Agreement on the Conservation of Albatrosses and Petrels

Twelfth Meeting of the Advisory Committee

Virtual meeting, 31 August – 2 September 2021 (UTC+10)

Small Grants and Secondment Programmes supported by the Advisory Committee

Secretariat

1. SMALL GRANTS PROJECTS SUPPORTED IN THE 2020 FUNDING ROUND

The 2020 Small Grants Programme applications opened on 4 September 2020, with deadline for proposal submission on 30 October 2020. 21 applications from 10 Parties requesting a total of AUD 405,307 were received by the Secretariat. Nine projects were granted a total of AUD 137,842 in February 2021. A summary of the projects supported is provided below.

ACAP 2020-01: ***An Electronic Monitoring system to assess the operational performance and compliance of use of the Underwater Baitsetter***

Project Leader: *Kieran Lawton, Managing Director, Skadia Technologies, Australia*

Co-investigators: *Graham Robertson, Scientific Adviser to Skadia Technologies and member of the ACAP Seabird Bycatch Working Group (ACAP SBWG); Di Brooks, owner of the FV Brid Voyager; Oliver Wilson, Manager, Fisheries Inshore New Zealand (FINZ); Janice Molloy, Convenor, Southern Seabird Solutions (SSS); Chris Rodley, CEO, SnapIT Marine, NZ; Igor Debski, Principal Science Adviser Marine, Department of Conservation, NZ (DOC)*

FUNDS GRANTED: AUD 11,000

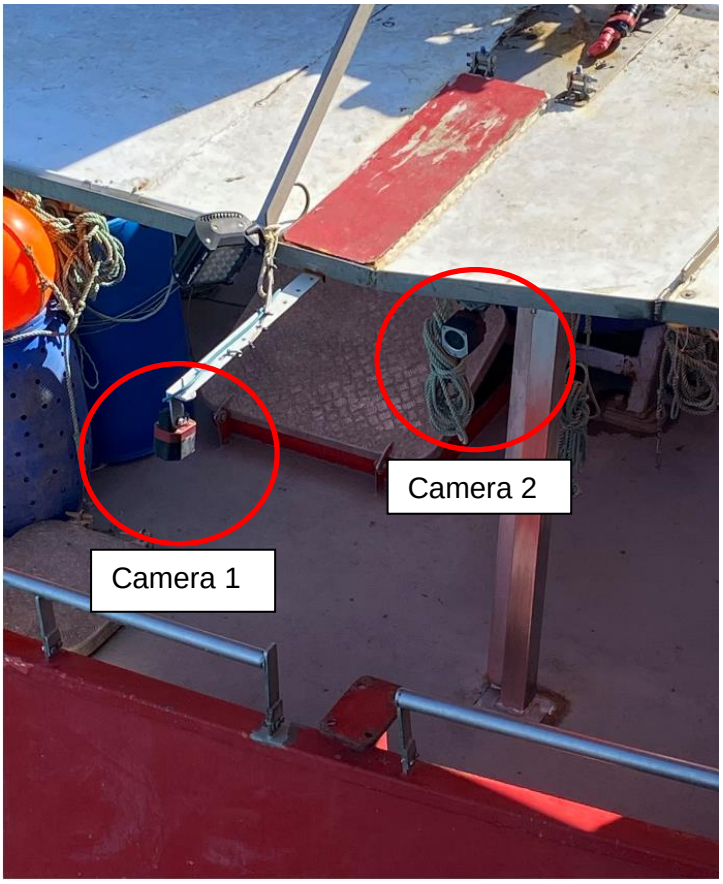
The underwater baitsetter (UBS) is an emerging technology designed to eliminate seabird bycatch in pelagic longlining. The UBS has been in development and testing for several years and in the last few years has cleared the technical challenges to achieve underwater setting at the pace and reliability required for commercial implementation. Its effectiveness in reducing seabird bycatch has also been demonstrated and the results published in peer reviewed journals.

We are now at the early commercialisation stage, and have a pilot study underway in the New Zealand domestic longline fishery. The Phase 1 trial, completed in December 2019, involved fishing for 6 weeks on a commercial vessel, the FV *Brid Voyager*, with a specialist UBS technician on-board throughout the Phase to oversee the trial and educate the crew.

The Phase 2 trial will involve commercial fishing on the same vessel for 5 months between March and August 2021, during which time the operational performance of the UBS will be tested under a wide variety of sea states and operational conditions. The crew will be trained in UBS operations before commencement of the trial. Data on the operational performance and functionality of the UBS will be collected for all sets in the trial, principally by video monitoring with additional data collected by on-board observers. The purpose of the cameras is also to assess the practicality of the camera system as a compliance monitoring tool for use on UBS-equipped vessels in the future.

Summary of activities/outcomes:

The EM system has been installed on the Brid Voyager and tested, and was delivered on budget ($11,000). The image below shows the two cameras in position above the stern of the vessel. Camera 1 is the wide-angle camera looking down across the stern to record UBS use and bait loading. Camera 2 has the longer lens and is looking along the mainline, primarily to record the potential 'tight-snood' error. Note that the UBS is not installed in this image. When installed the UBS sits directly under Camera 1.



Arrangements for data analysis have been put in place. Data is stored on the vessel during video capture, and will be collected on a hard drive each time the vessel returns to port. SnapIT Marine will then upload the data to an engagement platform hosted on Amazon Web Services.

In response to a request by the owner of the Brid Voyager, and the skipper, Phase 2 of the New Zealand pilot has been postponed until the next time the Brid Voyager goes surface longlining for Swordfish, likely later in 2021 or early 2022.

ACAP 2020-03: ***Pilot study: Non-invasive disease monitoring of Albatrosses and Petrels***

Project Leader: *Dr Meagan Dewar, Australia*

Co-investigators: *Dr Tom Hart, Oxford University; Dr Richard Phillips, British Antarctic Survey; Dr Patricia Pereira Serafini, Instituto Chico Mendes de Conservação da Biodiversidade, Brazil*

FUNDS GRANTED: AUD 25,100

Although disease is known to be a key threat to wildlife populations, including several species listed by ACAP, most research and monitoring is after the event, and focuses on outbreaks or establishment of pathogens within affected populations. Relatively little emphasis is placed on screening for disease prior to an outbreak or predicting those pathogens that are likely to become an issue.

We intend to test methods for disease screening (that can also be used for diet) on Wandering, Black-Browed, Amsterdam albatrosses, yellow-nosed albatrosses along with Northern Giant Petrel, Southern Giant Petrel and White-Chinned Petrels so that we can hand a protocol to ACAP for non-invasive sampling and monitoring.

This proof of concept study aims to demonstrate the capacity of field-based sequencing devices and genomic sequencing as real time disease surveillance/diagnostic tools in the Southern Ocean for ACAP species and to establish field based protocols and surveillance network for field-based disease surveillance.

Objectives:

1. To develop the framework for a combined screening programme involving sequencing to test for pathogens, including emerging diseases, within albatross and petrel populations and in potential vector species (e.g. skuas and giant petrels).
2. To establish a citizen science or stakeholder network, and protocols to allow regular sampling of key seabird populations.
3. To host an online workshop to determine the most effective management strategies with key governments and stakeholders (such as gateway ports, the International Association of Antarctica Tour Operators [IAATO] and ACAP parties, and to refine disease and biosecurity protocols.

Summary of activities/outcomes:

Unfortunately due to a number of unforeseen lockdowns in Melbourne and restrictions on accessing on campus research facilities and the impact of COVID on Antarctic scientific expeditions and shipment of samples from countries such as Brazil our work on this project has been delayed. Our team at BAS will be heading to the Southern Ocean during the 2021/22 season to collect samples and we are working on shipment plans for our samples from Brazil.

ACAP 2020-09: ***Winter fine-scale movements of black-browed albatrosses and encounters with fishing vessels***

Project Leader: *Dr Alastair Baylis, South Atlantic Environmental Research Institute*

Co-investigators: *Dr Rachael Orben, Oregon State University, USA*

FUNDS GRANTED: AUD 12,600

Over ¾ of the global population of black-browed albatross breed in the South Atlantic. Hence, the South Atlantic is of global importance to the population trends and conservation status of the species. Yet, very little is known about the fine-scale winter movements of individual black-browed albatross, including overlap with commercial fisheries. This is because the majority of research has been conducted during summer months or winter movements have been tracked using geolocator tags, which are associated with large location errors that are not well suited to deciphering fine-scale movements. A better understanding of where birds forage in winter and the degree they are reliant on fisheries discards, and basic demographics (proportion of males and females), will offer new insights into the ecology of the species and threats to population persistence.

This project addresses these basic knowledge gaps in the winter foraging ecology of black-browed albatross. In July 2018 & 2019, we observed individual birds consistently attending their breeding colony, an unusual behavior for albatross. This unique behavior offers the ability to study the fine-scale movements of individuals during the winter and overlap with fisheries.

Using archival igotU GPS tags, we will track the fine-scale movements of individual black-browed albatross (n = 45) during their winter central-place foraging trips. Black-browed albatross that are sitting on a nest will be approached and captured by hand. Tags will be deployed in July. Once recovered, location data from tags will be downloaded. This data will allow us to characterize foraging trips and identify wintertime foraging areas and habitats, for example, by calculating time spent in an area. Using the Global Fishing Watch dataset (https://globalfishingwatch.org/, AIS data from fishing vessels), we can then quantify individual overlap with fishing vessels on a daily temporal scale. If substantial overlap is observed this analysis can be extended to quantify individual encounter and interaction rates with fishing boats along with the identity of each boat. Simultaneously, we will use photographs (Reconyx cameras) to monitor the overall colony attendance.

By addressing drivers in vessel attendance from the perspective of the albatross, additional solutions to reduce vessel attendance may be apparent.

ACAP 2020-11: ***Effects of delayed mouse eradication on conservation status and population viability of Tristan Albatross on Gough Island***

Project Leader: *Dr. Steffen Oppel, Royal Society for the Protection of Birds*

Co-investigators: *Dr. Bethany Clark, BirdLife International; Prof. Peter Ryan, FitzPatrick Institute of African Ornithology*

FUNDS GRANTED: AUD 23,400

The critically endangered Tristan Albatross breeds almost exclusively on Gough Island, where invasive mice routinely prey on chicks and reduce breeding success to an average of ~30%, which is much lower than for other large albatrosses on predator-free islands (Caravaggi et al. 2018). The species is also subject to bycatch mortality in longline fisheries, and the last population assessment (in 2007) predicted that extinction might occur within 30 years (Wanless et al. 2009). Since this last population assessment, mice have started to attack adult breeding birds (Jones et al. 2019), while bycatch mitigation measures at sea may have reduced mortality (da Rocha et al. 2021), hence a re-assessment of the population status of Tristan Albatrosses is urgently needed.

In 2020, an eradication was scheduled to remove invasive mice from Gough to improve the breeding success of the Tristan Albatross population. Due to COVID-19 induced travel restrictions, the operation had to be postponed to 2021, but persisting uncertainty about travel regulations could potentially lead to further postponements. There is no information to judge how much the Tristan Albatross population will be affected by postponements of the mouse eradication on Gough, because the status of the population was last assessed in 2007 (Wanless et al. 2009).

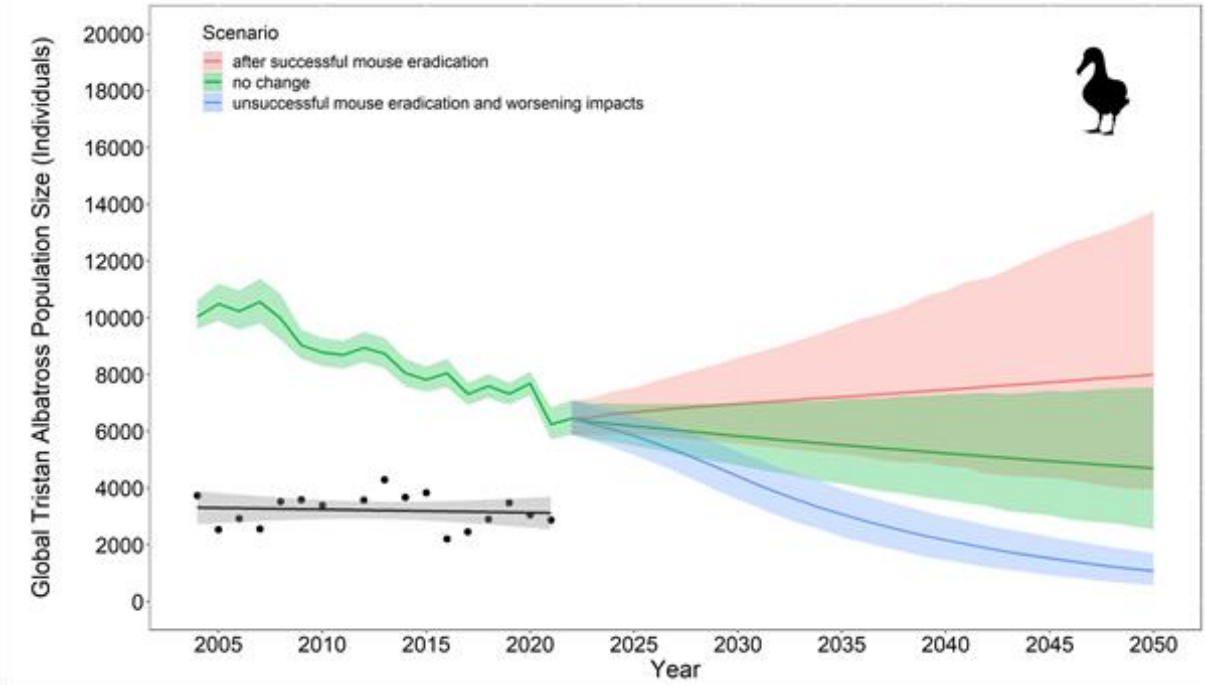
We propose to construct a population model to estimate past and quantitatively predict future population size and trajectory under various scenarios to demonstrate the consequences of postponing or cancelling the mouse eradication on Gough for the Tristan Albatross population.

Summary of activities/outcomes: completed

The analyses show that the adult breeding population of Tristan Albatrosses had remained stable, but that due to low productivity (0.31 fledglings/pair) the total population (including unobservable immature birds) had declined from ~10,000 to ~6,250 birds between 2004 and 2021. At the same time, the mean age of first return to the island decreased from 14 to 7 years of age, and this earlier return of young birds likely masked the decline of the population.

In April 2021, the first adult breeding Tristan Albatross was killed by house mouse attacks. We therefore explored future population trajectories if adult survival gradually decreased due to intensifying mouse predation.

We predict that a successful eradication leading to a two-fold increase in breeding success would result in a ~7 times higher albatross population in 2050 than without this intervention and a progressively increasing mouse impact. However, population recovery is surrounded by large uncertainty, and expected to take decades: even with a successful eradication, fewer Tristan Albatrosses would exist in 2050 (~8050) than there had been in 2004. An improvement of juvenile survival at sea is the most likely pathway to speed up recovery after a successful mouse eradication.



Observed and estimated population size of Tristan Albatross on Gough Island between 2004 and 2050. Black points indicate the number of observed adult breeding individuals, while the green line presents the total population size including unobservable immature birds at sea. Three scenarios for future population trajectory were considered, after a successful mouse eradication (red), without an eradication and either persistent chick predation (green) or increasing predation of both chicks and adults (blue).

The mouse eradication on Gough island was completed on 1 August 2021. The delay of one year from the planned operation date in 2020 to 2021 due to COVID-19 travel restrictions is therefore unlikely to have materially affected the Tristan Albatross population.

ACAP 2020-15: ***Estimating interactions with fishing vessels and their demographic impact on sooty albatrosses***

Project Leader: *Christophe Barbraud, Centre d'Études Biologiques de Chizé (CEBC-CNRS UMR7372 – La Rochelle University), France*

Co-investigators: *Karine Delord, Henri Weimerskirch Centre d'Études Biologiques de Chizé (CEBC-CNRS UMR7372 – La Rochelle University), France*

FUNDS GRANTED: AUD 11,500

The sooty albatross qualifies as Endangered owing to a very rapid decline over three generations. The main suspected cause of decline is bycatch in longline fisheries. The risk of bycatch is low in French Southern EEZ, where there is 100% control on legal fisheries. However, this risk is serious in international waters and for unregulated and illegal long-line fisheries.

To address this problem, the project will focus on a declining population of sooty albatrosses breeding in the Crozet archipelago (c.16% of the world population; Possession Island), French Southern Territories, southern Indian Ocean. This population has been monitored

annually using capture-mark-recapture studies and population surveys every year since 1969. It has suffered a 74.7% decline between 1980 and 2017.

The first objective of this proposal is to obtain AIS data in order to be able to provide an estimate of the proportion of vessels illegally deactivating their Automatic Identification Systems (AIS), by comparing the data made available by AIS to those provided by the birdborne radar detectors. The goal of this proposal is to complement the objectives of the related BEST 2.0+ proposal which are to: 1) obtain accurate information (occurrence and location) on interactions between fisheries and sooty albatrosses, by using loggers detecting and locating presence of vessels; 2) estimate the proportion of birds attending fishing boats after co-occurrence; 3) provide an estimate of the proportion of vessels illegally deactivating their Automatic Identification Systems (AIS), by comparing the data made available by AIS to those provided by the bird-borne radar detectors; and 4) assess the demographic and population impact of interactions with fishing vessels, by combining information on interactions, demographic data and bycatch rates in population models, while accounting for climate variability and change.

The second objective will be to use this information within the discussions of international agreements (CCAMLR, ACAP) or RFMOs (CTOI, CCSBT, ICCAT, SIOFA, SWIOFC), to promote the development, adoption and/or application of bycatch mitigation measures in identified risk areas for sooty albatrosses.

We will deploy XGPS loggers on 20 breeding sooty albatrosses on Possession Island during the incubation and early chick rearing period. XGPS loggers are equipped with radar detectors and record GPS positions of the birds at fine spatio-temporal scale. AIS signals of fishing vessels encountered by birds while at sea are made available independently.

Fishing vessel information and AIS data will be made available through the Themis interface (Collecte Localisation Satellites Toulouse) for the sector 20 to 60°S, 10 to 140°E, which is used by breeding sooty albatrosses from Possession Island during their foraging trips.

Summary of activities/outcomes:

This project has been postponed to austral summer 2022-2023 due to a delay in funding for the XGPS loggers.

ACAP 2020-16: ***Generating LiDAR spatial data to improve the population estimate of Pink-footed Shearwaters on Isla Mocha, Chile***

Project Leader: *Ryan Carle, Oikonos Ecosystem Knowledge, USA*

Co-investigators: *Verónica López, Oikonos; Tyler Clark, University of Montana; Peter Hodum & Tiare Varela, Oikonos*

FUNDS GRANTED: AUD 8,000

Pink-footed shearwaters are listed under Annex 1 of ACAP, and as Endangered in Chile and Canada, due to a small population size and multiple threats at-sea and on breeding colonies. However, conservation planning for this high priority species is hampered at all levels, from local to international, by lack of a robust breeding population for the species. Worldwide, pink-footed shearwaters nest only on the Juan Fernández Archipelago and Isla Mocha, both in Chile. Isla Mocha likely contains 70-90% of the world breeding population (Oikonos

unpublished data). However, to date, no reliable population estimate of pink-footed shearwaters on Isla Mocha exists. We propose to improve an existing census of the pink-footed shearwater population on Isla Mocha by using LiDAR to create a higher resolution habitat model than currently exists, allowing for more accurate identification of relationships between shearwater burrow density and habitat parameters, and identification of suitable habitat.

Isla Mocha is relatively large (47.82 km2), rugged, and densely forested, so it is impossible to directly count all of its shearwater burrows. Estimating the shearwater population is reliant on applying measurements of burrow density to habitat parameters, then modelling burrow density across the island based on habitat characteristics, as has been done for seabirds in many locations. On Isla Mocha this method is limited by the lack of high resolution topographical data to create a habitat model for the island. The best current satellite-based digital elevation models (DEMs) for Isla Mocha are at 30x30m resolution. In Isla Mocha's steep, rugged terrain, topography change dramatically over a 30x30m area. The imprecision of the existing DEMs results in weak predictive power and potentially misleading results in models relating shearwater burrow density to habitat parameters.

LiDAR collect dense and accurate elevation data across landscapes, using laser pulses to measure topography at the scale of <1m (often centimetres). Lidar is well-suited for heavily forested landscapes such as Isla Mocha because it can accurately measure ground-elevation through small canopy gaps, unlike other techniques (NOAA 2012). Lidar provides high resolution elevation and slope data, as well as canopy height, which can be used as another predictive variable to strengthen our shearwater density model.

Our objectives are to:

1. Conduct plane-based LiDAR aerial surveys to generate high resolution habitat data (specifically slope, elevation, and canopy height) for Isla Mocha

2. Apply the Lidar-derived habitat data to our current model to generate a more rigorous population estimate for pink-footed shearwaters on Isla Mocha.

ACAP 2020-18: ***Integrating an onboard observer program and remote tracking data to evaluate the interactions between the small-scale longline fisheries and adult Chatham albatrosses in their wintering grounds off Peru.***

Project Leader: *Carlos Zavalaga, PhD. Unidad de Investigación de Ecosistemas Marinos-Grupo Aves Marinas. Universidad Científica del Sur, Peru*

Co-investigators: *Javier Quiñones, PhD. & Maria Andrea Meza Torres, BSc. & Cynthia Romero Moreno, BSc. Oficina de Investigaciones en Depredadores Superiores, Instituto del Mar del Perú.*

FUNDS GRANTED: AUD 19,430

The Chatham albatross (*Thalassarche eremita*) is one the world´s critically endangered albatrosses, categorized as Vulnerable by the IUCN. Its breeding population is estimated ca. 5,245 pairs (Fraser et al. 2011). Nesting occurs only on Pyramid Is, a 1.7 ha stack in the Chatham Islands, NZ, with a well-known non-breeding dispersion to the Eastern Pacific, off

the coasts of Chile and Perú (Haase 1994, Spears et al. 2003 Latham et al. 2004, Quiñones et al. In Press). The total number of albatross caught annually by the Peruvian small-scale longline fishery is likely 5-13% of the pooled population of Waved (*P. irrorata*) and Chatham albatrosses that forage off the coast of Peru (Jahncke et al. 2001). Most of the identified albatross bycatch reports or overlapping areas is associated with the commercial longline fisheries for tuna (Alderman et al. 2011) in northern most area of its distribution. However, a greater understanding of the artisanal, small-scale fishing operations in Peru and its impact on incidental capture of Chatham albatrosses is urgently needed, since almost nothing is known regarding their interactions with small scale fisheries in their core of their wintering distribution in southern Peru. Pin-point locations of Chatham albatrosses in Peru have been determined with PTT satellite transmitters (Robertson and Nicholls in Birdlife 2004) or GLS (Deppe 2012), but a more detailed, fine-scale data of movements and habitat use in relation to longline fishing operations are needed to offer insights into priority areas for Chatham albatross bycatch mitigation measurements.

We will examine the overlap extent between the distribution of wintering adult Chatham albatrosses and the small-scale longline fishery areas in southern Peru by using GPS/Argos transmitters in albatrosses, and by incorporating data of an ongoing on-board observer program of the small-scale longline fisheries in southern Peru. Our objectives are 1) to determine the fine-scale at-sea movement patterns of the albatross during their migration in Peru, 2) to associate these movement patterns to oceanographic features, 3) to determine the extent of fishing areas of small-scale longline vessels, and 4) to create maps of overlapping areas between albatrosses and artisanal longline fisheries.

The study will be undertaken in waters offshore the port of Ilo (17.64o S), southern Peru, between May and August 2021. 6 GPS/Argos satellite transmitters (Technosmart, Italy) will be used. The Instituto del Mar del Perú (IMARPE), the research institution collaborating in this study, is currently evaluating the activities of longline fishing vessels of the port of Ilo. Onboard observers will use GPS dataloggers (Gipsy 5 Technosmart) to track the path and activities of the boat. Likewise, other set of fishing vessels without an observer will be instrumented with GPS dataloggers to track their movements and activities. During the 4-month study period, it is expected to collect boat tracking information from at least 50 trips.

Summary of activities/outcomes:

See **PaCSWG6 Inf 21** for preliminary information on the implementation of the project.

ACAP 2020-19: ***Sub-lethal effects of plastic ingestion in albatrosses and petrels: the Southern Giant Petrel as case study.***

Project Leader: *Luciana Gallo, Instituto de Biología de Organismos Marinos (IBIOMAR-CONICET), Argentina & Marcela Uhart, Karen C. Drayer Wildlife Health Center, University of California, Davis, USA*

Co-investigators: *Flavio Quintana, Instituto de Biología de Organismos Marinos (IBIOMAR-CONICET) & Andres Attademo, Universidad Nacional del Litoral (UNL), Argentina*

FUNDS GRANTED: AUD 18,500

The enormous amount of anthropogenic marine debris circulating in the world's oceans and the growing evidence of intentional or incidental ingestion by seabirds have highlighted the need for further investigation. Procellariiformes are particularly susceptible to plastic ingestion, since they feed preferably on small prey on the waters' surface, where plastics tend to float and accumulate.

Current knowledge on the negative effects of plastic debris on wildlife is largely based on consequences that are readily observed, such as entanglement, obstruction of the gut or starvation. Many of these interactions also include less visible and therefore poorly documented sublethal effects. Consequently, the true impact on wildlife health is likely underestimated. For example, the accumulation of plastic additives (e.g. plasticizers and flame retardants) has been documented in marine fauna, but their effects remain poorly understood. These compounds can induce a broad variety of chronic and sub-lethal effects, such as endocrine disfunction, neurotoxicity, hepatic stress, metabolic disorders, altered antioxidative system, among others. However, this knowledge originates largely from experimental lab studies on marine invertebrates, and very few studies were performed in free-ranging marine vertebrates.

In the last two decades, several ecotoxicological studies have used biomarkers to evaluate the sub-lethal effects of chemical pollutants such as heavy metals and persistent organic compounds. These biomarkers can be early indicators of disturbance, as well as predictive of possible perturbations and trends at the population level.

A number of studies have reported the occurrence of plastics in stomach content of albatrosses and petrels in the Southwest Atlantic. However, studies on chronic and sub-lethal effects of plastic consumption are lacking. With the support of ACAP (Project No: 2018-02) between 2018-2020 we assessed the magnitude of plastic exposure (macro and microplastics) in ACAP species incidentally caught by fisheries and in beached dead birds off the shores of Argentina and Brazil.

In this project we propose to complement our ongoing studies and increase current knowledge on the sub-lethal effects of plastic ingestion in Procellariforms, using the Southern Giant Petrel (SGP, *Macronectes giganteus*) as a model. This species plays a key role in the Southern Ocean ecosystem as a scavenger and top predator, and is one of the seabird species that shows highest plastic ingestion in the region.

We will evaluate the usefulness of selected biomarkers of toxicity and health status to assess sub-lethal effects of plastic ingestion in SGP chicks. For this, we will: a) asses plastic ingestion (items >1mm) by chicks through the collection of voluntary regurgitates and boluses; b) measure selected biomarkers of toxicity and health status in chick blood samples; c) measure morphometrical parameters related to body condition of chicks; d) evaluate the relationship between plastic ingestion (presence, number of pieces, plastic mass) and selected parameters.

Fieldwork will be conducted between February and April 2021 and the same months in 2022. This covers the last three months of the chick rearing period at Gran Robredo island (45° 08' S, 66° 03' W), Argentina.

ACAP 2020-20: ***Developing an epigenetic DNA ageing method for petrels (family: Procellariidae).***

Project Leader: *Lauren Roman, Institute for Marine and Antarctic Studies, University of Tasmania, Australia*

Co-investigators: *Nicholas Carlile, Ecosystems & Threatened Species, Department of Planning, Industry and Environment; Dr Chris Wilcox, Dr Britta Denise Hardesty, Dr. Piers Dunstan, CSIRO Oceans and Atmosphere, Australia*

FUNDS GRANTED: AUD 8,312

Understanding the age structure of populations is a key aspect of animal ecology and conservation. Age estimate information can help to determine animal mortality, susceptibility to parasites, reproductive life history and the impact of anthropogenic activities. However, measuring the chronological age of many wild animals is a difficult task due to the lack of external changes that reflect age. Such is the case for seabirds, for which the age can no longer be determined once the bird moults into its adult plumage.

Currently, the demographic study of seabirds requires long-term (multi-decadal) studies of breeding colonies combined with high rates of coverage of chick banding/ringing. This method is labour intensive, expensive, and vulnerable to gaps in data records due to the changing availability of skilled personnel and funding situations. However, with the advancement of new DNA technologies, reliance on decadal banding study to investigate population demographics and apply this knowledge to solving ecological and conservation problems may become a challenge of the past. Here we present an opportunity to develop the DNA technology, which, when fully complete, enables researchers to conduct demographic seabird research on any petrel species at any location.

Molecular biomarkers of age have recently been the focus of an increasing number of studies. Epigenetic modification controlling changes in gene expression that occur during animal ageing. Epigenetic regulation of gene expression can occur at several different levels and can include histone modification, non-coding RNA (ncRNA) and DNA methylation (DNAm). DNAm, the addition of a methyl group to a cytosine followed by a guanine (CpG site), has been examined in the most detail, and recent evidence supports the use of this epigenetic modification for individual age determination.

Last year, the first study was published (De Paoli-Iseppi et al., 2019) using age-related DNAm to estimate the age of short-tailed shearwaters, *Ardenna tenuirostris*. Presently, this method is new and expensive, and currently out of the reach of the resources available to most ecologists and wildlife biologists. To promote access to this emerging technology, CSIRO's Dr. Ben Mayne is currently working on a method to reduce the cost of conducting this DNA ageing technique.

So far, this epigenetic DNA age estimation method can only be used for short-tailed shearwaters. Our goal is to develop a set of age-related markers that are common to petrels generally (family Procellariidae), ultimately establishing a barometer against which the age of any petrel can be estimated with a DNA sample. To do this, we need to collect DNA from a petrel species that is more distantly related in the tree of evolution to *Ardenna* shearwaters, and for which a colony with a spread of known-aged individuals can be sampled.

Australian Gould's petrels, *Pterodroma leucoptera*, nest principally within two steep gullies on the western side of Cabbage Tree Island (32°41′18″S, 152°13′28″E), New South Wales, Australia. Gould's petrels on Cabbage Tree Island have been routinely banded since 1992, and the population currently produces about 300 chicks annually. Cabbage Tree Island provides a relatively accessible population of a Pterodroma petrel with individuals available in an age range spanning 0-29 years. We propose to visit Cabbage Tree Island in December 2021 to collect DNA from known-aged Gould's petrels. Age-related DNAm sites can then be compared with short-tailed shearwaters, and a set of age-related markers for petrels can be developed.

2. 2020 SECONDMENTS PROGRAMME

In light of the challenges and limitations associated with the COVID-19 pandemic, the Advisory Committee endorsed intersessionally (ACAP - AC Circular 2020-01) a proposal to expand the criteria for the Agreement's 2020 Secondments Programme to include some additional capacity building activities as follows:

1. The work to be undertaken addresses a task or tasks identified in the Advisory Committee's or Secretariat's Work Programme, and/or is deemed to be of high importance to achievement of the Agreement's objective.
2. The work proposed is international in nature (i.e. the outcomes will be of relevance to more than one country). However, this does not preclude secondments to a host institution within the applicant's country of residence, provided the international relevance of the capacity building is clear.
3. The funds allocated will not be used for the purpose of paying applicants' salaries. It is expected that the applicant's institution will continue to pay the applicant's salary. However, funds may be used to contract a suitable professional to develop/present a training webinar or online workshop.
4. The task to be undertaken has a capacity building focus.
5. The funds allocated will generally be used for travel, accommodation and per diem costs, but can also be used for online training activities including one-on-one mentoring, enrolment in a training course from a reputable educational institution, organisation of webinars/online workshops, and other relevant activities which enhance ACAP capacity.
6. The applicant has received in-principle agreement from the host or collaborating institution to participate in this work.

The 2020 Secondments Programme applications opened on 17 November 2020, with deadline for proposal submission on 2 February 2021. No applications were received.

The amended criteria are to be reviewed prior to the next call for secondment applications.

3. PROGRESS AND OUTCOMES OF SMALL GRANTS PROJECTS SUPPORTED IN THE 2019 FUNDING ROUND

The 2019 Small Grants Programme applications opened on 30 August 2019, with deadline for proposal submission on 25 October 2019. 15 applications from seven Parties requesting a total of AUD 347,263 were received by the Secretariat. Seven projects were granted a total of AUD 134,296 in February 2020. A summary of the projects supported, activities undertaken, and outcomes achieved is provided below.

ACAP 2019-01: ***Estimating encounter with fisheries and mortality risks of juvenile wandering and Amsterdam Albatrosses.***

Project Leader: *Henri Weimerskirch, CEBC CNRS, France*

FUNDS GRANTED: AUD 10,000

Today the basic knowledge about the distribution of fishing boats is fundamental for the regulation of fishing activities as well for the conservation of the oceans (Lewison et al., 2004a). Yet information about fishing location is very difficult to obtain. It is eventually made available to authorities or international agreements through voluntary declaration using Vessel Monitoring Systems (VMS) or indirectly through the use of Automatic Identification Systems (AIS) (Kroodsma et al., 2018). The former is generally used only in EEZs, the latter is supposed to be used in EEZ, but also in international waters, to avoid collisions and may be accessed through dedicated sites (www.marinetraffic.com). However, AIS are not used systematically, and can be switched off. In international waters, information on fishing effort and distribution is not available, or made available by Regional Fisheries Management Organisations (RFMO) such as tuna fisheries, at coarse scale and in aggregated form, making it impossible to have precise live/daily information. Recent efforts have been made to visualise, track and share data about global fishing activity through the use of AIS (https://globalfishingwatch.org) (Merten et al., 2016, Dunn et al., 2018). However, this information is difficult to be made available in real time.

In the Indian Ocean, populations of large albatrosses have varying trends (Weimerskirch et al 2018). The fate of juvenile is very different between population, and no information exist on the exact degree of interaction between juveniles and fisheries, and the role of non-declared fisheries, as well as whether juveniles are attracted by vessels as soon as they leave the colony, or whether attraction build up during the dispersal phase. This information is critical to understand whether fisheries are implicated in the different fates of juveniles from the different population, and to obtain information on the occurrence of non-declared fisheries.

Recently a new logger detecting radar emissions of vessels has been developed, providing locations of interactions between albatrosses and vessels over vast oceanic sectors (Weimerskirch et al., 2017). Building on this new platform, we have developed a new platform that transmit the information through the Argos system, allowing the tracking of individuals that cannot be recovered, and the immediate transmission of vessel location for improving surveillance and enforcement (Weimerskirch et al submitted). The concept of Ocean Sentinel, funded by the European Research Council (ERC) has been tested between November 2018 and May 2019 in the Southern Indian Ocean, where valuable and extensive fisheries operate in EEZs and in oceanic waters, from Cr ozet, Kerguelen and Amsterdam Island. We obtained excellent results on adults, but on juveniles, loggers failed to transmit for

a sufficient period, due to logger problems. The loggers have been replaced by the constructer, and we plan to deploy them on juvenile wandering and Amsterdam albatross in 2019-2020. However our funding from the ERC program finished in June 2019, and we have not the funding available to cover the acquisition of AIS data and reanalysis by CLS.

Summary of activities/outcomes: completed

The aim of the project was to track simultaneously from Crozet, Kerguelen and Amsterdam juvenile wandering and Amsterdam albatrosses in order to estimate the degree of overlap by juveniles of the two species with fisheries, and how the attraction and attendance change over the dispersal phase. In addition, the program was planned to allow the estimation of the proportion of declared and non-declared encountered by comparing the AIS data and the radar detections by the loggers.

In November – December 2019 at Crozet and Kerguelen, and in January 2020 at Amsterdam a total of 45 juveniles were equipped with Centurion tags, 15 at Crozet, 20 at Kerguelen and 10 at Amsterdam. All loggers worked from the departure of birds and continued to transmit for periods 2-4 months. This duration is shorter than that expected, due to problem with the battery on the logger that failed to recharge properly. However, despite this technical production problem due to batteries failures, we obtained sufficient data to achieve our main goal to estimate the degree of overlap with fisheries.

The tracking data from the Centurion transmitters have been merged with the AIS data obtained from CLS together with environmental data.

A paper 'Ontogeny of vessel attraction, personality and conservation implications', based on the data collected with the support of the ACAP Small Grant, is presently being written, to be submitted this autumn. We found that attraction differed between species, age classes and personality. By foraging in deep oceanic waters juveniles encountered fewer vessels than adults, but also showed a lower attraction to vessels when they encountered them. Amsterdam albatrosses appeared to be less attracted by vessels at all age classes. These results have important implications for the conservation of these species.

ACAP 2019-06: ***Factores influyentes en la mortalidad de la pardela balear* Puffinus mauretanicus *por la contaminación lumínica***
Factors influencing the mortality of the Balearic shearwater* Puffinus mauretanicus *due to light pollution

Project Leader: *Airam Rodríguez Martín, IRBI, Mallorca, Islas Baleares*

Co-investigators: *David García, IRBI; José Manuel Arcos, SEO/BirdLife; Claudia Pich Esteve, IRBI.*

FUNDS GRANTED: AUD 18,000

Light pollution causes a high mortality rate in young procellariforms during their first flights from the nest to the sea. To mitigate this mortality rate, the most frequently employed actions are rescue campaigns organised by local governments or conservationist associations in which citizens are asked to rescue (or alert them about) the birds landing. These campaigns save about 90% of the collected birds, considerably reducing the mortality rate. However, these are palliative campaigns as they save birds which have already been dazzled and forced to land. Furthermore, not all of the landing birds are saved and those that die are not

usually reported by the public. This leads to significant distortion in mortality rate estimates. Lastly, the campaigns can be financially costly (approx. €92,000 spent annually in Réunion). Despite these problems, and given the predicted increase of light pollution, these campaigns are the only way to reduce mortality rates in the short-term. However, more research is required to optimise their design, but also to minimise the number of affected birds by designing less harmful lighting systems.

Although seabirds' attraction to lights is a problem that has been known about for a long time, the phenomenon is far from being fully understood.

The Balearic Shearwater *Puffinus mauretanicus* is a priority population for the ACAP and is affected by light pollution. Although its impact is not well-known as campaigns are not being conducted by the archipelago's institutions, its small population size and current steep decline mean that any source of non-natural mortality ought to be evaluated and calculated.

Objectives:

1. Analysing the spatial fall pattern of young birds in the Balearic Islands.
2. Evaluation of the impact of awareness-raising campaigns about the number of birds.
3. Estimating the impact. The proportion of young birds (fallen and found) affected by light pollution in relation to the number of chicks produced by the population will be estimated. This requires breeding success, an estimate of the breeding population and making significant efforts to ring the largest number of colonies possible in 2020.

Summary of activities/outcomes: in progress

We have collected the data from the recovery centers through COFIB, but due to the limitations of covid-19, we have not yet been able to verify each of them. Covid restrictions have also prevented us from accessing colonies and achieving objective 3. Overall results for the three objectives:

1) The black spots for groundings due to light pollution are found near the breeding colonies. Although there are slight differences between the three species of Balearic procelariforms (Balearic shearwater, Mediterranean gray shearwater and common petrel), the main black spots tend to overlap.

2) We have seen a slight increase in the number of birds rescued since 2015. This may be due to a greater rescue effort by the population as a result of the spread of the problem among the population. The effect is not detected equally for all species. While the increase in rescued individuals is clear for the paíño and for the gray shearwater, it is not so clear for the Balearic shearwater, which could be indicative of a reduction in reproductive success or what would be worse, a population decline.

3) The rescue of fledglings has not produced the recovery of ringed chicks so objective # 3 cannot be carried out. 36 chicks were ringed in five colonies. However, this indicates that there are some colonies that appear to be safe from the threat of light pollution. Nevertheless, the data collected during the project has allowed us to obtain relevant information that will undoubtedly result in the conservation of the Balearic shearwater. We have better estimated the mean fledging dates of the birds, not only for the Balearic shearwater, but also for other threatened procelariforms such as the gray shearwater and the common petrel. We have also detected a generalized decline in the weight of rescued individuals with the date of rescue. Fledging weight of individuals is an essential trait for future survival at sea and recruitment in the breeding population.

Some materials resulting from the project:

- Preliminary presentation in poster format of results at the regional ornithology congress: Rodríguez A, García G, Carrasco G, Cardona E, Capellá L, Arcos JM (2020) Light pollution: a threat to Balearic seabirds. 2nd Congrés d'Ornitologia de les Terres de Parla Catalana, Menorca, Spain. 10-12 October 2020.

- Accident maps for the three species of procelariforms of the archipelago.

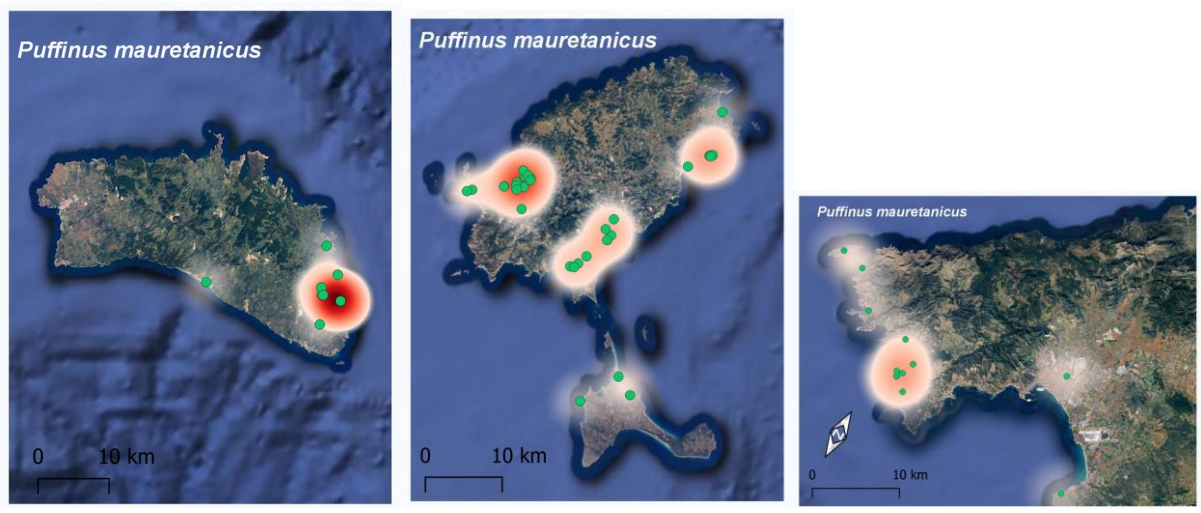
- development together with other collaborating entities of a video about environmental problems and light pollution in the Balearic Shearwater. https://www.youtube.com/watch?v=0MTCDJIe2cg

- Dissemination of the news "Help to collect young Balearic shearwaters dazzled by streetlights" by the EfeVerde News agency

- Dissemination of articles in the Diario de Ibiza and the Diario de Mallorca (regional newspapers) to request citizen collaboration in the rescue of young Balearic shearwaters.

https://www.diariodeibiza.es/pitiuses-balears/2020/07/08/piden-ayuda-recoger-juveniles-virot-31255901.html

https://www.diariodemallorca.es/mallorca/2020/07/09/piden-ayuda-recoger-juveniles-pardela-8006375.html



Grounding sites for Balearic shearwaters *Puffinus mauretanicus* on islands of (L to R) Menorca, Ibiza, and part of Mallorca with greatest number of birds affected. The intensity of colour in heat maps is positively related to the higher density of rescues (the more intense the colour, the higher the density).

ACAP 2019-08: ***Development of a bird-scaring line compliance monitoring device***

Project Leader: *Andrea Angel, Birdlife South Africa*

Co-investigators: *Victor Ncongo, Imvelo Blue Environment Consultancy; Dr Nelson Miranda, independent engineer.*

FUNDS GRANTED: AUD 18,370

Birdlife South Africa and Imvelo Blue Environment Consultancy have partnered to develop a bird-scaring line (BSL) compliance monitoring device that records the mechanical tension (kg) of a deployed BSL and converts it into an electronic signal through a process called mechatronic engineering. The technology has been developed locally by Dr Nelson Miranda an independent engineer. A pilot device has been produced, able to record the tension or pull by the BSL every 2 seconds while simultaneously recording the time and date.

The project seeks seed funding for further development of the pilot device with the objectives of:

a) Refining the data collection software and adjust its sensitivity to various deployment conditions at sea, such and weather and fluctuations in tension, as well as potential tampering with the BSL or deployment methods;

b) Capture data through a USB port, eliminating the need to remove the device from its attachment point;

c) Tamper proofing of the device and the recorded data;

d) Adapt the device for ease of use on various fleets and different types of BSLs

e) Developing tension profiles that can be used to analyse and validate the data in the absence of an observer

All objectives will be addressed through a combination of at-sea deployments and analysis of the data collected. A minimum of 4 to 6 trips will be needed for the following:

i) Deployments will target various weather conditions and preferably extremes of calm and rough seas, as well as different types of BSLs used, to adjust software and data collection intervals (Obj. a & c).

ii) The influence of varying deployment methods and potential tampering with deployments or of BSLs (removal of streamers or change of drag sections) will also be possible while at sea. (Obj. a & c).

iii) Testing will be carried out on least two gear types, trawl and longline as well as different typed of BSLs (long or short) (Obj.d).

iv) Trial various housing options for the device as well as attachment methods to ensure durability and resistance to adverse sea condition, and ease of data access for downloads (Obj. b).

v) All the data collected will be used to develop tension profiles for data analysis and future development of machine learning code, to handle large data sets.

Summary of activities/outcomes: completed

See **SBWG10 Inf 18.**

ACAP 2019-10: ***Colaborando para el desarrollo de medidas de mitigación de las capturas accidentales de pardela balear y otras aves marinas en el Mediterráneo español***

Working together to develop measures to mitigate bycatch of Balearic shearwater and other seabirds in the Spanish Mediterranean

Project Leader: *José Manuel Arcos, SEO/BirdLife*

Co-investigators: *Verónica Cortés Serra, SEO/BirdLife*

FUNDS GRANTED: AUD 19,000

Seabird bycatch in the western Mediterranean is having a serious impact on the population of seabirds, especially the critically endangered Balearic shearwater (*Puffinus mauretanicus*), the Yelkouan shearwater (*P. Yelkouan*)) and Cory's shearwater (*Calonectris diomedea*). Of particular concern is the case of the Balearic shearwater, whose population is considered a priority for the ACAP but is in steep decline mainly due to the impact of bycatch.

The information available shows artisanal fishing with a demersal longline to have the greatest impact on these species, especially the smallest shearwater (Puffinus), due to the use of small lures and hooks and their distribution which is closer to the coast. This is why in the last few years a great effort has been made to find methods that minimise bycatch in this fleet. However, due to the dynamic and diversity of fishing practices and the great diving ability of shearwaters, it is difficult to find measures that are easily adaptable to the entire fleet and which are effective and profitable.

According to the ACAP's recommendations and good practices for this type of fishery, the use of three general measures is recommended: night-setting, bird-scaring lines and increasing the line sink rate. All of these measures have been tested in the Spanish fleet's demersal longlines. However, when it came to adaptation, we encountered difficulties and even issues of incompatibility with some practices, as well as inappropriate design.

Night-setting can be recommended only for vessels fishing for European hake (*Merluccius merluccius*) since when fishing for other species, their different activity rhythms may reduce fishing yields.

When bird-scaring lines are installed, shearwaters are still captured due to insufficient protection of the lures. This stems from an excessively slow setting speed, and the great diving ability of the shearwaters. This method is also ineffective on calm days.

In the case of increasing the line sink rate, some methods, such as adding weights to the hooks and using vertical lines, have been tested. However, we found them to be unsuitable as they did not reach the recommended sink rate (0.3 m/s) or because they were not as profitable.

However, there is another method recommended by the ACAP for artisanal fishing with a demersal longline: the "NISURI Fastset". However, more trials are required so as to find a design which adequately adapts to the specific nature of the local fleet.

Lastly, a measure proposed by the fishermen themselves has been tested: the use of an olfactory repellent employed in farming to scare off birds. This method has already been preliminarily tested by our team and we were able to detect a reduction in the incidences of

attraction of shearwaters. Nonetheless, more tests are required in order to obtain conclusive results.

The project's objectives are:

1) Quantify the line sink rate in distinct configurations and find the most appropriate weighting system in each case

2) Perfect the design of the NISURI and confirm its effectiveness in reducing bird catching and its effects on commercial catching

3) Confirm the effectiveness and viability of the use of olfactory repellents

ACAP 2019-12: ***Demographic monitoring, at-sea movements, and scavenging behaviour in the Balearic shearwater***

Project Leader: *Professor Tim Guilford, Department of Zoology, Oxford University, UK*

Co-investigators: *Dr Oliver Padget, Department of Zoology, UK; Miguel McMinn-Grive, Societat d'Història Natural de les Balears (SHNB) Illes Balears; Elisa Miquel-Riera, Grup d'Ornitologia Balear (GOB), Illes Balears*

FUNDS GRANTED: AUD 20,702

IUCN Critically Endangered, Balearic shearwaters, *Puffinus mauretanicus*, are Europe's rarest seabird, and probably the most threatened bird species in the Western palearctic. They breed only in Spain's Balearic islands. Population estimates remain uncertain (20-30k individuals), but survival and productivity estimated at Sa Cella cave on Mallorca, the largest remaining single colony, suggest a 14% annual decline predicting extinction within 60 years. Before and during breeding Balearic shearwaters forage in the NW Mediterranean (with additional activity off North African coasts not yet well characterised). Scavenging discards and bait fish has proved demographically important, enhancing productivity but causing potentially catastrophic levels of by-catch. By-catch on demersal longlines during setting, mainly in artisanal fleets, probably causes half of all adult mortality during the breeding period. Post-breeding, Balearic shearwaters migrate out of the Mediterranean to feed off NW African, Portuguese, Spanish and French Atlantic coasts, showing considerable sex-segregation, with potentially differential dependence on scavenging, and individual consistency in foraging areas. Increases in Balearic shearwaters off southern UK and Irish coasts are poorly understood, but our data suggest these are mainly immatures or non-breeders since peak sightings occur after GLS tracked breeders have returned to the Mediterranean. Nevertheless, serious by-catch events have been documented in the Atlantic and understanding fisheries competition and by-catch risk, how these are changing, and how they may be segregated by life-history stage, during the population's Atlantic phase is crucial.

Objective (i): Improve and maintain repeatable annual monitoring of key life-history parameters at Sa Cella cave (dense colony) and Sa Dragonera (diffuse breeding), capturing the variation in typical breeding habitat.

Given the species' continued decline, introduction of EU discards bans, and the need to assess the impact of any future mitigation measures, establishing systematic and reliable future monitoring there is vital.

Objective (ii): Continue and extend monitoring of migratory movements, breeding phenology, and at-sea behaviour using geolocator/immersion loggers in order to detect shifts in behaviour and reproductive performance in relation to large scale events at sea (e.g. changes in fishing practice), and identify by-catch risk areas, year round.

Continued GLS tracking, combined with modern ethoinformatic analysis, provides a cost-effective, low-impact way to monitor at-sea non-breeding season movements and behaviour (timing of migration, non-breeding foraging areas, overlap with fisheries or MPAs, daily foraging effort and timing), as well as the detailed timing and outcomes of breeding events (colony attendance, egg-laying, hatching, breeding success or failure).

Objective (iii): Use high-resolution accelerometer-GPS biotelemetry to understand detailed foraging behaviour, and ultimately scavenging by-catch risk in different fisheries, at different times of day, and season, to inform optimum mitigation methods.

The detailed patterns of foraging behaviour, especially scavenging, remain unknown because even combined GPS-TDR does not resolve foraging types (for example, very shallow dip-dives cannot be reliably identified by TDR). We will use precision Axy-GPS tracking to help understand the precise patterns of by-catch risk and likely effectiveness of different mitigation measures, especially whether birds forage at night (the effectiveness of night-setting longlines is disputed) and if so exactly when and where, and whether facilitated by urban sky-glow or moonlight.

ACAP 2019-14: Examining the efficacy of the 'snatch block' in reducing seabird bycatch in Southern Cone trawl fisheries

Project Leader: *Cristián G. Suazo, Albatross Task Force-Chile, BirdLife International-Codeff*

Co-investigators: *Leandro L. Tamini, Albatross Task Force-Argentina, BirdLife International-Aves Argentinas; Patricio Ortiz, Albatross Task Force-Chile, BirdLife International-Codeff; Leandro N. Chavez, Albatross Task Force-Argentina, BirdLife International-Aves Argentinas*

FUNDS GRANTED: AUD 22,224

ACAP's bycatch mitigation best practice advice (ACAP 2018) for trawl fisheries is centered on discard management and the deployment of bird-scaring lines (BSLs) to reduce seabird collisions with warp cables (Kuepfer & Debski 2019).

This best practice advice highlights the substantial risks posed by net monitoring cables (also known as netsonde cables); indeed, the netsonde cable has been shown to result in up to 30 times more impact on albatrosses than vessels that do not us this cable (Richard & Adasme 2019). U.S studies (Melvin et al. 2011; Jannot et al. 2019) have also highlighted major impacts resulting from the use of net monitoring cables.

In the southern hemisphere, the impact of the netsonde cable in demersal and midwater trawl fisheries continues to affect a number ACAP species.

While the most effective means of mitigating this bycatch is to eliminate the netsonde cable altogether (ACAP 2018; Kuepfer et al. 2018), there is a reluctance to do this in the aforementioned South American fisheries where there is concern about impacts on fishing

operations. In such instances, ACAP best practice is to install a snatch block to reduce the aerial extent of the netsonde cable and bring it under the protection of bird-scaring lines deployed over the warp cables (Melvin et al. 2004, 2011; ACAP 2018).

Although the snatch block is recommended by ACAP as best practice, it is also important to recognize that there is little available evidence to demonstrate effectiveness beyond the U.S. studies (Melvin et al. 2011), as well as minimum standards for its implementation in different fleets (ACAP 2018; Kuepfer & Debski 2019).In Chile, new regulations require the use of a snatch block on trawl vessels using a netsonde cable (SUBPESCA 2017; 2019) and in Argentina, the ongoing update of the NPOA-Seabirds and conditions of the Marine Stewardship Council certification of the hoki fleet are driving the need to test and implement snatch blocks in addition to the mandatory use of BSLs (Argentina 2017; Morsan et al. 2018).

In order to bridge the gap between adequate technical development of the snatch block and its implementation in these fisheries, it is necessary to conduct at-sea trials to development specifications relevant to South American vessels, and to initiate participation and training of crew members to ensure smooth adoption (Suazo et al. 2019).

The core objective of this proposal is therefore to develop and evaluate different snatch block devices, with strong industry input, on commercial demersal and midwater trawlers in Chile. The experience gained through at-sea experimental work will be extended to Argentina and other Chilean fisheries through workshops and an ‘exchange’ with an Argentinean skipper.

More specifically, the project will:

i) Diagnose the impact of the netsonde cable on seabirds in central-southern Chilean trawl fisheries.

ii) Design and evaluation of netsonde mitigation in trawl fisheries.

iii) Development and feedback workshops for trawl crews.

iv) ACAP best practice development.

The findings of this work will be written up to inform the development of minimum standards for snatch block devices, as well as recommendations for monitoring and maintenance in a practical mitigation guide for bridge and deck crew members. This will include tailored recommendations on the correct use/manipulation of mitigation of netsonde on deck.

ACAP 2019-15: ***Complete population survey of Waved Albatross* Phoebastria irrorata *on Española Island, Galapagos***

Project Leader: *Washington Tapia Aguilera, Galapagos Conservancy, Ecuador*

Co-investigators: *James P. Gibbs, Ph.D. Environmental and Forest Biology, USA*

FUNDS GRANTED: AUD 26,000

The waved albatross (*Phoebastria irrorata*) is the only tropical albatross in the world. The vast majority (99.9%) of the world’s waved albatrosses breed on Española Island, in the Galápagos Archipelago, and birds forage in the tropical Peruvian upwelling during most of the breeding and throughout the nonbreeding season. Mortality of waved albatrosses in artisanal (small-scale) long line and gill net fisheries in these waters, coupled with declines in

adult survival and breeding population size, has motivated the species' listing as Critically Endangered by the IUCN.

The waved albatross is thought to nest primarily along the southern coast of Española Island yet an unknown fraction of the portion can be found breeding outside of these colonies on any south facing aspect of the island. Whole-island estimates of population size have been attempted three times since the early 1970s. None of these estimates was comprehensive and none used a probability-based design.

Major changes in Española's vegetation since Harris' (1973) count have made the logistics of a standardized, island-wide, count challenging. Eradication of feral goats from Española in 1978 generated a dramatic increase in thick, thorny, and woody vegetation that appeared to be associated with declines in the amount of inland nesting habitat for the waved albatross, where many nesting albatross still occur (Gibbs et al. 2008, Galapagos Research 67:18-21) and making access to inland colonies by researchers extremely difficult.

Population size estimates so far have been limited to the coastal colonies and nearby vegetation. An estimate of the entire population is needed to properly assess the species' status. In 2019 during late August and early September (around the hatching period) we piloted a new survey approach for the entire nesting range of the waved albatross that combined census of coastal nesting populations with probability-based sampling of plots in the interior zone. An elaborate trail system and set of base camps were established to provide access to the island's interior. Counting methodologies and sampling protocols were refined. The intent was to develop the infrastructure and protocols required to enable a comprehensive population estimate in 2020.

Objective - To fully execute the first, robust island-wide nesting survey in June 2020 at the peak of the waved albatross nesting.

Summary of activities/outcomes: completed

It was impossible to carry out the survey during 2020 due to Covid-19 restrictions and the field work was delayed until June 2021. Between June 20 to 30 of 2021 a group of 12 park rangers and researchers conducted a survey of the entire nesting range of the waved albatross on Española Island. The sampling frame included 1,265 hectares, delineated by 1) the southern side of the island, 2) lower elevations (< 130 m) where albatross nest, and 3) areas within 250 m where at least one albatross was detected in a preliminary survey of the entire island conducted in 2019. The counting method consisted of a census of all individuals in cliff edge areas along the coastline, which are heavily used by albatross where the open habitat allows for complete enumeration. For the remaining sampling frame (areas away from the coastline) we applied a stratified random sampling scheme based on counts of individuals in plots (326 plots).

Twelve sampling strata were considered as a factorial of the following: open areas (< 30% tree cover) versus closed areas (the remaining, identified using Quickbird 0.6 m resolution satellite imagery from 2010), near (< 100 m) versus far from the coastline, and population segment (east, central, west). Sampling points were randomly distributed within each stratum with plots per stratum determined through optimal allocation for stratified random sampling using the method of Cochran (1977). Variations in counts needed in order to calculate optimal sample proportions were derived from a preliminary albatross population survey conducted in August 2019 (188 plots) carried out in order to design the present study. We assumed that the sample variances of adult albatross observed in the 2019 counts were

comparable to any count conducted in 2021. The minimum distance between plots was 100 m.

Plot-based censuses for the interior of the island generated a density estimate of 24.9 adult albatross per hectare (+ 2.0 SE, 21.0 - 29.0 95% confidence intervals) and a total of 31,555 adult albatross (+ 2,558.4 SE, 26,540.2 - 36,569.1; 95% confidence intervals). Population estimates for each sampled stratum indicated that the majority of albatross occur in open areas in the Central Colony and in the East (Punta Cevallos) near as well as far from the coast. For nesting adults only ("nesting adults'' refers to those who are looking after nests), the density was 16.4 (+ 1.3 SE, 13.9–18.8; 95% confidence intervals) for a total of 20,692 (+ 1598.8 SE, 17,558.3 - 23,825.6; 95% confidence intervals).

As part of the census along open coastline area, 13,792 adults were found (West: Punta Suarez = 2,681; Central = 2,509; East: Punta Cevallos = 8,602). The albatross recorded along the coastline (13,792) represent only one third of the total population. This suggests that wave albatross population estimates that are based only on coastal counts are highly unrepresentative.

Altogether, the data from sampling the interior of the island and from the census of the coastal areas, suggest that 45,347 adult albatross were present on Española Island during the monitoring period (late June 2021).

Population Changes: In 2010, during the same month (June), we carried out counts using an identical methodology in 66 plots in an inner portion of Española Island (Colonia Central and Punta Cevallos). Counts were repeated in 2021 in the same plots, allowing for comparison of the decennial change in the nesting population of albatross in these areas. A repeated measures ANOVA (counts of adults and nests in 2010 and 2021 to measure temporal change) with area (Cevallos and Colonia Central) as a between-subjects factor (to test whether trends differ by area) revealed that the total number of adults and the number of nests have not changed during the last decade in the areas sampled.

4. PROGRESS AND OUTCOMES OF SECONDMENTS SUPPORTED IN THE 2019 FUNDING ROUND

Applications for the 2019 Secondments Programme opened on 23 August 2019, with deadline for proposal submission on 1 November 2019. Three applications for secondment support were received by the Secretariat, requesting a total of AUD 40,985. All three applicants were successful and following some budget and timeframes revisions, AUD 22,280 was granted. All projects have been delayed due to international travel restrictions.

S2019-01: ***Ecological risk assessment of the incidental mortality of seabirds in Argentine fisheries***

Secondee: *Maximiliano Manuel Hernandez, Doctoral student, Agencia Nacional de Promoción Científica y Tecnológica, ARGENTINA (ANPCyT). Grupo Vertebrados, Instituto de Investigaciones Marinas y Costeras*

(IIMyC, Universidad Nacional de Mar del Plata – National Research Council of Argentina).

Host Institution: *Department of Conservation, NEW ZEALAND*

FUNDS GRANTED: AUD 7,040

The Argentine Continental Shelf is one of the most productive marine areas of the planet, being used in great abundances as a feeding and wintering area by seabirds breeding in the Atlantic and Pacific Patagonian coasts and offshore islands, as well as in distant sites such as Australia, New Zealand and sub-Antarctic islands. A high percentage of the 27 seabird species breeding in the Southern Hemisphere, and listed in Annex 1 of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) make intensive use of the Argentine shelf and adjacent waters as feeding site, overlapping and interacting with a range of Argentine fisheries.

In Argentina, the incidental mortality of seabirds has been registered in commercial fisheries, mainly in longliners and trawlers, where birds die either by colliding, getting entangled or hooked in fishing gear. This type of interaction and its negative effects are exacerbated by the large fishing effort and the high spatio-temporal overlap with key species, in addition to the occurrence of fishing discards and waste generated by the industry. Studies focusing on the use of marine space by both seabirds and fisheries, and the interactions between them, are fundamental for the development of conservation policies. In this sense, ecological risk assessments (ERAs) quantify the likelihood of adverse ecological effects as a result of exposure to human activities. Within the framework of fisheries, ERAs function as an important tool to identify species that are under different levels of risk, in this case in particular as the consequence of incidental mortality. The use of ecological risk assessments addressing the impact of seabird bycatch in fisheries has been widely used by organizations such as the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and a range of Regional Fisheries Management Organisations. These assessments have significantly contributed to the identification of key areas, seasons and fisheries where the interaction with seabirds is significant.

The general objective of this project is to contribute in improving and maintaining a favorable conservation status of albatrosses, petrels and other key pelagic seabird species in the Argentine Continental Shelf by developing specific ecological risk assessments to be used by local agencies and decision makers involved in the management of fisheries. In this sense, the implementation of the project will allow the applicant to improve its skills in the design and development of ERAs (taking as a case study the demersal longline fleet operating in the Argentine EEZ and a 20-year historical database) and sharing this knowledge with other local colleagues. This internship will also favor the collaboration with scientists from other ACAP Parties, taking the expertise concentrated in New Zealand in the development of ERAs. The local development of ERAs will also allow the generation of products relevant to the management of local fisheries and the incorporation of a new chapter in the National Action Plan - Seabirds recently updated in Argentina.

The secondment was initially planned to take place in November 2020, with a stay in New Zealand of approximately two weeks.

S2019-02: ***Improving museum routines and curatorial skills in New Zealand***

Secondee: *Alice Pereira, Technical Consultant at Projeto Albatroz, Curator at National Brazilian Albatross and Petrels Sample Bank (BAAP), BRAZIL*

Host Institutions: *NEW ZEALAND Department of Conservation, and Museum of New Zealand*

FUNDS GRANTED: AUD 10,700

The secondment project consists in working for three or four months in New Zealand Department of Conservation Te Papa Atawhai and also at Museum of New Zealand Te Papa Tongarewa. These two institutions will build secondee's capacities in population monitoring, sample collection and museum curatorial activities. I work for Projeto Albatroz in close relationship with The National Centre for Bird Conservation and Research (CEMAVE) of Chico Mendes Institute for Biodiversity Conservation (ICMBio) collaborating in several initiatives of the Brazilian Plan of Action (NPOA) for Albatross and Petrels Conservation. Both institutions represent Brazil in ACAP and are developing an initiative named Brazilian Albatross and Petrel Biological Sample Bank (BAAP), which I am currently in charge of. Despite of being a Brazilian initiative, BAAP intends to share biological samples not only within Brazilian territory, but also with researchers and institutions overseas interested in albatrosses and petrels conservancy.

In BAAP, I deal with museum routines as accessioning, loans, donations, storage and conservation of different types of samples, preservation means, taxidermy and sample collection. So, it is crucial to develop collection methodologies and curatorial practices in accordance with those adopted in important foreign institutions to enable material exchange and samples that could be used for researchers from any country.

Thus, a secondment in New Zealand Department of Conservation is an excellent opportunity to: a) know how albatross and petrels populations are monitored, b) how the biological samples collected from these populations are treated when housed in New Zealand museums, c) how these samples are provided to interested researchers, and d) how these sample collection and donation works in legal terms in New Zealand. The expertise acquired during the three or four months expend in New Zealand Department of Conservation will be applied in BAAP routines and will be transmitted to partner institutions as Projeto Albatroz and CEMAVE/ICMBio/MMA engaged in albatross and petrel conservation in Brazil.

S2019-03: ***Entrenamiento en rehabilitación, determinación e identificación de enfermedades patógenas en aves marinas***
Training in rehabilitation, determination and identification of pathogenic diseases in seabirds

Secondee: *Rubén Antonio Alemán Lucero, Ministerio de ambiente – Parque Nacional Machalilla, ECUADOR*

Host Institutions: *Associação R3 Animal- Florianópolis-SC-Brasil and Centro Nacional de Pesquisa e Conservação das Aves Silvestres – CEMAVE, Instituto*

Chico Mendes de Conservação da Biodiversidade – ICMBio, Ministério do Meio Ambiente – MMA, BRAZIL

FUNDS GRANTED: AUD 4,540

Desde el año 2012 el Ministerio de Ambiente a través del Parque Nacional Machalilla inició con levantamiento de información sobre las causas de mortalidad y varamiento de fauna marina a través de necropsias realizadas en diferentes playas del área protegida y su zona de amortiguamiento, dentro de los resultados se pudo determinar causas macroscópicas de mortalidad de aves tales como: ingesta de basura, interacción con pesca, entre otras, pero debido a la falta de laboratorio, equipo, material no se pudo realizar una investigación de posibles enfermedades de aves marinas y especialmente aves migratorias. En el año 2013 se creó el centro de rehabilitación de fauna marina del Parque nacional Machalilla el cual es el único centro de rehabilitación de toda la costa y recibe fauna marina: aves marinas, tortugas marinas, lobos marinos, de toda la costa continental del Ecuador. El centro ha venido implementándose con equipo para la realización de análisis básicos de laboratorio y en la actualidad está buscando mejorar el equipamiento para realizar investigación y análisis de enfermedades en aves marinas especialmente migratorias.

Dentro del Parque Nacional Machalilla se encuentra Isla de la Plata la cual es un sitio de anidación de Albatros de Galápagos *Phoebastria irrorata*, y para su conservación se han venido implementando diferentes estrategias: monitoreo de anidación, marcaje, manejo de turistas, control de especies invasoras y se está tratando de implementar un programa de identificación del estado de salud de esta especie, además el centro de rehabilitación ha recibido especímenes de albatros para su rehabilitación y posterior reintroducción.

El objetivo de la pasantía es recibir el entrenamiento necesario para poder determinar enfermedades patógenas en forma temprana para de esta manera tener metodologías de reacción inmediata para evitar epidemias y tratamientos en aves silvestres marinas.

Luego de la pasantía se podrá implementar un programa de monitoreo de enfermedades patógenas en aves marinas silvestres para de esta manera crear un mecanismo de reacción en caso de epidemias en aves marinas silvestres. Para implementar este programa se va a entrenar a técnicos y guardaparques del ministerio de ambiente, y otras instituciones como universidades de las diferentes metodologías para la identificación temprana de enfermedades patógenas y toma de muestras para análisis.

Since 2012 the Ministry of Environment through the Machalilla National Park began with information gathering on the causes of mortality and stranding of marine fauna through autopsies performed on different beaches of the protected area and its buffer zone. From the results it was possible to determine macroscopic causes of bird mortality such as: garbage intake, interaction with fishing, among others, but due to the lack of laboratory, equipment, material, an investigation of possible diseases of seabirds and especially migratory birds could not be carried out. In 2013, the marine fauna rehabilitation centre of the Machalilla National Park was created, which is the only rehabilitation centre on the entire coast and receives marine fauna: sea birds, sea turtles, sea lions, from the entire continental coast of Ecuador. The centre has been fitted out with equipment to perform basic laboratory analysis and is currently seeking to improve the equipment for research and analysis of diseases, especially in migratory seabirds.

Within the Machalilla National Park is Isla de la Plata which is a nesting site for Waved Albatross *Phoebastria irrorata*, and for its conservation different strategies have been implemented: monitoring of nesting, marking, tourist management, control of invasive species and trying to implement a program to identify the health status of this species, in addition the rehabilitation centre has received specimens of albatrosses for rehabilitation and subsequent reintroduction.

The objective of the secondment is to receive the necessary training to be able to determine pathogenic diseases early so as to have immediate response methodologies to avoid epidemics and implement treatments in wild marine birds.

After the secondment, a monitoring program for pathogenic diseases in wild seabirds can be implemented to create a response mechanism in case of epidemics in wild seabirds. To implement this program, technicians and park rangers from the Ministry of Environment will be trained, and other institutions such as universities in the different methodologies for the early identification of pathogenic diseases and sampling for analysis.

5. PROGRESS AND OUTCOMES OF SMALL GRANTS PROJECTS AND SECONDMENTS SUPPORTED IN THE 2018 FUNDING ROUND

Six small grants projects and four secondments were supported during the 2018 call for applications. Five small grants and one secondment were still ongoing following reporting to AC11 in May 2019 (see AC11 Inf 02).

***ACAP 2018-02* Prevalence and magnitude of plastic exposure (macro and microplastics and select chemical compounds) in albatrosses and petrels off the shores of Argentina and Brazil**

Project Leader: Marcela Uhart, University of California and Patricia Pereira Serafini, CEMAVE / ICMBio / MMA, Brazil

Co-investigators / collaborators: Tatiana Neves, Projeto Albatroz; Luciana Gallo, Instituto de Biología de Organismos Marinos (IBIOMAR), CCT CENPAT, Argentina; & Leandro Tamini, Albatross Task Force, Aves Argentinas/AOP and BirdLife International

FUNDS GRANTED: AUD 20,000

Summary of activities/outcomes: in progress

Objective 1: Evaluate incidence and magnitude of plastic ingestion in dead birds

- March 2020-present: Continued recovery of beached carcasses in Argentina and Brazil. Necropsies, sample collection and storage. Bycatch carcass collection suspended due to COVID-19.
- July 2020-present: Prepared and submitted a manuscript to journal BioBrasil, in Portuguese, for scientific communication of best practices in sample collection and analysis.
- October 2020-present: Virtually trained new collaborator (Fundación Mundo Marino, Argentina) and (three) students. Distributed sample collection and storage kits.

Objective 2: Macroscopically estimate the prevalence of plastic ingestion and characterize items (>1mm) present in the stomach contents

- July-September 2020: Improved and standardized protocols for analysis of plastic items (>1mm) from stomach contents.
- October 2020-present: Transferred capacity to (three) students on macroscopic analysis of plastic items.
- March 2021-ongoing: Examined stomach contents, isolating and classifying plastic items (>1mm) in Argentina. Currently on hold in Brazil due to COVID-19.

Objectives 3 and 4: Establish diagnostic capacity for select chemical compounds derived from plastic degradation (phthalates) in Argentina and Brazil. Perform chemical analysis to identify and quantify phthalates in select tissues from dead birds.

During the last semester we have contacted a new lab in Argentina, at the Research and Analysis Program for Chemical Residues and Contaminants (Universidad Nacional del Litoral -UNL), to explore options for phthalate analysis to expand in-country capacity. While the laboratories at UFSC (Brazil) and UNL (Argentina) re-opened in February and April 2021 (both closed since March 2020), respectively, during the first weeks/months of operations priority was given to deadlines for MSc/PhD completion.

***ACAP 2018-03* Global review of nature and extent of trawl net captures**

Project Leader: Graham Parker, Parker Conservation, New Zealand

Co-investigators / collaborators: Kalinka Rexer-Huber, Parker Conservation, NZ and Igor Debski, New Zealand Department of Conservation

FUNDS GRANTED: AUD 12,000

Summary of activities/outcomes: in progress

We received and compiled information from five of twelve ACAP member nations contacted. Response rates to our requests for phone conversations were very slow for some, and non-existent for others. Respondents preferred to complete a questionnaire, rather than discuss the questions during a phone / internet call.

Produce a global review of literature on the nature and extent of seabird trawl net captures.

Information collected from five of twelve ACAP member nations contacted. Significant time spent corresponding and soliciting information. Detailed information exists for one further nation, New Zealand.

Summarise the nature of net-capture data collection

Limited data collected, but it has been summarised.

Develop advice on suitable protocols for future data collection to better understand the extent of trawl net captures and inform the development of mitigation.

The information collected to date will allow recommendations to improve future data collection. Ideally further information will be provided, but we have been exceedingly patient waiting for information.

Where possible, identify opportunities for development of trawl net capture mitigation methods to reduce or eliminate net captures.

The data collected to date will allow some further insight into the extent of net captures in trawl fisheries, but generally nations are not collecting data that will allow quantification of seabird net captures, nor provide information helpful to targeted mitigation.

***ACAP 2018-05* Hookpod for seabirds and sea turtles: Looking towards a multi-taxa approach for reducing bycatch in pelagic longlines**

Project Leader: Dimas Gianuca, Projeto Albatroz, Brazil

Co-investigators / collaborators: Tatiana Neves, Projeto Albatroz; Augusto Silva-Costa & Gabriel C. Sampaio, Projeto Albatroz/Albatross Task Force

FUNDS GRANTED: AUD 36,205

Summary of activities/outcomes: completed

See **SBWG10 Inf 16**.

ACAP 2018-07* Primera diagnosis de conservación de la pardela balear Puffinus mauretanicus *en Ibiza

First conservation diagnosis of the Balearic Shearwater* Puffinus mauretanicus *in Ibiza

Project Leader: Meritxell Genovart, CSIC, Spain

Co-investigators / collaborators: José Manuel Arcos, SEO/BirdLife; Maite Louzao, AZTI Fundazioa; & David García, IRBI

FUNDS GRANTED: AUD 20,000

Summary of activities/outcomes: completed

The project went according to plan. After the project (April 2020), the results of the demographic analysis served to support the maintenance of the CR threat category in a review process by BirdLife International.

1. Review of protocols.

The methodology used in the field was considered adequate for demographic analysis, although important changes were made in the structure of the databases.

2. Breeding monitoring campaign (2019).

The campaign consisted of two visits to the target islets, Sa Conillera, Bosc and Espartar, in the west of Ibiza (Reserves Naturals des Vedrà, es Vedranell i els illots de Ponent). A first visit, during the incubation season (March-April), allowed us to review the occupied nests, measure the eggs (in those nests with easy access and in which no impact risk was estimated) and identify the adults associated with each nest, banding new birds (breeders and prospectors). A second visit, during the chick season (May-June), made it possible to control the nests in which the chick had fledged and thus estimate the reproductive success rate, by banding the chicks. After the campaign, the monitoring database was updated and a

demographic analysis was carried out, combining the information collected between 2011 and 2019.

3. Remote monitoring analysis.

The main feeding area was located in the waters of the continental shelf of the Iberian east, between 38-41º N, with secondary zones further away in the north of Catalonia, the Alboran Sea and North Africa. Average trips lasted 70.0 hours (range 18.2-166.9 h), travelled 774.5 km (101.8-2196.0 km) and reached maximum distances of 214.4 km (19.9- 615.9 km). No significant differences were found between sexes and years.

4. Demographic analysis.

The analyses focused on Conillera and Bosc (Espartar presented a low sample size). Analysis of egg volume was included, with differences between years (higher in 2015, lower in 2019) and islets. The reproductive success was on average 0.60 ± 0.14SD, with interannual differences and between colonies (0.525 in Conillera, range 0.400-0.692, with up to 52 nests in a row; 0.676 in Bosc, range 0.400-0.875, 15 nests). Adult survival was estimated at 0.8170 (IC 0.7564-0.8650), being similar between Conillera (0.8116) and Bosc (0.8331). The analyses indicate a high individual heterogeneity in survival, with higher values in individuals marked with GPS or GLS, possibly due to the unconscious selection of those birds with higher rates of return. A stochastic population growth rate of 0.8613 (0.8579-0.8647) was estimated, that is, there is an annual population decrease of almost 14%. If the situation does not change, the population will be extinct in about 51 years (IC 50-53).

5. Explore possible differences in demographic parameters among different colonies.

Survival and growth rate show great similarity with the data from the only colony previously analysed, that of Sa Cella in Mallorca (Genovart et al. 2016).

It is worth highlighting some of the results:

- The demographic analysis indicates high adult mortality, a critical point in population viability, as had been detected in Mallorca. It is important to remember that none of the colonies analysed has land predators, so the main problem would be in the sea. Everything indicates that the main cause of mortality would be bycatch, so it is important to address this problem.

- The heterogeneity detected in survival rates is interesting, which could have implications for population viability. This aspect deserves attention in the future.

- The distribution patterns in the sea have been characterized for the population of Ibiza, and can be compared with those published in recent years for Mallorca, with a distribution further north. It is important to delve into this aspect, and carry out an overlap analysis with fisheries, which indicates possible points of high risk of bycatch. For this, it is important to also work on improving the estimates of fishing effort, especially of the artisanal fleet, and on characterizing in detail the occurrence of bycatch.

- In the recent review of the conservation status of the species, it was questioned that the demographic data were a good reflection of reality. Although those responsible for this project consider that this type of model is a very valuable tool for understanding the dynamics of populations that are difficult to accurately census, such as shearwaters, it will be important to explore other ways of documenting the decline of the species, in order to validate the results obtained, without forgetting the need to apply urgent conservation measures to reverse the negative population trend observed.

***ACAP 2018-10* Assessing the overlap between threatened pelagic seabirds and trawl fisheries operating in northern Patagonian Shelf**

Project Leader: Juan Pablo Seco Pon and Sofía Copello, IIMyC, CONICET-UNMDP, Argentina

Co-investigators / collaborators: Jesica Paz & Rocío Mariano-Jelicich, IIMyC, CONICET-UNMDP, Argentina

FUNDS GRANTED: AUD 12,000

Summary of activities/outcomes: in progress

Unexpected difficulties have arisen during the course of this project which are directly related to the impossibility of capturing individuals to be tagged. For this reason, we intented to extend our sampling efforts (both birds and prey facilitated from fisheries discards) during 2019, again with no success. This time, difficulties were linked to the availability of small-scale vessels where to conduct the at-sea surveys. In early 2020 the pandemic situation further complicated the situation and we were (still are) facing big challenges so as to conduct fieldwork. We continue to negotiate vessel access.

***S 2018-03* Conservation of albatrosses in Brazil: Definition of priority areas for conservation regarding the fisheries bycatch**

Secondee: Caio Azevedo Marques, Projeto Albatroz and State University of Santa Cruz (UESC), BRAZIL

Host Institution: British Antarctic Survey, UNITED KINGDOM

FUNDS GRANTED: AUD 16,900

Summary of activities/outcomes: in progress

This secondment aims to generate distribution maps of procellariform species occurring in the Brazilian territorial sea and its corresponding Exclusive Economic Zone, in order to collaborate with the definition of priority areas for the conservation of albatrosses and petrels in Brazil. For the elaboration of these distribution maps, SDM - Species Distribution Models, also known as ecological niche models, are being adopted. Knowledge about the spatial distribution of species is a fundamental part to support assessment measures and conservation action planning. SDMs are considered good tools for predicting species distribution (Araújo and Peterson, 2012; Jiménez-Valverde et al., 2011). These techniques are based on the concept of ecological niche, or the set of biotic and abiotic conditions in which species populations are able to remain viable and stable (Hutchinson, 1957). More specifically, these tools correlate the presence of the species with environmental descriptors (variables) of these locations, to create a multidimensional environmental space. This tool has also been widely used to verify and predict the environmental suitability of species, guiding and optimizing discussions about current conservation planning, methods and actions and whether these meet current needs and future perspectives (Loyola et al., 2012; Nóbrega and de Marco-Jr., 2011; Silva et al., 2013). The distribution maps of albatross and petrel species used in the assessment and conservation measures in Brazil are predominantly those produced and made available by BirdLife International/IUCN and the data generated by the sampling effort of monitoring carried out by the non-governmental organization, Projeto Albatroz.

Four species were selected (*Thalassarche melanophris, Procellaria aequinoctialis, Procellaria conspicillata, Ardenna gravis*), all known to interact with fishing fleets and suffer incidental mortality, and with occurrence records in three different databases: i) Projeto Albatroz database, with data collected from sightings on fishing vessels; ii) database of projects developed by the Federal University of Rio Grande (FURG); and tracking data, obtained through different projects and researchers, and that make up the Seabird Tracking Database managed by BirdLife International. Due to general trends, data inaccuracy, and uncertainty in species distribution models, different algorithms can result in different species distribution patterns (Barry and Elith, 2006; Diniz-Filho et al., 2009; Rocchini et al., 2011). To attend this secondment purposes, ensemble models were generated using the combination of results of three algorithms widely used and recognized for satisfactory performance (GLM - Generalized Linear Models, GAM - Generalized Additive Models and MaxLike - likelihood-based).

To collect environmental information from the confirmed occurrence record areas of the species and of interest to the study, we used the data available on the “Copernicus” platform, a platform that provides geo-referenced information on geophysical, biotic and climatic variables of marine environments on a global scale. From this dataset, we selected and used five variables (Chlorophyll, Sea Surface Temperature, Salinity, Eckman and Wind), which were used as environmental layers (predictive variables) during the modelling procedures. The collinearity of environmental variables was verified with the VIF - Variance Inflation Factor method, this method is recommended to avoid the use of variables with high collinearity and to avoid the use of variables that do not contribute to the predictive power of the model. In addition, single point sampling was performed per cell/quadrant of species occurrence data, with this procedure we also avoid overfitting/overestimating the model, which increases the accuracy of the models (Jimenez-Valverde et al., 2011; Silva et al., 2014). The grid adopted in all variables and in the sampling of single points was cells/squares with 0.5 degrees of resolution.

To verify the contribution of different data sources on model results, the effect of sampling (sampling/cleaning data) by single points, and distribution patterns during the breeding and non-breeding periods, the data used in the generation of models (input) and results (output) were categorized into: (a) breeding; (b) non-breeding and (c) total (breeding + non-breeding); (I) raw data and (II) unique points; and regarding the data collection method: (1) track: tracking data, (2) fishery: fishering cruise, (3) vessel: scientific cruise, and (4) total (track + fishery + vessel). Following these categories, the preliminary results of this study add up to 96 models, 24 models, for each species, which are being evaluated and discussed regarding ecological issues, statistics and applicability of the results in public policies for the conservation of albatrosses and petrels in Brazil. Final results should be presented at the next ACAP meeting in info paper format.