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THE DEVELOPMENT OF ACAP SEABIRD BYCATCH INDICATORS, DATA NEEDS, METHODOLOGICAL APPROACHES AND REPORTING REQUIREMENTS

Agreement on the Conservation of Albatrosses and Petrels

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SUMMARY

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a multilateral environmental agreement that seeks to achieve and maintain a favourable conservation status for albatrosses and petrels. The Agreement is currently ratified by 13 countries. In addition, a number of non-Party Range States actively participate in the work of the Agreement. The Agreement provides a framework for coordinating and undertaking international activity to mitigate known threats to populations of affected species, including fisheries bycatch. In order to monitor and report on the performance of the Agreement, a Pressure-State-Response framework is being developed and implemented by ACAP. The primary Pressure indicator for bycatch comprises two linked components: (i) the seabird bycatch rate across each of the fisheries of member Parties, and (ii) the total number of birds killed (bycaught) per year of ACAP species (per species where possible). The Seabird Bycatch Working Group of ACAP is currently undertaking work to develop guidelines on issues that need to be considered in estimating and reporting against these bycatch indicators and, considering the estimation methods currently in use, to propose guidance and recommendations to achieve consistent reporting. This paper provides an outline of the recommendations and guidelines that have

been developed to date. It is important to note that this represents work in progress, and is presented here to help inform discussions regarding seabird bycatch estimation and reporting within the Inter-American Tropical Tuna Commission (IATTC) and other RFMOs.

1. INTRODUCTION

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a multilateral agreement that seeks to achieve and maintain a favourable conservation status for albatrosses and petrels globally. There are presently 13 Parties to ACAP: Argentina, Australia, Brazil, Chile, Ecuador, France, New Zealand, Norway, Peru, South Africa, Spain, the United Kingdom and Uruguay. Already, non-Party Range States have also participated to varying degrees in the work of the Agreement, with Canada, Japan, Namibia, and the United States of America participating in meetings in previous years. Any Range State - a State with jurisdiction over breeding sites of ACAP-listed species, or whose flag vessels overlap with the range of ACAP-listed species - can become a Party to the Agreement. The Agreement provides a framework for coordinating and undertaking international activity to mitigate known threats to populations of affected species. Most species listed in Annex 1 of ACAP have extensive at-sea distributions, and the greatest threat to these species is incidental mortality (bycatch) in pelagic and demersal longline and trawl fisheries. The ACAP Action Plan calls on Parties to collect reliable data to enable accurate estimation of the nature and extent of albatross and petrels interactions with fisheries. The Action Plan also expects the ACAP Advisory Committee to regularly review and update data on the mortality of albatrosses and petrels in fisheries, as well as data on the distribution and seasonality of fishing effort for those fisheries that affect or have the potential to affect species listed in Annex 1 of the Agreement. In order to achieve this objective, a web-based reporting system was developed to capture and use fisheries and bycatch data submitted by Parties and collaborating Range States. Previous reviews of the aggregated data submitted by Parties highlighted that the temporal and spatial resolution of data is generally too coarse to enable useful assessments of seabird bycatch levels and trends. Subsequently, ACAP's Seabird Bycatch Working Group (SBWG) have discussed whether Parties should analyse their own bycatch data and routinely submit the results to ACAP, or whether the raw or aggregated data should be sent to ACAP for analyses.

The Agreement's Advisory Committee has agreed that the objective of the ACAP bycatch data reporting process is to routinely review and update information on the current levels and trends of incidental mortality of ACAP-listed species in relevant fisheries and to assess the implementation and effectiveness of bycatch mitigation measures in those fisheries. In addition, it has been agreed that the Pressure-State-Response framework[1] will be used by ACAP to measure performance of the Agreement, and that the primary **Pressure Indicator** for bycatch should comprise two linked components:

(i) the total number of birds killed (bycaught) per year of ACAP species (by species where possible), and

(ii) the bycatch rate, across each of the fisheries of member Parties.

A range of methodological approaches could be used by Parties to estimate these figures, and appropriate methodologies would vary according to the availability of data and capacity

[1] A causal framework developed by the Organisation for Economic Co-operation and Development (OECD) for describing interactions between human impacts and the environment, and commonly used for state of the environment reporting. It is based on the concept that human activities exert **pressures** on the environment (such as those associated with fisheries mortality or bycatch), altering the **state** of the environment (seabirds); the human **responses** to these changes aim to reduce, prevent or mitigate these effects on the environment.

to undertake assessments. An intersessional group has been established to further refine the Bycatch Pressure Indicator, and review the range of methodologies currently used by Parties and Range States to analyse and assess bycatch, in order to establish guidelines and advice on suitable methodologies and reporting requirements.

Work is currently being undertaken by the ACAP intersessional group to progress these tasks. In this paper, we first identify issues that need to be considered in reporting against the bycatch indicators and propose guidance and recommendations to achieve consistent reporting. We then provide a broad assessment of seabird bycatch estimation methods currently in use, and outline the basis of a proposed reporting framework for the consideration and further development by the ACAP SBWG. It is important to note that this paper presents work in progress, which will be further considered by ACAP's SBWG and Advisory Committee in 2017. Although this paper focusses on the development of a bycatch estimation and reporting framework for use by ACAP, the principles are broadly applicable, and is presented to the Bycatch Working Group and the Scientific Advisory Committee to help inform discussions regarding seabird bycatch estimation and reporting within the Inter-American Tropical Tuna Commission (IATTC) and other RFMOs.

2. REFINING BYCATCH INDICATORS

2.1. Bycatch Pressure indicator

There is a range of methods that may be used to estimate and monitor levels of seabird bycatch in fisheries. Inevitably, the assessment methods are dependent on the quantity and quality of data available, as well as the specific objectives of the exercise. In most situations, only a portion of the total fishing effort is formally observed for bycatch events. Consequently, extrapolation of bycatch figures from observed fishing effort to total fishing effort is required to estimate the bycatch associated with an entire fleet (i.e. including the unobserved fishing effort). ACAP has previously agreed that assessment and monitoring of seabird bycatch levels over time should include estimates of **a) bycatch rates** (i.e. number of birds killed per a given unit effort, for example birds per 1000 hooks set for longline fisheries) and **b) the total number of birds killed per fleet**. The reason it is important to include both of these measures as indicators is that although bycatch rates are suitable for direct comparisons over time or across strata or fisheries, it does not account for differences in fishing effort. Even if bycatch rates decline, impacts on seabird populations could increase if fishing effort increases. In some cases, changes in bycatch rates could also reflect declining/increasing seabird populations. Consequently, bycatch rates should be used in combination with estimates of the total number of birds killed per fleet as an overall indicator to monitor bycatch trends over time.

There are a number of issues to consider when estimating and interpreting these two metrics. These are discussed below, together with recommendations on how these issues could be considered for the purpose of bycatch assessment and reporting, either recommending a preferred methodology, or providing guidance on potential approaches and comparable reporting. The indicator should ultimately be able to report cumulative bycatch levels and rates across fisheries for all ACAP (and other threatened) species explicitly accounting for these factors.

2.1.1. Undetected mortality

Seabird mortality estimates are generally based on the number of dead birds brought aboard vessels on hooks (in longline fisheries). However, in many cases a proportion of birds that are caught on longlines during line setting may drop off hooks prior to hauling, and so will not be retrieved and recorded. This undetected mortality is sometimes referred to as 'cryptic mortality', and the proportion in some longline fisheries has been estimated at 50% (Brothers et al. 2010). This undetected mortality has the potential to significantly underestimate actual mortality. Ideally, the undetected mortality should be accounted for in bycatch estimates, but this is not necessarily a simple task. Some studies have been undertaken to derive correction factors. However, such a relationship is influenced by a number of variables, making it difficult to apply broadly. We recognise that methods to estimate undetected mortality are likely to vary, and rather than stipulating a single preferred method, providing metadata on the methods may be a more appropriate solution. The use of standardised metadata will allow quick assessment of the comparability of different estimates.

Guidelines and Recommendations

- Recognise that mortality estimates based on retrieved seabird carcasses are likely to underestimate actual mortality.
- The Bycatch Pressure Indicator should account for undetected mortality where possible by including this component in bycatch estimates, or where knowledge is insufficient by explicitly noting the exclusion of undetected mortality. If observers record the source of mortality, this may allow a subsequent consideration of undetected mortality to be factored in later.
- Bycatch estimates reported to ACAP should state whether undetected mortality is included, and if so provide some metadata on the methods used (e.g. based on proxy figures from an experimental study of the fishery).
- Encourage investigations that attempt to quantify the incidence and extent of undetected mortality. In longline fisheries, this would generally require focussed observations of seabird hookings during line setting, and comparing these with the number of birds subsequently hauled aboard. Other experimental approaches may also be applied to estimate the levels of undetected mortality associated with each fishery/method.

2.1.2. Uncertainty in estimation

Where there is 100% observer coverage of fishing events within a fishery, bycatch should be completely observed, and there is no need for estimation. However, in most situations, observer coverage is substantially lower, and extrapolation of bycatch from observed to total fishing effort is required. Seabird bycatch rates and numbers are influenced by a range of environmental, ecological and operational factors, all of which vary in space and time. Variation in the gear and fishing techniques used within a fishery may also influence seabird bycatch rates. Observations and data estimation should also consider the different modes of bycatch. For example, in longline fisheries birds may be killed during the line setting process, but also during the haul, and it is useful to differentiate between these sources of mortality.

It is inappropriate to assume that bycatch and associated data collected for a small sample of the overall fishing effort is necessarily representative of the whole fleet. Applying a bycatch rate from a particular area/time across a whole fleet, part of which may not be interacting with the seabirds will result in biases. With this in mind, every effort should be made to ensure that observer programmes sample a representative portion of the fishing effort of each fleet, spatially, temporally and across the full range of vessels and gear types (Debski et al. 2016). Ideally estimates should be reported with some measure of representativeness, but given the complexity of issues affecting representativeness a simpler approach is to simply collect and report metadata including the level of observer coverage and the factors used in the estimation (e.g. factors used to stratify data or co-variables in model derived estimates).

The representativeness of the observer coverage can be assessed in simple terms by determining the proportion of the total fishing effort that was observed for each strata, and how these compare with the target level of observer coverage required (see section 3.1.2.2 for further details on stratification). However, in some cases information on the overall fishing effort may be lacking, thus hampering efforts to determine how representative the observer coverage is. Spatial and temporal representativeness should be based on appropriate stratification. Temporal stratification is relatively straight forward, and could simply comprise year quarters. Spatial stratification should ideally be meaningful to the distribution of seabirds and fishing effort, dividing the area in question into units that are similar in respect of these properties, but are not necessarily the same size and shape. If such an approach is not possible, spatial stratification should be based on a resolution of 5x5 degree grid squares or a finer grid-arranged stratification. It is important to note that sampling should also be representative of other factors, such as vessel type, target fish and gear set up. Representativeness is less important when using a modelling approach to extrapolate bycatch estimates, provided the appropriate factors have been included.

Given generally low levels of observer coverage for many fisheries, there will inevitably be some level of uncertainty associated with bycatch estimates. In order to reflect this uncertainty and to understand the bounds of the estimates, confidence intervals should be calculated and reported together with the estimates of bycatch. Inconsistent methodology and therefore comparable uncertainty across countries, methods and underlying data structures will be difficult to achieve. Consequently, it may be useful to consider assigning uncertainty based on a range of factors, such as level and representativeness of observer coverage and level/accuracy of species identification.

Guidelines and Recommendations

- Encourage observer programmes to implement coverage of fishing effort that is representative across fishing operations, spatially and temporally, and sufficient to derive robust estimates of bycatch.
- Confidence intervals should be calculated and presented together with estimates of bycatch. As a minimum, these can be based on simple mathematical formulae, but consideration should be given to more complex methods where possible and appropriate.
- When submitting bycatch estimates, metadata should also be provided to describe the methods used, levels of underlying observer coverage and factors related to representativeness considered by the methodology.
- Representativeness should be based on appropriate stratification. Temporal stratification should be based on year quarters. Spatial stratification should comprise unit areas that are

similar in respect of the distribution of seabirds and fishing effort, at a resolution comparable or finer than 5x5 degree grid squares, or simply based on 5x5 degree grid squares. Representativeness can be evaluated very simply by calculating (and reporting) the proportion of the total fishing effort observed for each strata, and how these compare with the target level of observer coverage required.

2.1.3. Uncertainty in species identification

An important consideration for bycatch estimation is whether it is possible to estimate bycatch by species or some species groupings. The ability to provide estimates for each species is dependent on the accurate identification of bycaught seabirds by observers, or the use of programmes to analyse samples collected, or photographs, taken at sea. In order to understand the conservation implications of bycatch, it is preferable that estimates are derived for each species, which can also then be aggregated to groupings of species, and for all birds combined. Consequently, efforts should be directed towards encouraging the identification of all bycaught birds to species level, by for example retaining carcasses, biological samples, and taking photographs for later identification. The Seabird Bycatch Identification Guide produced by ACAP in collaboration with the Japan Fisheries Research Agency provides a useful tool to help identify bycaught seabirds. However, it may not always be possible to identify a bycaught bird to species level. In these cases, the identification of a bycaught bird at a coarser level (*e.g*. large/great albatross), or even unidentified birds, still contribute to the estimate of the total number of birds caught. A proposed standard set of nested groupings for birds unidentified species level is provided in Table 1 the use of which would allow estimates to be summed at different taxonomic levels.

Guidelines and Recommendations

- It is preferable that estimates are derived for each species. Consequently, efforts should be directed towards encouraging the identification of all bycaught birds to species level, by for example retaining carcasses, biological samples, and taking photographs for later identification
- For mortalities that cannot be identified to species level, estimates should be reported at the lowest taxonomic level possible (see Table 1).

2.2. Bycatch State indicator

The ACAP Bycatch **State** indicator relates to the availability of bycatch data relevant to ACAP species. Previously, it was anticipated that this indicator would be based on raw data availability. However, given the move towards a process in which Parties analyse their own data according to the guidelines provided in this document and submit the results and standard metadata to ACAP, this indicator may be best targeted at recording the extent of estimates reported (by Party, Range State and/or fleet). As a number of methodological approaches are available and used by Parties to estimate bycatch rates and levels, the indicator should report on the availability of estimates by method over time. Progress would be then measured as an increasing number of Parties and/or fleets reporting bycatch estimates over time, and a change in methods used to those producing most robust estimates. A table will be developed to summarise this information, once agreement is reached on the details of the Bycatch Pressure indicator.

3. METHODOLOGICAL APPROACHES THAT COULD BE USED TO REPORT AGAINST THE MEASURES DEVELOPED FOR THE BYCATCH PRESSURE INDICATOR

Any approaches ACAP recommend should be suited to the likely range of raw data available across different jurisdictions and fisheries. Key properties of the raw data that influence estimation, include:

- varying resolution;
- varying accuracy and precision;
- varying data collection methods;
- varying levels of observer coverage; and
- use of Electronic Monitoring (EM) and industry reported data.

3.1. Review of bycatch estimation methods

3.1.1. Bycatch rates per unit fishing effort

One of the commonest ways to measure and report levels of seabird bycatch is to express the number of birds caught per unit fishing effort (e.g. per 1000 hooks set for longline fisheries, and trawl, trawl day or hour of observation for trawl fisheries). Even for these simple and well-understood measures, there are challenges and limitations regarding representativeness and bias when dealing with low levels of observer coverage. All aspects of representativeness discussed in Section 2.1.2 are relevant to estimates of bycatch rate, and observer programmes should strive to ensure the data collected are truly representative of the fishery. In addition to the limitations associated with data gaps, bycatch rates do not account for changes in fishing effort, and therefore should be used as part of a broader indicator, in combination with estimates of the total numbers of seabirds killed. The calculation of bycatch rates should be conducted in a stratified manner (see section 2.1.2), and tracking changes in bycatch rates over time should be done by stratum, rather than the average rate across all strata (as different strata will likely have different background rates of bycatch). Ideally, estimates of bycatch rates should be provided for each species caught. However, data limitations will often preclude such an approach, and Parties should aim to provide estimates and the finest level possible (see Table 1).

3.1.2. Estimating the total number of birds killed

Given the situation in most fisheries, in which bycatch data are available for only a portion of the overall fishing effort, some sort of extrapolation is required to derive estimates for the total number of birds killed annually in a fishery. The usefulness of this metric is that it integrates the bycatch rate estimate with fishing effort, hence the ACAP approach of including both in the overall Bycatch Indicator. Generally, estimating total captures relies on the observed effort being representative of the total effort. In many fisheries, this may not be the case. For example, the observations may be biased towards a particular time of year when captures of seabirds are more or less frequent, or observers may be placed on vessels that are not representative of the fleet as a whole. Model-based approaches (such as generalised linear models) can be used to deal with these issues (unobserved fishing effort, quantifying uncertainty or error), but also have their limitations. The calculation of the total number of seabirds killed should be conducted in a stratified manner (see section 2.1.2), and tracking changes in mortality over time should be done by stratum, rather than the average estimate across all strata (as different strata will likely have different background levels of bycatch). Ideally, estimates of the total numbers of seabirds killed should be provided for each species caught. However, data limitations will often preclude such an approach, and Parties should aim to provide estimates and the finest level possible (see Table 1).

3.1.2.1. Simple ratio estimate

The simplest method of extrapolating bycatch from observed to total fishing effort is to multiply the rate estimator (observed bycatch rates) by the total fishing effort (in the case of longline fishing, this would be the total number of hooks set). This can be applied to data across a fleet. The number of birds observed caught is divided by the number of hooks observed to derive the ratio estimator (Birds Per Unit Effort, or BPUE), which is normally expressed as the number of birds caught per 1000 hooks set for longline fishing, or per 100 tows for trawl fishing. BPUE is then multiplied by the total fishing effort within the fleet or fishery to estimate the total number of birds killed. Ratio estimation relies on the assumption that the observed fishing effort is similar to the unobserved effort. Because seabird bycatch rates and numbers are influenced by a range of environmental, ecological and operational factors that vary in space and time, it is inappropriate to assume that bycatch and associated data collected for a small sample of the overall fishing effort is necessarily representative of the whole fleet. Applying a bycatch rate from a particular area and time across a whole fleet, which will likely vary in its interaction with the seabirds will result in biases.

3.1.2.2. Stratified ratio estimate

In order to improve the accuracy of bycatch estimation in cases where bycatch rates vary spatially and temporally within the fleet it is important to stratify the data. However it is necessary to ensure that sufficient data are contained within each stratum to allow estimation of total bycatch for each stratum. The amount of data required to enable total bycatch to be estimated within each stratum is influenced by the level of observer coverage and the frequency of bycatch events observed. Stratifying the ratio estimation helps address the issue of representativeness because the observed and unobserved fishing effort are likely to be more similar within the strata than for the entire fleet. The bycatch estimates for each strata are then summed to derive the total estimate for the fleet. Given that seabird bycatch varies spatially and seasonally, stratification should include both area and time components. At a coarse level, this stratification could for example divide a year into four quarters, and the area into meaningful biogeographic units comparable or finer than 5x5 degree grid squares, or simply using 5x5 degree grid squares. However, many Parties use much finer-scale resolutions than these, and the ACAP framework is being developed to accommodate a range of different options. The key objective is to capture time and area strata that are similar in their attributes, and to ensure that there are sufficient data collected within each. Observed strata in which no bycatch was recorded, should be recorded as having zero bycatch. However, it is important that unobserved strata are treated as such, and are not assumed to have zero bycatch. Estimates of bycatch for unobserved strata should be developed and applied using data from other similar strata, for which data have been collected.

3.1.2.3. Model based extrapolation

If additional data are recorded by observers for variables that might influence the capture rate of seabirds (such as specific fishing activities and environmental conditions), it may be possible to construct statistical models that analyse the effect of these variables on seabird bycatch. One can then estimate the expected level of bycatch based on these variables and resulting coefficients. This method is better able to account for a lack of representativeness of observer coverage. Models can be of varying complexity depending on the data available (i.e. observer coverage level). For example, the inclusion of random year effects and random vessel effects are possible when sufficient data are available and will improve the model fit. Models should be developed to report error bounds for estimates using a methodology appropriate to the model and data. For the purpose of comparison with areas/fisheries for which a modelling approach is not possible, the model development process should also include the derivation of stratified ratio estimates.

3.1.2.4. Quantitative risk assessment approaches

More complicated modelling approaches have been used to estimate total seabird bycatch. One example of this is the quantitative risk assessment for seabirds undertaken by New Zealand (Richard and Abraham 2015). This method uses seabird distribution maps and migration timing to estimate overlap with fishing effort. The overlap is compared to observed captures to estimate the vulnerability of species to capture. The vulnerability is applied to the fishing effort to predict annual potential fatalities (note the different terminology, annual potential fatalities are an assessment of risk rather than a true estimate of what would be observed with 100% observer coverage). This approach includes estimates for multipliers for undetected mortalities but does not account for lack of observer representativeness. The approach used in New Zealand also incorporates error around each model input parameter, providing for consolidated error bounds around risk estimates.

3.2. Approaches currently used by Parties to collect, analyse and report seabird bycatch data

The resolution at which fisheries and bycatch data are collected, and estimation methods used, varies both between and within Parties, the latter due to differences between multiple fisheries for which a Party has responsibility. Most fisheries for which observer data are collected, capture bycatch and fisheries effort data at a raw, fine-scale resolution (shot-by-shot). There was much greater variation in the methods used by Parties to extrapolate observed levels of bycatch to the whole fleet/fishery. In a few cases (some CCAMLR fisheries), the entire fishing effort is observed, and so extrapolation is not required. However, these represent the minority of fisheries. For several fisheries, modelled extrapolation (using explanatory variables to estimate bycatch) and stratified extrapolation, or a combination of both approaches, are used. The choice of methods is generally influenced by the availability of data. In some fisheries, bycatch is simply reported as the number of birds observed caught, and in others it is not reported at all. This is generally the case when there are insufficient data to conduct extrapolations, either because the fishery is perceived not to be problematic for seabirds, or there is simply not enough observer coverage and data.

3.3. Guidelines and recommendations on methodological approaches

Inevitably, it will be necessary to strike a pragmatic balance between a simple assessment approach with coarse resolution data and a highly sophisticated and quantitative approach. With low quality input data, an overly simple approach will lack accuracy and precision whereas an overly complex one will be hampered by data gaps and invalid assumptions (but certainly no more invalid than a data-poor assessment), and therefore provide a false representation of the level of accuracy. More complex models, with higher quality and quantity of data, allow more refined biological assumptions, so are more realistic than data poor models. An overly complex approach will also be much more costly and onerous to implement. However, the cost implications relate more to the collection of data than to the assessment procedure.

Guidelines and Recommendations

- The guidelines provided in section 2.1.2 (Uncertainty in Estimation) are all relevant to this section on methodological approaches. Observer programmes should strive to ensure the data collected are truly representative of the fishery, and Confidence Intervals, or other estimates of uncertainty, should be presented together with bycatch estimates.
- Including spatial, temporal and other strata in the estimation procedure helps address the issue of representativeness because the observed and unobserved fishing effort within strata are expected to be similar, and the extrapolation from observed to unobserved fishing effort more appropriate than simply extrapolating from the observed to the total fishing effort. This relies on the suitable selection of strata (that are similar in their seabird bycatch related attributes), and sufficient data within each stratum to enable estimates to be derived for each. Parties and fisheries management agencies should aim as a minimum to gather enough data to allow the derivation of stratified ratio estimates, which would allow the use and reporting of bycatch estimates against quarterly, 5x5 degree grid square strata. In some cases, fisheries will have sufficient data to conduct more detailed analyses and modelling approaches. In others a lack of data will preclude anything other than simple fishery-wide simple ratio estimates. The ACAP framework is intended to cater for all of these options.
- More quantitative model-based approaches are useful in dealing with unobserved fishing effort, unrepresentative observer coverage, and quantifying uncertainty or error, but can be resource intensive, and require the scientific capacity to conduct the analyses. These approaches are most suited to fisheries where there is substantial bycatch and where sufficient data has been collected to inform the development of robust models. In these cases the models will allow more precise tracking of changes in bycatch over time and facilitate the investigation of factors that contribute to seabird captures, and the assessment of bycatch management measures.

4. REFERENCES

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TABLE 1: PROPOSED CATEGORISATION FOR BIRDS UNIDENTIFIED TO SPECIES LEVEL

Every effort should be made to identify birds to species level, or failing that to the lowest level of taxonomic classification

Seabird sp	Large albatross sp	*Diomedea sp*	**Northern Royal Albatross -** *Diomedea sanfordi*
			Southern Royal Albatross - *Diomedea epomophora*
			Wandering Albatross - *Diomedea exulans*
			Antipodean Albatross - *Diomedea antipodensis*
			Amsterdam Albatross - *Diomedea amsterdamensis*
			Tristan Albatross - *Diomedea dabbenena*
	Smaller albatross sp	*Phoebetria sp*	**Sooty Albatross -** *Phoebetria fusca*
			Light-mantled Albatross - *Phoebetria palpebrata*
		Phoebastria sp	**Waved Albatross -** *Phoebastria irrorata*
			Black-footed Albatross - *Phoebastria nigripes*
			Laysan Albatross - *Phoebastria immutabilis*
			Short-tailed Albatross - *Phoebastria albatrus*
		Thalassarche sp	**Atlantic Yellow-nosed Albatross -** *Thalassarche chlororhynchos*
			Indian Yellow-nosed Albatross - *Thalassarche carteri*
			Grey-headed Albatross - *Thalassarche chrysostoma*
			Black-browed Albatross - *Thalassarche melanophris*
			Campbell Albatross - *Thalassarche impavida*
			Buller's Albatross - *Thalassarche bulleri*
			Shy Albatross - *Thalassarche cauta*
			White-capped Albatross - *Thalassarche steadi*
			Chatham Albatross - *Thalassarche eremita*
			Salvin's Albatross - *Thalassarche salvini*
	Petrel sp	*Macronectes sp*	**Southern Giant Petrel -** *Macronectes giganteus*
			Northern Giant Petrel - *Macronectes halli*
		Procellaria sp	**White-chinned Petrel -** *Procellaria aequinoctialis*
			Spectacled Petrel - *Procellaria conspicillata*
			Black Petrel - *Procellaria parkinsoni*
			Westland Petrel - *Procellaria westlandica*
			Grey Petrel - *Procellaria cinerea*
		Shearwater *sp*	**Pink-footed Shearwater -** *Ardenna creatopus*
			Balearic Shearwater - *Puffinus mauretanicus*

Highest (general) level of taxonomic classification → Lowest (specific) level of taxonomic classification