PROJECT REPORT

ENHANCING LEGACY AND CAPACITY FOR MARINE & COASTAL ENVIRONMENTAL CO-ORDINATION IN THE FALKLAND ISLANDS

PREPARED BY N BAX

27/05/2022 VERSION 3

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ABOUT THE SOUTH ATLANTIC ENVIRONMENTAL RESEARCH INSTITUTE (SAERI)

SAERI was a Falkland Islands Government initiative and operated as an arm's length government department from 2012 until June 2017. From 1 July 2017, however, it became a fully-fledged and independent Charitable Incorporated Organisation (CIO) operating out of its hub in Stanley, Falkland Islands. Its origins remain a fundamental aspect to its growth and its future.

SAERI undertakes research in the UK Overseas Territories (UKOTs) and other Atlantic and Caribbean coastal communities, from the tropics down to the ice in Antarctica. Its vision is to deliver world-class environmental research that informs the effective stewardship of our planet. Its mission is to grow a sustainable environmental research institute in the Falkland Islands, and to build research and environmental stewardship capacity within and between South Atlantic Overseas Territories.

Strategically, SAERI aims to be a world-class research institute that teaches students and builds capacity within and between the South Atlantic Overseas Territories. In order to achieve that it must be:

- Project optimised – by operating as a streamlined and efficient organisation through the Focal Areas;

- Fully funded – Falklands registered limited company is able to fund SAERI overheads, ensuring SAERI ultimately becomes fully financially independent from Falkland Islands Government and by ensuring that all grant applications (where possible) contain cost of seat coverage; and

- The holder of proprietary environmental knowledge of the South Atlantic – by continuing to provide the research expertise offered to date.

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1. PROJECT BACKGROUND

SAERI recruited a non-project based, co-ordination role within the organisation to ensure the continued focus on, and development of, marine and coastal environmental management in the Falkland Islands. Thanks to funding from the John Ellerman foundation the role of Marine and Coastal Programme Co-ordinator (MCPC) was secured at SAERI for a 2.5-year period. This post has been created to build capacity and sustainability in ocean conservation, management and research co-ordination by continuing to work with Falkland Islands Government (FIG) and stakeholders, providing evidence to support the proposed Marine Managed Areas (MMAs), establishing a framework to monitor the proposed MMAs and consolidating successful work that has already been completed including fine-scaling the design of the MMAs.

In recognition of the need for holistic marine management, and in support of the UK's commitments to meet the Aichi Target 11, the Falkland Islands started a process of Marine Spatial Planning (MSP) in 2014, which was followed by an Assessment of Fishing Closure Areas as Sites (AFCAS) for wider management of the Falkland Islands' marine environment. The aim of the AFCAS process was to provide evidence-based recommendations for a network of marine protected areas. The AFCAS process focused on areas that are closed to fishing or subject to low fishing impact (termed 'marine wilderness areas' in the literature), which have irreplaceable biodiversity and are ecologically representative, but presently do not have a legal framework for protection. The AFCAS study prioritised four main marine wilderness areas as potential MMAs. This MCPC post will secure long-term capacity and sustainability in ocean conservation, management and research co-ordination by continuing to work with FIG and stakeholders, providing evidence to support the proposed MMAs, establishing a framework to monitor the proposed MMAs and consolidating successful work that has already been completed.

The MCPC role is responsible for working with partners, stakeholders and the local community to deliver the three main outcomes:

Outcome 1: The local community will be engaged in the Marine and Coastal environment of the Falkland Islands, and there will be a strong commitment from FIG to lead on Marine and Coastal Environmental coordination into the future.

The community and people are at the heart of the Marine and Coastal environment of the Falkland Islands. The MPCP will develop an outreach, education and communication plan to disseminate the success of this multi-year partnership project. The role will also work with the FI education department to create education packages on the marine environment that could localise elements of the curriculum.

Outcome 2: Marine Management Areas on the Falkland Islands will be strengthened through the development and implementation of the first MMA Monitoring plans, and the creation of 'mixed sustainable use zones'.

This is a critical time in the development of FI MMAs. We have now entered into a period of policy formulation, management plans and monitoring design through a series of workshops with FIG and the major stakeholders. This will result in a 'designation package'. However, there is currently little resource (human or financial) for this to be implemented going forward. Without this post, the process could stall. Critically, the MCPC role will lead, in collaboration with FIG, 1) the finer scale design and implementation of monitoring plans for the MMAs and coastal zones, 2) use empirical data to sub-categorise the 'Mixed Sustainable Use Zones' within the nearshore MMA.

Outcome 3: The Marine and Coastal Environment of the Falkland Islands will be better understood through further funded innovative research, and robust data management.

A flexible and adaptive process is the philosophy of the FI MSP/MMA process is key to its delivery, as marine systems are highly dynamic in geographical space and time. New data will allow for better management, for informed monitoring and for a better understanding of this highly diverse and productive environment. The role of the MCPC will be to co-ordinate ongoing and new research and write grants for relevant research to the MSP/MMA process. A central role of the MCPC with support from the IMS-GIS Centre Manager will be to: maintain the MSP and coastal mapping toolboxes and update new marine data collected; develop data collection protocols, recording forms and platforms for monitoring and future research be responsible for collating metadata for all activities.

This report covers the period from December 2021 to May 2022. The focus of this reporting period was Outcome 2. Specifically, SAERI developed a technical document to support the public consultation on the designation of proposed Falkland Islands MMAs in April 2022. The technical document is a key output as it provides the scientific evidence to support the FIG led designation of the proposed MMAs.

2. KEY ACHIEVEMENTS (DECEMBER 2021 TO MAY 2022)

The marine and coastal environments of the Falkland Islands are spectacular – they support rich and diverse ecosystems and are incredibly productive. They provide feeding and breeding habitats that support globally significant populations of seabirds and marine mammals, both in terms of conservation status and population size. The inshore environment is biodiversity rich, and includes some of the world's densest giant kelp forests that protect the islands coasts from sub-Antarctic storms, provides vital nursery grounds for commercial and non-commercial fin-fish and squid species and provide key trophic links to the outer Patagonian shelf system.

The proposed Falkland Islands MMAs are the most significant development in the conservation of the Falkland Islands marine environment since the since the establishment of the Falkland Islands fishery conservation zone and fisheries management regime in 1986. The proposed MMAs, if designated, will protect near pristine marine wilderness areas that have little or no fishing impact,

have irreplaceable globally important biodiversity and are ecologically representative of the Falkland Islands marine ecosystems, but presently do not have a legal framework for protection. The proposed Falkland Islands MMAs would encompass 15% of the Falklands marine waters (67,000 km^2).

To further support FIG and provide a clear evidence-base for future planning, we compiled a comprehensive technical document to feed into the MMA public consultation that was held in April and May 2022. The technical document (also submitted to John Ellerman Foundation) was over 250 pages and included chapters spanning the wealth of data collected on inshore and offshore biodiversity, seabirds and marine mammals, and potential economic impacts. The technical document represents a significant project milestone, centralizing the data available to support the proposed MMAs, and providing a suit of in-depth analysis that ensures the proposed MMAs are supported by data.

It remains vitally important that FIG lead proposed MMA designation rather than an NGO, because the development of policy, and putting in place robust legislative frameworks for MMAs, can only be achieved if FIG have full ownership and there is political endorsement. However, the compilation of the technical document, and much of the research presented, was made possible by funding from the John Ellerman Foundation and their financing of the MCPC role, which has enabled SAERI to continue to support FIG through the provision of expertise, and advice to contribute to evidence-based decision making.

The proposed MMAs (Figure 1) were selected based on the fishing closure areas initially identified in the Assessment of Fishing Closure Areas as Sites (AFCAS) project, and are supported by further research that highlights the importance of these areas for biodiversity, and in some cases for social and economic activities. In order to balance the need for both biodiversity protection and current social and economic needs two types of area protections were proposed with green zones representing National Marine Nature Reserves (NMNR) designation and blue zones representing Sustainable Multi-use Zones (SMZs), with some ongoing human-use. These areas represent the current proposals for MMAs, and the public consultation noted that ''other areas may be added in the future, once policy development is complete and criteria are agreed''.

We also note that there is considerable interest in designating Key Biodiversity Areas (KBAs) in the Falkland Islands from both local and international NGOs, and in understanding whether KBAs can inform the location and scale of proposed MMAs. KBAs are sites that "*contribute significantly to the persistence of global biodiversity*". KBAs differ from proposed MMAs, most notably because, unlike MMAs, KBAs are non-statutory, and have no management plan or objectives. Systematic conservation planning on the basis of KBAs is challenging in the Falkland Islands, because almost all of the surrounding ocean is likely to be a KBA (over 70 % based on at-sea distribution of seabirds and seals alone). In addition, although KBA threshold-based criteria are standardized, repeatable, and globally applicable, the methods used to identify areas to assess against KBA criteria are not standardized for tracking and survey data. This means KBA size will vary, sometimes by an order of magnitude, depending on the methods used. Therefore, it is difficult to use KBAs to inform the location and scale of proposed MMAs and to generate a robust science narrative that underpins protected areas. A non-technical summary is available here), or within the technical report also submitted.

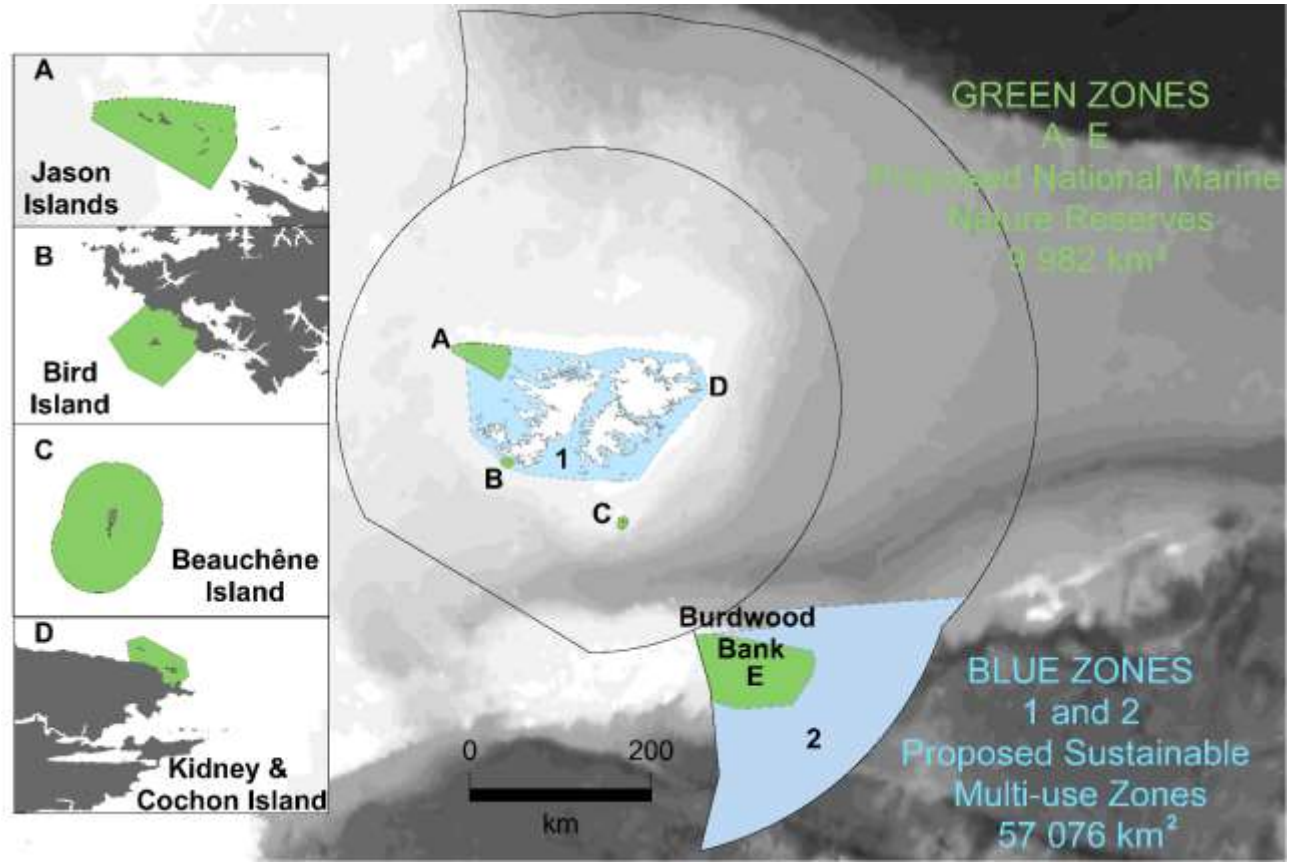


Figure 1: The proposed Falkland Islands Marine Managed Areas (MMAs). The MMAs are near pristine marine wilderness areas, which are closed to fishing or subject to low fishing impact and are important sites for a diverse range of taxa and habitats.

3. SUMMARY OF THE TECHNICAL DOCUMENT BY CHAPTER

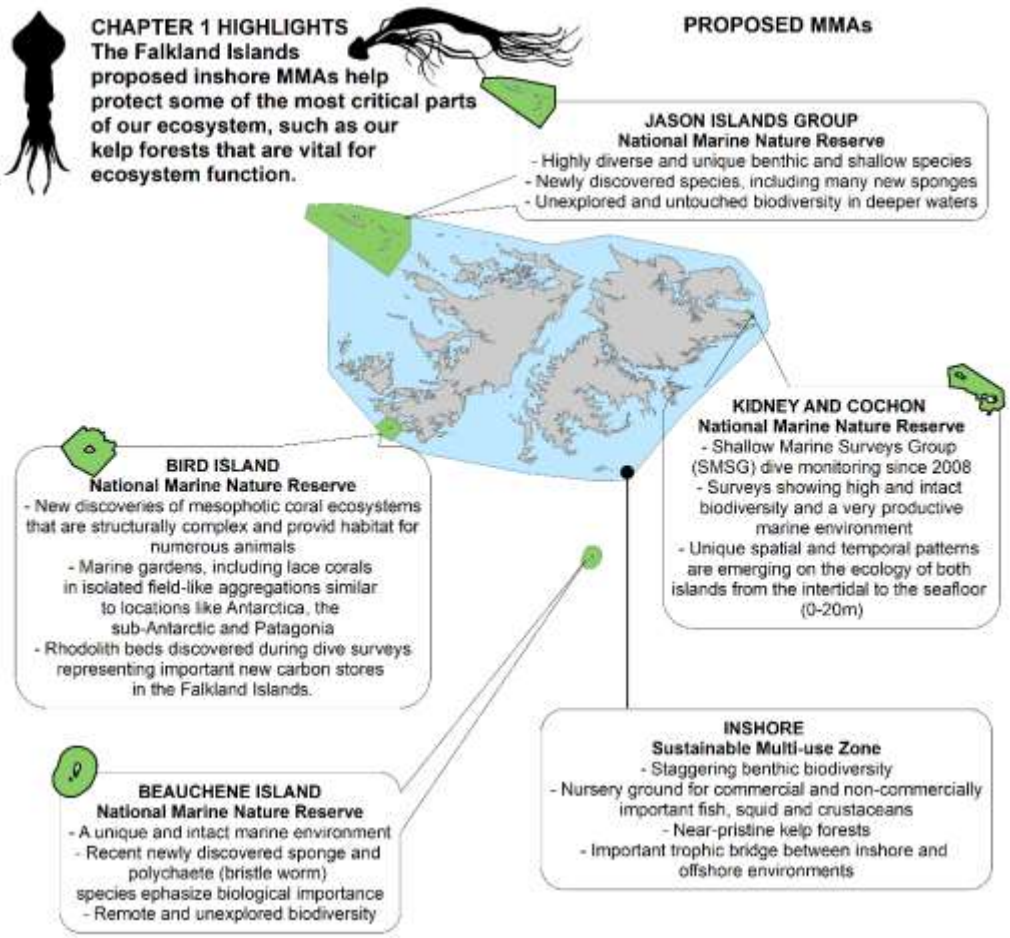
The SAERI technical report encompassed the breadth of available data that was used to help inform the proposed MMAs.

CHAPTER 1: INSHORE MARINE MANAGED AREAS

Chapter 1 focused on inshore data to support the conservation of Kelp forests, and the unique benthic diversity and ecosystems found within them, particularly in relation to the inshore SMZ. This proposed MMA comprises all of Falkland Islands internal waters as measured from 3 nm from the baseline inwards to the intertidal highwater mark (Figure 1). This area was identified as important as it is productive, near- pristine when viewed against other temperate ecosystems, with high diversity which is important for supporting the healthy function of the shelf ecosystem offshore. In this manner, kelp is seen as an ecosystem engineer in the function of this inshore system providing multiple services to the Falkland Islands and international community. This includes mitigating storm damage, nutrient cycling and providing habitat and productivity to harvestable resources indirectly

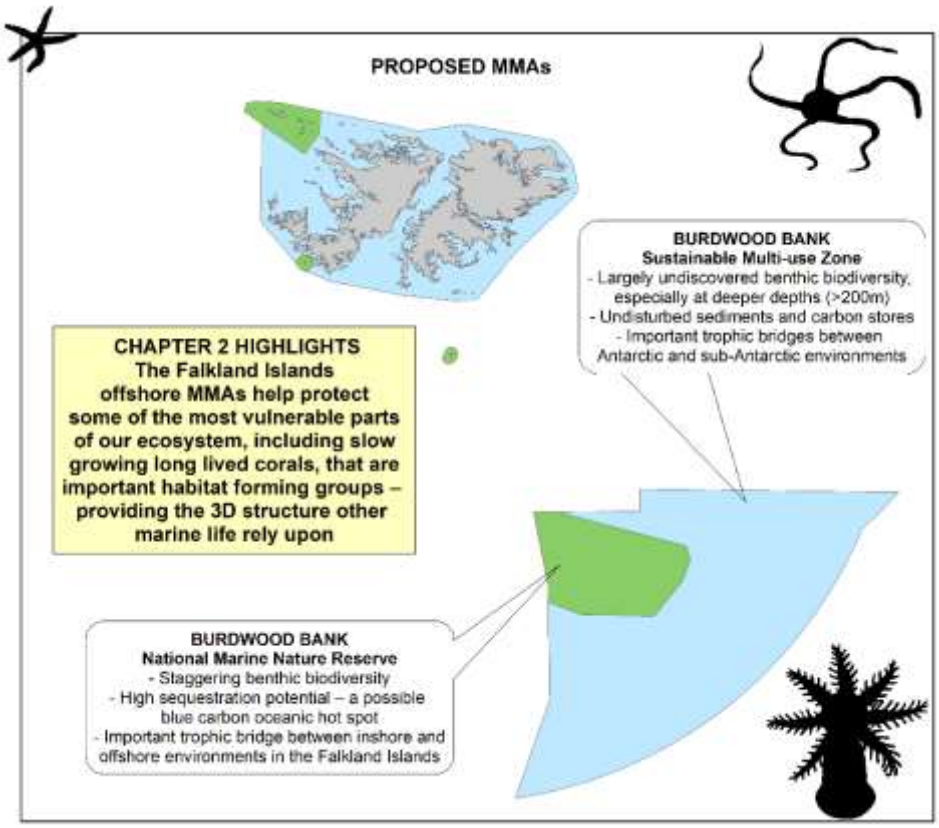
through 'trophic bridges' or directly as nurseries or habitat at differing life history stages for many species. The Chapter also explored the reasons for Falkland Islands high inshore biological biodiversity (Chapter 1.2). During the last glacial maximum (LGM / ice age), distributions of taxa were known to retreat to refugia for recolonisation. The Falkland Islands have been shown to be one such refugium, being free from ice during the LGM, with species rapidly re-dispersing to Patagonia and the surrounding sub-Antarctic from the Falklands' 'founder' populations after the ice retreated. This led to high species diversity with high genetic diversity at population levels and is a key feature of ongoing research.

Chapter 1 also provides the first insights into intertidal spatial community dynamics, and examines subtidal community structure around the Kidney Island National Nature Reserve in bathymetric and temporal scales with new species of fish, opisthobranch molluscs and crustaceans being described. Inshore research also continues to be a key priority within SAERI and with their national and international partners. There is now the opportunity to move into much deeper water, from SCUBA depths (<=20 m) with the use of side-scan sonar, Remotely Operated Vehicles (ROVs), drop down cameras, small Agassiz trawls and plankton nets. This will ensure future scientific discoveries, which will no doubt re-enforce the critical importance of these near-pristine marine areas await.



CHAPTER 2: OFFSHORE MARINE MANAGED AREAS (BURDWOOD BANK)

Chapter 2 focused on the unique biogeographic province associated with seafloor habitats and open ocean seascapes of the eastern Burdwood Bank (Figure 1). The Burdwood Bank hosts unique and fragile seafloor taxa (e.g. corals and other delicate sessile animals), known as Vulnerable Marine Ecosystem (VME) indicator taxa. The proposed Burdwood Bank National Marine Nature Reserve (NMNR) and Sustainable Multi-use Zone (SMZ) will help to ensure the long-term resilience of shelf and slope habitats and dependent species, as well as the sustainability of economically important fisheries by protecting connectivity between neighbouring biodiversity refugia. There is also an emerging basis for blue carbon research in the Falkland Islands. Blue carbon is broadly defined as the CO_2 absorbed from the atmosphere by marine ecosystems, which is ultimately sequestered for 100s to 1000s of years. Our research, supported by the John Ellerman Foundation, indicates that the Burdwood Bank hosts high carbon sequestration potential. Newly identified carbon rich biodiversity habitats including abundant stylasterid (lace) and scleractinian (cup) coral assemblages add to the conservation significance of this region. Such communities are hypothesized to be particularly vulnerable to the effects of physical disturbance, exemplifying their designation as VME indicator taxa. A focus on maintaining ecosystem function at the site of sequestration, where it is most crucial to long-term climate mitigation, includes conservation of VME taxa (such as corals) and the ecosystem services a biodiverse seafloor habitat can provide.



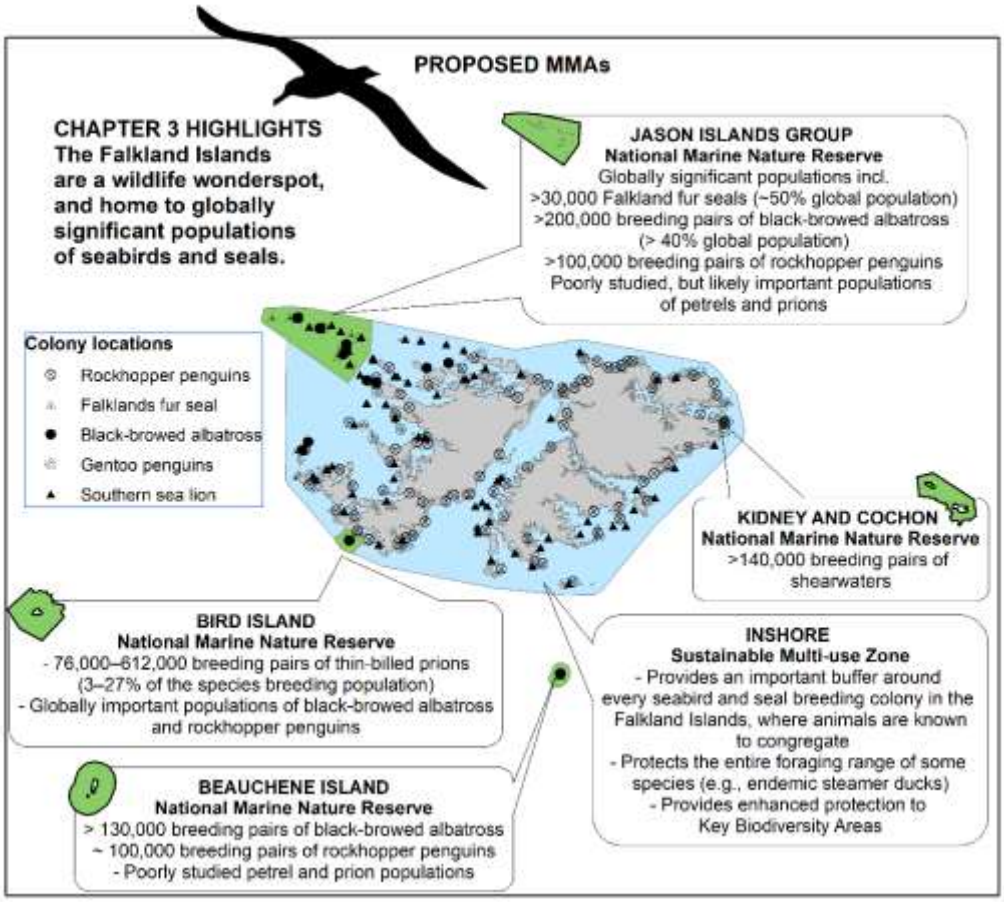
Furthermore, the high biological diversity of fish and squid communities on the Burwood Bank, when compared to other parts of the Falkland Islands, is also presented. This work illustrates the different community structure on the shelves and slopes of the Falklands Islands and High Seas areas (outside of national jurisdiction), with the Burdwood Bank showing greater dissimilarity. Some of the reasons for this include the habitat complexity of the seamount / ridge characterised by the Burdwood Banks unique geomorphology and proximity to the Antarctic Circumpolar Current (ACC), resulting in a meeting of sub-Antarctic and Magellanic fauna.

© SAERI, juvenile *Astrotoma agassizii* and Stylasteridae coral from the Burdwood Bank

CHAPTER 3: MARINE HIGHER PREDATORS

Chapter 3 highlighted the importance of coastal and inshore areas which provide feeding and breeding habitats that support globally important populations of seabirds and marine mammals. This chapter addressed knowledge gaps on the foraging areas of seabirds and marine mammals, and how they overlap with proposed MMA boundaries. The proposed inshore MMA, which extends 3 nautical miles from the Falkland Islands baseline, overlapped extensively with areas used by seabirds and seals. This reflects breeding colonies being distributed around much of the Falklands coastline, and animals spending time commuting to and from breeding colonies (Figure 2). To place the conservation value of the proposed MMAs into a global context for marine predators, and identify other important candidate areas for marine protection using standardised criteria, we also assessed how proposed Key Biodiversity Areas (pKBAs) overlapped with the proposed MMAs. The results revealed that almost all of Falkland Islands marine environment is likely to be a KBA (> 70 % of Falkland Islands Conservation Zones). This chapter also collated survey data for Peale's dolphins, Commerson's dolphins and sei whales. The available cetacean data highlights the importance of Falkland Islands nearshore waters, and the proposed inshore MMA in particular. The proposed MMAs

offer enhanced protection for the designated sei whale KBA (99 % of confirmed sei whale sightings occurred within the proposed MMA boundaries).



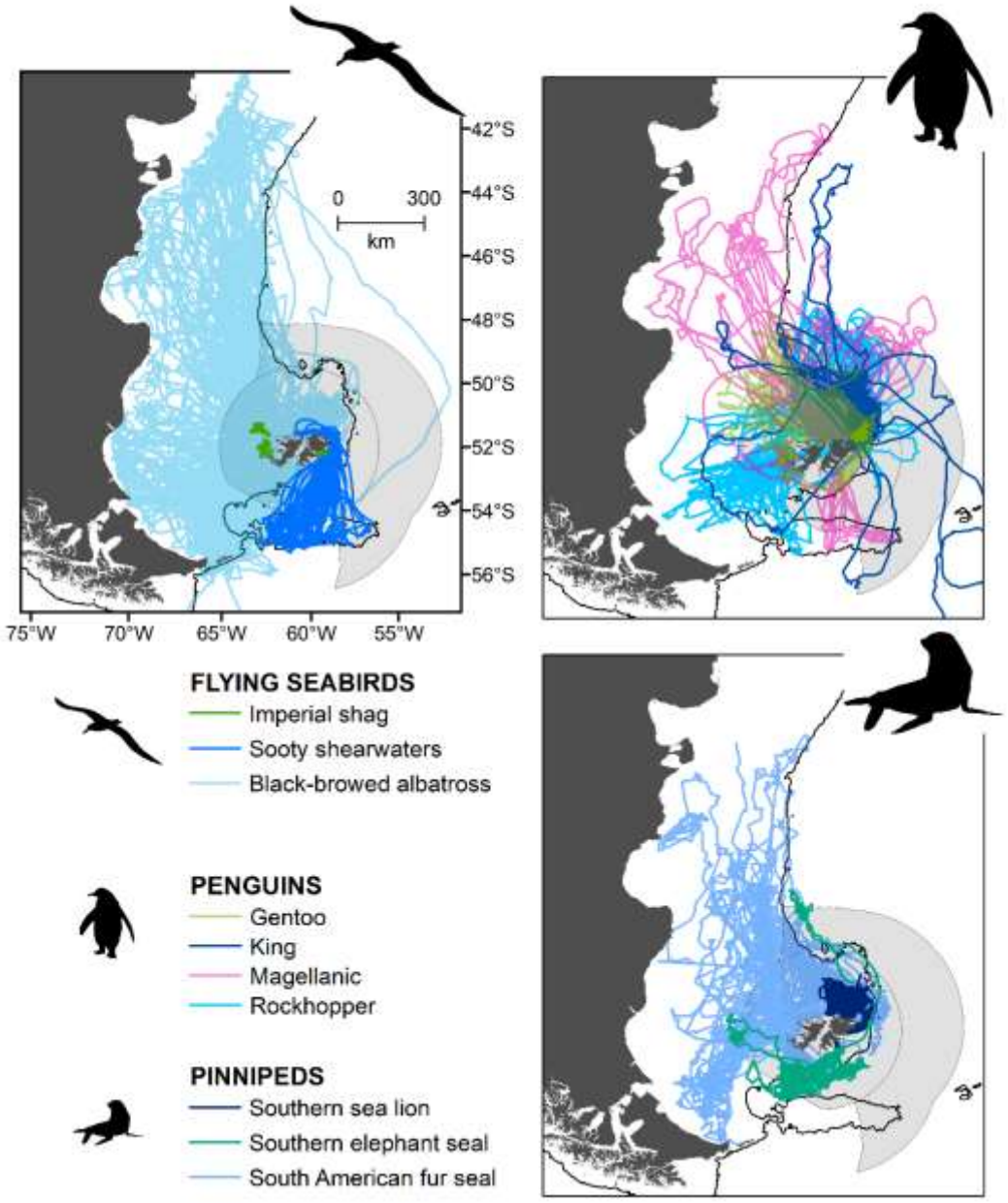


Figure 2: Summary of biotelemetry and biologging data for the Falkland Islands for the period 2009 - 2020. Black line = 400 m bathymetric contour. Grey shading = Falkland Islands Conservation Zones. Source: Baylis et al. 2021

CHAPTER 4: ECONMIC IMPLICATIONS

And finally, **chapter 4**, explored the social and economic data informing the critical importance of sustaining the marine economy, through ecosystem services, sustainable fisheries and tourism, and the Falklands way of life. The proposed Burdwood Bank SMZ is the only MMA to overlap with the commercial fishing sector and the SMZ design, as presently evaluated, is compatible with sustainable fishing, such as the Marine Stewardship Certified Falkland Islands longline fishery. Hence, negative impacts to the current commercial fishing operations are not anticipated currently. The NMNRs and the inshore SMZ are not expected to have significant economic impacts on current offshore fishing activity. However, several small-scale artisanal fisheries and recreational fisheries were unlikely to be compatible with the proposed National Marine Nature Reserves. The remaining inshore area around the Falkland Islands is a Sustainable Multi-use Zone, which is compatible with these small-scale artisanal and recreational fisheries. For the oil, gas and mineral sector, there is no overlap between current or currently proposed industrial activity (or licence blocks) and MMAs.

4. NEXT STEPS

SAERI is working towards the overall MCPC project objectives by engaging and supporting FIG where possible following the public consultation. It is expected that, so long as the MMAs progress into legislation, the next stage of the process will involve a monitoring and research plan in collaboration with local stakeholders, and substantial public engagement that presents the science behind MMAs (school engagement, public talks, Twitter, Facebook, SAERI website). The MCPC will lead SAERI's public engagement, and develop monitoring and research plans in support of MMAs. The MCPC will also continue to co-ordinate research. For example, research that seeks a broader understanding of Blue Carbon as a tool to inform future marine spatial planning (see our recent MCPC paper: Towards incorporation of blue carbon in Falkland Islands marine spatial planning: a multi-tiered approach in the journal Frontiers in Marine Science research topic - Blue Carbon: Beyond the Inventory: https://www.frontiersin.org/articles/10.3389/fmars.2022.872727/full).

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