Agreement on the Conservation of Albatrosses and Petrels

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The Marine Flyways of long-distance migratory albatross and petrel species

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SUMMARY

Flyways encompass the geographic areas used by migrating birds throughout their annual cycle and are an essential measure to determine the common routes used by multiple populations and species, and ultimately to promote their conservation by facilitating the collaboration between international stakeholders along the flyways. The eight major flyways presently recognised are poorly representative of seabird species, and identifying marine flyways, particularly within the High Seas, is a key conservation measure with applications such as analysis of spatial overlaps with threats such as long-line fisheries. Here, we present the preliminary progress to identify marine flyways for long distance seabird migrants. Tracking data from seabird researchers are being collated, and as of April 2023 the dataset encompasses the four key ocean basins (Atlantic, Indian, Pacific, and Southern), and includes 44 species of which seven species are listed by the Agreement on the Conservation of Albatrosses and Petrels (ACAP). These seven species represent key Southern Hemispheric flyways that will be delineated, including longitudinal movements between the Brazilian and Benguela Currents and the Tasman Sea and Humboldt Current, and also partial or full circumnavigations in the Southern Ocean. New analytical techniques are presently being developed to establish repeatable methods for flyway identification, and the full results will be presented in October 2023 during the Fourteenth Meeting of the Conference of the Parties (CMS COP14).

1. INTRODUCTION

Migratory bird species are more likely to experience population declines than non-migrants (Hardesty-Moore et al., 2018) and their conservation can be complex, requiring an understanding of the distribution and habitat requirements throughout their annual cycle (Webster et al., 2002). Migratory birds can also have vast ranges and rely on multiple sites during their annual cycle, with the conditions at one site potentially impacting the population demographics in different countries, continents or even hemispheres (e.g. Desprez et al., 2018; Morrison et al., 2013; Ramos et al., 2012). International collaborations are required to implement changes to policy or management practices for the conservation of migratory species, and a tool used to connect parties across full migratory ranges is the flyways concept (UNEP/CMS, 2012). Flyways are the regular routes used by large numbers of birds travelling between breeding and non-breeding areas (Boere & Stroud, 2006; UNEP/CMS, 2012).

Globally eight major flyways are recognised, which link together conservation organisations to facilitate coordinating action to protect birds along their migratory route. However, the current flyways are restricted to terrestrial or coastal areas and seabirds are poorly represented (BirdLife International, 2010). Many seabirds are long-distance migrants and face a multitude of threats throughout their annual cycle, with incidental capture (bycatch) in fisheries being a particular concern for albatrosses and petrels in the marine environment (Dias et al., 2019). Identification of marine flyways is useful to understand the migratory routes of multiple species and populations and can facilitate the inclusion of migratory connectivity in the design of conservation and management measures to ensure they are appropriate.

Since the advent of tracking devices to study animal movements, the migrations of a vast array of seabird species have been revealed (e.g. Egevang et al., 2010; González-Solís et al., 2007; Guilford et al., 2009; Stenhouse et al., 2012). Seabird tracking studies have expanded our knowledge of their distributions and as of April 2023, there were over 30 million locations recorded from 160 seabird species uploaded to the Seabird Tracking Database (STDB; BirdLife International, 2020). However, the collation of these single species migratory routes to develop a multi-species global marine flyway network is essential. The data driven approach to delineate the marine flyways over four ocean basins (Atlantic, Indian, Pacific and Southern) will facilitate the definition of major migratory corridors for seabirds and can be a powerful tool to further collaborative conservation action for migratory species.

2. METHODS

Flyways delineation
The analytical techniques to identify ocean-scale flyways from seabird tracking data are currently in development.

Data collation
From September 2022, an extensive search was conducted to identify and compile all the potentially relevant datasets, with pelagic long-distance migrants being prioritised. As of April 2023, data from 44 seabird species were available for analyses, of which seven are ACAP listed species: wandering albatross *Diomedea exulans*, grey-headed albatross *Thalassarche chrysostoma*, black-browed albatross *Thalassarche melanophris*, grey petrel *Procellaria* cinerea, spectacled petrel *Procellaria conspicillata*, Westland petrel *Procellaria westlandica*, white-chinned petrel *Procellaria aequinoctialis*. Tracking data from additional ACAP listed species have been requested, with a cut-off date for inclusion in the project at the end of May 2023.

3. PRELIMINARY RESULTS RELEVANT TO ACAP

Exploratory data analysis collated for the ACAP listed species (April 2023) represent several expected flyways within the Southern Hemisphere. This includes the longitudinal migrations of grey and Westland petrels in the Pacific between the Tasman Sea and Humboldt Current (Figure 1A), and spectacled petrels in the Atlantic between the Brazilian and Benguela Currents (Figure 1B). Grey-headed albatross and wandering albatross partially or fully circumnavigate the Antarctic continent at different latitudes (Figure 1D), and there are recorded black-browed albatross locations across the oceans in the Southern Hemisphere (generally in the Southern, Atlantic and Indian Oceans, with some recorded in the Pacific particularly around the South American coast).

4. NEXT STEPS

The results of the Marine Flyways project, led by BirdLife International and with tracking data provided by seabird researchers across the world, will be presented at the CMS COP14 (Convention of the Conservation of Migratory Species of Wild Animals Fourteenth Meeting of the Conference of the Parties) in October 2023. The work will be presented as the keynote speech at the virtual British Ornithologists' Union (BOU) Global flyways conference in November 2023. A peer-reviewed publication is being prepared, with a submission target of late 2023.

The marine flyways project uses decades of tracking data from a suite of seabird species, including ACAP listed species. Identified flyways are highly likely to represent the migratory routes of other species not included in the analysis. By using tracking data, the locations of marine flyways will be accurate meaning that overlaps with threats, such as risk of bycatch, can be established. The marine flyways can also be used to evaluate connectivity across a network of sites, including Key Biodiversity Areas.

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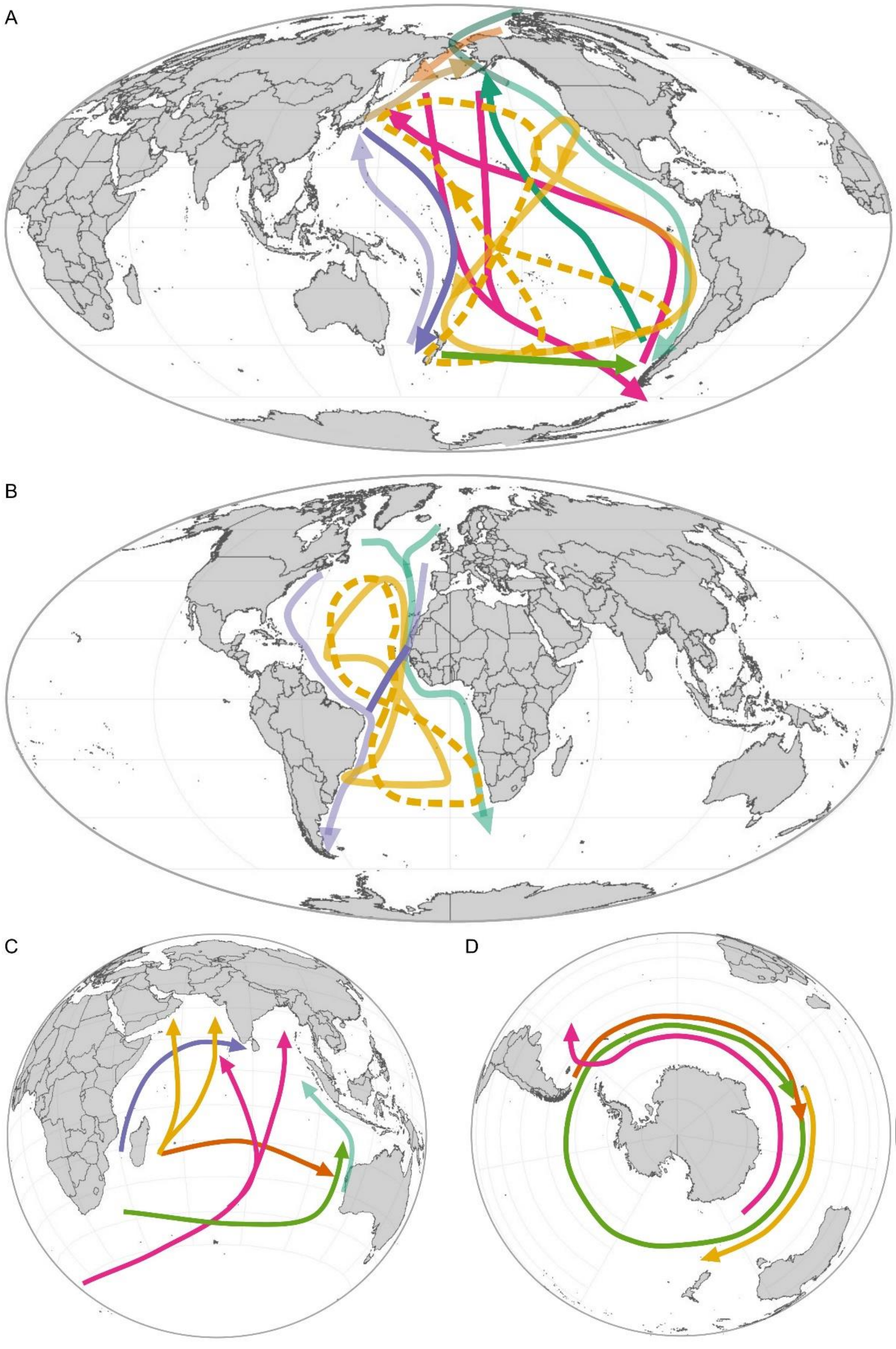

Figure 1. A preliminary and schematic representation of the expected marine flyways in four ocean basins (A. Pacific, B. Atlantic, C. Indian, D. Southern) as derived by exploratory data analyses and literature review for explanatory purposes in this Info Paper only. Coastal routes with faded arrows are represented by existing flyways.