	15000000	58
Pachyptila_turtur	Fairy Prion	XFP	LC	5100000	59
Fulmarus_glacialoides	Antarctic Fulmar	FUG	LC	4000000	60
Puffinus_assimilis	Little Shearwater	PUA	LC	900000	61
Pterodroma_heraldica	Herald Petrel	PTH	VU	110880	62
Pachyptila_belcheri	Thin-billed Prion	PAB	LC	7000000	63
Pterodroma_nigripennis	Black-winged Petrel	PTN	LC	9000000	64
Lugensa_brevirostris	Kerguelen Petrel	LUB	LC	1000000	65
Phoebetria_fusca	Sooty Albatross	PHF	EN	48615	66
Halobaena_caerulea	Blue Petrel	HBE	LC	4764000	67
Pachyptila_desolata	Antarctic Prion	PWD	LC	75150000	68
Pelecanoides_urinatrix	Common Diving-Petrel	GDU	LC	15999999	69
Pachyptila_crassirostris	Fulmar Prion	PCC	LC	225000	70

c) Spring

Scientific name	Common name	Code	Threat status	Population	Rank
Diomedea_epomophora	Southern Royal Albatross	DIP	VU	27650	1
Diomedea_gibsoni	Gibson's Albatross	GBA	VU	18400	2
Diomedea_exulans	Wandering Albatross	DIX	VU	28175	3
Diomedea_antipodensis	Antipodean Albatross	ANA	VU	22022	4
Diomedea_sanfordi	Northern Royal Albatross	DIS	EN	20412	5
Phoebastria_albatrus	Short-tailed Albatross	PHA	VU	1410	6
Thalassarche_eremita	Chatham Albatross	DER	CR	13725	7
Procellaria_parkinsoni	Parkinson's Petrel	PRK	VU	9999	8
Thalassarche_bulleri	Buller's Albatross	DNB	NT	91380	9
Thalassarche_impavida	Campbell Albatross	TQW	VU	63000	10
Phoebastria_immutabilis	Laysan Albatross	PHI	VU	1774068	11
Thalassarche_salvini	Salvin Albatross	DLS	VU	95841	12
Thalassarche_steadi	White-capped Albatross	XWM	NT	291333	13
Puffinus_bulleri	Buller's Shearwater	PBU	VU	900000	14
Phoebastria_nigripes	Black-footed Albatross	PHN	EN	183921	15
Procellaria_westlandica	Westland Petrel	PCW	VU	12000	16
Macronectes_giganteus	Southern Giant Petrel	MAI	LC	150510	17
Macronectes_halli	Northern Giant Petrel	MAH	LC	35400	18
Procellaria_aequinoctialis	White-chinned Petrel	PRO	VU	3723000	19
Thalassarche_cauta	Shy Albatross	THC	NT	37755	20
Phoebetria_palpebrata	Light-mantled Sooty Albatross	PHE	NT	79100	21
Procellaria_cinerea	Grey Petrel	PCI	NT	335052	22
Thalassarche_melanophrys	Black-browed Albatross	DIM	EN	1805058	23
Pseudobulweria_macgillivrayi	Fiji Petrel	PSM	CR	26	24
Pterodroma_macroptera	Great-winged Petrel	PDM	LC	1500000	25
Pterodroma_lessonii	White-headed Petrel	XWH	LC	660000	26
Puffinus_griseus	Sooty Shearwater	PFG	NT	18000000	27
Puffinus_tenuirostris	Short-Tailed Shearwater	PUT	LC	23000000	28
Thalassarche_chrysostoma	Grey-Headed Albatross	DIC	VU	335118	29
Pterodroma_alba	Phoenix Petrel	PLB	EN	30000	30
Puffinus_pacificus	Wedge-tailed Shearwater	PUP	LC	5200000	31

Pterodroma_axillaris	Chatham Petrel	PTA	EN	900	32
Pseudobulweria_becki	Beck's Petrel	PSB	CR	150	33
Pterodroma_mollis	Soft-plumaged Petrel	PTS	LC	4980000	34
Pterodroma_inexpectata	Mottled Petrel	XMP	NT	1230000	35
Pterodroma_magentae	Magenta Petrel	PTM	CR	135	36
Puffinus_carneipes	Flesh-footed Shearwater	PFC	LC	648000	37
Pseudobulweria_rostrata	Tahiti Petrel	PSR	NT	20000	38
Puffinus_nativitatis	Christmas Shearwater	PNT	LC	22388	39
Puffinus_lherminieri	Audubon's Shearwater	PUL	LC	500000	40
Pterodroma_solandri	Providence Petrel	PTI	VU	100000	41
Pterodroma_brevipes	Collared Petrel	PTB	NT	5500	42
Puffinus_huttoni	Hutton's Shearwater	PHU	EN	282000	43
Pterodroma_sandwichensis	Hawaiian Petrel	PTW	VU	20000	44
Pterodroma_leucoptera	Gould's Petrel	PTL	VU	12000	45
Bulweria_bulwerii	Bulwer's Petrel	BUB	LC	750000	46
Pterodroma_longirostris	Stejneger's Petrel	PTO	VU	400000	47
Pterodroma_pycrofti	Pycroft's Petrel	PTP	VU	15000	48
Puffinus_newelli	Newell's Shearwater	PUW	EN	38600	49
Puffinus_heinrothi	Heinroth's Shearwater	PUN	VU	625	50
Pterodroma_ultima	Murphy's Petrel	PTU	NT	900000	51
Pterodroma_cervicalis	White-necked Petrel	WNP	VU	450000	52
Pterodroma_atrata	Henderson Petrel	PTT	EN	75000	53
Fulmarus_glacialoides	Antarctic Fulmar	FUG	LC	4000000	54
Pterodroma_neglecta	Kermadec Petrel	PVB	LC	174900	55
Daption_capense	Cape Pigeon	DAC	LC	1998000	56
Puffinus_assimilis	Little Shearwater	PUA	LC	900000	57
Pachyptila_turtur	Fairy Prion	XFP	LC	5100000	58
Pterodroma_externa	Juan Fernàndez Petrel	PTE	VU	3000000	59
Pachyptila_vittata	Broad-billed Prion	XPV	LC	15000000	60
Pachyptila_belcheri	Thin-billed Prion	PAB	LC	7000000	61
Lugensa_brevirostris	Kerguelen Petrel	LUB	LC	1000000	62
Pachyptila_desolata	Antarctic Prion	PWD	LC	75150000	63
Halobaena_caerulea	Blue Petrel	HBE	LC	4764000	64
Pterodroma_heraldica	Herald Petrel	PTH	VU	110880	65
Pterodroma_nigripennis	Black-winged Petrel	PTN	LC	9000000	66
Pelecanoides_urinatrix	Common Diving-Petrel	GDU	LC	15999999	67
Phoebetria_fusca	Sooty Albatross	PHF	EN	48615	68
Pachyptila_crassirostris	Fulmar Prion	PCC	LC	225000	69
Pterodroma_cookii	Cook's Petrel	PTC	VU	2100000	70

d) Summer

Scientific name	Common name	Code	Threat status	Population	Rank
Diomedea_exulans	Wandering Albatross	DIX	VU	28175	1
Diomedea_gibsoni	Gibson's Albatross	GBA	VU	18400	2
Phoebastria_albatrus	Short-tailed Albatross	PHA	VU	1410	3
Diomedea_antipodensis	Antipodean Albatross	ANA	VU	22022	4

Procellaria_parkinsoni	Parkinson's Petrel	PRK	VU	9999	5
Diomedea_sanfordi	Northern Royal Albatross	DIS	EN	20412	6
Phoebastria_nigripes	Black-footed Albatross	PHN	EN	183921	7
Thalassarche_salvini	Salvin Albatross	DLS	VU	95841	8
Phoebastria_immutabilis	Laysan Albatross	PHI	VU	1774068	9
Puffinus_bulleri	Buller's Shearwater	PBU	VU	900000	10
Thalassarche_eremita	Chatham Albatross	DER	CR	13725	11
Thalassarche_impavida	Campbell Albatross	TQW	VU	63000	12
Thalassarche_bulleri	Buller's Albatross	DNB	NT	91380	13
Procellaria_westlandica	Westland Petrel	PCW	VU	12000	14
Macronectes_halli	Northern Giant Petrel	MAH	LC	35400	15
Diomedea_epomophora	Southern Royal Albatross	DIP	VU	27650	16
Macronectes_giganteus	Southern Giant Petrel	MAI	LC	150510	17
Thalassarche_steadi	White-capped Albatross	XWM	NT	291333	18
Procellaria_aequinoctialis	White-chinned Petrel	PRO	VU	3723000	19
Thalassarche_melanophrys	Black-browed Albatross	DIM	EN	1805058	20
Pterodroma_macroptera	Great-winged Petrel	PDM	LC	1500000	21
Thalassarche_cauta	Shy Albatross	THC	NT	37755	22
Procellaria_cinerea	Grey Petrel	PCI	NT	335052	23
Pseudobulweria_macgillivrayi	Fiji Petrel	PSM	CR	26	24
Phoebetria_palpebrata	Light-mantled Sooty Albatross	PHE	NT	79100	25
Puffinus_tenuirostris	Short-Tailed Shearwater	PUT	LC	23000000	26
Thalassarche_chrysostoma	Grey-Headed Albatross	DIC	VU	335118	27
Pterodroma_nigripennis	Black-winged Petrel	PTN	LC	9000000	28
Pseudobulweria_becki	Beck's Petrel	PSB	CR	150	29
Pterodroma_lessonii	White-headed Petrel	XWH	LC	660000	30
Puffinus_carneipes	Flesh-footed Shearwater	PFC	LC	648000	31
Pseudobulweria_rostrata	Tahiti Petrel	PSR	NT	20000	32
Puffinus_lherminieri	Audubon's Shearwater	PUL	LC	500000	33
Puffinus_huttoni	Hutton's Shearwater	PHU	EN	282000	34
Pterodroma_alba	Phoenix Petrel	PLB	EN	30000	35
Pterodroma_brevipes	Collared Petrel	PTB	NT	5500	36
Pterodroma_leucoptera	Gould's Petrel	PTL	VU	12000	37
Puffinus_griseus	Sooty Shearwater	PFG	NT	18000000	38
Pterodroma_solandri	Providence Petrel	PTI	VU	100000	39
Puffinus_pacificus	Wedge-tailed Shearwater	PUP	LC	5200000	40
Pterodroma_neglecta	Kermadec Petrel	PVB	LC	174900	41
Bulweria_bulwerii	Bulwer's Petrel	BUB	LC	750000	42
Pterodroma_mollis	Soft-plumaged Petrel	PTS	LC	4980000	43
Pterodroma_sandwichensis	Hawaiian Petrel	PTW	VU	20000	44
Pterodroma_inexpectata	Mottled Petrel	XMP	NT	1230000	45
Puffinus_heinrothi	Heinroth's Shearwater	PUN	VU	625	46
Pterodroma_longirostris	Stejneger's Petrel	PTO	VU	400000	47
Pterodroma_ultima	Murphy's Petrel	PTU	NT	900000	48
Puffinus_newelli	Newell's Shearwater	PUW	EN	38600	49
Pterodroma_pycrofti	Pycroft's Petrel	PTP	VU	15000	50
Puffinus_nativitatis	Christmas Shearwater	PNT	LC	22388	51
Pterodroma_atrata	Henderson Petrel	PTT	EN	75000	52

Pterodroma_cervicalis	White-necked Petrel	WNP	VU	450000	53
Puffinus_assimilis	Little Shearwater	PUA	LC	900000	54
Daption_capense	Cape Pigeon	DAC	LC	1998000	55
Fulmarus_glacialoides	Antarctic Fulmar	FUG	LC	4000000	56
Pachyptila_turtur	Fairy Prion	XFP	LC	5100000	57
Pterodroma_cookii	Cook's Petrel	PTC	VU	2100000	58
Pterodroma_externa	Juan Fernàndez Petrel	PTE	VU	3000000	59
Pachyptila_vittata	Broad-billed Prion	XPV	LC	15000000	60
Pachyptila_belcheri	Thin-billed Prion	PAB	LC	7000000	61
Lugensa_brevirostris	Kerguelen Petrel	LUB	LC	1000000	62
Pachyptila_desolata	Antarctic Prion	PWD	LC	75150000	63
Pterodroma_axillaris	Chatham Petrel	PTA	EN	900	64
Halobaena_caerulea	Blue Petrel	HBE	LC	4764000	65
Pelecanoides_urinatrix	Common Diving-Petrel	GDU	LC	15999999	66
Pterodroma_heraldica	Herald Petrel	PTH	VU	110880	67
Pachyptila_crassirostris	Fulmar Prion	PCC	LC	225000	68
Phoebetria_fusca	Sooty Albatross	PHF	EN	48615	69
Pterodroma_magentae	Magenta Petrel	PTM	CR	135	70

e) Autumn

Scientific name	Common name	Code	Threat status	Population	rank
Phoebastria_nigripes	Black-footed Albatross	PHN	EN	183921	1
Phoebastria_albatrus	Short-tailed Albatross	PHA	VU	1410	2
Phoebastria_immutabilis	Laysan Albatross	PHI	VU	1774068	3
Procellaria_parkinsoni	Parkinson's Petrel	PRK	VU	9999	4
Diomedea_exulans	Wandering Albatross	DIX	VU	28175	5
Diomedea_gibsoni	Gibson's Albatross	GBA	VU	1.84E+004	6
Diomedea_antipodensis	Antipodean Albatross	ANA	VU	22022	7
Puffinus_bulleri	Buller's Shearwater	PBU	VU	900000	8
Diomedea_sanfordi	Northern Royal Albatross	DIS	EN	20412	9
Thalassarche_salvini	Salvin Albatross	DLS	VU	95841	10
Thalassarche_eremita	Chatham Albatross	DER	CR	13725	11
Thalassarche_cauta	Shy Albatross	THC	NT	37755	12
Macronectes_giganteus	Southern Giant Petrel	MAI	LC	150510	13
Thalassarche_impavida	Campbell Albatross	TQW	VU	63000	14
Macronectes_halli	Northern Giant Petrel	MAH	LC	35400	15
Thalassarche_steadi	White-capped Albatross	XWM	NT	291333	16
Thalassarche_bulleri	Buller's Albatross	DNB	NT	91380	17
Procellaria_westlandica	Westland Petrel	PCW	VU	12000	18
Pseudobulweria_macgillivrayi	Fiji Petrel	PSM	CR	2.55E+001	19
Diomedea_epomophora	Southern Royal Albatross	DIP	VU	27650	20
Puffinus_tenuirostris	Short-Tailed Shearwater	PUT	LC	23000000	21
Puffinus_newelli	Newell's Shearwater	PUW	EN	38600	22
Pterodroma_alba	Phoenix Petrel	PLB	EN	30000	23
Pterodroma_macroptera	Great-winged Petrel	PDM	LC	1500000	24
Procellaria_aequinoctialis	White-chinned Petrel	PRO	VU	3723000	25
Pseudobulweria_becki	Beck's Petrel	PSB	CR	150	26

Puffinus_carneipes	Flesh-footed Shearwater	PFC	LC	648000	27
Pterodroma_sandwichensis	Hawaiian Petrel	PTW	VU	20000	28
Pterodroma_solandri	Providence Petrel	PTI	VU	100000	29
Puffinus_lherminieri	Audubon's Shearwater	PUL	LC	500000	30
Pseudobulweria_rostrata	Tahiti Petrel	PSR	NT	20000	31
Puffinus_nativitatis	Christmas Shearwater	PNT	LC	22388	32
Pterodroma_brevipes	Collared Petrel	PTB	NT	5500	33
Procellaria_cinerea	Grey Petrel	PCI	NT	335052	34
Thalassarche_melanophrys	Black-browed Albatross	DIM	EN	1805058	35
Bulweria_bulwerii	Bulwer's Petrel	BUB	LC	750000	36
Puffinus_pacificus	Wedge-tailed Shearwater	PUP	LC	5200000	37
Pterodroma_leucoptera	Gould's Petrel	PTL	VU	12000	38
Pterodroma_longirostris	Stejneger's Petrel	PTO	VU	400000	39
Pterodroma_atrata	Henderson Petrel	PTT	EN	7.50E+004	40
Pterodroma_neglecta	Kermadec Petrel	PVB	LC	174900	41
Puffinus_heinrothi	Heinroth's Shearwater	PUN	VU	6.25E+002	42
Pterodroma_pycrofti	Pycroft's Petrel	PTP	VU	15000	43
Pterodroma_ultima	Murphy's Petrel	PTU	NT	900000	44
Pterodroma_inexpectata	Mottled Petrel	XMP	NT	1230000	45
Pterodroma_lessonii	White-headed Petrel	XWH	LC	660000	46
Pterodroma_nigripennis	Black-winged Petrel	PTN	LC	9000000	47
Pterodroma_externa	Juan Fernàndez Petrel	PTE	VU	3000000	48
Puffinus_huttoni	Hutton's Shearwater	PHU	EN	282000	49
Puffinus_griseus	Sooty Shearwater	PFG	NT	18000000	50
Phoebetria_palpebrata	Light-mantled Sooty Albatross	PHE	NT	7.91E+004	51
Pterodroma_cervicalis	White-necked Petrel	WNP	VU	450000	52
Daption_capense	Cape Pigeon	DAC	LC	1998000	53
Puffinus_assimilis	Little Shearwater	PUA	LC	900000	54
Pterodroma_mollis	Soft-plumaged Petrel	PTS	LC	4980000	55
Pachyptila_turtur	Fairy Prion	XFP	LC	5100000	56
Fulmarus_glacialoides	Antarctic Fulmar	FUG	LC	4000000	57
Thalassarche_chrysostoma	Grey-Headed Albatross	DIC	VU	335118	58
Pachyptila_vittata	Broad-billed Prion	XPV	LC	15000000	59
Pachyptila_belcheri	Thin-billed Prion	PAB	LC	7000000	60
Pterodroma_heraldica	Herald Petrel	PTH	VU	110880	61
Pachyptila_desolata	Antarctic Prion	PWD	LC	75150000	62
Pterodroma_axillaris	Chatham Petrel	PTA	EN	900	63
Lugensa_brevirostris	Kerguelen Petrel	LUB	LC	1000000	64
Halobaena_caerulea	Blue Petrel	HBE	LC	4764000	65
Pelecanoides_urinatrix	Common Diving-Petrel	GDU	LC	15999999	66
Phoebetria_fusca	Sooty Albatross	PHF	EN	48615	67
Pterodroma_magentae	Magenta Petrel	PTM	CR	135	68
Pachyptila_crassirostris	Fulmar Prion	PCC	LC	225000	69
Pterodroma_cookii	Cook's Petrel	PTC	VU	2100000	70

Table 3. Species level information on risk posed to species in the Ecological Risk Assessment, assigned to the flag state of vessels which fish in regions overlapping the distribution of the species. Flags are listed in descending order of their contribution to risk for the species, with flags contributing the first 90% of risk for each species listed. The overall rank of the species in the PSA is indicated as "rank of species in analysis". Those ranked with smaller numbers had highest overall risk levels. Species are listed by alphabetical order in relation to their scientific name. Highlighted in orange, the flags contributing over 2/3 of the total risk of the top ten seabird the most at risk.

Scientific name	Common Name	Flag	Flag contribution to species risk	Rank of species in analysis
Bulweria_bulwerii	Bulwer's Petrel	Taiwan	30	42
Bulweria_bulwerii	Bulwer's Petrel	United States	19	42
Bulweria_bulwerii	Bulwer's Petrel	Japan	11	42
Bulweria_bulwerii	Bulwer's Petrel	South Korea	11	42
Bulweria_bulwerii	Bulwer's Petrel	Indonesia	9	42
Bulweria_bulwerii	Bulwer's Petrel	China	6	42
Bulweria_bulwerii	Bulwer's Petrel	Philippines	4	42
Bulweria_bulwerii	Bulwer's Petrel	French Polynesia	3	42
Bulweria_bulwerii	Bulwer's Petrel	American Samoa	2	42
Bulweria_bulwerii	Bulwer's Petrel	Vanuatu	1	42
Daption_capense	Cape Pigeon	Taiwan	20	58
Daption_capense	Cape Pigeon	Japan	13	58
Daption_capense	Cape Pigeon	French Polynesia	12	58
Daption_capense	Cape Pigeon	Fiji	10	58
Daption_capense	Cape Pigeon	Vanuatu	7	58
Daption_capense	Cape Pigeon	New Zealand	7	58
Daption_capense	Cape Pigeon	American Samoa	7	58
Daption_capense	Cape Pigeon	Australia	6	58
Daption_capense	Cape Pigeon	China	4	58
Daption_capense	Cape Pigeon	South Korea	3	58
Daption_capense	Cape Pigeon	Cook Islands	3	58
Daption_capense	Cape Pigeon	Tonga	3	58
Daption_capense	Cape Pigeon	Samoa	2	58
Daption_capense	Cape Pigeon	Belize	1	58
Diomedea_antipodensis	Antipodean Albatross	New Zealand	38	5
Diomedea_antipodensis	Antipodean Albatross	Japan	27	5
Diomedea_antipodensis	Antipodean Albatross	Taiwan	16	5
Diomedea_antipodensis	Antipodean Albatross	Vanuatu	9	5
Diomedea_antipodensis	Antipodean Albatross	Australia	8	5
Diomedea_antipodensis	Antipodean Albatross	Belize	1	5
Diomedea_epomophora	Southern Royal Albatross	New Zealand	100	4
Diomedea_exulans	Wandering Albatross	Japan	75	1
Diomedea_exulans	Wandering Albatross	Australia	16	1
Diomedea_exulans	Wandering Albatross	Taiwan	6	1
Diomedea_exulans	Wandering Albatross	Vanuatu	3	1
Diomedea_gibsoni	Gibson's Albatross	Japan	51	2
Diomedea_gibsoni	Gibson's Albatross	New Zealand	33	2
Diomedea_gibsoni	Gibson's Albatross	Taiwan	8	2
Diomedea_gibsoni	Gibson's Albatross	Australia	4	2
Diomedea_gibsoni	Gibson's Albatross	Vanuatu	4	2
Diomedea_sanfordi	Northern Royal Albatross	New Zealand	93	9

Diomedea_sanfordi	Northern Royal Albatross	Taiwan	3	9
Diomedea_sanfordi	Northern Royal Albatross	Vanuatu	1	9
Fulmarus_glacialoides	Antarctic Fulmar	Japan	48	60
Fulmarus_glacialoides	Antarctic Fulmar	New Zealand	31	60
Fulmarus_glacialoides	Antarctic Fulmar	Australia	10	60
Fulmarus_glacialoides	Antarctic Fulmar	Taiwan	8	60
Fulmarus_glacialoides	Antarctic Fulmar	Vanuatu	3	60
Halobaena_caerulea	Blue Petrel	Japan	49	67
Halobaena_caerulea	Blue Petrel	New Zealand	40	67
Halobaena_caerulea	Blue Petrel	Taiwan	6	67
Halobaena_caerulea	Blue Petrel	Australia	3	67
Halobaena_caerulea	Blue Petrel	Vanuatu	2	67
Lugensa_brevirostris	Kerguelen Petrel	Japan	54	64
Lugensa_brevirostris	Kerguelen Petrel	New Zealand	35	64
Lugensa_brevirostris	Kerguelen Petrel	Taiwan	6	64
Lugensa_brevirostris	Kerguelen Petrel	Australia	3	64
Lugensa_brevirostris	Kerguelen Petrel	Vanuatu	3	64
Macronectes_giganteus	Southern Giant Petrel	Japan	38	17
Macronectes_giganteus	Southern Giant Petrel	New Zealand	24	17
Macronectes_giganteus	Southern Giant Petrel	Australia	19	17
Macronectes_giganteus	Southern Giant Petrel	Taiwan	12	17
Macronectes_giganteus	Southern Giant Petrel	Vanuatu	6	17
Macronectes_halli	Northern Giant Petrel	New Zealand	35	18
Macronectes_halli	Northern Giant Petrel	Japan	31	18
Macronectes_halli	Northern Giant Petrel	Australia	17	18
Macronectes_halli	Northern Giant Petrel	Taiwan	11	18
Macronectes_halli	Northern Giant Petrel	Vanuatu	5	18
Pachyptila_belcheri	Thin-billed Prion	Japan	44	63
Pachyptila_belcheri	Thin-billed Prion	New Zealand	26	63
Pachyptila_belcheri	Thin-billed Prion	Australia	21	63
Pachyptila_belcheri	Thin-billed Prion	Taiwan	7	63
Pachyptila_belcheri	Thin-billed Prion	Vanuatu	3	63
Pachyptila_crassirostris	Fulmar Prion	New Zealand	97	70
Pachyptila_crassirostris	Fulmar Prion	China	2	70
Pachyptila_crassirostris	Fulmar Prion	Vanuatu	1	70
Pachyptila_desolata	Antarctic Prion	Japan	42	65
Pachyptila_desolata	Antarctic Prion	New Zealand	32	65
Pachyptila_desolata	Antarctic Prion	Australia	15	65
Pachyptila_desolata	Antarctic Prion	Taiwan	8	65
Pachyptila_desolata	Antarctic Prion	Vanuatu	3	65
Pachyptila_turtur	Fairy Prion	Japan	35	61
Pachyptila_turtur	Fairy Prion	New Zealand	27	61
Pachyptila_turtur	Fairy Prion	Australia	20	61
Pachyptila_turtur	Fairy Prion	Taiwan	11	61
Pachyptila_turtur	Fairy Prion	Vanuatu	4	61
Pachyptila_vittata	Broad-billed Prion	New Zealand	83	62
Pachyptila_vittata	Broad-billed Prion	Japan	6	62
Pachyptila_vittata	Broad-billed Prion	Taiwan	5	62
Pachyptila_vittata	Broad-billed Prion	Vanuatu	3	62
Pachyptila_vittata	Broad-billed Prion	Fiji	2	62
Pachyptila_vittata	Broad-billed Prion	China	1	62
Pelecanoides_urinatrix	Common Diving-Petrel	Japan	32	68
Pelecanoides_urinatrix	Common Diving-Petrel	New Zealand	26	68
Pelecanoides_urinatrix	Common Diving-Petrel	Australia	19	68
Pelecanoides_urinatrix	Common Diving-Petrel	Taiwan	13	68
Pelecanoides_urinatrix	Common Diving-Petrel	Vanuatu	6	68

Pelecanoides_urinatrix	Common Diving-Petrel	Fiji	2	68
Pelecanoides_urinatrix	Common Diving-Petrel	China	1	68
Phoebastria_albatrus	Short-tailed Albatross	Taiwan	58	3
Phoebastria_albatrus	Short-tailed Albatross	Japan	34	3
Phoebastria_albatrus	Short-tailed Albatross	United States	5	3
Phoebastria_albatrus	Short-tailed Albatross	Vanuatu	2	3
Phoebastria_immutabilis	Laysan Albatross	Japan	35	7
Phoebastria_immutabilis	Laysan Albatross	Taiwan	30	7
Phoebastria_immutabilis	Laysan Albatross	United States	18	7
Phoebastria_immutabilis	Laysan Albatross	Vanuatu	13	7
Phoebastria_immutabilis	Laysan Albatross	China	3	7
Phoebastria_nigripes	Black-footed Albatross	United States	36	8
Phoebastria_nigripes	Black-footed Albatross	Taiwan	25	8
Phoebastria_nigripes	Black-footed Albatross	Japan	22	8
Phoebastria_nigripes	Black-footed Albatross	Vanuatu	14	8
Phoebastria_nigripes	Black-footed Albatross	China	3	8
Phoebetria_fusca	Sooty Albatross	Australia	100	69
Phoebetria_palpebrata	Light-mantled Sooty Albatross	New Zealand	59	22
Phoebetria_palpebrata	Light-mantled Sooty Albatross	Japan	34	22
Phoebetria_palpebrata	Light-mantled Sooty Albatross	Taiwan	4	22
Phoebetria_palpebrata	Light-mantled Sooty Albatross	Vanuatu	3	22
Procellaria_aequinoctialis	White-chinned Petrel	New Zealand	41	20
Procellaria_aequinoctialis	White-chinned Petrel	Japan	40	20
Procellaria_aequinoctialis	White-chinned Petrel	Taiwan	8	20
Procellaria_aequinoctialis	White-chinned Petrel	Australia	5	20
Procellaria_aequinoctialis	White-chinned Petrel	Vanuatu	5	20
Procellaria_cinerea	Grey Petrel	New Zealand	72	21
Procellaria_cinerea	Grey Petrel	Japan	23	21
Procellaria_cinerea	Grey Petrel	Taiwan	3	21
Procellaria_cinerea	Grey Petrel	Vanuatu	2	21
Procellaria_parkinsoni	Parkinson's Petrel	New Zealand	88	6
Procellaria_parkinsoni	Parkinson's Petrel	Japan	5	6
Procellaria_parkinsoni	Parkinson's Petrel	French Polynesia	3	6
Procellaria_parkinsoni	Parkinson's Petrel	Taiwan	2	6
Procellaria_parkinsoni	Parkinson's Petrel	South Korea	1	6
Procellaria_westlandica	Westland Petrel	New Zealand	98	16
Procellaria_westlandica	Westland Petrel	Japan	1	16
Pseudobulweria_becki	Beck's Petrel	South Korea	20	28
Pseudobulweria_becki	Beck's Petrel	Taiwan	20	28
Pseudobulweria_becki	Beck's Petrel	China	13	28
Pseudobulweria_becki	Beck's Petrel	Fiji	11	28
Pseudobulweria_becki	Beck's Petrel	Japan	11	28
Pseudobulweria_becki	Beck's Petrel	French Polynesia	5	28
Pseudobulweria_becki	Beck's Petrel	Vanuatu	4	28
Pseudobulweria_becki	Beck's Petrel	American Samoa	4	28
Pseudobulweria_becki	Beck's Petrel	Australia	2	28
Pseudobulweria_becki	Beck's Petrel	Papua New Guinea	2	28
Pseudobulweria_becki	Beck's Petrel	Cook Islands	2	28
Pseudobulweria_becki	Beck's Petrel	Samoa	2	28
Pseudobulweria_becki	Beck's Petrel	New Caledonia	1	28
Pseudobulweria_becki	Beck's Petrel	Tonga	1	28
Pseudobulweria_becki	Beck's Petrel	Micronesia	1	28
Pseudobulweria_macgillivrayi	Fiji Petrel	Fiji	97	24
Pseudobulweria_macgillivrayi	Fiji Petrel	Tonga	2	24
Pseudobulweria_rostrata	Tahiti Petrel	Taiwan	19	31

Pseudobulweria_rostrata	Tahiti Petrel	American Samoa	18	31
Pseudobulweria_rostrata	Tahiti Petrel	South Korea	13	31
Pseudobulweria_rostrata	Tahiti Petrel	China	10	31
Pseudobulweria_rostrata	Tahiti Petrel	Fiji	9	31
Pseudobulweria_rostrata	Tahiti Petrel	Japan	9	31
Pseudobulweria_rostrata	Tahiti Petrel	French Polynesia	6	31
Pseudobulweria_rostrata	Tahiti Petrel	Cook Islands	4	31
Pseudobulweria_rostrata	Tahiti Petrel	Samoa	4	31
Pseudobulweria_rostrata	Tahiti Petrel	Vanuatu	3	31
Pseudobulweria_rostrata	Tahiti Petrel	Australia	2	31
Pseudobulweria_rostrata	Tahiti Petrel	New Caledonia	1	31
Pseudobulweria_rostrata	Tahiti Petrel	Tonga	1	31
Pseudobulweria_rostrata	Tahiti Petrel	Papua New Guinea	1	31
Pterodroma_alba	Phoenix Petrel	South Korea	46	27
Pterodroma_alba	Phoenix Petrel	Taiwan	22	27
Pterodroma_alba	Phoenix Petrel	China	11	27
Pterodroma_alba	Phoenix Petrel	Fiji	4	27
Pterodroma_alba	Phoenix Petrel	French Polynesia	4	27
Pterodroma_alba	Phoenix Petrel	Japan	3	27
Pterodroma_alba	Phoenix Petrel	American Samoa	3	27
Pterodroma_alba	Phoenix Petrel	Vanuatu	1	27
Pterodroma_alba	Phoenix Petrel	Cook Islands	1	27
Pterodroma_alba	Phoenix Petrel	Samoa	1	27
Pterodroma_alba	Phoenix Petrel	United States	1	27
Pterodroma_alba	Phoenix Petrel	Tonga	1	27
Pterodroma_atrata	Henderson Petrel	French Polynesia	28	53
Pterodroma_atrata	Henderson Petrel	Taiwan	26	53
Pterodroma_atrata	Henderson Petrel	South Korea	23	53
Pterodroma_atrata	Henderson Petrel	Japan	14	53
Pterodroma_atrata	Henderson Petrel	China	7	53
Pterodroma_atrata	Henderson Petrel	Vanuatu	2	53
Pterodroma_axillaris	Chatham Petrel	New Zealand	100	54
Pterodroma_brevipes	Collared Petrel	South Korea	22	35
Pterodroma_brevipes	Collared Petrel	Taiwan	18	35
Pterodroma_brevipes	Collared Petrel	Fiji	15	35
Pterodroma_brevipes	Collared Petrel	China	14	35
Pterodroma_brevipes	Collared Petrel	French Polynesia	7	35
Pterodroma_brevipes	Collared Petrel	Japan	5	35
Pterodroma_brevipes	Collared Petrel	American Samoa	5	35
Pterodroma_brevipes	Collared Petrel	Vanuatu	4	35
Pterodroma_brevipes	Collared Petrel	Cook Islands	2	35
Pterodroma_brevipes	Collared Petrel	Samoa	2	35
Pterodroma_brevipes	Collared Petrel	Tonga	2	35
Pterodroma_brevipes	Collared Petrel	New Caledonia	1	35
Pterodroma_cervicalis	White-necked Petrel	Taiwan	22	50
Pterodroma_cervicalis	White-necked Petrel	Japan	17	50
Pterodroma_cervicalis	White-necked Petrel	South Korea	15	50
Pterodroma_cervicalis	White-necked Petrel	China	11	50
Pterodroma_cervicalis	White-necked Petrel	Fiji	9	50
Pterodroma_cervicalis	White-necked Petrel	United States	6	50
Pterodroma_cervicalis	White-necked Petrel	Vanuatu	5	50
Pterodroma_cervicalis	White-necked Petrel	French Polynesia	3	50
Pterodroma_cervicalis	White-necked Petrel	American Samoa	2	50
Pterodroma_cervicalis	White-necked Petrel	New Zealand	2	50
Pterodroma_cervicalis	White-necked Petrel	Tonga	2	50
Pterodroma_cervicalis	White-necked Petrel	Cook Islands	1	50

Pterodroma_cervicalis	White-necked Petrel	Samoa	1	50
Pterodroma_cervicalis	White-necked Petrel	Micronesia	1	50
Pterodroma_cookii	Cook's Petrel	New Zealand	73	49
Pterodroma_cookii	Cook's Petrel	Taiwan	6	49
Pterodroma_cookii	Cook's Petrel	Japan	5	49
Pterodroma_cookii	Cook's Petrel	South Korea	5	49
Pterodroma_cookii	Cook's Petrel	United States	3	49
Pterodroma_cookii	Cook's Petrel	China	3	49
Pterodroma_cookii	Cook's Petrel	French Polynesia	2	49
Pterodroma_cookii	Cook's Petrel	Vanuatu	1	49
Pterodroma_cookii	Cook's Petrel	American Samoa	1	49
Pterodroma_externa	Juan Fernàndez Petrel	United States	43	56
Pterodroma_externa	Juan Fernàndez Petrel	Japan	17	56
Pterodroma_externa	Juan Fernàndez Petrel	South Korea	16	56
Pterodroma_externa	Juan Fernàndez Petrel	Taiwan	13	56
Pterodroma_externa	Juan Fernàndez Petrel	China	7	56
Pterodroma_externa	Juan Fernàndez Petrel	Vanuatu	2	56
Pterodroma_heraldica	Herald Petrel	Taiwan	47	66
Pterodroma_heraldica	Herald Petrel	French Polynesia	15	66
Pterodroma_heraldica	Herald Petrel	Vanuatu	10	66
Pterodroma_heraldica	Herald Petrel	South Korea	8	66
Pterodroma_heraldica	Herald Petrel	China	8	66
Pterodroma_heraldica	Herald Petrel	Belize	7	66
Pterodroma_heraldica	Herald Petrel	Japan	6	66
Pterodroma_inexpectata	Mottled Petrel	New Zealand	43	46
Pterodroma_inexpectata	Mottled Petrel	Taiwan	11	46
Pterodroma_inexpectata	Mottled Petrel	South Korea	9	46
Pterodroma_inexpectata	Mottled Petrel	Japan	9	46
Pterodroma_inexpectata	Mottled Petrel	China	6	46
Pterodroma_inexpectata	Mottled Petrel	Fiji	5	46
Pterodroma_inexpectata	Mottled Petrel	United States	4	46
Pterodroma_inexpectata	Mottled Petrel	Vanuatu	3	46
Pterodroma_inexpectata	Mottled Petrel	French Polynesia	2	46
Pterodroma_inexpectata	Mottled Petrel	American Samoa	2	46
Pterodroma_inexpectata	Mottled Petrel	Australia	1	46
Pterodroma_lessonii	White-headed Petrel	New Zealand	47	32
Pterodroma_lessonii	White-headed Petrel	Japan	29	32
Pterodroma_lessonii	White-headed Petrel	Australia	11	32
Pterodroma_lessonii	White-headed Petrel	Taiwan	8	32
Pterodroma_lessonii	White-headed Petrel	Vanuatu	4	32
Pterodroma_leucoptera	Gould's Petrel	Taiwan	18	38
Pterodroma_leucoptera	Gould's Petrel	Fiji	14	38
Pterodroma_leucoptera	Gould's Petrel	China	14	38
Pterodroma_leucoptera	Gould's Petrel	Japan	11	38
Pterodroma_leucoptera	Gould's Petrel	South Korea	10	38
Pterodroma_leucoptera	Gould's Petrel	French Polynesia	9	38
Pterodroma_leucoptera	Gould's Petrel	American Samoa	6	38
Pterodroma_leucoptera	Gould's Petrel	Vanuatu	4	38
Pterodroma_leucoptera	Gould's Petrel	Australia	4	38
Pterodroma_leucoptera	Gould's Petrel	Cook Islands	3	38
Pterodroma_leucoptera	Gould's Petrel	Samoa	3	38
Pterodroma_leucoptera	Gould's Petrel	Tonga	2	38
Pterodroma_leucoptera	Gould's Petrel	New Caledonia	2	38
Pterodroma_leucoptera	Gould's Petrel	New Zealand	1	38
Pterodroma_longirostris	Stejneger's Petrel	Taiwan	28	43
Pterodroma_longirostris	Stejneger's Petrel	Japan	24	43

Pterodroma_longirostris	Stejneger's Petrel	South Korea	18	43
Pterodroma_longirostris	Stejneger's Petrel	United States	14	43
Pterodroma_longirostris	Stejneger's Petrel	China	11	43
Pterodroma_longirostris	Stejneger's Petrel	Vanuatu	4	43
Pterodroma_macroptera	Great-winged Petrel	New Zealand	61	23
Pterodroma_macroptera	Great-winged Petrel	Japan	18	23
Pterodroma_macroptera	Great-winged Petrel	Taiwan	8	23
Pterodroma_macroptera	Great-winged Petrel	Australia	7	23
Pterodroma_macroptera	Great-winged Petrel	Vanuatu	4	23
Pterodroma_magentae	Magenta Petrel	New Zealand	99	57
Pterodroma_mollis	Soft-plumaged Petrel	New Zealand	58	45
Pterodroma_mollis	Soft-plumaged Petrel	Japan	36	45
Pterodroma_mollis	Soft-plumaged Petrel	Taiwan	3	45
Pterodroma_mollis	Soft-plumaged Petrel	Vanuatu	2	45
Pterodroma_neglecta	Kermadec Petrel	Taiwan	26	52
Pterodroma_neglecta	Kermadec Petrel	Japan	17	52
Pterodroma_neglecta	Kermadec Petrel	South Korea	13	52
Pterodroma_neglecta	Kermadec Petrel	China	10	52
Pterodroma_neglecta	Kermadec Petrel	Fiji	9	52
Pterodroma_neglecta	Kermadec Petrel	Vanuatu	6	52
Pterodroma_neglecta	Kermadec Petrel	United States	5	52
Pterodroma_neglecta	Kermadec Petrel	French Polynesia	3	52
Pterodroma_neglecta	Kermadec Petrel	American Samoa	2	52
Pterodroma_neglecta	Kermadec Petrel	New Zealand	1	52
Pterodroma_neglecta	Kermadec Petrel	Belize	1	52
Pterodroma_neglecta	Kermadec Petrel	Cook Islands	1	52
Pterodroma_neglecta	Kermadec Petrel	Australia	1	52
Pterodroma_neglecta	Kermadec Petrel	Samoa	1	52
Pterodroma_nigripennis	Black-winged Petrel	New Zealand	22	55
Pterodroma_nigripennis	Black-winged Petrel	Taiwan	22	55
Pterodroma_nigripennis	Black-winged Petrel	Fiji	18	55
Pterodroma_nigripennis	Black-winged Petrel	Vanuatu	16	55
Pterodroma_nigripennis	Black-winged Petrel	Tonga	9	55
Pterodroma_nigripennis	Black-winged Petrel	Japan	7	55
Pterodroma_nigripennis	Black-winged Petrel	China	5	55
Pterodroma_pycrofti	Pycroft's Petrel	New Zealand	50	44
Pterodroma_pycrofti	Pycroft's Petrel	Japan	10	44
Pterodroma_pycrofti	Pycroft's Petrel	South Korea	9	44
Pterodroma_pycrofti	Pycroft's Petrel	Taiwan	8	44
Pterodroma_pycrofti	Pycroft's Petrel	United States	8	44
Pterodroma_pycrofti	Pycroft's Petrel	Fiji	7	44
Pterodroma_pycrofti	Pycroft's Petrel	China	4	44
Pterodroma_pycrofti	Pycroft's Petrel	Vanuatu	3	44
Pterodroma_sandwichensis	Hawaiian Petrel	United States	78	39
Pterodroma_sandwichensis	Hawaiian Petrel	Japan	9	39
Pterodroma_sandwichensis	Hawaiian Petrel	South Korea	6	39
Pterodroma_sandwichensis	Hawaiian Petrel	Taiwan	3	39
Pterodroma_sandwichensis	Hawaiian Petrel	China	3	39
Pterodroma_solandri	Providence Petrel	Japan	22	34
Pterodroma_solandri	Providence Petrel	Taiwan	19	34
Pterodroma_solandri	Providence Petrel	South Korea	16	34
Pterodroma_solandri	Providence Petrel	Fiji	10	34
Pterodroma_solandri	Providence Petrel	United States	9	34
Pterodroma_solandri	Providence Petrel	China	8	34
Pterodroma_solandri	Providence Petrel	Australia	6	34
Pterodroma_solandri	Providence Petrel	Vanuatu	5	34

Pterodroma_solandri	Providence Petrel	New Caledonia	1	34
Pterodroma_solandri	Providence Petrel	Samoa	1	34
Pterodroma_ultima	Murphy's Petrel	Taiwan	27	51
Pterodroma_ultima	Murphy's Petrel	South Korea	18	51
Pterodroma_ultima	Murphy's Petrel	China	16	51
Pterodroma_ultima	Murphy's Petrel	French Polynesia	12	51
Pterodroma_ultima	Murphy's Petrel	Japan	6	51
Pterodroma_ultima	Murphy's Petrel	American Samoa	6	51
Pterodroma_ultima	Murphy's Petrel	Vanuatu	5	51
Pterodroma_ultima	Murphy's Petrel	United States	4	51
Pterodroma_ultima	Murphy's Petrel	Cook Islands	4	51
Pterodroma_ultima	Murphy's Petrel	Belize	1	51
Puffinus_assimilis	Little Shearwater	New Zealand	26	59
Puffinus_assimilis	Little Shearwater	Taiwan	25	59
Puffinus_assimilis	Little Shearwater	Japan	20	59
Puffinus_assimilis	Little Shearwater	Vanuatu	13	59
Puffinus_assimilis	Little Shearwater	Australia	7	59
Puffinus_assimilis	Little Shearwater	Fiji	3	59
Puffinus_assimilis	Little Shearwater	Tonga	2	59
Puffinus_assimilis	Little Shearwater	China	2	59
Puffinus_assimilis	Little Shearwater	Belize	2	59
Puffinus_bulleri	Buller's Shearwater	New Zealand	54	11
Puffinus_bulleri	Buller's Shearwater	Taiwan	10	11
Puffinus_bulleri	Buller's Shearwater	Japan	8	11
Puffinus_bulleri	Buller's Shearwater	South Korea	7	11
Puffinus_bulleri	Buller's Shearwater	China	5	11
Puffinus_bulleri	Buller's Shearwater	Fiji	4	11
Puffinus_bulleri	Buller's Shearwater	United States	4	11
Puffinus_bulleri	Buller's Shearwater	Vanuatu	2	11
Puffinus_bulleri	Buller's Shearwater	American Samoa	1	11
Puffinus_carneipes	Flesh-footed Shearwater	Japan	25	29
Puffinus_carneipes	Flesh-footed Shearwater	Taiwan	20	29
Puffinus_carneipes	Flesh-footed Shearwater	Fiji	11	29
Puffinus_carneipes	Flesh-footed Shearwater	New Zealand	8	29
Puffinus_carneipes	Flesh-footed Shearwater	China	7	29
Puffinus_carneipes	Flesh-footed Shearwater	South Korea	7	29
Puffinus_carneipes	Flesh-footed Shearwater	Australia	7	29
Puffinus_carneipes	Flesh-footed Shearwater	United States	6	29
Puffinus_carneipes	Flesh-footed Shearwater	Vanuatu	5	29
Puffinus_carneipes	Flesh-footed Shearwater	New Caledonia	1	29
Puffinus_carneipes	Flesh-footed Shearwater	Micronesia	1	29
Puffinus_griseus	Sooty Shearwater	New Zealand	56	41
Puffinus_griseus	Sooty Shearwater	Taiwan	9	41
Puffinus_griseus	Sooty Shearwater	Japan	8	41
Puffinus_griseus	Sooty Shearwater	South Korea	7	41
Puffinus_griseus	Sooty Shearwater	China	5	41
Puffinus_griseus	Sooty Shearwater	Fiji	4	41
Puffinus_griseus	Sooty Shearwater	United States	3	41
Puffinus_griseus	Sooty Shearwater	Vanuatu	2	41
Puffinus_griseus	Sooty Shearwater	French Polynesia	2	41
Puffinus_griseus	Sooty Shearwater	American Samoa	1	41
Puffinus_griseus	Sooty Shearwater	Australia	1	41
Puffinus_heinrothi	Heinroth's Shearwater	Papua New Guinea	61	48
Puffinus_heinrothi	Heinroth's Shearwater	Japan	26	48
Puffinus_heinrothi	Heinroth's Shearwater	Taiwan	7	48
Puffinus_heinrothi	Heinroth's Shearwater	Solomon Islands	3	48

Puffinus_heinrothi	Heinroth's Shearwater	South Korea	2	48
Puffinus_huttoni	Hutton's Shearwater	Japan	34	47
Puffinus_huttoni	Hutton's Shearwater	Australia	30	47
Puffinus_huttoni	Hutton's Shearwater	New Zealand	27	47
Puffinus_huttoni	Hutton's Shearwater	Taiwan	7	47
Puffinus_huttoni	Hutton's Shearwater	Vanuatu	2	47
Puffinus_huttoni	Hutton's Shearwater	Papua New Guinea	1	47
Puffinus_lherminieri	Audubon's Shearwater	Taiwan	31	33
Puffinus_lherminieri	Audubon's Shearwater	South Korea	18	33
Puffinus_lherminieri	Audubon's Shearwater	Japan	12	33
Puffinus_lherminieri	Audubon's Shearwater	China	12	33
Puffinus_lherminieri	Audubon's Shearwater	Fiji	8	33
Puffinus_lherminieri	Audubon's Shearwater	French Polynesia	4	33
Puffinus_lherminieri	Audubon's Shearwater	American Samoa	3	33
Puffinus_lherminieri	Audubon's Shearwater	Vanuatu	3	33
Puffinus_lherminieri	Audubon's Shearwater	Cook Islands	1	33
Puffinus_lherminieri	Audubon's Shearwater	Samoa	1	33
Puffinus_lherminieri	Audubon's Shearwater	Micronesia	1	33
Puffinus_lherminieri	Audubon's Shearwater	Belize	1	33
Puffinus_lherminieri	Audubon's Shearwater	Tonga	1	33
Puffinus_nativitatis	Christmas Shearwater	South Korea	53	37
Puffinus_nativitatis	Christmas Shearwater	Taiwan	24	37
Puffinus_nativitatis	Christmas Shearwater	China	14	37
Puffinus_nativitatis	Christmas Shearwater	Japan	7	37
Puffinus_nativitatis	Christmas Shearwater	Vanuatu	1	37
Puffinus_nativitatis	Christmas Shearwater	United States	1	37
Puffinus_newelli	Newell's Shearwater	United States	85	40
Puffinus_newelli	Newell's Shearwater	South Korea	6	40
Puffinus_newelli	Newell's Shearwater	Japan	4	40
Puffinus_newelli	Newell's Shearwater	Taiwan	3	40
Puffinus_newelli	Newell's Shearwater	China	2	40
Puffinus_pacificus	Wedge-tailed Shearwater	Taiwan	27	30
Puffinus_pacificus	Wedge-tailed Shearwater	Japan	19	30
Puffinus_pacificus	Wedge-tailed Shearwater	South Korea	12	30
Puffinus_pacificus	Wedge-tailed Shearwater	China	9	30
Puffinus_pacificus	Wedge-tailed Shearwater	United States	9	30
Puffinus_pacificus	Wedge-tailed Shearwater	Fiji	6	30
Puffinus_pacificus	Wedge-tailed Shearwater	Vanuatu	4	30
Puffinus_pacificus	Wedge-tailed Shearwater	New Caledonia	3	30
Puffinus_pacificus	Wedge-tailed Shearwater	French Polynesia	2	30
Puffinus_pacificus	Wedge-tailed Shearwater	American Samoa	2	30
Puffinus_pacificus	Wedge-tailed Shearwater	Australia	1	30
Puffinus_tenuirostris	Short-Tailed Shearwater	Taiwan	23	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Japan	19	26
Puffinus_tenuirostris	Short-Tailed Shearwater	South Korea	14	26
Puffinus_tenuirostris	Short-Tailed Shearwater	China	10	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Fiji	7	26
Puffinus_tenuirostris	Short-Tailed Shearwater	United States	6	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Vanuatu	5	26
Puffinus_tenuirostris	Short-Tailed Shearwater	French Polynesia	3	26
Puffinus_tenuirostris	Short-Tailed Shearwater	American Samoa	2	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Australia	2	26
Puffinus_tenuirostris	Short-Tailed Shearwater	New Zealand	2	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Cook Islands	1	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Samoa	1	26
Puffinus_tenuirostris	Short-Tailed Shearwater	Micronesia	1	26

Puffinus_tenuirostris	Short-Tailed Shearwater	New Caledonia	1	26
Thalassarche_bulleri	Buller's Albatross	New Zealand	56	12
Thalassarche_bulleri	Buller's Albatross	Japan	40	12
Thalassarche_bulleri	Buller's Albatross	Taiwan	2	12
Thalassarche_bulleri	Buller's Albatross	Australia	1	12
Thalassarche_bulleri	Buller's Albatross	Vanuatu	1	12
Thalassarche_cauta	Shy Albatross	Australia	75	19
Thalassarche_cauta	Shy Albatross	Japan	22	19
Thalassarche_cauta	Shy Albatross	New Zealand	2	19
Thalassarche_cauta	Shy Albatross	Taiwan	1	19
Thalassarche_chrysostoma	Grey-Headed Albatross	New Zealand	47	36
Thalassarche_chrysostoma	Grey-Headed Albatross	Taiwan	20	36
Thalassarche_chrysostoma	Grey-Headed Albatross	Japan	18	36
Thalassarche_chrysostoma	Grey-Headed Albatross	Vanuatu	12	36
Thalassarche_chrysostoma	Grey-Headed Albatross	Belize	2	36
Thalassarche_chrysostoma	Grey-Headed Albatross	Australia	1	36
Thalassarche_eremita	Chatham Albatross	New Zealand	86	10
Thalassarche_eremita	Chatham Albatross	Taiwan	3	10
Thalassarche_eremita	Chatham Albatross	Vanuatu	2	10
Thalassarche_eremita	Chatham Albatross	Japan	2	10
Thalassarche_eremita	Chatham Albatross	Fiji	2	10
Thalassarche_eremita	Chatham Albatross	French Polynesia	1	10
Thalassarche_eremita	Chatham Albatross	China	1	10
Thalassarche_impavida	Campbell Albatross	New Zealand	70	14
Thalassarche_impavida	Campbell Albatross	Japan	19	14
Thalassarche_impavida	Campbell Albatross	Taiwan	4	14
Thalassarche_impavida	Campbell Albatross	Australia	2	14
Thalassarche_impavida	Campbell Albatross	Vanuatu	2	14
Thalassarche_impavida	Campbell Albatross	Fiji	1	14
Thalassarche_melanophrys	Black-browed Albatross	Taiwan	28	25
Thalassarche_melanophrys	Black-browed Albatross	Japan	25	25
Thalassarche_melanophrys	Black-browed Albatross	New Zealand	16	25
Thalassarche_melanophrys	Black-browed Albatross	Vanuatu	15	25
Thalassarche_melanophrys	Black-browed Albatross	Australia	12	25
Thalassarche_melanophrys	Black-browed Albatross	Belize	2	25
Thalassarche_melanophrys	Black-browed Albatross	China	1	25
Thalassarche_melanophrys	Black-browed Albatross	Fiji	1	25
Thalassarche_salvini	Salvin Albatross	New Zealand	70	13
Thalassarche_salvini	Salvin Albatross	Japan	17	13
Thalassarche_salvini	Salvin Albatross	Taiwan	6	13
Thalassarche_salvini	Salvin Albatross	Vanuatu	4	13
Thalassarche_salvini	Salvin Albatross	Australia	3	13
Thalassarche_steadi	White-capped Albatross	New Zealand	83	15
Thalassarche_steadi	White-capped Albatross	Japan	9	15
Thalassarche_steadi	White-capped Albatross	Australia	4	15
Thalassarche_steadi	White-capped Albatross	Taiwan	3	15
Thalassarche_steadi	White-capped Albatross	Vanuatu	1	15