Darwin Plus Main: Annual Report

To be completed with reference to the "Project Reporting Information Note" (https://darwinplus.org.uk/resources/information-notes)

It is expected that this report will be a **maximum of 20 pages** in length, excluding annexes)

Submission Deadline: 30th April 2024

Submit to: BCF-Reports@niras.com including your project ref in the subject line

- Darwin Plus Project Information

Project reference	DPLUS168
Project title	Understanding increased FI seal bycatch to inform bycatch Action Plan
Territory(ies)	FI
Lead Partner	South Atlantic Environmental Research Institute (SAERI)
Project partner(s)	Falkland Islands Government Department of Natural Resources – Fisheries (DNR-Fisheries) Falkland Islands Fishing Companies Association (FIFCA)
Darwin Plus grant value	**363,563**
Start/end dates of project	June 2022 – May 2025
Reporting period (e.g. Apr 2023-Mar 2024) and number (e.g. Annual Report 1, 2)	Apr 2022-Mar 2023 Annual Report 2
Project Leader name	Dr Alastair [redacted]
Project website/blog/social media	Organisation: https://www.south-atlantic-research.org/ SAERI Twitter: @SAERI_FI SAERI Facebook: https://www.facebook.com/S4ERI/ SAERI blogs: https://www.south-atlantic-research.org/news/
Report author(s) and date	Dr Javed [redacted] & Dr Alastair [redacted] 12/04/2024

1. Project summary

FI is home to globally significant populations of seals and seabirds, including > 50% of the global population of South American fur seals. Seal bycatch and seal-fishery interactions has historically been low. However, in 2017 seal-fishery interactions increased by > 400% in the FI squid fishery. The introduction of SEDs reduced seal mortality substantially, but interactions continue at unprecedented levels and the seal bycatch issue continues to evolve, with higher levels of interactions now being reported in the fin-fish fishery. At present, seal-fishery interactions and SED effectiveness in the fin-fish fishery is poorly understood due to limited observer coverage. In addition, factors contributing to an increase in seal-fishery interactions are presently unknown. Combined, this lack of baseline data limits our ability to adapt and evolve mitigation efforts and national action plans

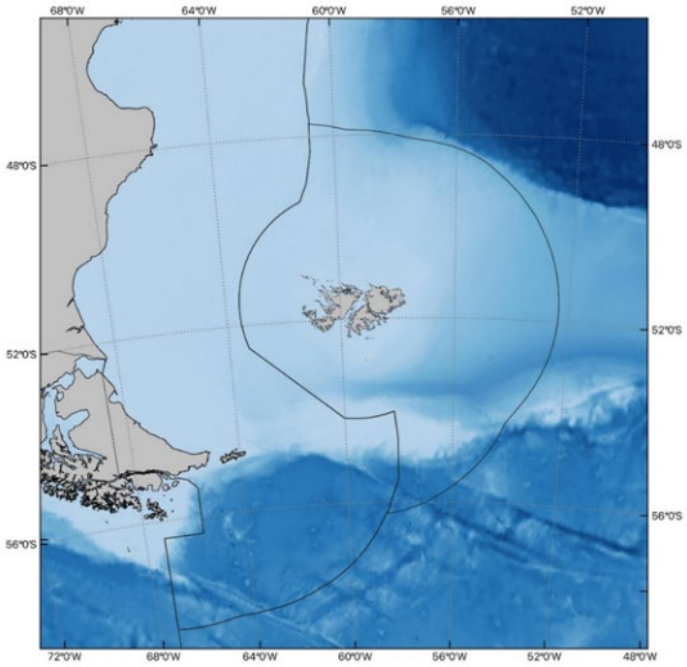
Work Package (WP) 1 – Trial and deploy net cameras
The FI squid trawl fishery has 100% observer coverage. In contrast, observer coverage in the fin-fish fishery is low (< 10%) and seal-fishery interactions are comparatively poorly understood.

We will trial net cameras on the DNR-Fisheries pre-recruitment surveys with the outlook to subsequently deploy on fin-fish vessels. The data collected will allow us to quantify the depth and frequency of net entry by seals, seal behavior, and interactions with SEDs OR SED efficiency. Ultimately, data will enable a better understanding of seal-fishery interactions within the fin-fish fishery.

WP2 – Occurrence of interactions in space and time
During the initial bycatch 'wave' in 2017, seals were brought back to the laboratory. Necropsies revealed that about 30 % were lactating female fur seals – implying colony origin was FI given the distance to other breeding colonies (e.g., Uruguay). To better understand occurrence of interactions we will: (1) Track seal movements using satellite tags to understand behaviour and quantify spatial and temporal overlap with fisheries. (2) Determine whether seals are following vessels and are habituated to net feeding or whether interactions are driven by proximity to seal colonies.

WP3 - Factors that predict and increase bycatch risk
Develop mathematical models that combine observer data and tracking data (see WP 2) with environmental and operational data to quantify which variables explain and predict seal-fishery interactions. Provide recommendations on how findings can support and inform management.

WP4 – Trophodynamic model and trophic changes over time
Use dietary data to quantify trophic links between seals and prey to facilitate ecologically sustainable development frameworks that are key to ecosystem-based fisheries management – a long-term goal of the DNR-Fisheries. We will Ecopath and Ecosim modelling approach and information on the distribution, abundance, and diet of fin-fish, squid and seals to understand their ecological roles and the importance of commercial caught species in seal diet.
Recognizing limited seals dietary data exists, we will use DNA analysis to enhance knowledge contemporary diet, and compound specific stable isotope analysis using an existing seal tooth collection to understand dietary changes over time.



The Falkland Islands in relation to southern South America and their Conservation Zones.

2. Project stakeholders/partners

The project was designed as a collaborative project with the Falkland Islands Government (FIG) Department of Natural Resources (DNR) - Fisheries and the Falkland Islands Fishing Companies Association (FIFCA). Both FIG and FIFCA are also key stakeholders. The project

has therefore, worked closely with both FIG and FIFCA during the project set-up phase and support received from our project partners to date, is exceptional.

Since the last annual report, the project continues to actively engage with project partners and stakeholders.

Specifically:

- All project partners are present as either co-authors or in the acknowledgements of the published paper in Global Ecology and Conservation, based on work from Work Package 2. Available open access here: https://doi.org/10.1016/j.gecco.2023.e02615.
- DNR-Fisheries have been actively involved in the collation of spatial, environmental and operational fisheries datasets, relevant to Work Package 3. They have also facilitated the use of their on-site laboratory to process seal biological samples, relevant to Work Package 4.
- All stakeholders have been actively promoted in various SAERI social media posts that have received significant public engagement (see screenshot examples below).
- FIFCA and DNR-Fisheries continued to work with the Net Camera Specialist to identify several opportunities for further camera deployments.

All partners are involved in planning, monitoring and evaluation through the Project Management Group. Our second Project Management Group meeting was held in November 2023. Meeting notes are available on request.

3. Project progress

3.1 Progress in carrying out project Activities

1.1 Project Manager (x1) and Specialist to lead net camera deployment (x1) recruited

Project Manager (Dr Javed [redacted]) and net camera specialist (Megan [redacted] were successfully recruited and commenced in January 2023.

1.2 Net cameras trialled with DNR-Fisheries

As part of this project, we set out to trial net cameras on the DNR-Fisheries bottom trawl vessels within the Falkland Islands fishing fleet. This work was successfully completed by our net-camera specialist. Over a seven-month period between January- August, net cameras were deployed on 8 different fishing vessels. For each trawl, different positions and orientations on the net were tested in order to find the best view of the SED. Many different camera configurations and parameter set-ups were also tested, in order to find the best combination of settings to provide the best quality data. Like all gear trials, there was some troubleshooting required, which naturally comes with developing, testing and deploying technical equipment. Megan has been in communication with the manufacturers, Williamson and Associates (WASSOC) to troubleshoot the issue encountered. This involves working to better protect and utilise the cameras on near-bottom trawls. Overall, our deployments captured 350 hours of underwater footage. A final report on the net camera trials is available upon.

1.3 Rollout of net cameras to fishing vessels with DNR-Fisheries

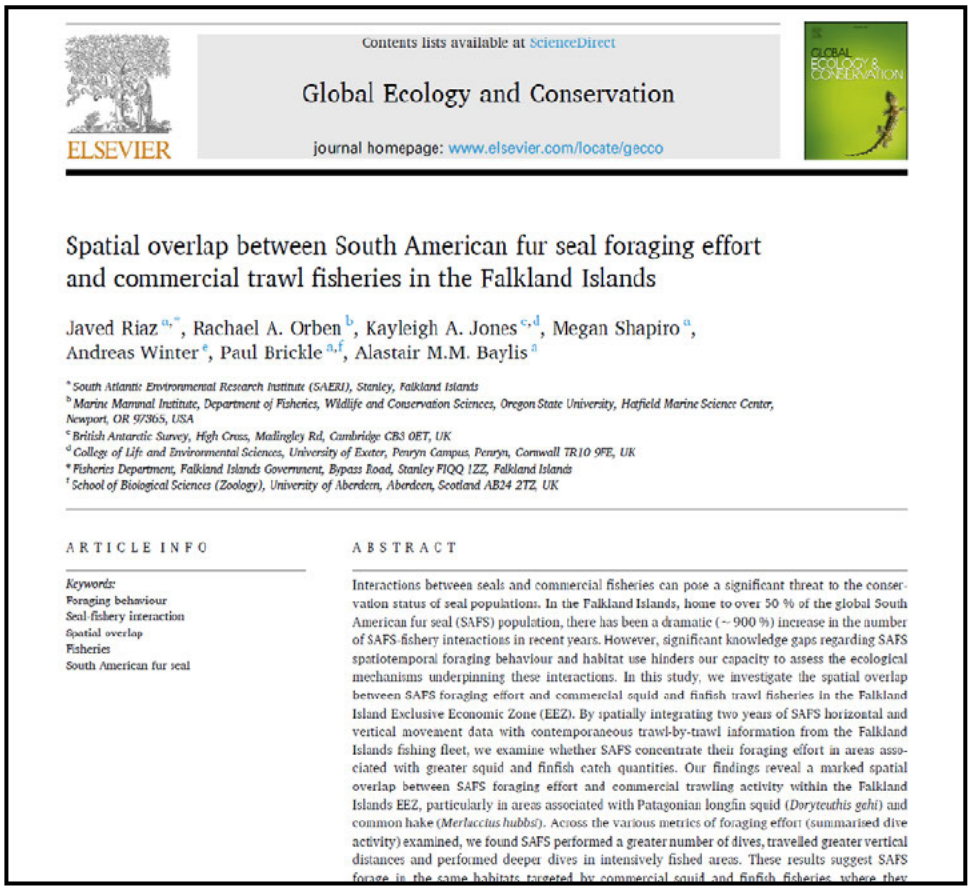
Over a seven-month period between January- August, the specialist worked with FIFD and FIFCA to facilitate eight deployments of trawl net cameras on two Loligo and six finfish vessels. In total, this captured 350 hours of underwater footage. With this collective effort, the specialist was able to create a protocol for fisheries observers and fishermen to follow, so that cameras can continue to be deployed across the fleet, independent of the specialists' oversight/technical expertise.

2.1 Deploy biologging tags on seals

This activity is now completed. Over a three-week period in August 2023, fieldwork was conducted at the Bird Island fur seal colony. This trip was a huge success. We deployed 19 satellite tags on male fur seals. These satellite tags will collect several months' worth of data for each seal, providing us with critical information about their movement ecology and habitat use. These tracking efforts are poised to generate one of the largest movement datasets available for this fur seal species anywhere in the world. With this information, we'll be able to examine the extent and frequency in which male fur seals are interacting with the Falkland Islands fishery.

2.2 Results presented in a report delivered to PMG. Report re-focused for a scientific journal.

Research conducted as part of this work package has recently been published in a highly regarded and open-access international scientific journal, *Global Ecology and Conservation*. This publication made use of fur seal tracking data collected in 2018 and 2019 to examine the at-sea movement behaviour (spatial location and dive) of female fur seals at the Falklands Islands and spatial overlap with commercial trawl fisheries. The research demonstrated a distinct spatial overlap between female fur seal foraging effort and commercial trawling activity within the Falkland Islands EEZ, particularly in areas associated with Patagonian longfin squid (*Doryteuthis gahi*) and common hake (*Merluccius hubbsi*). Importantly, the publication discussed the implications of the research (and the project) within the broader context of local prey-field dynamics and fisheries management in the Falkland Islands. Full publication available here: https://doi.org/10.1016/j.gecco.2023.e02615.



Contents lists available at ScienceDirect

Global Ecology and Conservation

journal homepage: www.elsevier.com/locate/gecco

Spatial overlap between South American fur seal foraging effort and commercial trawl fisheries in the Falkland Islands

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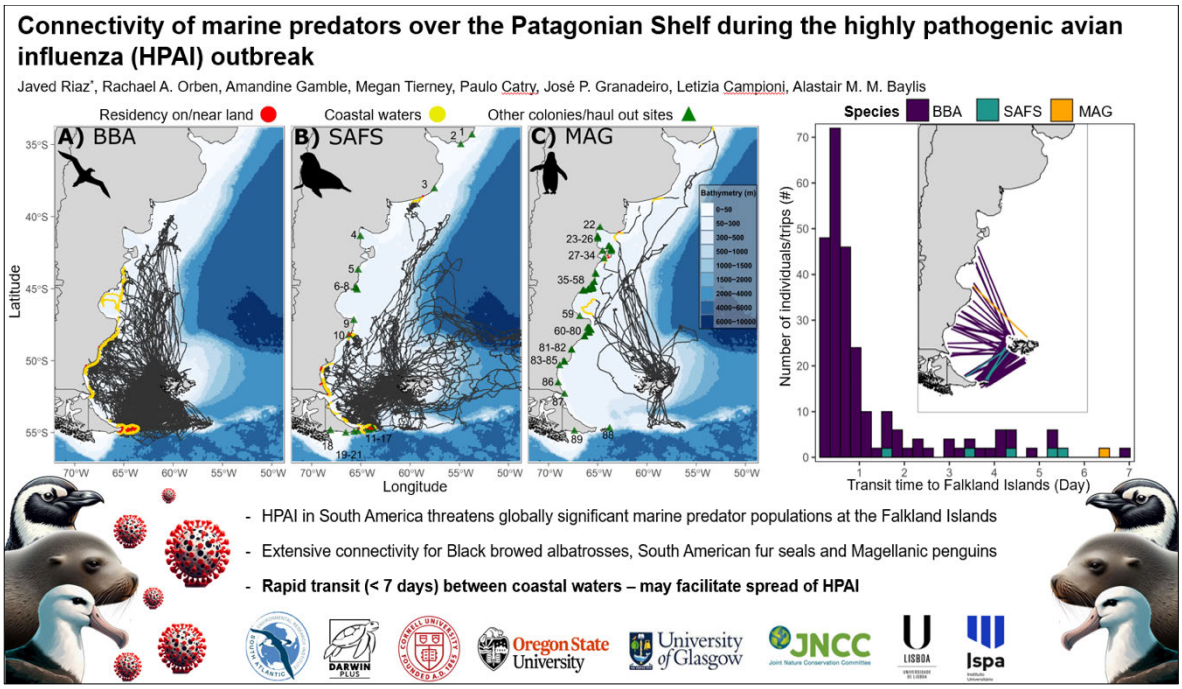
ABSTRACT

Interactions between seals and commercial fisheries can pose a significant threat to the conservation status of seal populations. In the Falkland Islands, home to over 50 % of the global South American fur seal (SAFS) population, there has been a dramatic (~ 900 %) increase in the number of SAFS-fishery interactions in recent years. However, significant knowledge gaps regarding SAFS spatiotemporal foraging behaviour and habitat use hinders our capacity to assess the ecological mechanisms underpinning these interactions. In this study, we investigate the spatial overlap between SAFS foraging effort and commercial squid and finfish trawl fisheries in the Falkland Island Exclusive Economic Zone (EEZ). By spatially integrating two years of SAFS horizontal and vertical movement data with contemporaneous trawl-by-trawl information from the Falkland Islands fishing fleet, we examine whether SAFS concentrate their foraging effort in areas associated with greater squid and finfish catch quantities. Our findings reveal a marked spatial overlap between SAFS foraging effort and commercial trawling activity within the Falkland Islands EEZ, particularly in areas associated with Patagonian longfin squid (*Doryteuthis gahi*) and common hake (*Merluccius hubbsi*). Across the various metrics of foraging effort (summarised dive activity) examined, we found SAFS performed a greater number of dives, travelled greater vertical distances and performed deeper dives in intensively fished areas. These results suggest SAFS forage in the same habitats targeted by commercial squid and finfish fisheries, where they

We have also made good use of the more recent fur seal tracking data collected in 2023 (see Activity 2.1). Using these data, we investigated the spatial connectivity of marine predators over the Patagonian Shelf to assess the risk of highly pathogenic avian reaching the Falkland Islands. This research is currently in review at in the journal *Ecography,* ranked as a very high-impact factor journal in field. The pre-print for this publication is available open access here: https://www.biorxiv.org/content/10.1101/2023.12.12.570574v1.



3.1 At least 10 variables from FIFD data collated

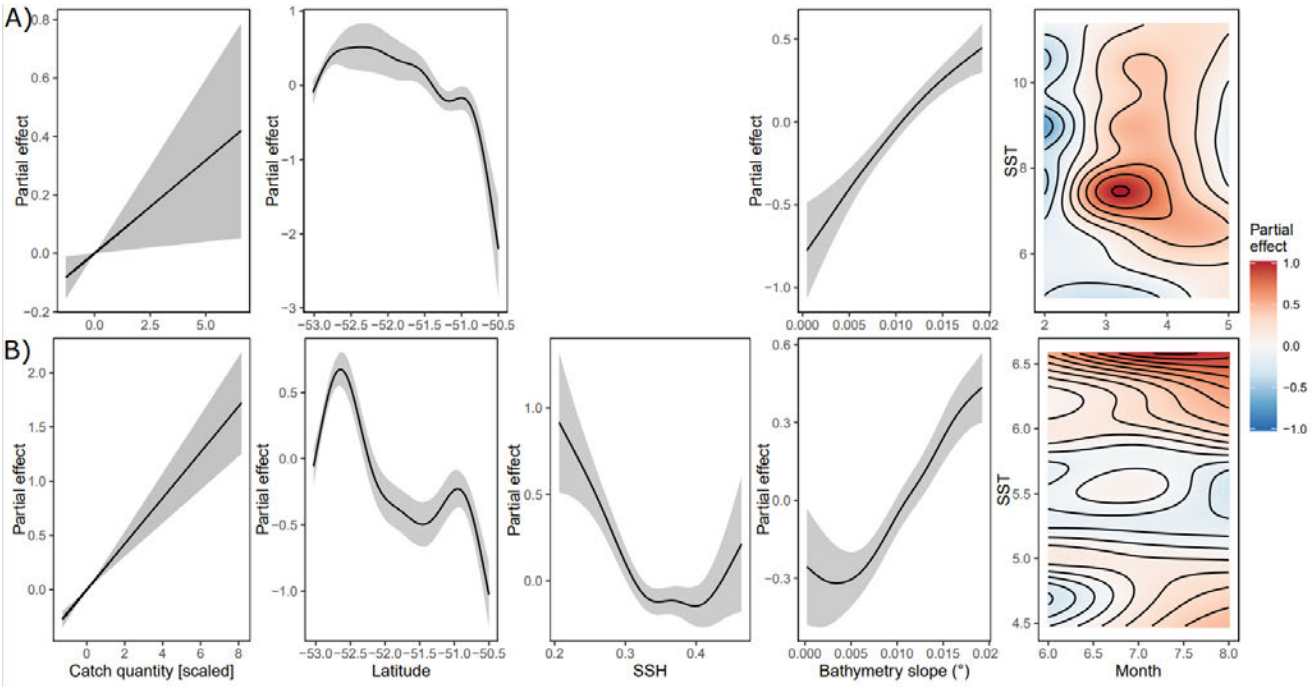
This component of the work package has been completed. To examine the influence of different parameters on seal-fishery interaction events, we used trawl-by-trawl data provided by FIFD and extracted and calculated a range of variables. Broadly, we sought to obtain a suite of explanatory variables that could be reasonably expected to influence seal foraging behaviour and at-sea decisions to interact with trawl operations. This resulted in 13 different variables being collected.

Covariate type	Predictor	Description
Operational	Catch quantity	Total catch quantity (kg) of Loligo recorded for each trawl
	Trawl duration	Total duration of each trawl occurring within the Loligo Box
	Catch per unit effort (CPUE)	$CPUE = Catch\ quanity \div Trawl\ duration$
Spatiotemporal	Trawl location	Latitudinal coordinates of the end trawl position. Latitude was considered an appropriate metric of trawl location given the north-south geometry of the Loligo Box positioned over the shelf-break.
	Vessel clustering (near-real-time)	For each trawl, we calculated how many other trawling operations occurred within a 20 km distance and a 5-hour window.
	Vessel clustering (time lag)	As for the near-real-time clustering, although within a 24-hour time window
	Distance to land	Vessel distance (km) to nearest land feature, indicative of possible seal resting area.
	Time of year	Calendar month (1 – 12) vessel trawl activity occurred
Environmental	Sea surface temperature (SST)	Measured daily in °C at a 0.01° spatial resolution.
	Sea surface height (SSH)	Measured daily in m at 0.25° spatial resolution.
	Bathymetry (BATH)	Sea floor depth (m) at a 0.02° × 0.02° spatial resolution.
	Bathymetry slope (BSlope)	Gradient (°) of the sea floor calculated from bathymetry data (0.02° × 0.02° spatial resolution)
	Eddy kinetic energy (EKE)	Measured daily (cm^2/s^2) at a 0.25° × 0.25° spatial resolution. Calculated consistent with (Reisinger et al. 2018) as: $EKE = 0.5\,(U^2 + V^2)$ Where U and V represent the horizontal (zonal) and vertical (meridional) geostrophic velocity, respectively.

3.2 At least 10 variables identified and included in models to understand and predict seal-fishery interactions

We have identified the 13 datasets and have worked closely with fisheries to access the data. These variables have been configured into statistical modelling efforts. These 13 variables consist of various operational (n = 3), spatiotemporal (n = 5) and environmental (n = 5) metrics corresponding to the location and timestamp of each individual trawl recorded within the Falkland Islands fishery. These variables were carefully considered and were selected based on their known capacity to mediate prey availability and influence the movement and foraging behaviour of air-breathing marine predators.

We found that a consistent set of operational, spatiotemporal and environmental factors played a significant role in explaining the occurrence of seal-fishery interactions between both fishing seasons. Our models revealed that the probability of seal-fishery interaction events increased during trawls which recorded higher catch quantities. These interaction events were more pronounced in the southern area of the Loligo Box between -53 – -52 ºS. Generally, the probability of interaction events decreased with increasing latitude, albeit for a small spike in interactions in the north-east of the Falklands at around -51ºS. We also found interactions were more likely to occur during trawls conducted over steeper bathymetric gradients and tended to occur more frequently during the middle of the fishing season.



4.1 PM build trophic model in relevant modelling environment (*e.g.* Ecopath with Ecosim)

Activity not within this reporting period.

4.2 Undertake and report on DNA analysis on seal scat

This work package requires us to use dietary data to quantify trophic links between seals and prey. During our recent fieldwork on Bird Island in August 2023, we collected seal whiskers from the 19 male fur seals we tagged. In addition to these samples, we

also scoured the island and collected over 100 poo samples. Both of these sample datasets can yield critical insight into fur seal diet and trophodynamics. Molecular and visual analyses of poo samples can provide information about the relative importance of commercially caught species, whilst compound-specific stable isotope analysis of whiskers will tell us whether there have been any changes in diet over time.

Lab work to process and prepare these fur seal biological samples are underway. Poo samples were processed and prepared for visual and molecular analyses during October 2023. These samples are currently being prepared for export to the British Antarctic Survey laboratories based in Cambridge. A report will be prepared based on the results of this laboratory work.

4.3 Undertake and report on compound-specific stable isotope analysis on seal samples

Laboratory work for stable isotope preparation and analysis of seal whiskers is currently underway, and we plan to export these samples mid-year.

5.1 PMG established, with representatives from DNR-Fisheries, industry and SAERI

To support the alignment of long-term management objectives and actions towards a national bycatch plan, it is important to meet regularly with an established PMG to discuss project findings and direction. A PMG has been successfully established which consists of representatives from DNR-Fisheries (Dr Andreas Winter; FIFD), industry (James Bates; FIFCA) and SAERI (Dr Javed Riaz, Dr Alastair Baylis and Dr Paul Brickle). The PMG met on 30/03/2023 and 25/10/2023. To accommodate the variable workloads and annual leave of project partners over the summer period, meetings have been held with individuals rather than in a PMG format. A meeting was held with FIFCA in January 2023 and 2 meetings held with FIFD in November 2023 and March 2024. In these meetings, all members were briefed on the project's progress and advice was sought regarding project direction, particularly in relation to work package 5 objectives which involve stakeholder workshops. Meeting minutes are available on request.

5.2 Conduct workshop/present findings on WP1

Activity not within this reporting period.

5.3 Conduct workshop, compile and publish agreed recommendations for seal-bycatch

Activity not within this reporting period

3.2 Progress towards project Outputs

A detailed and output-specific summary of project progress has been incorporated in the above section (3.1 of this report).

3.3 Progress towards the project Outcome

Significant progress has been made towards the overall project outcome to establish: "*Robust baseline data which enables the factors that have contributed to an increase in seal-fishery interaction to be understood and provides informed, evidence-based recommendations for management mitigation efforts*".

Throughout work packages 1 – 3, valuable baseline data has been generated to help identify and ascertain the factors that have contributed to an increase in seal-fishery interactions (see section 3.1 for further details).

These efforts, in addition to continued progress on work package 4 will allow us to provide evidence-based recommendations to fisheries management and spatial conservation efforts. Therefore, we believe this project is likely to achieve the desired outcomes set out during the project proposal.

3.4 Monitoring of assumptions

Outcome

Assumption 1 Industry remains committed to the project and engage in project activities (industry are project partners)

- **Comments:** Assumption remains valid. The project has received excellent support from industry, including via the PMG. This has been vital in facilitating the work of the Net Camera Specialist to deploy equipment on fishing vessel.

Assumption 2 Increased understanding results in positive action for seal-fishery management and governance.

- **Comments:** Assumption remains valid. The project has received excellent support from industry and government project partners – which numerous discussion on how the findings of this research can translate into management and conservation.

Assumption 3 That the duration of the project is appropriate to inform policy.

- **Comments:** Assumption remains valid. Our project progress to date highlights the aims and objectives are achievable within the lifetime of the project.

Assumption 4 Covid-19 impacts don't place restrictions on national and international travel

Comments: Assumption remains valid. The Project Manager and Camera Specialist arrived in the Falkland Islands in early 2023 – the project is no longer reliant on international travel.

Outputs

Output 1: Net cameras trailed and deployed on vessels to quantify seal-fishery interactions with the fin-fish fishery

Assumption 1: Recruitment is successful in appointing a suitably qualified candidate

Comments: No longer relevant as recruitment was successful.

Assumption 2: Project Manager and specialist are able to travel.

Comments: No longer relevant as both project manager and specialist are on-island.

Assumption 3: Enough lead-in time is allocated for delays in the procurement and delivery of goods related to Covid-19 disruptions

Comments: Not relevant at this stage as there are no Covid-19 travel restrictions.

Assumption 4: Continued support of in-kind vessel time from partners.

Comments: Still relevant. Partners are part of the PMG and the project has received considerable support from project partners to date (as detailed in this annual report).

Output 2: Identify where seal-fishery interactions occur in space and time.

Assumption 1: Weather conditions enable fieldwork within the proposed time periods.

Comments: Still relevant for fieldwork efforts in 2024 – although project aims were met during 2023 field season

Assumption 2: Vessel available for charter

Comments: Assumption remains valid.

Assumption 3: Covid-19 impacts do not place restrictions local activities.

Comments: Assumption remains valid, although now considered to be low risk.

Output 3: Understand the factors that help predict interactions through the synthesis of available data and integration of additional data collected during project lifetime.

Assumption 1: Partners have the capacity and resource to contribute data and collaborate in the data synthesis

Comments: Still relevant.

Output 4: Establish trophic links between commercially caught fin-fish and squid species and seals, and trophic changes in seal diet over time.

Assumption 1: Partners have the capacity and resource to contribute data and collaborate in the data synthesis

Comments: Still relevant.

Assumption 2: Covid-19 impacts do not complicate or close DNA and stable isotope sample analysis at UK labs

Comments: Still relevant, but low risk.

Output 5: Stakeholders engaged, informed and project findings available and accessible

Assumption 1: Stakeholders engaged, informed and project findings available and accessible.

Comments: Still relevant.

4. Project support to environmental and/or climate outcomes in the UKOTs

The project continues to be relevant to a number of national and international obligations and strategies. On a national level, the project addresses FI Biodiversity Framework (2016-2030) priority areas, particularly coastal, shelf and marine species and ecosystems and natural resource use. The project also directly supports the implementation of the Conservation and Wildlife Ordinance (protection of wildlife) and FIG's aspirations for Ecosystem Based Management (FI Environment Strategy 2021 – 2040). The project will provide recommendations to DNR-Fisheries for a national seal bycatch Action Plan. The project also contributes to international obligations. These include CBD: Aichi 4 (Natural Resources); 6 (Sustainable fisheries); 10 (Vulnerable Marine Ecosystems). UNCLOS 61(2) coastal states take 'into account the best scientific evidence available to it' in determining conservation and management measures.' The project will also make important contribution towards FIG commitments to the CMS for Appendix I and II species.

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5. Gender Equality and Social Inclusion (GESI)

Please quantify the proportion of women on the Project Board[1].	0%
Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women[2].	50% of project partners (i.e. Dr Andrea Clausen as the Director of Natural Resources for the Falkland Islands Government, overseeing FIFD)

GESI Scale	Description	Put X where you think your project is on the scale
Not yet sensitive	The GESI context may have been considered but the project isn't quite meeting the requirements of a 'sensitive' approach	
Sensitive	The GESI context has been considered and project activities take this into account in their design and implementation. The project addresses basic needs and vulnerabilities of women and marginalised groups and the project will not contribute to or create further inequalities.	X

[1] A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

[2] Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

Empowering	The project has all the characteristics of a 'sensitive' approach whilst also increasing equal access to assets, resources and capabilities for women and marginalised groups	
Transformative	The project has all the characteristics of an 'empowering' approach whilst also addressing unequal power relationships and seeking institutional and societal change	

SAERI's policy statement on Equality is:

"SAERI and its Group Companies (SGCs) are committed to ensuring that recruitment, promotion, training, development, assessment, benefits, pay, terms and conditions of employment, redundancy and dismissals are determined on the basis of capability, qualifications, experience, skills and productivity. SGCs are also committed to achieving a working environment, which provides equality of opportunity and freedom from unlawful discrimination on the grounds of race, sex, pregnancy and maternity, marital or civil partnership status, gender reassignment, disability, religion or beliefs, age or sexual orientation. This Policy aims to remove unfair and discriminatory practices within SAERI and to encourage full contribution from its diverse community."

We believe that better decisions are made by diverse groups, and believe that equality thus wide and far-reaching. We actively uphold this approach in all we do and we ensure that all our partners have similar policies.

We acknowledge that attendance at stakeholder workshops or meetings may be limited by parental responsibilities and as such timings will be considered to be most appropriate (within the day) and education year (outside school holidays) both in the FI and internationally.

In the SAERI office, the current staff cohort is 60% female and 40% male.

6. Monitoring and evaluation

The project is being implemented as a partnership between SAERI, FIG, and FIFCA. These organizations are members of the PMG, whose main commitment and task is to monitor and steer the project. A draft Memorandum of Understanding (MoU) between all of the project partners was distributed at the first PMG meeting in March 2023. The MoU articulate the roles and responsibilities of all parties in the delivery of the project. Additionally, the PM will prepare a detailed Monitoring and Evaluation (M&E) plan in which a set of evaluation questions will used to assess the effectiveness of the project's outcomes. Specific monitoring questions will be used to answer the evaluation questions and will be checked through indicators, data sources/methods to obtain the data, and the responsibilities for data collection. The M&E plan will be then submitted to the PMG for sign off. The PMG meets quarterly and the project manager will present a quarterly report on progress against deliverables.

7. Lessons learnt

A key challenge over the past year has been the utility of underwater camera footage obtained from net cameras. While these data are critical in obtaining and documenting in-situ behavioural observations of seals around fishing vessels, these data are often hampered by turbidity and other oceanographic conditions affecting visual resolution and acuity. In this context, discussions are ongoing with project partners regarding future sampling practices and procedures.

8. Actions taken in response to previous reviews (if applicable)

Not applicable

9. Risk Management

No new and unexpected risks have occurred over the past 12 months, and therefore, the project has not had to make any significant adaptations to the project design.

10. Sustainability and legacy

The FI economy is heavily reliant on its marine environment particularly fisheries, which are central to its economic success. An aim of FIG is long-term sustainability of the fishery and marine environment to benefit of future generations. This includes sustainable catches of commercially targeted species, reducing harmful impacts on bycatch species while maintaining ecosystem function. There has been considerable interest from government and the fishing industry, as is evidenced by their involvement and support for the project (detailed in sections above).

The exit strategy is still valid. This includes overall project impact to produce recommendations and guidance for management, including how to advance recommendations agreed. SAERI is a local FI organization and has close working relationships with FIG and industry, and will ensure the sustained legacy of the project going forward. For example, one legacy item is an "interactive spatial webGIS database will be built for the project on an open-source platform that has no licensing costs and therefore ensures longevity. Additionally, the long-term management of the spatial database is ensured by having it embedded in the Falkland Islands IMS-GIS data centre, managed by a full time and skilled data manager already employed by SAERI. The database is built to enable easy updates. Knowledge transfer will ensure that awareness and use of the data/equipment produced by the project are firmly established before the project ends (WP5)."

11. Darwin Plus identity

The project has been publicised widely as a Darwin project via our project website (link here) and via twitter (examples presented in figures above).

Research from the project was also recently presented to an international scientific audience at the 8th International Biologging Science Symposium held in Tokyo in March 2023. During this presentation, the Project Manager declared the project as a being facilitated and supported by the Darwin Plus initiative.

Spatial overlap between South American fur seal foraging effort and commercial trawl fisheries in the Falkland Islands

Javed Riaz*, Rachael A. Orben, Kayleigh A. Jones, Megan Shapiro, Andreas Winter, Paul Brickle, Alastair M. M. Baylis

Global Ecology and Conservation, 2023

Postdoctoral researcher
jriaz@saeri.ac.fk
@JavedZRiaz

12. Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?	No
Have any concerns been reported in the past 12 months	No
Does your project have a Safeguarding focal point?	Yes Arlene [redacted]
Has the focal point attended any formal training in the last 12 months?	Yes. Designated safe guarding Lead L3 and Safe Guarding Adults L3
What proportion (and number) of project staff have received formal training on Safeguarding?	Past: 33% [n = 1] Planned: 66% [n = 2]
Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses. None	
Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify. No developments or activities have been planned around Safeguarding	

Please describe any community sensitisation that has taken place over the past 12 months; include topics covered and number of participants. No community sensitisation activity have taken place over the past 12 months
Have there been any concerns around Health, Safety and Security of your project over the past year? If yes, please outline how this was resolved. There have been no concerns around Health, Safety and Security over the past year.

13. Project expenditure

- **Table 1: Project expenditure <u>during the reporting period</u> (1 April 2023 – 31 March 2024)**

Project spend (indicative) in this financial year	**2023/24 D+ Grant (£)**	**2024/25 Total actual D+ Costs (£)**	**Variance %**	**Comments (please explain significant variances)**
Staff costs	[redacted]			
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others (Please specify)				
TOTAL	**141,767**	**141,767**		

Table 2: Project mobilised or matched funding during the reporting period (1 April 2023 – 31 March 2024)

	Secured to date	Expected by end of project	Sources
Matched funding leveraged by the partners to deliver the project (£)			
Total additional finance mobilised for new activities occurring outside of the project, building on evidence, best practices and the project (£)			

14. Other comments on progress not covered elsewhere

15. OPTIONAL: Outstanding achievements or progress of your project so far (300-400 words maximum). This section may be used for publicity purposes.

I agree for the Biodiversity Challenge Funds to edit and use the following for various promotional purposes (please leave this line in to indicate your agreement to use any material you provide here).

- Research conducted as part of this work package has recently been published in a highly regarded and open-access international scientific journal, *Global Ecology and Conservation*. Full publication available here: https://doi.org/10.1016/j.gecco.2023.e02615.
- Tracking efforts undertaken in this project have generated the largest movement datasets available for South American fur seals anywhere in the world.
- Research regarding the spatial connectivity of marine predators over the Patagonian Shelf is currently in review at the journal *Ecography,* ranked as a very high-impact factor journal in the field. The pre-print for this publication is available open access here: https://www.biorxiv.org/content/10.1101/2023.12.12.570574v1.
- Research from the project was recently presented to an international scientific audience at the 8th International Biologging Science Symposium held in Tokyo in March 2023.

- **Annex 1: Report of progress and achievements against logframe for Financial Year 2023-2024**

Project summary	SMART Indicators	Progress and Achievements April 2023 - March 2024	Actions required/planned for next period
Impact The development of a national Action Plan for seal bycatch that contributes to an ecosystem-based approach to fisheries management in the FI.		The project has made significant project progress on work packages 1 – 3, and progress on work package 4 is currently underway. Taken together, this body of work will underpin recommendations for a national plan of action.	
Outcome Robust baseline data enables the factors that have contributed to an increase in seal-fishery interactions to be understood and provides informed, evidence-based recommendations for management and mitigation efforts.	0.1 Major advance in baseline knowledge of seal-fishery interactions (Y3,Q4) 0.2 Recommendations for national seal bycatch Action Plan to key stakeholders (Y3, Q4)	0.1 Considerable progress has been made, collating and publishing the results of existing data. We have also collected new tracking data from male fur seals during the field season in 2023, significantly improving baseline information and understanding of habitat use. These are detailed in sections above. 0.2 *Not applicable to this reporting period*	0.1 – Development of trophodynamic models to identify the relative importance of commercially harvested species to the Falkland Islands' seal population 0.2 Report on recommendations for a seal bycatch Action Plan and how to progress recommendations provided to DNR-Fisheries and stakeholders
Output 1. Net cameras trailed and deployed on vessels to quantify seal-fishery interactions with the fin-fish fishery	1.1. Project Manager (x1) successfully recruited (by Y1, Q3). Specialist (x1) successfully recruited to lead net camera deployment (by Y1, Q3)	1.1 Successfully completed. 1.2. Successfully completed. 1.3. Successfully completed. Report available upon request.	

Project summary	SMART Indicators	Progress and Achievements April 2023 - March 2024	Actions required/planned for next period
	1.2 Net camera trial successfully completed on pre-recruitment survey (by Y2, Q3) 1.3 Net cameras deployed on at least 8 vessel/s (by Y2, Q4). If no seal interactions are recorded, we will report on overall SED operation		
1.1 Project Manager (x1) and Specialist to lead net camera deployment (x1) recruited		1.1 Successfully completed.	
1.2 Net cameras trialled with DNR-Fisheries		Successfully completed. Report available upon request.	
1.3 Rollout of net cameras to fishing vessels with DNR-Fisheries		1.3 Net cameras have been deployed on commercial fishing vessels during commercial operations.	Continued rollout of net cameras during the 2024 fishing season
Output 2 Identify where seal-fishery interactions occur in space and time.	2.1 At least 30 satellite link seal tags deployed by (by Y3, Q1) 2.2 One report on overlap with fisheries (by Y3, Q4)	2.1 Successfully completed. 2.2 Successfully completed.	
2.1 Deploy biologging tags on seals		2.1 Successfully completed	

Project summary	SMART Indicators	Progress and Achievements April 2023 - March 2024	Actions required/planned for next period
2.2 Results presented in a report delivered to PMG. Report re-focused for a scientific journal.		2.2 Successfully completed. https://doi.org/10.1016/j.gecco.2023.e02615	
Output 3 Understand the factors that help predict interactions through the synthesis of available data and integration of additional data collected during project lifetime.	3.1 At least 10 variables related to seal-fishery interactions are collated (by Y2, Q1) 3.2 The 10 variables included in models to understand and predict seal-fishery interactions (by Y2, Q4)	3.1 Successfully completed 3.2 Successfully completed	
3.1 Desktop review, data collated and metadata stored on the IMS-GIS data centre portal		3.1 Successfully completed	
3.2 Review report and metadata catalogue delivered to Project partners		3.2 Successfully completed. Metadata catalogue was presented during the PMG and is publicly available on the SAERI webpage	
Output 4 Establish trophic links between commercially caught fin-fish and squid species and seals, and trophic changes in seal diet over time.	4.1 At least 1 trophic model developed (using Ecosim and Ecopath software or similar) (by Y3, Q4) 4.2 DNA analysis of at least 60 seal scats completed (by Y2, Q4)	4.1 *Not relevant to the reporting period* 4.2 Over 100 seal scat samples have been prepared in the laboratory and we are currently in the process of organising export of these samples to our collaborators at the British Antarctic Survey in Cambridge.	4.1 Development of a trophic model and showcase to stakeholders 4.2 Report prepared synthesising the results of this DNA dietary analysis
4.1 PM build trophic model in relevant modelling environment (*e.g.* Ecopath with Ecosim)		*Not relevant to the reporting period*	Model due in Y3, Q4

Project summary	SMART Indicators	Progress and Achievements April 2023 - March 2024	Actions required/planned for next period
4.2 Undertake and report on DNA analysis on seal scat		Not relevant to the reporting period. Lab identified in the UK.	Report prepared synthesising the results of this DNA dietary analysis
4.3 Undertake and report on compound-specific stable isotope analysis on seal teeth		Lab work is currently underway to prepare samples for stable isotope analysis	Samples will be sent away and a report prepared based on the results of this analysis.
Output 5 Stakeholders engaged, informed and project findings available and accessible.	5.1 PMG established, with representatives from DNR-Fisheries, industry and SAERI. M&E Plan created (Y1, Q2). 5.2 One stakeholder workshop on WP 1 (by Y3, Q4) 5.3 One stakeholder workshop on WP 2-4 (by Y3, Q4) 5.4 Consensus reached on recommendations for conservation and management (by Y3, Q4)	5.1 To date, we have had 2 PMGs (April 2023 and October 2023). To accommodate the variable workloads and annual leave of project partners over the summer period, meetings have been held with individuals rather than in a PMG. A meeting was held with FIFCA in January 2023 and 2 meeting held with FIFD in November 2023 and March 2024. Meeting notes are available upon request. 5.2 *Not relevant to the reporting period* 5.3 *Not relevant to the reporting period* 5.4 *Not relevant to the reporting period*	5.1 PMG will continue to be held quarterly, providing regular updates on project progress 5.2 Operational guide for net camera deployment will be provided to stakeholders and the report circulated to stakeholders and published on the SAERI project website 5.3 Workshop report, including recommendations, list of attendees, and presentations circulated to stakeholders, PMG and published on the SAERI project website 5.4 Review report circulated to PMG, Stakeholders and uploaded to project website. Submit report to FIG's Fisheries Committee

Project summary	SMART Indicators	Progress and Achievements April 2023 - March 2024	Actions required/planned for next period
5.1 PMG established, with representatives from DNR-Fisheries, industry and SAERI		5.1 PMG was established, with the first PMG held in March. Meeting notes are available on request.	PMG will be held quarterly.
5.2 Conduct workshop/present findings on WP1		Not relevant to the reporting period	Operational guide for net camera deployment will be provided to stakeholders and report circulated to stakeholders and published on the SAERI project website
5.3 Conduct workshop, compile and publish agreed recommendations for seal-bycatch		Not relevant to the reporting period	Workshop will take place by Y3, Q4.

- **Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)**

Project summary	SMART Indicators	Means of verification	Important Assumptions
Impact: The development of a national Action Plan for seal bycatch that contributes to an ecosystem based approach to fisheries management in the FI. .			
Outcome: Robust baseline data enables the factors that have contributed to an increase in seal-fishery interactions to be understood and provides informed, evidence-based recommendations for management and mitigation efforts.	0.1 Major advance in baseline knowledge of seal-fishery interactions (Y3,Q4)	0.1 Publication of tracking data on the FI IMS-GIS data centre portal http://dataportal.saeri.org/ and reports on SEDs, trophodynamic model, factors that contribute to increased by-catch circulated to stakeholders 0.2 Report on recommendations for a seal bycatch Action Plan and how to progress recommendations	Industry remains committed to the project and engage in project activities (industry are project partners) Increased understanding results in positive action for seal-fishery management and governance.

Project summary	SMART Indicators	Means of verification	Important Assumptions
	0.2 Recommendations for national seal bycatch Action Plan to key stakeholders (Y3, Q4)	provided to DNR-Fisheries and stakeholders	That the duration of the project is appropriate to inform policy. Covid-19 impacts don't place restrictions on national and international travel
OUTPUT 1. Net cameras trailed and deployed on vessels to quantify seal-fishery interactions with the fin-fish fishery	1.2 Project Manager (x1) successfully recruited (by Y1, Q3). Specialist (x1) successfully recruited to lead net camera deployment (by Y1, Q3) 1.2 Net camera trial successfully completed on pre-recruitment survey (by Y2, Q3) 1.3 Net cameras deployed on at least 8 vessel/s (by Y2, Q4). If no seal interactions are recorded, we will report on overall SED operation	1.1 Employment contracts signed. 1.2 Field report submitted to industry and results detailed in DPLUS annual report 1.3 Synthesis report of both field seasons to the PMG and stakeholders and regular reports to DPLUS.	Recruitment is successful in appointing a suitably qualified candidate Project Manager and specialist are able to travel – we have recruited from the UK and Australia during the past year. Enough lead-in time is allocated for delays in the procurement and delivery of goods related to Covid-19 disruptions Continued support of in-kind vessel time from partners. Partners will form part of the project management group, thereby

Project summary	SMART Indicators	Means of verification	Important Assumptions
			ensuring partners help steer the project
Output 2 Identify where seal-fishery interactions occur in space and time.	2.1 At least 30 satellite link seal tags deployed by (by Y3, Q1) 2.2 One report on overlap with fisheries (by Y3, Q4)	2.1 Dedicated webGIS project page with tracking data *e.g.*, webGIS page 2.2 Report submitted to PMG and regular reporting to DPLUS	Weather conditions enable field work within the proposed time periods. Vessel available for charter Covid-19 impacts do not place restrictions local activities.
Output 3 Understand the factors that help predict interactions through the synthesis of available data and integration of additional data collected during project lifetime.	3.1 At least 10 variables related to seal-fishery interactions are collated (by Y2, Q1) 3.2 The 10 variables included in models to understand and predict seal-fishery interactions (by Y2, Q4)	3.1 FIG IMS-GIS data centre metadata catalogue updated and searchable 3.2 Report submitted to PMG and regular reporting to DPLUS	Partners have the capacity and resource to contribute data and collaborate in the data synthesis
Output 4 Establish trophic links between commercially caught fin-fish and squid species and seals, and trophic changes in seal diet over time.	4.1 At least 1 trophic model developed (using Ecosim and Ecopath software or similar) (by Y3, Q4) 4.2 DNA analysis of at least 60 seal scats completed (by Y2, Q4)	4.1 Trophic model showcased to stakeholders during workshop and report published on project website. 4.2 Report published on project website and submitted to PMG	Partners have the capacity and resource to contribute data and collaborate in the data synthesis Covid-19 impacts do not complicate or close DNA and stable isotope sample analysis at UK labs

Project summary	SMART Indicators	Means of verification	Important Assumptions
	4.3 Compound specific stable isotope analysis of at least 20 seal teeth completed (by Y2, Q4)	4.3 Report published on project website and submitted to PMG. Regular reporting to DPLUS	
Output 5 Stakeholders engaged, informed and project findings available and accessible.	5.1 PMG established, with representatives from DNR-Fisheries, industry and SAERI. M&E Plan created (Y1, Q2). 5.2 One stakeholder workshop on WP 1 (by Y3, Q4) 5.3 One stakeholder workshop on WP 2-4 (by Y3, Q4) 5.4 Consensus reached on recommendations for conservation and management (by Y3, Q4)	5.1 Terms of reference circulated to PMG and meeting minutes recorded. M&E Plan circulated 5.2 Training video/guide for net camera deployment provided to stakeholders and uploaded to the Project website Workshop report, including recommendations, list of attendees, and presentations circulated to stakeholders and published on the SAERI project website 5.3 Workshop report, including recommendations, list of attendees, and presentations circulated to stakeholders, PMG and published on the SAERI project website 5.4 Review report circulated to PMG, Stakeholders and uploaded to project website. Submit report to FIG's Fisheries Committee	Key FIG officials and stakeholders available for the workshop and continue to engage. Covid-19 impacts do not place restrictions on national travel. .

Project summary	SMART Indicators	Means of verification	Important Assumptions

- **Annex 3: Standard Indicators**

- **Table 1 Project Standard Indicators**

DPLUS Indicator number	Name of indicator	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
DPLUS168-1	Rollout of net cameras to fishing vessels with DNR-Fisheries	Number	New	0	8	0	8	8
DPLUS168-2	Improved understanding of seal habitat use through deployment of biologging tags	Number	Improved	19	19	0	38	30
DPLUS168-3	Collect and analyse seal dietary data	Number	Improved	0	130	0	130	80
DPLUS168-5	Trophic model developed	Number	New	0	0	0	0	1
DPLUS168-4	Peer-reviewed publications improving knowledge of seal-fishery interactions	Number	Improved	0	2	0	2	3
DPLUS168-6	Conduct workshop, compile and publish agreed recommendations for seal-bycatch	Number	New	0	0	0	0	1

- **Table 2 Publications**

Title	Type (e.g. journals, best practice manual, blog post, online videos, podcasts, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
Spatial overlap between South American fur seal foraging effort and commercial trawl fisheries in the Falkland Islands	Journal	2023 Javed Riaz, Rachael A. Orben, Kayleigh A. Jones, Megan Shapiro, Andreas Winter, Paul Brickle, Alastair M.M. Baylis	Male	Australian/British	Global Ecology and Conservation	https://www.sciencedirect.com/science/article/pii/S2351989423002500
Connectivity of marine predators over the Patagonian Shelf during the highly pathogenic avian influenza (HPAI) outbreak	Journal	2023 Javed Riaz, Rachael A. Orben, Amandine Gamble, Megan Tierney, Paulo Catry, José P. Granadeiro, Letizia Campioni, Alastair M. M. Baylis	Male	Australian/British	Preprint available at *bioRxiv* Manuscript in review at *Ecography*	https://www.biorxiv.org/content/10.1101/2023.12.12.570574v1

- Annex 4: Onwards – supplementary material (optional but encouraged as evidence of project achievement)

Links to supplementary material provided throughout the report.

- Checklist for submission

	Check
Different reporting templates have different questions, and it is important you use the correct one. Have you checked you have used the **correct template** (checking fund, type of report (i.e. Annual or Final), and year) and **deleted the blue guidance text** before submission?	x
Is the report less than 10MB? If so, please email to BCF-Reports@niras.com putting the project number in the Subject line.	x
Is your report more than 10MB? If so, please discuss with BCF-Reports@niras.com about the best way to deliver the report, putting the project number in the Subject line.	x
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	x
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 15)?	x
Have you involved your partners in preparation of the report and named the main contributors	x
Have you completed the Project Expenditure table fully?	x
Do not include claim forms or other communications with this report.	