DPLUS139 2021 FIELD REPORT – TRACKING FALKLANDS MARINE HIGHER PREDATORS

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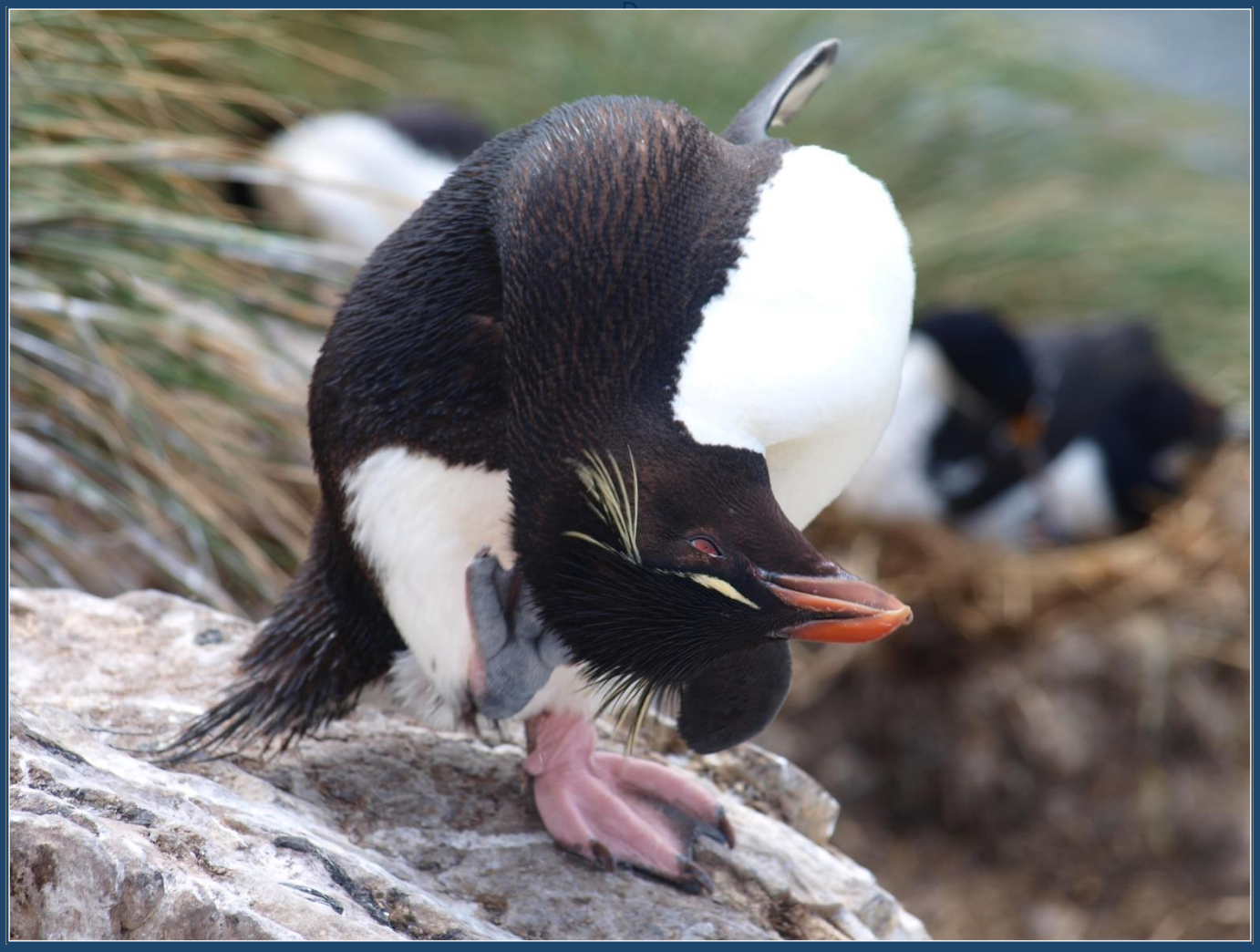

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01/02/2022 - BAYLIS

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1. SUMMARY

This report is a brief summary of fieldwork conducted during 2021/22 austral summer, as part of the DPLUS139 tracking project. We successfully tracked 99 seabirds from three species (black-browed albatross, rockhopper penguins and thin-billed prions) and two sites (Bird Island and Steeple Jason Island) during the 2021 austral summer. Rockhopper penguins from Bird Island foraged at the Burdwood Bank during incubation, but switched to short, < 1 day foraging trips during early chick rearing, where they foraged within nearshore waters around West Falklands. In contrast, rockhopper penguins from Steeple Jason Island foraged in oceanic waters, and undertook longer foraging trips during chick-rearing, with average foraging trip distance at Steeple Jason Island being 49 ± 35 km compared to 24 ± 44 km at Bird Island. Black-browed albatross tracked from Bird Island typically foraged to the south east of the Falkland Islands and frequently visited the region around Staten Island, however albatrosses also made local trips to nearshore waters around West Falklands. Black-browed albatross foraging trips were on average 240 ± 191 km. Thin-billed prions travelled below the Antarctic convergence during incubation foraging trips, with an average foraging trip distance of 823 ± 162 km. Fieldwork will continue over the austral winter and summer of 2022.

2. INTRODUCTION

Project background

Colonial breeding seabirds and seals link our marine and terrestrial environments. They are abundant marine predators near the top of the food chain, and are often referred to as sentinel species, because they provide clues to ecosystem health, and reflect the state of the wider marine environment. Tracking the movements of seabirds and seals enables us to understand how individuals, colonies and populations use our coastal waters, and helps us to disentangle and then address potential threats to population persistence. Tracking data collected from seabirds and seals ultimately improves evidence-based marine management and conservation initiatives, facilitates ecosystem-based management and increases the amount and quality of information available to researchers and decision makers.

Seabird and seal tracking data are particularly relevant in the Falkland Islands context, because the Falkland Islands are a globally important breeding site for colonial marine higher predators in terms of population size and conservation status. For example, the Falklands are home to approximately 75 % of the global population of black-browed albatross, 50 % of the South American fur seal population, and over 30 % of the global population of southern rockhopper and gentoo penguins, with fluctuations in breeding numbers at the Falkland Islands impacting the global conservation status of these species. However, tracking data are spatially and temporally limited, or lacking, for many species.

To help inform our field work, we undertook a gap analysis of existing Falkland Islands tracking data (1999-2019) for seabirds and seals, and identified species and breeding colonies that would help to improve our understanding of the spatial distribution of seabirds and seals at-sea (Baylis et al. 2021). For example, the

gap analysis revealed surprising gaps in tracking data for albatross, penguin and prion breeding colonies at Bird Island, Beauchene Island and Steeple Jason Island. Filling tracking data gaps for the largest populations of seabirds and seals supports and informs current Falkland Islands Government (FIG) initiatives such as the proposed Falkland Islands Marine Managed Areas (MMA), helps to address elements of the Falkland Islands Biodiversity Framework 2016-2030, and aligns with the Falkland Islands Environment Strategy 2021-2040 (filling knowledge gaps and improved understanding, which aids effective decision making) (FIG 2021).

Project aims

Our multi-species project will address key data gaps by using state-of-the art GPS tags to track the largest colonies of seabird and seals. During the 2.5-year project, we aim to track the following species to better understand how they use our marine environment:

- Thin-billed prions (~3 % global population breeds in the Falkland Islands) (Stokes et al. 2021)
- Rockhopper penguin (~30% global population breeds in the Falkland Islands) (Baylis et al. 2013b)
- Gentoo penguin (~30% global population breeds in the Falkland Islands) (Baylis et al. 2013a)
- Black-browed albatross (> 75 % global population breeds in the Falkland Islands) (S. Crofts, Falklands Conservation)
- Falklands fur seal (> 50 % global population breeds in the Falkland Islands) (Baylis et al. 2019a)
- Magellanic penguin (no reliable island-wide census data exists)
- Diving petrel and/or Fairy Prion (no reliable census data exists)
- Imperial Shag (no reliable island-wide census data exists)

We will combine and analyze tracking data collected during the current project, with existing tracking data (Augé et al. 2018, Baylis et al. 2019b, 2021). Combining new and existing tracking data will provide a very large data set that will allow us to develop more robust predictive models to help understand spatial usage over large temporal and spatial scales. We will use the data to better assess how the largest seabird and seal breeding colonies interact with the proposed Falkland Islands Marine Managed Areas (see MMA FIG website), and to quantify overlap with commercial fishing in both the Southern Ocean and across the Patagonian Shelf Large Marine Ecosystem.

This brief report details deployments during the project's first summer field season. Additional fieldwork is planned during winter and summer 2022/23.

3. METHODS

In 2021/22 the South Atlantic Environmental Research Institute (SAERI) worked at two offshore islands, Bird Island and Steeple Jason Island, West Falkland. Both islands are proposed MMAs (see MMA FIG website).

3.1 Animal capture and handling

All seabirds were captured by hand and manually restrained. When capturing albatross, we waited for pairs to swap and captured the outgoing bird once it was off the nest. Similarly, Rockhopper penguin females (identified based on bill size) where captured while standing next to their nest, with the males incubating

eggs or guarding chicks. Prions were captured while in the burrow, incubating eggs. Hence, there was no predation risk to eggs or chicks during seabird capture. Devices were attached using Tesa tape. Devices were positioned relative to the model of locomotion and body type of the seabird (back or tail – Fig 1). All seabirds were released at the point of capture.

Recovery of GPS tags differed by species. For albatross brooding chicks, we were able to gently remove Tesa tape and recover tags without restraining the bird. Rockhopper penguins were recaptured at their nests (occasionally they were incubating or guarding chicks and were carefully picked-up, with male rockhoppers then taking over incubation/guarding duties). After tags were recovered, Rockhopper penguins and prions were placed into a breathable, light weight cloth bag and weighed. Once weighed, birds were released back onto their nest or into their burrow, respectively. In the case of rockhopper penguins, we then moved away from the nest and observed the bird at a distance for approximately 10 minutes.

South American fur seals give birth to pups in December. Their lactation length is approximately 10 months, during which adult female fur seals alternate between foraging at sea and nursing their pup ashore. Pups wean the following October (approx. 10 months of age), when they depart for sea and must provision for themselves. Pups were captured by hand, restrained in a bespoke seal net, and the tag glued to seals dorsal pelage. The pup was then released and observed from a distance for approximately 10 minutes.

3.2 Tags

Externally attached devices can increase foraging trip duration through increased drag and weight. This raises ethical concerns regarding animal welfare and can bias the data collected (Hull 1997). We recognize these potential impacts and have taken great care in the design of our study (number of animals, size of tag) to ensure risks to individuals are minimized. We used small and streamlined tags, which were < 1 % of body mass (Fig 1).

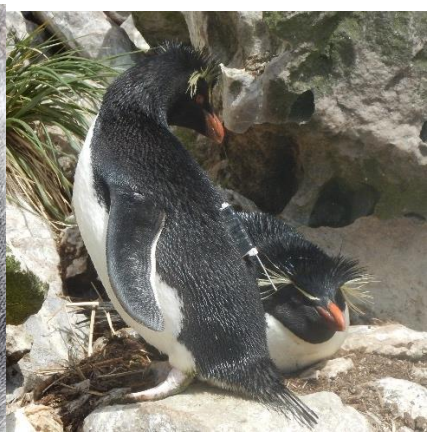
Species tracked	Tag used
Rockhopper penguins	NanoFix Geo (15 g)  
Thin-billed prions	NanoFix Geo mini (<2 g)  
Black-browed albatross	Mr. Lee & Pathtrack tags (<30 g)  

Fig 1: Type, weight and image of seabird tags used during the 2021 summer field season.

4. RESULTS AND DISCUSSION

4.1 Seabirds

In total, we deployed 105 tags and recovered 101 (96% recovery rate). Of those not recovered, 1 albatross and 3 prion nests failed, and birds were not resighted. The unrecovered tags will fall off given the Tesa tape used to attach the devices degrades over time.

Of the 101 tags recovered, 2 tags failed, leaving tracking data for 99 individual seabirds. This includes 59 Rockhopper penguins tracked at two sites, 29 Black-browed albatross and 11 Thin-billed prions tracked at one site. Rockhopper penguins and Black-browed albatross were tracked over both incubation and chick-rearing. Thin-billed prions were tracked over the incubation period only.

The average deployment duration was 6.9 ± 3.5 days for Rockhopper penguins, 11.4 ± 5.0 days for Black-browed albatross and 8.0 ± 2.5 days for Thin-billed prions. A total of 225 foraging trips were recorded from the 99 individual seabirds. Average foraging trip duration was 3.0 ± 2.7 days for Black-browed albatross and 7.9 ± 2.3 days for Thin-billed prions. Average foraging trip duration was 0.8 ± 1.5 days for Rockhopper penguins at Bird Island and 1.5 ± 1.7 days at Steeple Jason Island.

Rockhopper penguins from Bird Island foraged along the Burdwood Bank during incubation, but switched to short, typically < 1 day foraging trips during early chick rearing, and foraged within nearshore waters around West Falklands (Fig 2). In contrast, rockhopper penguins from Steeple Jason Island travelled over twice the distance during chick-rearing (average foraging trip distance at Steeple Jason Island being 49 ± 35 km compared to 24 ± 44 km at Bird Island) (Fig 2).

Black-browed albatross tracked from Bird Island typically foraged to the south east of the Falkland Islands, and frequently visited Staten Island, during foraging trips that were on average 240 ± 191 km (Fig 3).

Thin-billed prions foraged below the Antarctic convergence during the incubation period, with maximum foraging trip distances of 823 ± 162 km (Fig 3).

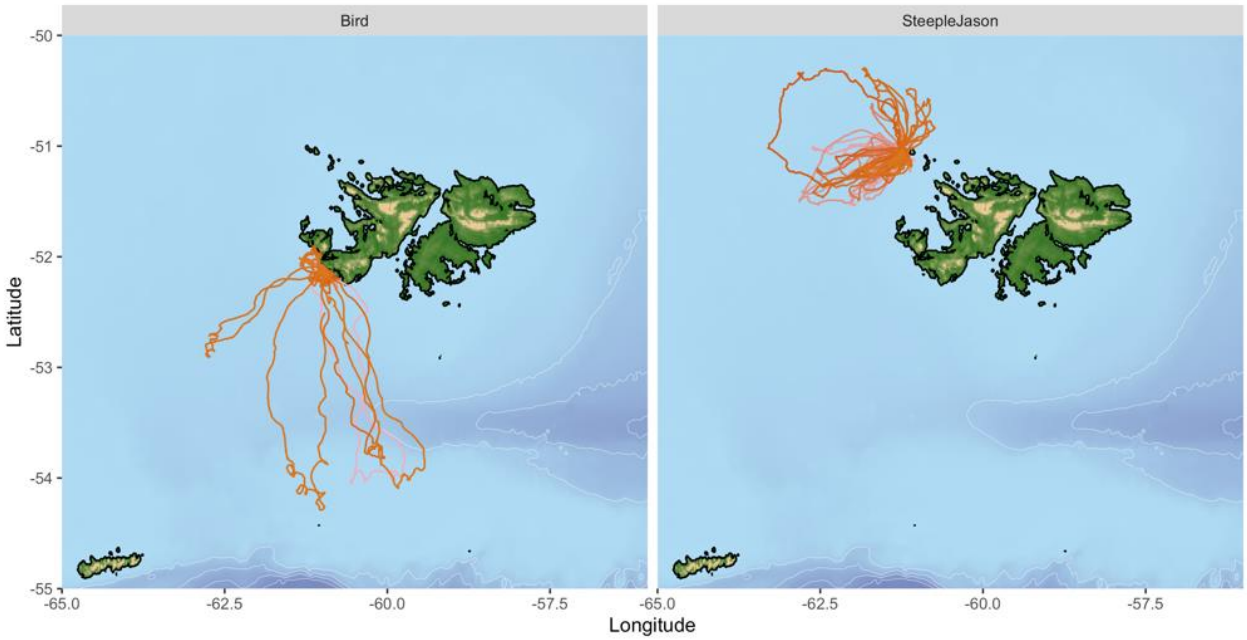


Fig 2: Foraging trips of Rockhopper penguins tracked from two globally important breeding colonies, Bird Island (left panel) and Steeple Jason Island (right panel). The long trips to the Burdwood Bank (left panel – Bird Island) are incubation foraging trips. Although poorly depicted in this figure, rockhopper penguins from Steeple Jason Island actually travelled further during the chick rearing period than Bird Island rockhopper penguins (49 ± 35 km compared to 24 ± 44 km, respectively).

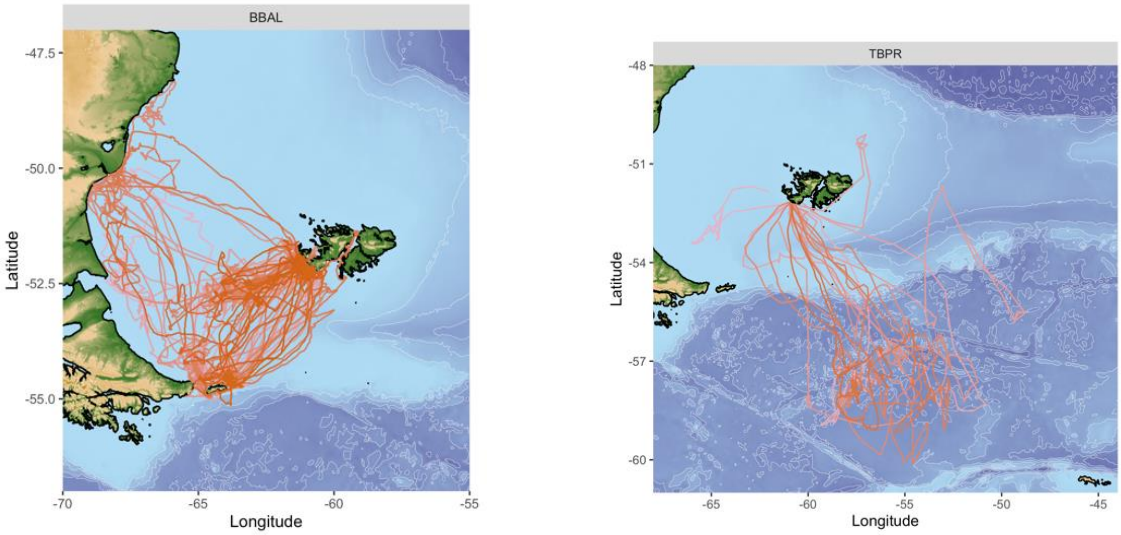


Fig 3: Foraging trips of black-browed albatross (BBAL) and Thin-billed prions (THPR) from Bird Island.

4.2 Falkland fur seals

In total, 10 satellite tags were deployed on South American fur seal pups in October 2021 at Flat Jason Island. Pups travelled over 1,500 km during the first three months of post-weaning dispersal (Fig 4). While most pups remained on the Patagonian Shelf, several pups undertook extended movements to the east of the Falkland Islands along the Falklands Escarpment (Fig 4). Additional deployments are scheduled for October 2022.

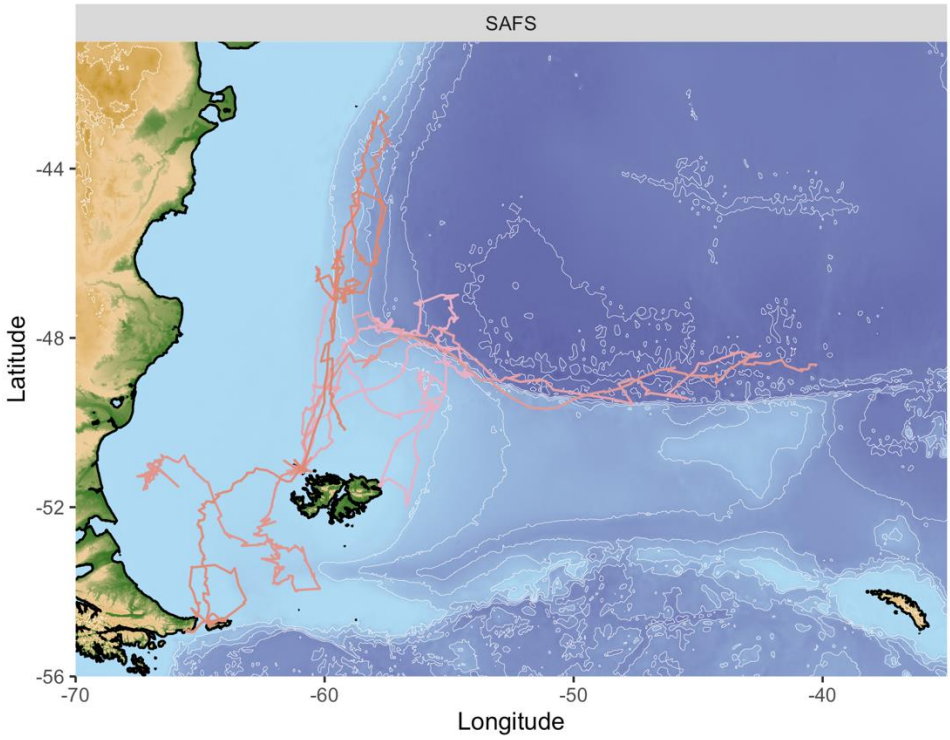


Fig 4: The movements of 10 South American Fur seal (SAFS) pups on their post-weaning dispersal from Flat Jason Island, West Falklands.

5. FIELDWORK 2022/23

- Imperial shag deployments over winter and summer (research permit application pending)
- Winter deployments on Black-browed albatross using satellite tags
- Deployments on South American fur seal pups in October
- Repeat 2021 summer field season (aim to track three islands)

6. ACKNOWLEDGMENTS

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