

Bird Island – Coral Voyage of Discovery

Dr Narissa Bax & Amy Guest

First published 22nd November 2021

Vessel: Saoirse

Crew: Greg Landreth and Keri Pashuk

Science team: Narissa Bax and Amy Guest

Bird Island, Falkland Islands (FI), is located to the South-West of the archipelago. A government-owned island with strict visiting permit rules, the island is rarely visited by the local population and remains pristine in condition, with fully established tussac grass due to a historical lack of grazing animals.

Abundant in seabirds such as petrels, prions, albatrosses, penguins, gulls and more, as well as marine mammals such as sea lions and fur seals. Below the surface, the marine biodiversity mirrors high abundance, and a recent survey found dense coral populations at 47m, representing a new and important ecosystem in the Falkland Islands.



Bird Island, a proposed Marine Management Area in the Falkland Islands

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In October/November 2021 SAERI scientists Dr Narissa Bax and Amy Guest organised a ~10 day coral voyage of discovery to Bird Island, focused on collecting specimens for morphological, genetic and paleo-archive analysis and quantifying the distribution of the stylasteridae coral, *Errina sp.*,

based on their discovery at ~47m using drop-down camera's at two sites during a SAERI assessment in November 2019. The voyage was planned as an opportunistic collaboration with Greg Landreth and Keri Pashuk on the yacht Saoirse of Patagonia Projects from Chile, during their return voyage from the Falkland Islands, and included the use of a cinema quality Remote Operated Vehicle (ROV) – capable of exploring depths of ~1000m and sampling by non-invasive means with an arm attachment (as opposed to trawling, which is a destructive process).

The research plan also included sub tidal biodiversity assessments for Amy Guest's PhD, enabling a combined approach targeting the nearshore (0-5m), and mesophotic depths (50m+) which divers do not regularly access, and where key biodiversity gaps exist. Other opportunistic sampling was conducted across nine sites in West Falklands including at Ten Shilling Bay, The Arch Islands, Lucas Bay, Albemarle and Bird Island for collaborators Dr Ceridwen (Crid) Fraser working on kelp genomics at the University of Otago in New Zealand.



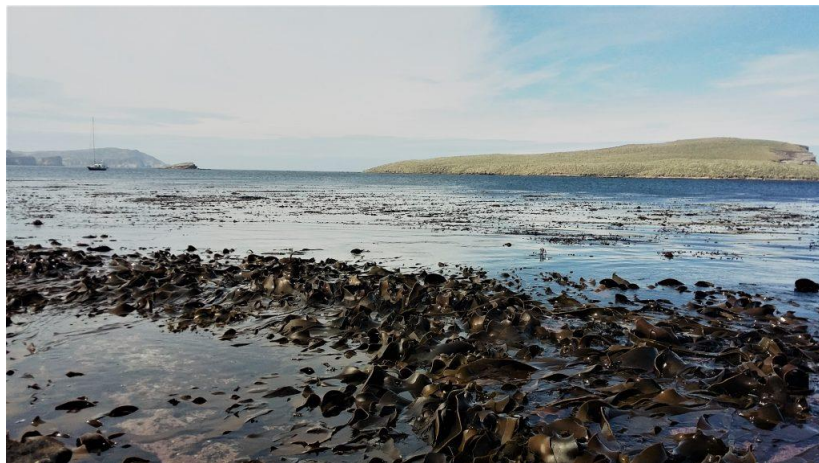
PhD student Amy Guest preparing for work on Bird Island.

Amy is working to document sub tidal biodiversity (0-5m), a key gap in knowledge because marine surveys often focus on diveable depths (~5-20m). This work complements Narissa's research goals focused on seafloor biodiversity at deeper depths below ~50m to capture unique and understudied biodiversity in the Falkland Islands.

Due to limitations of weather and ROV use, no corals were collected and no video below ~40 meters was acquired, unfortunately. However, three new coral sites were identified at Bird Island, including GoPro video footage of their field-like abundance, similar to the density found in other locations such as the Patagonian Fjords and Antarctica – confirming that Bird Island hosts important mesophotic coral biodiversity and ROV footage showed aggregations of *Paralomis granulosa* (snow crabs) possibly exceeding 10,000 individuals at ~35 – 40 meters,

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suggesting that other unique high density populations also thrive in the region.. In all instances (and in combination with past diver surveys to ~20m), footage illustrates high biodiversity and justification for Marine Management Area (MMA) designation due to the unique ecosystems across the depths explored to date (~5m – 50 meters). Ideally these insights will inform a more extensive and well-funded research expedition in the future that includes the capacity to sample at deeper depths.



*Tide pool and kelp habitat at Ten Shilling Bay, with the yacht Saoirse in the background. Kelp species *Macrocystis pyrifera* (giant bladder kelp) and *Durvillaea Antarctica* (southern bull kelp) are important biodiversity and blue carbon habitats in the Falkland Islands and understanding how connected (or the inverse*

isolated) locations are from one another helps inform conservation management. Specimens collected from nine sites will contribute to local and global scale genomics research.

*Marine garden, including *Errina* sp. corals photographed in 2021 at three new sites from ~40 – 50m off Bird Island, one of the proposed Marine Management Areas locations in the Falkland Islands. The coral genus *Errina* is one of the most species rich genera of *Stylasteridae* (lace)*



corals and isolated field-like aggregations have been documented in Antarctica, the sub-antarctic, Patagonia and now potentially in the Falkland Islands as well.

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Haliclona sp. sponge from BoxFish ROV footage near Albemarle at ~20 meters, West Falklands. Sponge diversity is high in the Falklands, particularly in deep locations like the Burdwood Bank. The sponge expert Dr. Claire Goodwin was visiting the Falklands in early November and kindly identified this sponge image

and provided an expert tutorial on taxonomic tools for SAERI staff members Tabitha Pearman, Amy Guest and Narissa Bax. © Keri-Lee Pasuk Patagonia Projects



*An aggregation of *Paralomis granulosa* (snow crabs, or Centollón) at ~35-40 meters off Bird Island. This species is known to have lecithotrophic larvae, meaning the larvae are carried on ocean currents with a yolk sack that provides sustenance during the dispersal stage. This species is found in Patagonia and the Falkland Islands –*

how much connectivity (gene flow) exists between the two geographic locations is unknown. If a species is connected to other populations (rather than isolated), its capacity to withstand change and thrive into the future is more likely – an important aspect of marine conservation. © Keri-Lee Pasuk Patagonia Projects

Amy's work – Saoirse Bird Island Trip

BRUV deployment videos across sites at Port Stephens Harbour and Bird Island

During bad-weather days when trips to Bird Island were not plausible, data collection was able to continue at five sites across Port Stephens Harbour using a Baited Remote Underwater Video (BRUV). The BRUV included a 'chum' mix of bait in a mesh bag securely attached to a GoPro and weighted mount, deployed for at least 1 hour. The BRUV captured footage of an array of predators and scavengers, namely crabs (*Peltarion spinulosum*, *Eurypodius latreilii*, *Eurypodius longirostris*), fish (*Patagonotothen elegans*, *P. tessellata*), isopods, southern red octopus (*Enteroctopus megalocyathus*) and also a pinniped during deployment at Bird Island (Fig 1a).

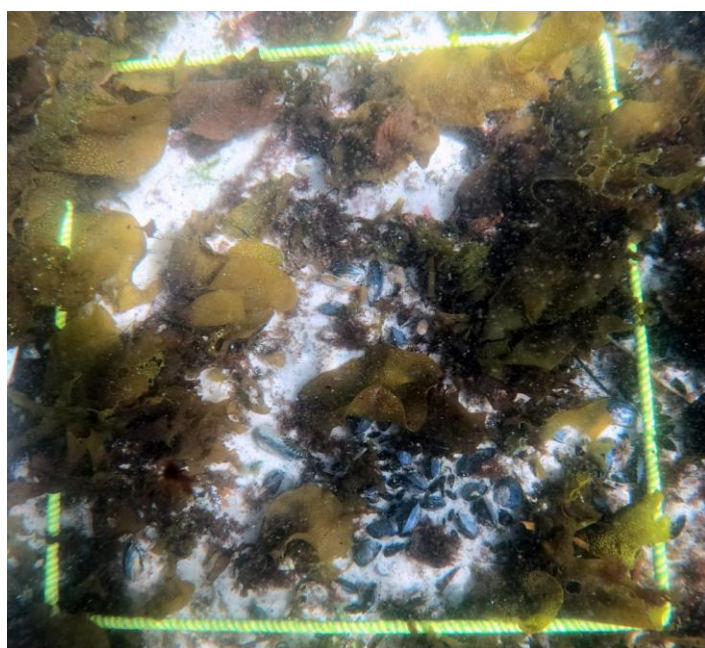
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This data collected using the BRUV is the first study of its kind to investigate predator and scavenger presence, absence and abundance in the shallow marine depths of the Falkland Islands across different sites, building further on the scientific knowledge gaps.



Fig.1a Spider crab (*E. longirostris*) and rock cod (*P. elegans* and *P. tessellata*) surrounding bait bag, BRUV footage still, Port Stephens Harbour

Transect at Lucas Bay, Stoney Ridge



Methodology included snorkelling and taking photos across a 25m transect running parallel to the shore with the use of a weighted measuring tape and a 0.25m² quadrat. Photographs were taken using a GoPro at 1m intervals along the transect at depths of between 0.5m and 1m, taking in to account the low tide (Fig 2a).

Fig. 2a Blue mussels (*Mytilus edulis*) and different algae species inside PhotoQuadrat, Lucas Bay

The photos will later be analysed using photo software PhotoQuad and the subsequent data exported to Excel files will be analysed at a later date, contributing to the 'spatial ecology' chapter of the PhD. This work will also help to build a picture of the biodiversity in the Falkland Islands shallow marine depths, addressing a crucial knowledge gap.

Starfish measurements and genetics collections at Port Stephens Harbour

Finally, a third component of Amy's PhD work completed included taking body measurements, brooding status and any feeding details of sea stars *Anasterias*

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Antarctica from the eastern end of Port Stephens Harbour (Albemarle land). A small snippet of arm was then cut and placed in 96% ethanol and the sea star was released for genetics. These samples will be used for DNA analysis as part of the PhD's phylogeography chapter that aims to help understand further gaps on population connectivity's across the Southern Cone, including the Falkland Islands and southern South America.



Saorise crew and science team: Narissa Bax, Greg Landreth, Amy Guest and Keri Pashuk

Acknowledgements

Amy's PhD project would not be possible without core funding from FIG's CDS fund, the John Cheek Trust and RBC Ltd. Thanks equally go to collaborator Dr Ceridwen (Crid) Fraser at the University of Otago, New Zealand and the John Ellerman foundation for providing funding to Narissa's work.

The SAERI team would also like to kindly thank the land owners for their permission to access all of the sites mentioned, including Paul Robertson at Port Stephens, Jennifer Hill at Stoney Ridge and the Falkland Islands Government for granting access to Bird Island. Finally, special thanks go to Shaun May, Tanya Ford and the family at Albemarle as well as Tex and Fayan Alazia at Port Edgar for their kind hospitality.