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|  <p>Agreement on the Conservation<br/>of Albatrosses and Petrels</p> | <p><b>Fourth Meeting of the Population and<br/>Conservation Status Working Group</b><br/><i>Wellington, New Zealand, 7 – 8 September 2017</i></p> <p><b>Developing methods for diet determination<br/>and monitoring within ACAP</b></p> <p><b><i>Jonathon HS Barrington, Julie C McInnes, Rachael<br/>Alderman, Richard A Phillips</i></b></p> |
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### **SUMMARY**

A systematic review of published albatross diet research papers highlights changes in methodologies and spatial and temporal coverage of monitoring efforts. Studies have shifted away from morphological examination of prey species, to a preference for stable isotopic examination of tissue, with a diminution in availability of detailed taxonomic information about prey species. This hinders the ability to detect changes in prey species, with implications for management of threatened albatrosses and for monitoring broader changes in marine ecosystems including climate change. A number of recommendations and actions were identified in the review. These recommendations and actions are set out in this paper for the consideration of PaCSWG.

### **RECOMMENDATION**

That PaCSWG consider the recommendations and actions for ongoing albatross dietary monitoring arising from the review of published albatross diet research papers.

## **Desarrollo de métodos para determinar y supervisar dietas dentro del ACAP**

### **RESUMEN**

Una revisión sistemática de documentos de investigación publicados sobre las dietas de los albatros destaca cambios de metodologías y cobertura espacial y temporal de esfuerzos de supervisión. Los estudios se han apartado del examen morfológico de especies presa y se inclinan más por un examen isotópico estable de tejido, con una disminución en la disponibilidad de información taxonómica detallada sobre las especies presa. Esto obstaculiza la capacidad de detectar cambios en especies presa y tiene implicaciones en la ordenación de albatros amenazados y en la supervisión de cambios más amplios en ecosistemas marinos, lo que incluye el cambio climático. En la revisión, se identificó una serie de recomendaciones y medidas. Esas recomendaciones y medidas se presentan en este documento para la consideración del GdTPEC.

### **RECOMENDACIÓN**

Que el GdTPEC considere las recomendaciones y las medidas relativas a la actual supervisión dietaria de los albatros que surgieron de la revisión de documentos de investigación publicados sobre las dietas de los albatros.

## **Élaboration de méthodes pour la détermination et le suivi de l'alimentation au sein de l'ACAP**

### **RÉSUMÉ**

Un examen systématique des documents de recherche publiés sur l'alimentation des albatros met en évidence les changements dans les méthodologies et la couverture spatiale et temporelle des efforts de surveillance. Des études ont évolué loin de l'examen morphologique des espèces proies, vers une préférence pour un examen isotopique stable de tissu, avec une diminution de la disponibilité des informations détaillées sur la taxonomie des espèces proies. Cela entrave la capacité à détecter des changements dans les espèces proies, avec des implications pour la gestion des albatros menacés et à surveiller les changements plus larges dans les écosystèmes marins, y compris le changement climatique. Un certain nombre de recommandations et d'actions ont été identifiées par l'examen. Ces recommandations et ces actions sont énoncées dans le présent document pour examen par le groupe de travail.

### **RECOMMANDATION**

Que le GTSPC prenne en considération les recommandations et les actions pour la surveillance de l'alimentation des albatros en cours découlant de l'examen des documents de recherche publiés sur l'alimentation des albatros.

## 1. REVIEW OF METHODS USED TO ANALYSE ALBATROSS DIETS

A systematic review of methods used to analyse albatross diets has been undertaken (**PaCSWG Inf 13**). This review found there was a shift away from morphological examination of prey species, with an increasing preference for stable isotopic examination of tissue. This shift has resulted in a progressive diminution in availability of detailed taxonomic information about prey species. This difference in resolution hinders the ability to detect changes in prey species, with implications for management of threatened albatrosses and for monitoring broader changes in marine ecosystems. The review also highlighted the low number of long-term diet monitoring studies, which will make it difficult to assess the impacts of climate change on prey resources. Maintaining and augmenting long-term research programs will enable analyses of the impacts of changing climate and fishing practices on seabird populations and facilitate the timely identification and implementation of management options.

The review identifies a number of recommendations and actions for ongoing albatross monitoring (see below). Proposed actions directly relevant to ACAP concerning knowledge gaps and detecting change are:

1. ACAP/Birdlife International to facilitate the prioritisation of species and IBS [Important Breeding Sites] to investigate diet. Potentially use tracking databases and existing stable isotope and prey data to determine monitoring priorities.
2. Work with organisations such as ACAP to encourage signatories to improve diet monitoring.

The other recommendations and proposed actions would also be relevant to consideration by ACAP of approaches for ongoing albatross dietary monitoring.

**Table 1.** Summary of key findings, recommendations and actions for ongoing albatross dietary monitoring.

| Key findings   | Recommendation   | Proposed action  |
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| <p><b>Knowledge gaps</b></p> <p>Significant gaps in prey information exist for: Amsterdam, Chatham, Salvin's, and white-capped albatross, with limited information for Tristan and short-tailed albatross.</p> <p>Prey information mostly restricted to chick rearing.</p> <p>Reduction in resolution of information on prey items consumed due to changes in methodology.</p> | <p>Prioritise filling the gaps for the species and sites where such information is needed to make a difference to conservation and management.</p> <p>Increase monitoring to incorporate other stages of the breeding and non-breeding seasons. This may potentially be facilitated by a combination of SIA [stable isotope analysis] and the utilisation of new techniques such as DNA dietary analysis.</p> <p>Continue to progress the application of DNA and other forensic dietary analyses for</p> | <p>ACAP/Birdlife International to facilitate the prioritisation of species and IBS [Important Breeding Sites] to investigate diet. Potentially use tracking databases and existing stable isotope and prey data to determine monitoring priorities.</p> <p>Incorporate appropriate dietary studies as an integral component of species recovery and management plans.</p> <p>Elevate the importance of dietary studies in long term monitoring plans to link</p> |

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|  | <p>albatross. DNA analysis may allow some of these gaps to be filled as it is logistically straightforward to collect and provides detailed prey information.</p> <p>Resume collection of prey information either using morphological examination of hard parts or DNA dietary techniques, to complement SIA.</p>  | <p>observed demographic parameters to ecological drivers.</p> <p>Undertake trials to check the feasibility of DNA and other forensic methods for albatross.</p>  |
| <p><b>Detecting change</b></p> <p>Difficulty in detecting change due to limited long-term data collection.</p> | <p>Maintain long-term research at key sites to enable robust longitudinal diet assessment and maximise the outputs from past investment in such studies.</p> <p>Compile diet data including prey and SIA at a centralised location to enable detection of changes over time.</p> <p>To achieve consistency in data collection, adopt standardised methods of collecting and reporting dietary data that enables comparisons over time. These should likely be based on existing protocols such as the CCAMLR Ecosystem Monitoring Program Standard Method.<sup>1</sup></p> | <p>Use the key dietary monitoring sites<sup>2</sup> as a basis for an implementation plan to enable longer time-series data to be collected.</p> <p>Develop a centralised top-predator database of diet information to facilitate quantification of changes in prey over temporal and spatial scales. Such a database could include similar information from other marine predators to allow evaluation of impacts of climate and fisheries changes at an ecosystem level. Coordination with EGBAMM [Expert Group on Birds and Marine Mammals] within SCAR [Scientific Committee on Antarctic Research] who have begun a similar database for SI data [stable isotope data].</p> <p>Work with organisations such as ACAP to encourage signatories to improve diet monitoring.</p> <p>Repeat SIA studies at the same sites to identify any major shifts in prey or habitat use.</p> |

Source: Table 5 in PaCSWG4 Inf 13.

<sup>1</sup> SC-CCAMLR, CCAMLR ecosystem monitoring program: Standard methods for monitoring studies (CCAMLR, Hobart, 1997).

<sup>2</sup> The review identifies 16 key monitoring sites (see PaCSWG Inf 13, table 3).

## **2. ACTION BY PaCSWG**

PaCSWG is invited to consider the recommendations and actions for ongoing albatross dietary monitoring arising from the review of published albatross diet research papers.