Agreement on the Conservation of Albatrosses and Petrels

Fourth Meeting of Advisory Committee
1.1.1 Cape Town, South Africa, 22 – 25 August 2008

Report of the Taxonomy Working Group to AC4

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1 SUMMARY

This report presents the application of the taxonomic guidelines developed by the Taxonomy Working Group to three pairs of taxa currently listed under Annex 1 (Attachment 1) of the Agreement on the Conservation of Albatrosses and Petrels (ACAP):

1. Amsterdam and Wandering Albatross (*Diomedea amsterdamensis/exulans*)
2. Black and Westland petrels (*Procellaria parkinsoni/westlandica*)
3. Campbell and Black-browed albatross (*Thalassarche impavida/melanophrys*)

We concluded that available data for these taxa do not call for an amendment to the species currently listed under Annex 1 of the ACAP Agreement.

We also propose a 2008/2009 Work Programme for the Taxonomy Working Group (Attachment 2) that includes:
1. Review the taxonomic status of the Wandering Albatross species complex

Following the review of these taxa the Taxonomy Working Group will have concluded the Assessment process for all closely-related sister taxa listed under Annex 1.

2. Continue to update the Taxonomy Working Group's web-based bibliographic database; and
3. Continue the establishment of a morphometric and plumage database to facilitate the taxonomic process, the identification of bycatch specimens, and the long-term storage of valuable data.

2 INTRODUCTION

Article IX 6 (b) of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) requires the Advisory Committee to "endorse a standard reference text listing the taxonomy and maintain a listing of taxonomic synonyms for all species covered by the Agreement". This reflects the current state of flux in the taxonomy of Procellariiformes and, in particular, of albatrosses.

Resolution 1.5 of the First Session of the Meeting of the Parties (MoP1) to ACAP provides for the establishment by the Advisory Committee of a Working Group on the taxonomy of albatross and petrel species covered by the Agreement.

The objective of the Working Group was to establish a transparent, defensible and highly consultative taxonomic listing process. The Scientific Meeting that preceded the first meeting of Parties (MoP1; ScM1; Section 4.3) stated that "…given the importance that species lists have upon conservation policy and scientific communication, taxonomic

decisions must be based on robust and defensible criteria. It is important to resolve differences in a scientific and transparent manner with appropriate use of peer-reviewed publications."

The Terms of Reference for the Taxonomy Working groups are presented in Attachment 3.

The first action for this WG was to agree on a set of guidelines for taxonomic decision-making (AC2 Doc 11). These guidelines are based on those described by Helbig et al. (2002) of the taxonomic sub-committee of the British Ornithologists' Union and justify the adoption of a particular species concept and make the decision-making process transparent. They facilitate the assessment and assimilation of potentially influential studies while guarding against poor science. The guidelines also consider the inevitable limitations of species lists and the benefits of taxonomic stability.

The 2007/08 Work Programme of the Taxonomy Working Group recommended that the specific status of four pairs of taxa should be reviewed before AC4. The available data and taxonomic decisions for these species are presented below.

3 REVIEW OF TAXONOMIC DATA AND JUSTIFICATION OF TAXONOMIC DECISIONS

3.1 Amsterdam and Wandering Albatross

For convenience Wandering albatross, Antipodean albatross and Tristan albatross are sometimes referred to as *exulans, antipodensis and dabbenena* respectively.

Recent taxonomic history

Roux *et al*. (1983) described the Wandering Albatrosses of Amsterdam Island as a separate species (*Diomedea amsterdamensis*) which bred in dark brown plumage at an unusual time of year and had a white eyelid and a dark line on the cutting edge of the upper mandible. Jouventin *et al.* (1989) researched the species' breeding biology, pointing out that the birds weighed less than other great albatrosses and laid smaller eggs. However, this taxonomic innovation was not universally accepted. For example, Bourne (1989), Marchant and Higgins (1990) and Warham (1990) all preferred to retain the Amsterdam birds as a subspecies of the Wandering Albatross *D. exulans*. Subsequent molecular studies (Nunn & Stanley, 1998) have established that the Amsterdam Albatross is a sister taxon of the Wandering Albatross *Diomedea exulans* (*sensu stricto*) within the wider Wanderer species complex, and certainly has a good claim to specific status if the complex is to be split, following Robertson & Nunn (1998). Whilst Penhallurick & Wink (2004) cast doubt on the molecular case for splitting the Wandering Albatross complex, their critique was severely criticised by Rheindt & Austin (2005).

Primary publications or reviews of data relevant to the great albatross taxonomy

1. **Roux et al. (1983)** first proposed the split of the two taxa based on plumage, bill features and seasonality of breeding. *Amsterdamensis* is confined as a breeding species to Amsterdam Island.
2. **Warham (1990),** in a definitive work on the Procellariiformes which generally inclined towards 'lumping' rather than 'splitting', considered *amsterdamensis* as a subspecies of *exulans.*
3. **Nunn & Stanley (1998)** provided the first molecular evidence. The taxa were clearly very closely related, a point that remains undisputed.
4. **Penhallurick & Wink (2004),** noting the slight molecular differences, suggested that *amsterdamensis* be considered as a subspecies of *exulans.*
5. **Rheindt & Austin (2005)** were highly critical of Penhallurick & Wink's tendency to 'lump' taxa, but these authors did not comment specifically on the issue of *amsterdamensis/exulans*.
6. **Milot et al. (2007),** in a genetic rather than a taxonomic study, accepted the two forms as good species that diverged approximately 0.84 Myr ago, a figure derived from Nunn & Stanley's (1998) work on rates of cytochrome *b* evolution. Such a divergence time is wholly compatible with species status for the two taxa.

Assessment of diagnosibility

A. Same age/sex individuals of *amsterdamensis* and *exulans (sensu stricto)* **can** be distinguished by one or more qualitative differences.
B. Same age/sex individuals of *amsterdamensis* and *exulans (sensu stricto)* **can** be distinguished by a complete discontinuity in one or more continuously varying characters.
C. Same age/sex individuals of *amsterdamensis* and *exulans (sensu stricto)* **can** be distinguished by a combination of two or three functionally independent characters.

Decision

While the above assessment offers an argument in favour of diagnosability, it should be mentioned that distinguishing *amsterdamensis* and *antipodensis* is potentially more problematical since these two taxa potentially can share bill characters which provide a discontinuity with *exulans*: the dark line on the cutting edge of the upper mandible and the dark tip to the bill are features wholly characteristic of *amsterdamensis* but also seen in some *dabbenena* and *antipodensis*. However, molecular data (Nunn & Stanley, 1998) suggest that *antipodensis* is a sister taxon to *amsterdamensis/exulans*. With that caveat, Amsterdam and Wandering Albatrosses are diagnosable and should be retained as two full species:
Amsterdam Albatross *Diomedea amsterdamensis*
Wandering Albatross *Diomedea exulans*

This is the position adopted by recent wide-ranging works on the Procellariiformes and therefore effectively confirms the status quo.

3.2 Black and Westland Petrels

For convenience Black and Westland Petrels are sometimes referred to as *parkinsoni* and *westlandica* respectively.

Recent taxonomic history
Westland Petrels were first described as a sub-species of Black Petrel by Falla (1946) but to our knowledge the two taxa have been treated as separate species since Jackson (1958).

Primary publications or reviews of data relevant to the taxonomy of Black and Westland Petrels

1. **Falla (1946)** proposed *Procellaria parkinsoni parkinsoni* and *P. p. westlandica* as subspecies and provided as type specimen of *westlandica*. *P.p. westlandica* shown to be larger than *parkinsoni*.
2. **Jackson (1958)** showed that *westlandica* bred in the (austral) winter (peak egg-laying May), while *parkinsoni* breeds in the summer (peak egg-laying November-December) (additional information in Marchant & Higgins (1990) from J.A. Bartle and M.J. Imber confirms continuing differences).
3. **Imber (1976)** reported that the diet of *parkinsoni*, *westlandica* and the white-chinned petrel (*Procellaria aequinoctialis*) were similar.
4. **Warham (1988)** demonstrated differing vocalisations between *parkinsoni* and *westlandica*.
5. **Marchant & Higgins (1990)** summarised available morphometric information for *parkinsoni* and *westlandica. P. westlandica* clearly larger than *parkinsoni*.
6. **Penhallurick & Wink (2004)** considered that mitochondrial DNA supported the separation of the two taxa at the specific level and showed cytochrome *b* sequences to be 2.3% different.
7. **Onley & Scofield (2007)** summarise distribution information and demonstrate radically different feeding ranges – *westlandica* remains in higher latitudes of southern Pacific, while *parkinsoni* crosses the equator to feed off western central America.

Assessment of diagnosibility
Based on data provided in the studies described above:

A. Same age/sex individuals of *parkinsoni* and *westlandica* **can** be distinguished by one or more qualitative differences.
B. B. Same age/sex individuals of *parkinsoni* and *westlandica* **can** be distinguished by a complete discontinuity in one or more continuously varying characters.
C. C. Same age/sex individuals of *parkinsoni* and *westlandica* **can** be distinguished by a combination of two or three functionally independent characters.

Decision
These taxa satisfy all three of the diagnosibility criteria in use by ACAP. Criterion A: taxa can be separated by a single qualitative trait (mitochondrial sequences); Criterion B: many morphometric measurements show a complete discontinuity; Criterion C: using a combination of two independent traits (morphometric measurements and bill coloration)

all adults can be accurately diagnosed. We also recognise that these taxa have been shown to be genetically distinct and behave differently. Adult *parkinsoni* breed in the summer and disperse across the equator outside the breeding season and frequently reach Central American waters. In contrast, adult *westlandica* breed in the winter and remain in the southern Pacific. We therefore agree that these taxa warrant specific status. These taxa are recognised as follows:
Procellaria parkinsoni (Black Petrel)
Procellaria westlandica (Westland Petrel)

3.3 Black-browed and Campbell Albatrosses

For convenience the Black-browed and Campbell Albatrosses are sometimes simply referred to by their taxon names; *melanophrys* and *impavida* respectively.

Recent taxonomic history

The widespread taxon breeding on islands in the South Atlantic and Indian Oceans was originally described by Temminck (1828). A second taxon is restricted mainly to Campbell Island, south of New Zealand. This taxon was first recognised by Mathews (1912) as having a pale eye and was described as a subspecies *D. m. impavida* of the previously described species. Prior to Robertson & Nunn (1998) these two taxa were classified as subspecies; Black-browed Albatross (*Diomedea melanophrys melanophrys*) and Campbell Albatross (*D. m. impavida*) e.g. Marchant & Higgins (1990). Robertson & Nunn (1998) were first to suggest that both should be elevated to specific status in the genus *Thalassarche*.

Primary publications or reviews of data relevant to the taxonomy of Black-browed and Campbell Albatrosses

1. **Nunn et al. (1996)** only included DNA sequence data from *D. melanophrys*, but provided convincing justification establishment of genus Thalassarche and for the placement of Black-browed albatross within the genus. Analyses of molecular data for *impavida* were later presented in Nunn & Stanley (1998) placing it as a sister group to *T. melanophrys***.**
2. **Robertson & Nunn (1998)** presented a phylogeny for full mitochondrial cytochrome-*b* DNA sequences. Their unweighted maximum parsimony tree shows *melanophrys* sister to *impavida* and together with the Grey-headed Albatross (*T. chrysostoma*) forming a sister clade to all other *Thalassarche* taxa. The data were not included in this publication, but have since appeared among GenBank entries; URL: www.ncbi.nlm.nih.gov/. These authors did not elaborate on their justification for their recognition as full species.
3. **Moore et al. (1997)** report inter-specific parings of melanophrys and impavida on Campbell Island but both *melanophrys* x *melanophrys* and *melanophrys* x *impavida* had significantly lower breeding success than the pure *impavida* pairs on this island.

4. **Onley & Bartle (1999)** show that birds of all ages can be reliably distinguished by eye colour: dark brown in *melanophrys*, honey-yellow in *impavida*.
5. **Waugh et al. (1999)** analysed the morphometry of Black-browed albatrosses from five breeding locations in the Southern Atlantic, Indian and Pacific Oceans. Two groups were identified in a Principal Components Analysis with *impavida* as the sole representative in one. The measurements of *impavida* and *melanophrys* overlapped but the sexes were not analysed separately.
6. **Burg and Croxall (2001)** examined mtDNA control region and microsatellite variation in six different island populations of Black-browed morphotypes. Their analyses provided clear evidence for three clades one of which was the *impavida* of Campbell Island.
7. **Moore et al. (2001)** used mtDNA haplotyping to show that dark-eyed males on Campbell Island were of the *T. melanophrys* type and were usually males in inter-specific breeding pairs with *T. impavida.* Successful hybridisation is suspected but has yet to be shown.
8. **Penhallurick & Wink (2004)** analysed the Nunn & Stanley (1988) dataset and noted that the mtDNA cytochrome *b* genetic distance between *melanophrys* and *impavida* was 0.79% and thus fell below their criterion for recognition of species. The authors' phylogenetic methodology and their application of species definitions have been extensively criticised by Rheindt & Austin (2005).
9. **Alderman et al. (2005)** carried out new population genetic analyses of mtDNA sequences from individuals breeding on Macquarie Island, Diego de Almagro and Ildefonso Islands. They all corresponded to the widespread form of *melanophrys*. This study also shows the remaining sampling gaps; Antipodes Islands (New Zealand), Crozet and Heard Islands (Indian Ocean) and Evangelista Islands (Chile).

Assessment of diagnosibility

Based on data provided in the studies described above:

A. Same age/sex individuals of *T. melanophrys* and *T. impavida* **can** be distinguished by one or more qualitative differences.
B. Same age/sex individuals of *T. melanophrys* and *T. impavida* **can** be distinguished by a complete discontinuity in one or more continuously varying characters.
C. C. Same age/sex individuals of *T. melanophrys* and *T. impavida* **can** be distinguished by a combination of two or three functionally independent characters.

Decision

These taxa satisfy the accepted ACAP diagnosibility criteria as they can be separated by qualitative molecular characters (mitochondrial DNA sequences and microsatellite allele frequency profiles), a discrete morphologic character (iris colour) and multivariate morphometric data. We recognise that although the two taxa have been shown to be genetically distinct, they are very closely related and successful hybridisation may be possible. We, therefore, recommend that these taxa warrant specific status recognised as follows:

Thalassarche impavida (Campbell Albatross)
Thalassarche melanophrys (Black-browed Albatross)

Comments
A question remains regarding the third distinct 'western South Atlantic' clade of lack-browed albatross identified by Burg and Croxall (2001). Further behavioural, morphological data are required before this Working Group can formally assess the taxonomic status of these albatrosses.

3.4 Other

The assessment of the Tristan and Wandering Albatross (*Diomedea dabbenena/exulans*) taxon pair was not completed this year.

4 OTHER ITEMS ON THE 2007/08 WORK PROGRAMME

4.1 Migrate the WG's web site to the ACAP Secretariat

The Working Group's web site and bibliographic database have been removed from the servers of a commercial web service and are now hosted by ACAP's own Internet Service Provider (http://www.acap.aq/moodle/).

4.2 Assess the utility of the subspecies rank for ACAP purposes and if appropriate develop guidelines for the recognition of subspecific status

Traditionally, subspecies have been recognised on the basis of discontinuities in the geographical distribution of phenotypic traits (Mayr & Ashlock, 1991).However, like the rank of species, the Linnean rank of subspecies is mired in controversy. The ranking grew in frequency during the mid 1900, as species were 'demoted' under the popular rise of the biological species concept (Zink, 2004). It has been reported that the number of avian species decreased by half under this paradigm (Mayr, 1970; Zink, 2004). Despite the popularity of the biological species concept at that time other were more critical of the subspecies rank. Wilson & Brown (1953) stated 'the subspecies concept is the most critical and disorderly area of modern systematic theory'. Zink (2004) suggests that during this period the subspecies rank 'functioned as units in at least three roles, namely in classifications, evolutionary theories and, more recently, conservation plans, without strong tests of how well they function in these roles'.

Controversy surrounding the subspecies rank has not subsided. Recent molecular studies have largely failed to confirm traditional subspecies as phylogenetically distinct (e.g. Ball & Avise, 1992; Burbrink *et al.*, 2000). Zink (2004), in a review of Nearctic/Palearctic subspecies, found that 97% of these subspecies were not supported by genetic data. This study was criticised by Phillimore & Owens (2006) as geographically biased and in their more widespread review of subspecies, found that approximately 30% of subspecies were supported by genetic data. Importantly this study revealed that island dwelling subspecies

were more likely to be phylogenetically distinct that continental subspecies. This suggests that systematists may treat island species differently and are less likely to assign specific status to such taxa. Alternatively, due to founder effects and smaller effective population sizes, island subspecies attain reciprocal monophyly more rapidly than continental subspecies (Phillimore & Owens, 2006). These studies suggest that the subspecific rank may or may not reflect distinct evolutionary units and cases must be assessed in isolation.

Currently the ACAP Agreement does not recognise subspecies in Annex 1 (Attachment 1), however, we suggest there are only two taxa that are potential candidates for listing as subspecies: the Gibson's Albatross and the Pacific Albatross. Both of these taxa were not considered sufficiently distinct to warrant specific status following assessment by the Taxonomy Working Group.

Three factors lead us to recommend that taxa should not be listed as subspecies under Annex 1. First, there are no well developed and widely accepted criteria for recognising subspecies. Second there are currently no characters that can be used to reliably identify the taxa identified above. Third, because these taxa are thought to occur on specific islands and are not sympatric with their sister taxa then there is little loss of scientific information because most data are associated with the breeding sites (particularly when reliable identification at sea is not possible).

If the present taxonomy listed in Annex 1 remains at the heart of the ACAP Agreement then it is our opinion that the conservation and understanding of these seabird taxa will not be enhanced greatly by listing subspecific forms. This assessment may differ from other conservation initiatives and legislation but is largely a consequence of recent taxonomic revision in this group of birds. Many taxa appearing in the Annex were elevated from subspecific to specific status following the publication of the taxonomic hypothesis of Robertson & Nunn (1998). This hypothesis has been adopted widely (with some amendments) and largely supported by subsequent studies (Abbott *et al.*, 2006; Abbott & Double, 2003a; Abbott & Double, 2003b; Burg & Croxall, 2001; Burg & Croxall, 2004), however, acceptance is not universal (Christidis & Boles, 2008; Penhallurick & Wink, 2004). Should a decision be made to radically amend Annex 1 so it more closely reflects alternative taxonomies such as that proposed by Christidis & Boles (2008) then the decision not to list subspecies would have to be revisited.

4.3 Construct a morphological and plumage database, then canvas for, collate, archive and summarise available data

A structure for the ACAP Morphometric, Plumage and Genetic Dataset (MPGD) was constructed and circulated among the Taxonomy Working Group and other WG Convenors for comments. The structure is described in Attachment 4. This structure was submitted to the application developer who had been engaged by the ACAP Secretariat to construct ACAP Data Portal.

4.4 Maintain the WG's bibliographic database of published scientific papers relevant to the taxonomic status of ACAP listed taxa

The bibliographic database as been updated to include new references identified in the latest taxonomic assessments. This database and associated pdf files of the references are housed on the ACAP server (http://www.acap.aq/moodle/).

5 OTHER BUSINESS

The Taxonomy Working Group has been notified of Case 3449 soon to be assessed by the International Commission on Zoological Nomenclature (http://www.iczn.org/). The WG will review the decision made by Commission and then decide if there are implications for the species list in Annex 1 of the Agreement.

Case 3449
Diomedea melanophris ***Temminck, 1828 (currently*** **Thalassarche melanophris*; Aves, Procellariiformes): proposed conservation of original spelling***
Abstract. The purpose of this application, under Articles 33.2.3 and 33.3 of the Code, is to rule that the name of the Black-browed Albatross Diomedea melanophris Temminck, 1828 (currently Thalassarche melanophris) is confirmed as the correct original spelling. Since 1839, half of authors have used melanophris and the other half melanophrys, following Temminck's (1839) incorrect subsequent spelling. The difference is not statistically significant, and it is proposed that the original spelling is confirmed as correct to follow the priority and to promote stability.

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ATTACHMENT 1

Species currently listed under Annex 1 of the Agreement on the Conservation of Albatrosses and petrels (ACAP)

Family Diomedeidae Albatrosses		
1	*Diomedea exulans*	Wandering Albatross
2	*Diomedea dabbenena*	Tristan Albatross
3	*Diomedea antipodensis*	Antipodean Albatross
4	*Diomedea amsterdamensis*	Amsterdam Albatross
5	*Diomedea epomophora*	Southern Royal Albatross
6	*Diomedea sanfordi*	Northern Royal Albatross
7	*Phoebastria irrorata*	Waved Albatross
8	*Thalassarche cauta*	Shy Albatross
9	*Thalassarche steadi*	White-capped Albatross
10	*Thalassarche salvini*	Salvin's Albatross
11	*Thalassarche eremita*	Chatham Albatross
12	*Thalassarche bulleri*	Buller's Albatross
13	*Thalassarche chrysostoma*	Grey-headed Albatross
14	*Thalassarche melanophrys*	Black-browed Albatross
15	*Thalassarche impavida*	Campbell Albatross
16	*Thalassarche carteri*	Indian Yellow-nosed Albatross
17	*Thalassarche chlororhynchos*	Atlantic Yellow-nosed Albatross
18	*Phoebetria fusca*	Sooty Albatross
19	*Phoebetria palpebrata*	Light-mantled Albatross

Family Procellariidae - Petrels		
20	*Macronectes giganteus*	Southern Giant-petrel
21	*Macronectes halli*	Northern Giant-petrel
22	*Procellaria aequinoctialis*	White-chinned Petrel
23	*Procellaria conspicillata*	Spectacled Petrel
24	*Procellaria parkinsoni*	Black Petrel
25	*Procellaria westlandica*	Westland Petrel
26	*Procellaria cinerea*	Grey Petrel

ATTACHMENT 2

Proposed Work Programme for the Taxonomy Working Group 2008/2009

This Taxonomy Working Group was established to develop a practical, defendable and consistent list of species for ACAP and also summarise available data on the listed species. We will therefore review the remaining taxa listed by ACAP that have been the subject of recent taxonomic debate (see below).

The Working Group will continue the establishment of a morphometric and plumage database to facilitate the taxonomic process, the identification of bycatch specimens, and the long-term storage of valuable data.

The 2008/2009 Work Programme for the Taxonomy Working Group

Action	Completed by	Responsibility
Review the taxonomic status of the Wandering Albatross species complex	2008/2009	WG
Continue the construction a morphological and plumage database, then canvas for, collate, archive and summarise available data	2008/2009	WG
Maintain the WG's bibliographic database of published scientific papers relevant to the taxonomic status of ACAP listed taxa	2008/2009	WG Convenor
Develop and provide advice to AC on the construction and maintenance of species lists as appropriate	Ongoing	WG
Provide annual reports to AC on WG activities	2008/2009	WG
Draft resolutions (when necessary) for amendments to the species list in Annex 1 of the Agreement	Ongoing	AC

ATTACHMENT 3

Taxonomy Working Group Terms of Reference

Article IX 6 (b) of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) requires the Advisory Committee to "endorse a standard reference text listing the taxonomy and maintain a listing of taxonomic synonyms for all species covered by the Agreement". This reflects the current state of flux in the taxonomy of Procellariiformes and, in particular, of albatrosses.

Resolution 1.5 of the First Session of the Meeting of the Parties (MoP1) to ACAP provides for the establishment by the Advisory Committee of a Working Group on the Taxonomy of albatross and petrel species covered by the Agreement.

The terms of reference for the group are to:

1. establish a transparent, defensible and highly consultative listing process for the recognition of taxa of albatrosses and petrels listed under Annex 1 of the Agreement.
2. review the specific status of all taxa of albatrosses and petrels listed under Annex 1 of the Agreement;
3. collate and maintain a bibliographic database for published scientific papers relevant to the taxonomy of ACAP listed species;
4. develop and maintain a morphometric database of albatrosses and petrels to assist in taxonomic assessments and ensure long-term storage of valuable data in accordance with agreed data confidentiality arrangements;
5. report to the Meeting of Parties through the Advisory Committee on taxonomic assessments as appropriate.

ATTACHMENT 4

ACAP Morphometric, Plumage and Genetic Dataset (MPGD) within the ACAP Data Portal

Introduction

Morphometric and plumage data of procellariiform seabirds is valuable for understanding the biodiversity and taxonomy within this avian Order and also for the identification and aging of birds killed by fishing operations. Such data are therefore critical for the aims of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). Here we propose a structure, management and data sharing system for an ACAP Morphometric, Plumage and Genetics Dataset (MPGD) that will:

- further our understanding of procellariiform taxonomy and diversity
- further our ability to identify, sex and age individuals
- advertise the existence of available morphometric and plumage data sets
- advertise the existence of genetic samples from sampled individuals
- maximize the utility of existing datasets
- protect and archive valuable data
- prevent unnecessary disturbance to birds through the repeated collection of similar data

The establishment of a morphometric, plumage and genetics dataset was endorsed by the Third Meeting of the ACAP Advisory Committee in 2007 and forms part of the current Work Plan for the ACAP Taxonomy Working Group.

Currently the ACAP Secretariat is developing a Data Portal to collect, manage and disseminate data collected by all ACAP Working Groups. The MPGD will form one component of this Data Portal.

Data structure

The proposed structure of the MPGD is shown in Table 1.

Data submission

The MPGD will be populated by individuals or institutions who wish to submit their data. The most appropriate mechanism to submit data will be devised by the IT professional who is contracted to construct the ACAP Data Portal after consulting with the ACAP Secretariat. Ideally the ACAP Data Portal will facilitate a simple, rapid, bulk data submission process for the MPGD.

Data Sharing and Sharing Options

Data within the MPGD will be submitted by data owners (the individual or institution who currently own the data). The ownership of data will remain with those that submit data unless stipulated otherwise (see below). Data can be withdrawn from the MPGD by

a data owner, should the owner so wish, through the submission of a request to the ACAP Secretariat.

Upon submission of data the data owner will select one of the three data sharing options:

1. *The data owners relinquish ownership of the data they submit*. The data will then become open access and can be downloaded from the MPGD with no restrictions or obligation to collaborate with the original data owners.

2. *The data owners will retain ownership of the data they submit until a specified date* (sunset clause) and only allow metadata (see below) to be displayed via the ACAP Data Portal.

3. *The data owners will retain ownership of the data they submit indefinitely* and only allow metadata (see below) to be displayed via the ACAP Data Portal.

For data submitted under Options 2 or 3, the ACAP Data Portal will only display those fields marked 'Open' in the first column of Table 1. These columns are essentially the information or 'metadata' describing the data set.

Should a researcher wish to gain access to 'Restricted' data (Table 1) submitted under Options 2 or 3 then they must contact the data owner. The data owner can then negotiate a collaborative relationship with the researcher and supply their data directly or write to the ACAP Secretariat requesting that the data be released to the named researcher.

Data security and protection
Data within the MPGD will be part of the ACAP Data Portal. Access to *all* data within MPGD of the ACAP Data Portal will be restricted to the ACAP Secretariat and the ACAP Data Portal administrator.

The ACAP Data Portal will be backed-up each day and versions will be stored in multiple secure locations.

Data quality
All data submitted to the MPGD will be reviewed by a member of the ACAP Taxonomy Working Group before it is included in the MPGD dataset.

Table 1 Proposed data structure and access levels of the MPGD

Access level	Field	Options	Notes
Open	Owner of data		Name of individual and/or Institution
Open	Contact address of data owner		Address
Open	Email address of data owner		Email address
Open	Alternate email address of data owner		Email address
Open	Institution email address		Email address
Open	Data collected by		Name
Open	Data submitted by		Name
Open	Date specimen caught		DD/MM/YYYY
Open	Date data collected		DD/MM/YYYY
Open	Species name	*Diomedea exulans*	ACAP listed species
		Diomedea dabbenena	
		Diomedea antipodensis	
		Diomedea amsterdamensis	
		Diomedea epomophora	
		Diomedea sanfordi	
		Phoebastria irrorata	
		Thalassarche cauta	
		Thalassarche steadi	
		Thalassarche salvini	
		Thalassarche eremita	
		Thalassarche bulleri	
		Thalassarche chrysostoma	
		Thalassarche melanophrys	
		Thalassarche impavida	
		Thalassarche carteri	
		Thalassarche chlororhynchos	
		Phoebetria fusca	

Access level	Field	Options	Notes
		Phoebetria palpebrata	
		Macronectes giganteus	
		Macronectes halli	
		Procellaria aequinoctialis	
		Procellaria conspicillata	
		Procellaria parkinsoni	
		Procellaria westlandica	
		Procellaria cinerea	
Open	Specimen identifier 1		Identification code used by data collector (e.g. museum number/ring number/Darvic)
Open	Specimen identifier 2		Identification code used by data collector (e.g. museum number/ring number/Darvic)
Open	Name of location caught		If on breeding island follow ACAP 'site' names
Open	Latitude caught		Decimal degrees
Open	Longitude caught		Decimal degrees
Open	Caught at sea	Yes	
		No	
Open	Live or dead	Live	
		Dead	
Open	If dead then state of carcass	Intact/fresh	
		Damaged/degraded	
Open	Age class	Subadult	
		Adult	
Open	Age		Years
Open	Breeding status	Breeder (incubation)	

Access level	Field	Options	Notes
		Breeder (brood-guard)	
		Breeder (post-guard)	
		Failed breeder	
		Non-breeder	
		Unknown	
Open	Sex	Female	
		Male	
		Unknown	
Open	Sample taken for genetics	Yes	
		No	
Open	Location of genetic sample		Address
Open	Measurement method	Following Hedd et al. 1998	Hedd, A., Gales, R., Brothers, N., 1998. Reliability of morphometric measures for determining the sex of adult and fledgling shy albatrosses, *Diomedea cauta cauta*, in Australia. Wildlife Research 25, 69-79.
		Insert new reference…	Allow user to input alternate reference
Open	Measurements comment		State any deviations from selected methodology
Restricted	Weight		g
Restricted	Culmen length		mm
Restricted	Unguis bill depth		mm
Restricted	Bill minimum depth		mm
Restricted	Bill base depth		mm
Restricted	Bill base width		mm
Restricted	Head and bill length		mm
Restricted	Head length		mm

Access level	Field	Options	Notes
Restricted	Head width		mm
Restricted	Tarsus length		mm
Restricted	Mid toe length with nail		mm
Restricted	Mid toe length without nail		mm
Restricted	Tail length		mm
Restricted	Wing chord		mm
Restricted	Wing area		sq. cm
Restricted	Moult scoring method	Following Ginn and Melville 1983	
		Insert new reference…	Allow user to input alternate reference and scoring method
Restricted	MR1	0 to 5	
Restricted	MR2	0 to 5	
Restricted	MR3	0 to 5	
Restricted	MR4	0 to 5	
Restricted	MR5	0 to 5	
Restricted	MR6	0 to 5	
Restricted	MR7	0 to 5	
Restricted	MR8	0 to 5	
Restricted	MR9	0 to 5	
Restricted	MR10	0 to 5	
Restricted	ML1	0 to 5	
Restricted	ML2	0 to 5	
Restricted	ML3	0 to 5	
Restricted	ML4	0 to 5	
Restricted	ML5	0 to 5	
Restricted	ML6	0 to 5	
Restricted	ML7	0 to 5	
Restricted	ML8	0 to 5	

Access level	Field	Options	Notes
Restricted	ML9	0 to 5	
Restricted	ML10	0 to 5	
Restricted	Plumage scoring method	Following Gibson 1967	
		Insert new reference…	Allow user to input alternate reference
Restricted	Plumage Index - back	0 to 6	Gibsons plumage scheme
Restricted	Plumage Index - head	0 to 6	Gibsons plumage scheme
Restricted	Plumage Index - wing	0 to 5	Gibsons plumage scheme
Restricted	Plumage Index - tail	0 to 4	Gibsons plumage scheme
Restricted	Photo1		File name
Restricted	Photo2		File name
Restricted	Photo3		File name
Restricted	Photo4		File name
Restricted	Description Photo1		Brief description
Restricted	Description Photo2		Brief description
Restricted	Description Photo3		Brief description
Restricted	Description Photo4		Brief description
Restricted	Comments		Any comments but particularly those relating to how measurements were taken