

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	DPLUS161
Project title	Exploring the drivers of human-shark conflict at Ascension Island
Territory(ies)	UKOT(s)
Lead Partner	University of Exeter
Project partner(s)	University of Exeter, University of Windsor, University of Plymouth, Zoological Society of London, Ascension Island Government
Darwin Plus grant value	£285,415.00
Start/end dates of project	October 2022 – March 2025
Reporting period (e.g. Apr 2023-Mar 2024) and number (e.g. Annual Report 1, 2)	Annual Report 2 (October 2023 – March 2024).
Project Leader name	Dr Sam [REDACTED]
Project website/blog/social media	N/A
Report author(s) and date	Sam [REDACTED], Daniel [REDACTED], David [REDACTED], Claire [REDACTED], Nigel [REDACTED], Phil [REDACTED] (26 th April 2024).

1. Project summary

Ascension Island is surrounded by one of the world’s largest marine protected areas (MPAs), which aims to conserve biodiversity while simultaneously contributing to the social and economic wellbeing of the Island’s human population. Recently, however, an increasing number of Galapagos sharks in shallow coastal waters has created significant conflicts with ocean users. While no full-time commercial fishery exists on Ascension Island, recreational fishing is a culturally important activity with 3-6 inshore vessels regularly operating from Georgetown Pier and a significant proportion of the island’s population people engaged in shore-based rock fishing. Diving and bathing are also popular pastimes on an island with few other amenities. However, catch depredation and perceived or real threat to life from sharks using shallow coastal waters has increasingly impacted these activities. The disruption to Island life has led some to call for a cull, posing a significant test of Ascension’s MPA and strict shark protection laws. At present, however, the causes of the recent increase in shark activity are unknown, which is fuelling speculation and concern. This project aims to provide reliable evidence to Government and stakeholders by undertaking a rigorous, scientific investigation into the socio-ecological drivers of human-shark conflict at Ascension Island. The project will characterise the nature and extent of human-shark interactions; explore underlying ecological drivers; and conduct experimental trials and feasibility studies of conflict reduction measures. Results will be shared with the community to foster a deeper understanding of shark ecology and will feed into ongoing public consultations led by AIG to find evidence-based solutions for resolving human-shark conflicts.

2. Project stakeholders/partners

This project involves five formal partners (Ascension Island Government Conservation and Fisheries Directorate, University of Exeter, University of Windsor, University of Plymouth, Zoological Society of London) and a large and diverse stakeholder group of local marine users and policy makers. The need for the project was originally identified by AIGCFD who then worked alongside other partners to develop a proposal and set of outputs that are relevant to local needs. This collaborative approach has continued throughout Y2 through participation in joint field expeditions, project M&E, collective report writing, and data sharing.

Between 16th–31st December 2023 (Y3 Q2), the project leader (University of Exeter) and social science lead from ZSL visited Ascension Island with the specific goal of finalising approaches for community human-shark conflict surveys which had proven particularly sensitive during Y1, leading to this activity being postponed. The visit included constructive meetings between AIGCFD, the Ascension Fishers' Association (AFA), and overseas partners to discuss challenges and opportunities, agree the boundaries for the work, and conduct pilot questionnaires on stakeholders from these organisations to refine and provide confidence in the methodology (see **Annexes 4.1 & 4.2**). The visit was very productive and paved the way for a wider scale roll out of community surveys beginning in April/May 2024 (Y3 Q1). Meetings also explored solutions to several other obstacles to completing project outputs, including alternative means of gathering catch depredation data given the reluctance of local fishers to engage with voluntary Government-issued logbooks. Following a recommendation by the AFA, a board for anonymised reporting of shark encounters has now been installed at the Pierhead and is in regular use (see **Annex 4.3**).

A second collaborative expedition began in March 2024 (Y2 Q4) with the goal of recovering, servicing, and redeploying shark telemetry and oceanographic equipment. The visit involved partners from AIGCFD, UoE, UoW, and ZSL and received extensive support from AIG's marine operations team, resulting in successful recovery and redeployment of 30 of 31 project moorings (see section 3). The trip also provided an opportunity to train the local AIGCFD team in the analysis of acoustic telemetry data and carry out a rapid inspection of the first 12-months of data, with remote support from UoP. Preliminary results have been distilled into a series of visual outputs that will be shared with the local community during the second half of the expedition (Y4 Q1) to ensure that stakeholders remain informed and engaged in the project while more detailed analyses are undertaken. All datasets generated during Y2 have been made accessible to partners via a project SharePoint and an analysis strategy has been agreed with clear roles and responsibilities.

3. Project progress

3.1 Progress in carrying out project Activities

Output 1: The social context of human-shark conflict on Ascension Island is characterised through a process of inclusive stakeholder engagement.

1.1 Design and deliver semi-structured interviews with representative stakeholder groups to better understand the human dimensions of conflicts.

1.2 Develop and promote online and in-person tool to collect information on shark sightings and other key behaviours (such as depredation)

1.3 Analyse interview data to inform project design is appropriate for setting

Following a series of delays to Output 1 while the scope and methodology were agreed with local stakeholders (see AR1), significant progress on Activities 1.1 - 1.3 has been made during Y2. In December 2023 (Y2 Q3) the project leader and ZSL Social Science specialist (Dr Claire Collins) visited Ascension Island for 2 weeks with the specific goal of finalising the approach for this element of the project (see Section 2). During the visit, a total of 8 key informant interviews were carried out with stakeholders from a range of sectors to understand the social dimensions of human shark conflict, discuss the practicality and acceptability of proposed sampling methods, and run a series of pilot questionnaires. Preliminary results were reported back to local partners (**Annex 4.1**) and used to develop a more structured interview protocol for use on a wider range of island stakeholders during a longer visit planned for April 2024 (Y1 Q4; see **Annex 4.2**).

1.4 Gather data on catch depredation rates working in collaboration with local recreational and sports fishers.

Recreational fishers have so far proven reluctant to complete voluntary government-issued logbooks which had originally been intended as the principal mechanism of data collection on levels of catch depredation. This risk was anticipated in the original logframe and several alternative data sources have been explored during Y2 in consultation with local stakeholders. In December 2023 (Y2 Q3), representatives from AIG, UoE and ZSL met with the Ascension Fishers Association to update on the project and discuss challenges and opportunities for greater fisher engagement. Following a recommendation from AFA at this meeting, a whiteboard for anonymous reporting of shark encounters was installed at the Pierhead and is now in regular use (**Annex 4.3**). In parallel, an undergraduate dissertation student and PhD researcher from the University of Exeter have been exploring whether trends in publicly-accessible social media activity can be used as an alternative index to track the frequency of negative interactions with sharks (**Annex 4.4**). Preliminary results are promising and have allowed us to timeline and quantify recent spikes in inshore shark activity and conflict with humans that predate the project (**Annex 4.4**).

Output 2: Knowledge of the behaviour and distribution of Galapagos sharks on Ascension Island is significantly enhanced and is used to evaluate a range of hypotheses proposed to explain recent increases in inshore activity.

2.1 Install fixed-point, time-lapse camera assemblies for monitoring shark activity at key coastal locations.

2.2 Analyse time-lapse imagery to quantify relative shark abundance and validate results generated from online citizen science platforms.

Fixed, solar powered camera systems (<https://cam-do.com/products/time-lapse-packs>) have now been installed at two coastal locations with potential for human-shark conflict, including the island Pier and a popular swimming cove (Comfortless Cove) (**Annex 4.5**). Timelapse photographic data (5-minute resolution) have been collected almost continuously at these locations over a 12-month period and are currently being processed and analysed by local staff and volunteers. These preliminary analyses will determine whether the data collected is suitable for uploading to online citizen science platforms for crowd-based analysis. Inshore shark activity has fortunately been low since the camera systems were installed; nevertheless, the study has provided a valuable trial of the methodology. The remote camera systems have generally fared well in Ascension's harsh coastal environment. However, a fault with the timelapse controller at the Pierhead location has resulted in this unit being temporarily out of service for 3 months of Y2 while overseas repair/replacement can be arranged. The Pierhead is a more likely location to be able to record sharks with the camera system so the Comfortless Cove camera has been temporarily moved there. We expect that this system will be back in operation early in Y3, but it will result in an unavoidable gap in the monitoring timeseries at Comfortless Cove.

2.3 Deploy passive acoustic telemetry array and oceanographic moorings.

Deployment of the acoustic telemetry array and oceanographic moorings was completed in Y1 (AR1), and 30 of the 31 assemblies were subsequently recovered in March 2024 (Y2 Q4) for download of the first 12-months of data. A single telemetry receiver was lost due to a failure of the subsurface flotation buoy but this level of attrition is expected and was accounted for in the array design. All recovered receivers were serviced and redeployed using additional matched funding leveraged through a NERC PhD studentship (**Annex 4.6**), ensuring that shark movement ecology and oceanographic research initiated during the project continues beyond the lifetime of the project.

Activity 2.4: Deploy acoustic telemetry tags on Galapagos sharks.

Most planned shark tagging was completed during Y1 and no additional tag deployments occurred during the reporting period. However, a second expedition is planned for April 2024 (Y3 Q1) to deploy the remaining tags and fill demographic gaps in the current sample (including small juvenile and large adult sharks).

Activity 2.5: Carry out monthly physiological, morphological and reproductive assessments of Galapagos sharks to assess spatiotemporal variation in body condition and breeding status.

Monthly blood sampling and assessments of shark morphology (girth/length) commenced in February-March 2023 (Y1Q4) and has continued throughout Y2, led by the local AIGCFD Project Officer who received full training from visiting partners in Y1. To date, 162 morphological measurements, 158 tissue samples (fin clips) and 68 blood samples have been obtained from 112 Galapagos sharks and 50 silky sharks spanning a 14-month period.

Samples collected during the first 6 months of Y2 (March – September 2023) have now been analysed for biochemical markers of diet (stable isotopes) and nutritional condition (plasma triglycerides, cholesterol and ketone bodies; **Annex 4.7**). The remaining samples were returned to the University of Exeter in March 2024 (Y2 Q4) and will be analysed during Y3 Q1. Results from Y2 have yielded low within-sample repeatability for concentrations of some blood biochemical markers (cholesterol and ketone bodies) estimated using commercially available test kits so further validation and method development is required to assess the reliability of these measurements. If reproducibility cannot be improved to acceptable levels, then trends in these markers will be excluded from the analysis. In addition to tracking seasonal variation in body condition, this Activity also planned to track seasonal variation in reproductive status using ultrasonography and analysis of sex hormones in blood. Unfortunately, a lack of adult males and females encountered during Y2 have so far prevented this (see Sections 3.4 & 10). The habitats of these larger individuals outside of periods of inshore activity is currently unknown; however, assessment of reproductive stage will begin if/when these individuals are located.

Activity 2.6: Analyse ecological and oceanographic data to explain any observed variation in inshore shark activity and rates of catch depredation.

The first 12-months of data from the acoustic tracking array and oceanographic moorings was only recovered in March 2024 (Y2Q4), so much of the detailed processing and analysis is still underway. Nevertheless, several preliminary outputs have been produced to share with island stakeholders at planned public meetings in April 2024 (Y3Q1). These includes animations showing movements of individual tagged sharks and changes in the spatial distribution and depth use of the tagged population over the past 12 months, along with figures visualising seasonal variation in coastal oceanography (see **Annex 4.7**). Future analyses will seek to combine these datasets to try and explain observed shifts in distribution.

Activity 2.7: Report and publish the findings of applied shark research.

Scheduled to commence in Y3 once analyses are complete (Activity 2.6).

Output 3: Field trials and fully costed feasibility studies of non-lethal conflict reduction measures are undertaken to assess their viability on Ascension Island.

Activity 3.1 Conduct baited camera trials of electronic deterrent devices to assess their effectiveness in repelling Galapagos sharks.

Trials of electronic deterrent devices (specifically Ocean Guardian FISH series) have been ongoing during Y2. An experimental rig has been designed which allows recording of shark interactions with a bait stimulus in the presence or absence of an active deterrent using a stereo remote underwater video system. Trials of this system are currently ongoing using a small aggregation of sharks found in a slightly more protected area of one of the bays and have so far indicated a minimal deterrent effect. Overall, however, progress on this Activity has been limited by the effort expended on monthly shark physiological sampling (Activity 2.5), which has consumed much of the available vessel and staff time. Monthly sampling will be paused during Y3 now that a robust physiological baseline has been obtained across a full annual cycle, and will only resume if sharks return in large numbers to inshore areas. This will free up more time to complete planned deterrent trials.

Activity 3.2: Deploy electronic deterrent devices on fishing vessels to establish their effectiveness at reducing catch depredation relative to experimental controls.

There is no progress on this activity to report from Y2. The movement of sharks away from inshore areas during the first six months of the project and the resulting decrease in fisheries catch depredation mean there is currently no motivation for fishers to engage in these trials. Feedback from meetings held with the

Ascension Fishers Association in February 2023 and December 2023 was that members would be open to participating in trials of deterrent devices should catch depredation become a problem again; however, concerns that gear-mounted devices might reduce catch rates of target species is currently a disincentive. In addition, due to maintenance on several vessels, there are currently only three active inshore fishing boats meaning participation will remain inherently low even if catch depredation returns to previous levels.

Activity 3.3: Produce fully-costed designs and associated environmental impact assessments for shark barriers at bathing beaches, engaging with manufacturers and local marine users.

Bespoke designs and quotes have now been received from manufacturers of three of the most widely used, commercially available shark barrier systems, based on information and designs supplied by the AIGCFD Project Officer. A draft report has been prepared that compares and ranks the three systems based on a series of criteria (installation cost, maintenance requirements, technical feasibility, effectiveness on local species, environmental impacts and social acceptability) and makes recommendations for future installations at Ascension Island, should it be deemed necessary and practical to mitigate human-shark conflicts. [Contains sensitive material and cannot be provided as evidence until internally peer reviewed]

Activity 3.4: Analyse and report the results of field trials of shark deterrents.

Not scheduled until Y2, once deterrent trials are completed (see 3.1. and 3.2)

Output 4: The results of social and ecological research are openly shared and discussed with the Ascension Island community

Activity 4.1: Hold public meetings on Ascension Island to present and discuss project plans and findings.

Project activities during Y2 have primarily focussed on data collection, with the first 12 months of shark tracking data, physiological measurements and oceanographic monitoring only available in March 2024 (Y2 Q2). As such, there has been limited information to share with stakeholders at public meetings during the reporting period. Instead, community engagement has focussed on more targeted meetings with particular stakeholder groups to update them on progress and seek input and advice (e.g. Ascension Fishers Association, Ascension Administrator). However, a second full public meeting has been scheduled for April 2024 (Y3 Q1) to update the community on the findings of the first full year of shark research (see **Annex 4.7**).

Activity 4.2: Disseminate and promote project activities and outputs through a range of online and print media.

During Y2, project activities have been promoted through 14 posts on AIGCFD's official Facebook and Instagram social media channels (**Annex 4.8 & 4.9**) and 12 local newspaper articles.

Activity 4.3: Produce a non-technical report summarising project findings and setting out recommendations for mitigating human-shark conflicts.

No action to report in this reporting period. Scheduled to commence in Y3.

3.2 Progress towards project Outputs

Output 1. The social context of human-shark conflict on Ascension Island is characterised through a process of inclusive stakeholder engagement, ensuring that local knowledge and views are duly represented in project design and implementation.

After some initial setbacks during Y1 while the aims, scope and methodology for this Output were agreed with local stakeholders, significant progress has been made during Y2. In December 2023 (Y2Q3), eight key informant interviews were conducted with stakeholders from # employing organisations, including Government, military, and civil society (**Output 1.1**). Preliminary results were reported back to stakeholders (**Annex 4.1**) and used to refine a semi-structured interview protocol which has been approved for use on broader cross section of the Ascension Island community during a longer period of fieldwork scheduled for April 2024 (**Annex 4.2; Output 1.2**). Two substantive changes to this Output were also made (and approved by Darwin Secretariat) following stakeholder consultation in Y1. Firstly, plans to distribute online questionnaires were abandoned over concerns about verifying the location and identity of respondents.

Instead, a subset of multiple-choice questions has been extracted from the semi-structured interview protocol that can be completed electronically on tablet devices distributed at public meetings and events. This format will permit the collection of quantitative data on public interactions with and attitudes towards sharks on a larger sample than would be achievable through more in depth interviews. Secondly, methods for gathering data on frequency of fisher interactions with sharks (**Output 1.3**) had to be changed after low uptake of Government issued logbooks. Based on suggestions from the Ascension Fishers' Association, a board for anonymous reporting of shark encounters has been installed at the main fish landing point and is in regular use (**Annex 4.3**). We are also exploring possibilities for electronic data gathering, including analysis of social media data (**Annex 4.4**) and the establishment of a dedicated repository to log events and deposit photos and videos of shark encounters (**Output 1.3**). As a result of these changes and prolonged period of stakeholder consultation, we are behind schedule on delivering this output. However, the approach has achieved our goal of ensuring that local views are represented in project design and implementation.

Output 2: Knowledge of the behaviour and distribution of Galapagos sharks on Ascension Island is significantly enhanced and is used to evaluate a range of hypotheses proposed to explain recent increases in inshore activity.

Substantial progress towards understanding the spatial dynamics of sharks around Ascension Island has been made during Y2, and several Output level indicators have now been either fully or partially achieved. Acoustic tracking receivers and oceanographic monitoring equipment deployed in Y1 were successfully recovered in March 2024 (Y2Q4), yielding > 12 months data on nearshore physical oceanography and the movements of 36 Galapagos and silky sharks tagged in Y1 (**Outputs 2.2 and 2.4**). Analysis of these data have only recently begun; however preliminary investigations have already provided a number of valuable insights. For example, acoustic detection data have revealed that Galapagos sharks tagged in February-March 2023 were almost permanently resident around Ascension Island over the past year but predominantly concentrated around remote, exposed south coast areas that are not visited by inshore fishing craft or bathers (**Annex 4.7**). This distributional shift helps to explain the decrease in public sightings over the past 12 months and has helped to discredit one theory that sharks engaged in inshore conflict with humans were attracted in from more distant, oceanic waters e.g. by fisheries discards. However, tracking results have also revealed highly spatially dynamic distributions, with sharks substantially altering both their depth use and geographic location around the island across the 12-month study period, including occasional movements into more sheltered west coast areas in November-December 2023 which coincided with a pulse in depredation events reported by fishers (**Output 2.2**). Water temperature and thermal stratification of the water column also varied substantially over this period in a manner that might explain some of the observed changes (**Annex 4.7**); however, further analysis is needed to test this hypothesis. Analysis of morphological measurements and tissue (blood and fin clip) collected from 158 sharks sampled over the same 12-month period is also currently underway (**Output 2.3**) and aims to provide information on diet and body condition that can be related to observed movement patterns. Results from the first 12-months of sampling have already revealed dietary differences between the two dominant coastal shark species that occur around Ascension (Galapagos and silky) which might help to explain why only the former has been found to engage in movements into shallow, coastal habitats. Future analyses will examine if and how diet and condition has shifted across the annual cycle coinciding with changing shark distributions and oceanography.

As detailed in the first annual report, a major constraint on this Output has been the limited shark activity that has occurred in shallow, coastal habitats since formal data collection began. Time lapse camera systems have been installed at two sensitive coastal locations (Pierhead and Comfortless Cove bathing beach; **Output 2.1; Annex 4.5**), however very limited shark activity has been observed during the 12-month monitoring period. While obviously a benefit for the Island community, this outcome (which was acknowledged in the assumptions and risk register) will limit our ability to test hypotheses on what caused recent incursions and requires longer term studies of shark spatial dynamics over multiyear timescales. An important development during Y2 that will help to secure this legacy is the awarding of a 3.5-year NERC GW4+ PhD studentship (worth £115,000 in match funding) which will extend the goals of the current project over a further 2 years of data collection (see **Annex 4.6** and Section 10). A postgraduate researcher (Lucy Clarke) has already been appointed to the role and is participating in a project expedition in March-May 2024 (Y2Q4) for training. In addition to collecting new data, the PhD will also create a timeline of recent and historic human-shark conflict at Ascension Island using a mixture of social media and museum archive data, helping us to formally document and explore the drivers of events that predate the project.

Output 3. Field trials and fully costed feasibility studies of non-lethal conflict reduction measures are undertaken to assess their viability on Ascension Island

As detailed in Section 3.1, significant progress has been made on the feasibility analysis of non-lethal shark barrier systems (**Output 3.2**), with quotes and bespoke designs received from three leading manufacturers and a draft report assessing the suitability of each for deployment on Ascension Island now approaching completion (expected Y3Q1). An assessment of public preferences and confidence in each system is currently ongoing as part of planned community questionnaires and semi-structured interviews (Output 1.2) and will be incorporated into the final recommendations. Comparatively less progress has been made on trials of vessel and gear mounted electronic deterrents (**Output 3.1**), largely due to the time demands of shark sampling (Output 2.3) - which has limited staff and vessel availability - and low fisher motivation during periods of less intense catch depredation. With data collection for Output 2.3 now complete, we hope to be able to allocate more time to completing deterrent trials in Y3.

Output 4 The results of social and ecological research are openly shared and discussed with the Ascension Island community.

Y2 of the project has primarily focussed on data collection with the second planned public meeting to disseminate findings not scheduled until Y3Q1 (**Output 4.1**). However, publicity and preparation of slideshows and visual aids for this meeting is underway (see **Annex 4.10**) and from expressions of interest we expect a strong turnout. Aside from community meetings, regular dissemination of project results has continued throughout Y2 via social media, local newspaper articles (**Annexes 4.8-4.9**) and consultation with key stakeholder groups (e.g. AFA; see Section 3.1). With data collection for Outputs 1-3 now largely complete, a key focus for Y3 will be the reporting and dissemination of findings through talks, peer reviewed papers and non-technical reports (**Output 4.3**).

3.3 Progress towards the project Outcome

Outcome *The underlying socio-ecological drivers of, and potential solutions to, human-shark conflict on Ascension Island are better understood and form the basis of evidence-based management recommendations.*

As detailed in Sections 3.1-3.2, several important steps needed to achieve the outcome-level indicators have been taken in Y2. Data on shark distributions, diet, nutritional condition, and potential environmental drivers of these have now been collected over a 12-month period using a combination of acoustic telemetry, oceanographic monitoring, and physiological studies, providing the needed to test hypotheses on factors affecting shark movement and behaviour around Ascension Island (**Outcome 0.1**). Preliminary findings have been shared with the Ascension Island community and there is evidence that they are already prompting public conversation and greater interest and awareness of the complexities of shark ecology. We hope to quantify this effect through stakeholder interviews and participation in public meetings in Y3, with a goal of transitioning the conversation from 'the shark problem' to a shared understanding that ultimately promotes co-existence (**Outcome 0.3**). A feasibility study of shark barrier systems for installation at public bathing beaches is also close to completion (pending the conclusion of community consultation) and makes practical recommendations for mitigation measures that could help to restore public confidence in marine recreation (**Outcome 0.2**). Whether these options are deemed affordable or proportionate is outside the scope of the project; however, informal feedback from stakeholders suggest that the process of exploring solutions has provided reassurance that concerns are being taken seriously and acted upon.

As described in Annual Report 1, a key challenge to achieving Indicators 0.1 and 0.2, and hence the project outcome, within the funding period is the change in shark distribution that has occurred since the inception of this project. Where there were previously large numbers of sharks concentrated in inshore areas, shark activity since project data collection began has been predominantly focussed on the less visited southern coast of the island. Anecdotally, inshore movements have occurred periodically over the past 5 years with peaks in 2017 and 2021, which may suggest a longer-term cycle requiring multiyear studies to capture. As detailed in Section 3.2, an important development during Y2 has been the award of a 3.5-year NERC doctoral training grant that will extend the current project for several more years and provide the time to detect and study the drivers of such cycles (**Annex 4.6**). The studentship builds on the initial results and research infrastructure established during the project and represents an important outcome in itself, that will help secure the legacy and impact of the work.

3.4 Monitoring of assumptions

Outcome Assumptions

0.1 Inshore shark activity varies during the study and sufficient data can be collected to test each hypothesis.

Comments: As described in section 3.3, this assumption has not fully held. Data obtained from acoustic telemetry and shore-based monitoring indicate that, while shark distributions have varied substantially over the study period, inshore activity has not returned to the very high levels observed during peaks in 2016-2017 and 2020-2021. This behaviour change will inevitably affect our ability to test hypotheses on what caused these recent peaks; however, the project has responded in several ways to ensure that useful information can still be generated. Firstly, a novel approach has been adopted to quantify shark conflict based on social media activity over the past decade, allowing us to precisely timeline peaks in activity that predate the project (**Annex 4.4**). These peaks can then be related to prevailing environmental conditions at the time, reconstructed using fine-scale oceanographic models developed and validated during the project. In addition, a set of tissue samples originally collected for genetic analysis from sharks using inshore waters during the 2020-2021 peak has been obtained, which we plan to analyse for isotopic markers of diet and trophic position to compare with more recent measurements from individuals sampled offshore. This will allow us to test hypotheses that shifts in prey availability may have underpinned past incursions. Finally, it is possible that inshore movements occur on longer timescales than can be studied in a single project. To enable this, the project team have secured funding for a 3.5-year PhD studentship that will extend the shark research and oceanographic monitoring initiated during the project for at least another 2 years, providing greater opportunity to study and understand multiannual cycles (**Annex 4.6**).

0.2 Assumes that local fishers and manufacturers of shark barriers and deterrents engage in the project (see Output specific assumptions).

Comments: This assumption has partially held. Manufacturers of shark barrier systems have been very positive in engaging with the project and provided bespoke designs and quotations for installation of three alternative barrier systems at two of Ascension's most popular bathing beaches. These systems have been compared and ranked based on a range of criteria in the draft feasibility study which will be completed shortly. In contrast, while local fishers have expressed some interest in participating in trials of gear mounted deterrent devices, low levels of catch depredation experienced during Y2 of the project have created minimal incentive and no trials have been initiated to date. We will continue to work with fishers in Y3 to explore opportunities for conducting these trials. If uptake remains low, we plan to complete experimental trials of devices deployed from the AIGCFD inshore research vessel to at least provide proof-of-concept.

0.3 Drivers of recent increases in shark activity can be confidently identified within the timeframe of the project.

Comments: Depends heavily on assumption 0.1. As outlined in the original logframe, even if this assumption is not met, a range of management options can still be assessed based on international best practice and tests of common conflict reduction measures carried out during the project. Shark behavioural and oceanographic data collect in Y2 have already revealed highly dynamic distributions and variable inshore oceanography which will undoubtedly provide insights into factors affecting shark movements, even if these have not resulted in a repeat of large-scale incursions observed over the past 5 years.

Output Assumptions

1.1-1.2 People engage with the project and are willing to participate in interviews and questionnaires.

This assumption has held. Stakeholders have proven to be very willing to participate in social research, with eight planned key informant interviews completed in Y2 and contact details obtained for a large sample of individuals interested in participating in semi-structured interviews planned for Y3Q1.

1.3 Assumes that fishers are willing to participate and reliably record and report logbook data.

Comments: As described in Section 3.1, uptake of government-issued logbooks has so far been low, necessitating the development of alternative systems for capturing data on frequency of human-shark interactions. This has included use of public-facing social media posts to quantify the location, nature and frequency of human-shark encounters over the past 10 years (**Annex 4.4**) and the installation of a whiteboard at the Pierhead for reporting of sightings and catch depredation events (**Annex 4.3**).

2.1 Permissions can be obtained and suitable locations can be found for securely mounting monitoring cameras.

Comments: This assumption has held. Following a public consultation, permission has been granted by the Ascension Administrator for the installation of camera systems at agreed locations the Pierhead and bathing beaches (**Annex 4.5**).

2.2-2.4 A suitable research vessel is available for the duration of the project.

Comments: This assumption has so far held. AIG Conservation's 8.0m RIB has remained available for routine research activities and AIG Operations have been supportive in providing access to a container barge for the deployment of heavy moorings to hold large items of scientific equipment.

2.2 - 2.3 Sufficient sharks can be captured for tagging and sampling.

Comments: This assumption has held. Although inshore shark activity has been substantially lower during the project than during previous years, large numbers of sharks have still been predictably encountered at several deeper water aggregation sites allowing tagging and sampling targets to be met. These aggregations have tended to consist primarily of larger juveniles and subadults with a notable absence of sexually mature individuals. In Y3, focus will shift towards filling these demographic gaps.

2.4. Instruments do not malfunction or are lost.

Comments: This assumption has held. Of the 31 telemetry receivers and oceanographic moorings deployed in Y1, 30 were successfully recovered, serviced and redeployed in Y2, yielding > 12 months of high resolution shark movement and oceanographic data (**Annex 4.7**).

3.1-3.2 Local fishers agree to participate in trials of shark deterrents and manufacturers of barrier systems respond with quotes and technical specifications.

Comments: See Output-level indicator 0.2.

4.1 The Ascension Island community are sufficiently engaged in the project to attend meetings.

Comments: No additional public meetings were held during the reporting period to evaluate this assumption. However, informal conversations and regular requests for updates from fishers and other island stakeholders suggest that interest remains high. Continued 'Likes' and 'Shares' of project communications on AIGCFD's official social media channels also indicate sustained interest (**Annex 4.8-4.9**).

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

As described and evidenced in Section 3, several important steps have been taken towards the overall objective of understanding socio-ecological drivers of, and finding solutions for, human-shark conflict on Ascension Island. This objective is well aligned with strategic objectives 1 & 2 of the Ascension MPA Management Plan ("Conserving Ascension Island's marine biodiversity...")

and “Supporting the sustainable development of social and economic activities”) which are conflicted by negative interactions between sharks and human ocean users such as fishers, divers, and bathers. The project is also contributing to research priorities identified in the [Ascension Island MPA Research, Monitoring and Evaluation Strategy](#), particularly Topic 6 “Establish temporal and spatial movement patterns and degree of residency of Galapagos sharks around Ascension Island”.

Internationally, the project contributes to meeting AIG’s commitments under the draft Post 2020 Global Biodiversity Framework, specifically Target 4 (managing human-wildlife conflict), Target 9 (ensuring livelihoods of local communities), and Target 14 (integrating biodiversity values). The project also supports the recently adopted IUCN Resolution relating to human-wildlife conflict, which recognises the challenges of balancing public safety and wildlife’s needs and calls for holistic responses “...supported by the best-available information and systematically collected and credible evidence;” which is core to the proposed project.

5. Gender Equality and Social Inclusion (GESI)

Please quantify the proportion of women on the Project Board ¹ .	33%
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%

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
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	

Human-shark conflict is not a highly gendered issue at Ascension Island. While there are known gender biases in the fishing community, with men possibly more engaged with and vocal about

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.

conflicts involving catch depredation, the issue regarding shark interactions effects everyone. Thus, while the project does not have any specific gender empowerment objectives, we have been careful to build gender inclusivity (and other forms of diversity) into all project activities. This includes ensuring that semi-structured interviews and questionnaires consist of a gender balanced and representative sample. Opportunities for volunteering have also been fully inclusive, with both men and women actively engaged in shark tagging and sampling activities.

6. Monitoring and evaluation

M&E in Y1 has been organised as per the original project application, involving weekly email updates from the Project Officer and (at least) monthly meetings between project partners to monitor progress, discuss emerging risks or milestones that have been missed, and adapt accordingly. Overall responsibility for M&E rests with the Project Leader (University of Exeter) and local Project Officer (AIGCFD) with any issues discussed between all partners at monthly meetings. A project SharePoint has also been established for sharing live versions of datasets, reports and other documents, which has greatly assisted in monitoring progress against monthly sampling targets. M&E during Y2 has focussed on monitoring progress against measurable indicators for Outputs 1-3 as the contribution of each of these to achieving the overall Outcome is explicit in the project's pathway to impact.

Indicators for these Outputs have generally been appropriate with several quantitative targets now fully or partially achieved (see Annex 1). However, M&E has also identified and responded to several external factors that have changed the context and approach for the project. As described in Section 3, stakeholder consultation in Y1-2 identified several flaws in our original social science and fisher engagement plan which required a reworking of the logframe and associated indicators. These changes were agreed by all project partners and approved by Darwin in December 2023 (Y2Q3). Secondly, as noted in the review for the first annual report, the relatively low level of inshore shark activity experienced during the project compared to that reported in recent years also poses an unmanageable risk to fully achieving our proposed Outcome-level indicators (e.g. *Outcome 0.1: At least four credible hypotheses proposed to explain recent increases in inshore shark activity*). The review report suggested that we revisit indicators of what success looks like considering temporarily reduced levels of conflict, with a greater emphasis on enhanced knowledge and capacity to respond to future conflict. Given continued low levels of activity during Y2 we plan to work with Darwin to implement this recommendation.

7. Lessons learnt

In addition to reaffirming experiences from Y1 (including the value of a consultative approach to build consensus and trust, even at expense of delays to project activities), a key lesson learned from Y2 is that complex socio-ecological systems, including human-wildlife conflicts, cannot be fully understood, or resolved, through short-term parachute projects. This revelation is not unexpected given experiences elsewhere; however, the movement of sharks away from inshore areas for much of the project emphasises that cycles of predator movement and interactions with people can occur over longer timescales than a single project can effectively cover. Rather than negating the benefits of the current project – which stands to contribute many novel insights into factors driving shark movements around Ascension Island – our experiences highlight the need for effective legacy planning to build on the infrastructure, research findings, and social capital generated and enable the long-term studies and partnerships that can deliver answers and attitudinal change. We have already begun this process through leveraging of follow-up funding, but there is scope to do more, including formal MOUs to underpin long-term partner commitments of equipment and time and strengthened branding and promotion of project goals and outputs to attract long-term strategic funding.

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

Comment: Describe the fishery.

Action: A brief description of the fishery has now been in the project summary (Section 1)

Comment: Comparison of Galapagos sharks elsewhere?

Action: This is an important point and one that we have been actively exploring. During Y2, the project team made contact with another team that are currently investigating causes and solutions to catch depredation at Lord Howe Island in Australia (see [Mitchell et al. 2021](#)), using very similar methods to those employed here. Several video conference calls were held to exchange ideas/experiences (e.g. in relation to testing deterrent devices) and discuss opportunities for future collaboration, including comparisons of species behaviour at the two sites. We plan to develop this collaboration further during Y3 and after the project has completed.

Comment: Should the Risk Register also consider the physical hazards of working with shark tagging, at depths and at sea.

Action: Physical hazards to staff and animal subjects are all covered in mandatory institutional risk assessments and ethical applications reviewed by veterinary professionals, which are read and signed by all project staff. Rather than duplicate these risks in the project Risk Register we append the approved risk assessments and ethics permits to this report (**Annexes 4.11 and 4.12**).

9. Risk Management

No additional risks have arisen during the reporting period other than those identified in the original Risk Register submitted with first annual report. However, both risks identified in the Register (inshore shark activity does not resume and fishers do not voluntarily report catch and catch depredation data) have materialised. Adaptations have largely followed the proposed risk mitigation measures from the Risk Register, including development of alternative mechanisms for gathering data on human-shark interactions, focussing on what can be learned about drivers of shark movements around Ascension to explain future inshore movements, and greater emphasis on legacy building (see Sections 3, 6 and 10).

10. Sustainability and legacy

The Project's intended exit strategy, including a legacy of enhanced understanding of the socio-ecological drivers of human-shark conflict and evidenced recommendations for mitigating these, remains valid and largely achievable. Results of acoustic tracking, oceanographic monitoring and key informant interviews completed during Y2 have already yielded novel insights into the spatial ecology of Galapagos and silky sharks around Ascension Island and helped to characterise the social dimensions of human-shark conflict (**Annexes 4.1, 4.2 & 4.7**). A feasibility study on the installation of shark barrier systems at bathing beaches is also approaching completion and makes transparent and evidence-based recommendations that can be actioned by policy makers in future. Results of these work packages will shortly be communicated to stakeholders with the aim of fostering shared understanding of the problem, drivers, and potential solutions, which is key to addressing interpersonal conflicts that often underpin human-wildlife conflict. However, results from Y2 have also highlighted that the dynamics of shark distributions and interactions with humans may occur on longer timescales than can be effectively captured by a single project, making legacy planning and the continuation of the work a key priority. As a result of leading and participating in partner expeditions and routine monthly sampling, AIGCFD now have considerable capacity for practical shark research, with at least 7 current team members trained in shark handling, tagging, and sampling procedures. The Darwin Project Officer is also planning to complete a Masters by Research degree based on the results of the work, helping to build capacity in data analysis and reporting. Finally, legacy planning was given a substantial boost in Y2 through the award of a competitive NERC-funded PhD scholarship that builds directly on project findings and will extend the project for at least a further 2.5 years, including funding to sustain shark tracking and oceanographic monitoring (**Annex 4.6**). Along with the enhanced knowledge, social capital and local capacity already generated through the project, this additional funding will help to secure the legacy of the work in the medium term.

11. Darwin Plus identity

The Darwin Initiative has been the principal external funder of conservation work on Ascension Island over the past decade and its identity and brand are already well known in the Territory. During the reporting period, the Darwin Initiative logo and/or acknowledgement of Darwin funding has featured in publicity for upcoming public meetings (**Annex 4.10**), project reports (**Annex 4.1**) public notices published in the local newspaper, updates in the local pier mounted public notice board and electronic correspondence distributed via social media posts (see Section 3.1, **Annex 4.9**).

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?	Most safeguarding issues are associated with the social science elements of the project (Output 1) for which the nominated focal point is Dr Claire [REDACTED] (ZSL)
Has the focal point attended any formal training in the last 12 months?	Yes
What proportion (and number) of project staff have received formal training on Safeguarding?	Past: 75% [6] Planned: 0% [0]
Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses.	
No safeguarding issues have been encountered during Y2 of the project.	
Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify.	
Stakeholder interviews in Y3 of the project have the potential to present safeguarding issues, which have been fully addressed and mitigated in institutional ethics permits for human research. A copy of the relevant ethics permit is attached to this report (Annex 4.13).	
Please describe any community sensitisation that has taken place over the past 12 months; include topics covered and number of participants.	
Community sensitisation to the social science objectives of the project began in Y2 through key informant interviews conducted with 8 stakeholders (5 men and 3 women) in influential community roles. These interviews outlined the aims and scope of the work and solicited feedback on proposed methodology which has been incorporated into survey design, e.g. when designing maps for participatory mapping and identifying categories for survey responses. An update on project plans and findings was also provided to the board of the Ascension Fishers Association (2 persons, 1 male, 1 female) to cascade to members. Topics covered including opportunities for growing fisher participation and a summary of preliminary results on shark behavioural research.	

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.

No Health & Safety concerns have been raised, other than those identified and mitigated in institutional risk assessments conducted by all project partners in relation to their travel, fieldwork and laboratory procedures.

13. Project expenditure

Table 1: Project expenditure during the reporting period (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				draft
Consultancy costs				
Overhead Costs				draft
Travel and subsistence				Costs associated with an additional partner visit (UoE and ZSL) in Y2Q3 to finalise methodology for delayed social science outputs from Y1 (see Section 3)
Operating Costs				draft
Capital items				Some costs met by additional matched funding secured through a NERC PhD studentship.
Others (Please specify)				
TOTAL				98,595.00

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 (£)			University of Exeter, Ascension Island Government, ZSL, University of Windsor, University of Plymouth
Total additional finance mobilised for new activities occurring outside of the project, building on evidence, best practices and the project (£)			

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

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
<p>Impact</p> <p>Evidence-based solutions are identified for an emerging human-wildlife conflict in one of the world's largest marine protected areas.</p>		<p>With much of the data analysis left to complete, the project is still at too early a stage to recommend solutions for addressing human-shark conflict. However, project activities appear to be gradually changing the tone of the public conversation (aided by movements of sharks away from inshore areas) and we will seek to consolidate this through reporting and dissemination activities during Y3.</p>	
<p>Outcome <i>The underlying socio-ecological drivers of, and potential solutions to, human-shark conflict on Ascension Island are better understood and form the basis of evidence-based management recommendations.</i></p>	<p>0.1 By Q4 of Y2, at least four credible hypotheses proposed to explain recent increases in inshore shark activity have been evaluated using empirical data.</p> <p>0.2 By Q4 of Y2, experimental trials and/or costed feasibility studies of at least four different non-lethal conflict reduction measures have been undertaken that are specific to Galapagos sharks on Ascension Island.</p> <p>0.3 By Q1 of Y3, available mitigation options are reviewed and presented to stakeholders, drawing on the findings of 0.1-0.2 together with experiences of managing similar human-wildlife conflicts elsewhere.</p>	<p>0.1 Data on shark movements, diet, body condition, and potential environmental drivers of these have been collected over a 12-month period using a combination of acoustic telemetry, oceanographic monitoring equipment and monthly physiological sampling, providing the necessary evidence base for hypothesis testing (<i>Annex 4.7</i>).</p> <p>0.2 Draft feasibility study on installation of shark barrier systems at bathing beaches completed, incorporating bespoke quotes and designs from three leading manufacturers (draft contains commercially sensitive information and not yet suitable for attachment until internal peer review process is completed).</p> <p>0.3 No progress this reporting period</p>	
<p>Output 1. The social context of human shark conflict on Ascension Island is characterised through a process of inclusive</p>	<p>1.1 By Q2 of Y2, at least 7 key informants have completed a semi-structured interview to help inform</p>	<p>1.1 Eight key informant interviews completed and used to refine semi-structured interview protocol for stakeholder surveys (<i>Annex 4.1-4.2</i>).</p>	<p>1.1. Output complete – no further action needed.</p>

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
stakeholder engagement, ensuring that local knowledge and views are duly represented in project design and implementation	<p>and co-develop sampling protocols and approaches.</p> <p>1.2 By Q1 of Y3, at least 30 persons representing different marine user groups, genders, age classes and nationalities have participated in semi-structured interviews to gather baseline data on attitudes towards sharks, perceived causes of recent activity spikes spatiotemporal patterns in activity and perceived causes of recent activity spikes.</p> <p>1.3 By Q2 of Y3, a system for collecting data and media from marine users on shark sightings and depredation has been developed, both in-person and online.</p>	<p>1.2. Semi-structure interview protocol finalised and approved for community surveys beginning in Y3Q1 (Annex 4.2).</p> <p>1.3 Board installed at the Pierhead for anonymous reporting of shark interactions/encountered (Annex 4.3); pilot study completed on use of social media activity to track human-shark conflict on Ascension as part of an undergraduate dissertation (Annex 4.4).</p>	<p>1.2 Carry out semi-structured interviews with a representative cross-section of the community.</p> <p>1.3 Formalize and write up social media analysis in conjunction with museum archive data as part of a newly-funded PhD studentship; develop repository for marine users to log and upload media (photos/videos) of shark encounters.</p>
Activity 1.1 Design and deliver semi-structured interviews with representative stakeholder groups to better understand the human dimensions of conflicts.		See Output 1.1 – 1.2	See Output 1.1 – 1.2
Activity 1.2 Develop and promote online and in-person tool to collect information on shark sightings and other key behaviours.		See Output 1.1 – 1.2	See Output 1.1 – 1.2
Activity 1.3 Analyse interview data to inform project design is appropriate for setting		See Output 1.1 – 1.2	See Output 1.1 – 1.2
1.4 Gather data on catch depredation rates working in collaboration with local recreational and sports fishers		See Output 1.3	See Output 1.3

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
<p>Output 2. Knowledge of the behaviour and distribution of Galapagos sharks on Ascension Island is significantly enhanced and is used to evaluate a range of hypotheses proposed to explain recent increases in inshore activity.</p>	<p>2.1 By Q3 of Y2, time lapse camera systems have been installed and used to monitor Galapagos shark activity at three sensitive coastal locations (including the Pierhead and major bathing beaches) over a minimum 12- month period.</p> <p>2.2 By Q3 of Y2, an acoustic tracking array is established on the Ascension Island coastal shelf and is used to monitor the movements and depth use of at least 50 Galapagos sharks over a minimum 12-month period.</p> <p>2.3 By Q3 of Y2, spatiotemporal variation in the body condition and reproductive status of Galapagos sharks is assessed over a 12-month period using blood biochemistry, morphology and/or ultrasound of at least 100 individuals sampled in inshore and offshore locations.</p> <p>2.4 By Q3 of Y2, spatiotemporal variation in the physical oceanography of Ascension Island's coastal environment is monitored over a 12-month period and is related to Galapagos shark distribution, behaviour and life-stages present (3.4).</p>	<p>2.1 Two timelapse camera systems installed (at the pierhead and one popular bathing beach) and used to monitor shark presence/absence across a 12-month period (Annex 4.5), although a technical fault with the Pierhead system has resulted in data gaps at this site pending repair. Image processing and analysis to be finalised in Y3.</p> <p>2.2 A total of 36 sharks (27 Galapagos and 9 silky) tracked over a 12-month period on an island-wide hydrophone array consisting of 31 moored telemetry receivers located in coastal and offshore areas (Annex 4.7). More than 300,000 detections of tagged animals recorded and used to generate residency indices and animations visualising changes in distribution depth use (Annex 4.7)</p> <p>2.3 Morphological measurements and tissue samples (fin clip, blood) collected from 158 sharks over a 12-month period for assessment of diet and nutritional condition (Annex 4.7). Laboratory analysis of first 6 months of samples complete, with remaining samples to be processed in Y3. A lack of adult males and females in the current sample has so far prevented assessment of seasonal changes in reproductive status.</p> <p>2.4 Three fixed oceanographic moorings (comprising of temperature sensors and acoustic doppler current profilers) have been deployed on Ascension's coastal shelf and yielded > 12 months data on ocean currents, water temperature and thermal stratification over the range of depths typically utilised by Galapagos sharks (Annex 4.7). Analyses planned for Y3 will relate observed trends in physical oceanography to changes in shark distributions, depth use and physiology.</p>	
<p>Activity 2.1 Install fixed-point, time-lapse camera assemblies for monitoring shark activity at key coastal locations.</p>		<p>Cameras installed at two coastal locations.</p>	<p>No further action needed.</p>

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
Activity 2.2 Analyse time-lapse imagery to quantify relative shark abundance and validate results generated from online citizen science platforms.		No progress this reporting period	Analyse timelapse imagery.
2.3 Deploy passive acoustic telemetry array and oceanographic moorings.		Acoustic array and oceanographic moorings recovered, serviced, and redeployed. First 12-months data downloaded and archived locally and on cloud.	Retrieve, download, service and redeploy all moorings after a further 6-12 months.
2.4 Deploy acoustic telemetry tags on Galapagos sharks.		No further tag deployments in Y2 pending the results of tracking for 36 individuals tagged in Y1.	Carry out additional tag deployments to fill demographic gaps in the study cohort (e.g. large adults).
2.5 Carry out monthly physiological, morphological and reproductive assessments of Galapagos sharks to assess spatiotemporal variation in body condition and breeding status.		>160 individuals sampled over a 12-month period, including 158 tissue samples and 63 blood samples.	Complete laboratory analysis of samples collected during Y2.
2.6 Analyse ecological and oceanographic data to explain any observed variation in inshore shark activity (2.2) and rates of catch depredation (1.4).		Preliminary analyses of shark tracking and oceanographic data completed to describe broad trends over the study period.	Complete in-depth analyses to relate observed changes in shark distribution and behaviour to potential drivers.
2.7 Report and publish the findings of applied shark research		No progress this reporting period	Report and publish findings once data analysis complete.
Output 3. Field trials and fully costed feasibility studies of non-lethal conflict reduction measures are undertaken to assess their viability on Ascension Island.	3.1 By Q1 of Y2, experimental trials of at least two electronic 'shark deterrent' devices are carried out to establish their effectiveness in reducing negative interactions with fishing vessel.	3.1 No progress in this reporting period	3.1 Complete experimental trials
	3.2 By Q3 of Y2, feasibility studies of at least two 'shark barrier' systems are undertaken for Ascension Island's main bathing beaches, including fully costed installation and maintenance	3.2 Draft feasibility study on installation of shark barrier systems at bathing beaches completed, incorporating bespoke quotes and designs from three leading manufacturers (draft contains	3.2 Complete internal review of feasibility report; submit final draft to Ascension Island Government.

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
	budgets, and an assessment of wider impacts on biodiversity and other marine users (e.g. navigation hazards).	commercially sensitive information and not yet suitable for attachment until internal peer review process is completed).	
<p>Output 4. The results of social and ecological research are openly shared and discussed with the Ascension Island community and are used to assess the suitability of a range of mitigation options for ameliorating human-shark conflicts.</p>	<p>4.1. By the end of the project, at least two public meetings have been held (one in Y1 and one in Y3) to discuss and adapt research plans, and to disseminate findings.</p> <p>4.2. By Q2 of Y3 a report outlining potential mitigation options for emerging human-shark conflicts on Ascension Island is presented to stakeholders, including non-technical summaries of the key findings of social and ecological research.</p>	<p>4.1 Publicity and preparation of dissemination materials for second planned public meeting begun (Scheduled Y3Q1; Annex 4.7 & 4.10). This meeting will summarize what we have learned about shark behaviour around Ascension Island over the past 12 months and was arranged in response to public demand for an update, pending the completion of data analysis and reporting. An additional public meeting may be arranged at the end of Y3 to present final conclusions and recommendations.</p> <p>4.2 Not scheduled until Y3.</p>	
4.1 Hold public meetings on Ascension Island to present and discuss project plans and findings.		See Output 4.1	See Output 4.1
4.2 Disseminate and promote project activities and outputs through a range of online and print media.		4.2 A total of 14 social media posts and 12 local newspaper articles featuring project content have been produced to date (Annex 4.8 & 4.9). Hard copies of public information materials placed on the notice board installed at the Pierhead.	4.2 Continue to provide public updates on at least a monthly basis.
4.3 Produce a non-technical report summarising project findings and setting out recommendations for mitigating human-shark conflicts		4.4 No progress to report this period.	

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: Evidence-based solutions are identified for an emerging human-wildlife conflict in one of the world’s largest marine protected areas.			
Outcome: The underlying socio-ecological drivers of, and potential solutions to, human-shark conflict on Ascension Island are better understood and form the basis of evidence-based management recommendations.	0.1 By Q1 of Y3 , at least four credible hypotheses proposed to explain recent increases in inshore shark activity have been evaluated using empirical data. 0.2 By Q1 of Y3 , experimental trials and/or costed feasibility studies of at least four different non-lethal conflict reduction measures have been undertaken that are specific to Galapagos sharks on Ascension Island. 0.3 By Q2 of Y3 , available mitigation options are reviewed and presented to stakeholders, drawing on the findings of 0.1-0.2 together with experiences of managing similar human-wildlife conflicts elsewhere.	0.1 Papers published in the peer-reviewed literature or in-press manuscripts; MSc theses. 0.2 Reports available on the AIG website; manuscripts for submission to peer-reviewed journals. 0.3 Reports available on the AIG website	0.1 Assumes that inshore shark activity varies during the study and that sufficient data can be collected from Outputs 1-3 to test each hypothesis (see Output specific assumptions). 0.2 Assumes that local fishers and manufacturers of shark barriers and deterrents engage in the project (see Output specific assumptions). 0.3 Action to address underlying causes assumes that drivers of recent increases in shark activity can be confidently identified within the timeframe of the project. Even if this assumption is not met, a range of management options can still be assessed based on international best practice and tests of common conflict reduction measures carried out during the project.
Outputs: 1. The social context of human-shark conflict on Ascension	1.1 By Q2 of Y2 , at least 7 key informants have completed a semi-structured interview to help	1.1-1.2 Summaries of fully anonymised datasets and disaggregated summary	1.1-1.2 Assumes that people engage with the project and are willing to participate in interviews.

<p>Island is characterised through a process of inclusive stakeholder engagement, ensuring that local knowledge and views are duly represented in project design and implementation.</p>	<p>inform and co-develop sampling protocols and approaches.</p> <p>1.2 By Q1 of Y3, at least 30 persons representing different marine user groups, genders, age classes and nationalities have participated in semi-structured interviews to gather baseline data on attitudes towards sharks, perceived causes of recent activity spikes spatiotemporal patterns in activity and perceived causes of recent activity spikes</p> <p>1.3 By Q2 of Y3, a system for collecting data and media from marine users on shark sightings and degradation has been developed, both in-person and online.</p>	<p>statistics for spatiotemporal activity patterns available in project reports and databases held by AIGCFD.</p> <p>1.3 Data reporting form available online and in-person (e.g. a board at the pier) and data collected and summarised in reports</p> <p>1.3 Catch depredation data in databases held by AIG and summarised in project reports.</p>	<p>1.3 Assumes that fishers are willing to participate and reliably record and report data relating to fishing sites and catch depredation.</p>
<p>2. Knowledge of the behaviour and distribution of Galapagos sharks on Ascension Island is significantly enhanced and is used to evaluate a range of hypotheses proposed to explain recent increases in inshore activity.</p>	<p>2.1 By Q4 of Y2, time lapse camera systems have been installed and used to monitor Galapagos shark activity at three sensitive coastal locations (including the Pierhead and major bathing beaches) over a minimum 12-month period.</p> <p>2.2 By Q4 of Y2, an acoustic tracking array is established on the Ascension Island coastal shelf and is used to monitor the</p>	<p>2.1 Time-lapse footage uploaded to online citizen science platforms (e.g. zoonopia.org); monitoring databases held by AIG; summarised findings in project reports and MSc theses.</p> <p>2.2 Tag/receiver metadata and filtered detections entered in existing AIGCFD databases; papers published in the peer-reviewed literature or in-press</p>	<p>2.1 Assumes that necessary permissions can be obtained and suitable locations can be found for securely mounting cameras. Also assumes that cameras do not malfunction and that sharks can be accurately enumerated in time-lapse images.</p> <p>2.2-2.4 Assumes that a suitable research vessel is available for the duration of the project. AIG have confirmed current vessel availability, which includes a level</p>

	<p>movements and depth use of at least 50 Galapagos sharks over a minimum 12-month period.</p> <p>2.3 By Q4 of Y2, spatiotemporal variation in the body condition and reproductive status of Galapagos sharks is assessed over a 12-month period using blood biochemistry, morphology and/or ultrasound of at least 100 individuals sampled in inshore and offshore locations.</p> <p>2.4 By Q4 of Y2, spatiotemporal variation in the physical oceanography of Ascension Island's coastal environment is monitored over a 12-month period and is related to Galapagos shark distribution, behaviour and life-stages present (3.4).</p>	<p>manuscripts; MSc theses; project reports.</p> <p>2.3-2.4 Papers published in the peer-reviewed literature or in-press manuscripts; MSc theses; project reports made available on the Ascension Government website.</p>	<p>of redundancy in case individual assets require repair or maintenance; however, this remains a risk.</p> <p>2.2 - 2.3 Assumes that sufficient sharks can be captured for tagging and sampling. Minimum sample sizes are based on experiences during previous shark tagging projects at Ascension Island and are likely to be achievable given current high levels of activity.</p> <p>2.4. Assumes that instruments do not malfunction or are lost.</p>
<p>3. Field trials and fully costed feasibility studies of non-lethal conflict reduction measures are undertaken to assess their viability on Ascension Island.</p>	<p>3.1 By Q3 of Y2, experimental trials of at least two electronic 'shark deterrent' devices are carried out to establish their effectiveness in reducing negative interactions with fishing vessel.</p> <p>3.2 By Q1 of Y3, feasibility studies of at least two 'shark barrier' systems are undertaken for Ascension Island's main</p>	<p>3.1 Results of experimental trials presented in project reports and manuscripts for submission to peer-reviewed journals.</p> <p>3.2 Results of feasibility studies presented in project reports available on the AIG website.</p>	<p>3.1 Assumes that local fishers agree to participate in trials of shark deterrents. Given the impact of catch depredation on the fishing community and the desire to find solutions, we expect that this assumption will hold.</p> <p>3.2 Assumes that manufacturers of barrier systems respond with quotes and technical specifications.</p>

	bathing beaches, including fully costed installation and maintenance budgets, and an assessment of wider impacts on biodiversity and other marine users (e.g. navigation hazards).		
4. The results of social and ecological research are openly shared and discussed with the Ascension Island community, and are used to assess the suitability of a range of mitigation options for ameliorating human-shark conflicts.	<p>4.1. By the end of the project, at least two public meetings have been held (one in Y1 and one in Y3) to discuss and adapt research plans, and to disseminate findings.</p> <p>4.3. By Q2 of Y3 a report outlining potential mitigation options for emerging human-shark conflicts on Ascension Island is presented to stakeholders, including non-technical summaries of the key findings of social and ecological research.</p>	<p>4.1 Promotional posters for public meetings; Powerpoint presentations; photographs and attendance figures.</p> <p>4.3 Report presented to AIG and the Island Council and made publicly available online.</p>	<p>4.1 Assumes that the Ascension Island community are sufficiently engaged in the project to attend meetings. Given the high profile of this issue we are confident that this assumption will hold.</p> <p>4.2</p>
<p>Activities</p> <p>Output 1: <i>The social context of human-shark conflict on Ascension Island is characterised through a process of inclusive stakeholder engagement, ensuring that local knowledge and views are duly represented in project design and implementation.</i></p> <p>1.1 Design and deliver semi-structured interviews with representative stakeholder groups to better understand the human dimensions of conflicts. 1.2 Develop and promote online and in-person tool to collect information on shark sightings and other key behaviours (such as depredation) 1.3 Analyse interview data to inform project design is appropriate for setting 1.4 Gather data on catch depredation rates working in collaboration with local recreational and sports fishers.</p> <p>Output 2: <i>Knowledge of the behaviour and distribution of Galapagos sharks on Ascension Island is significantly enhanced and is used to evaluate a range of hypotheses proposed to explain recent increases in inshore activity.</i></p> <p>2.1 Install fixed-point, time-lapse camera assemblies for monitoring shark activity at key coastal locations.</p>			

- 2.2 Analyse time-lapse imagery to quantify relative shark abundance and validate results generated from online citizen science platforms.
- 2.3 Deploy passive acoustic telemetry array and oceanographic moorings.
- 2.4 Deploy acoustic telemetry tags on Galapagos sharks.
- 2.5 Carry out monthly physiological, morphological and reproductive assessments of Galapagos sharks to assess spatiotemporal variation in body condition and breeding status.
- 2.6 Analyse ecological and oceanographic data to explain any observed variation in inshore shark activity (2.2) and rates of catch depredation (1.4).
- 2.7 Report and publish the findings of applied shark research.

Output 3: *Field trials and fully costed feasibility studies of non-lethal conflict reduction measures are undertaken to assess their viability on Ascension Island.*

- 3.1 Conduct baited camera trials of electronic deterrent devices to assess their effectiveness in repelling Galapagos sharks.
- 3.2 Deploy electronic deterrent devices on fishing vessels to establish their effectiveness at reducing catch depredation relative to experimental controls.
- 3.3 Produce fully-costed designs and associated environmental impact assessments for shark barriers at bathing beaches, engaging with manufacturers and local marine users.
- 3.4. Analyse and report the results of field trials of shark deterrents.

Output 4: *The results of social and ecological research are openly shared and discussed with the Ascension Island community, and are used to assess the suitability of a range of mitigation options for ameliorating human-shark conflicts.*

- 4.1 Hold public meetings on Ascension Island to present and discuss project plans and findings.
- 4.2 Disseminate and promote project activities and outputs through a range of online and print media.
- 4.3 Produce a non-technical report summarising project findings and setting out recommendations for mitigating human-shark conflicts.

Annex 3: Standard Indicators

Table 1 Project Standard Indicators

DPLUS Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with DPLUS Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
DPLUS-A01	Number of people from key national and local stakeholders completing structured and relevant training	Members of AIG Conservation & Fisheries Directorate trained in shark tagging and sampling methodologies	People	Gender: 4M 3F Stakeholder: Public sector (7) Typology: Biodiversity (7)	2	5			1
DPLUS-A03	Number of local/national organisations with improved capability and capacity as a result of project	Number of local organisations with enhanced capacity to undertake applied research on sharks	Organisations		1	1		1	1
DPLUS -C05	Number of projects contributing data, insights, and case studies to national Multilateral Environmental Agreements (MEAs) related reporting processes and calls for evidence.	Projects contributing data and insights relevant to the Post 2020 Global Biodiversity Framework Target 4 (managing human-wildlife conflict)	Projects	Typology: data and insights	1	1		1	1
DPLUS-C15	Number of Media related activities.	Number of Media related activities.	Number	Social media (17) Local print media (6)	23	14		37	

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.	
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)?	
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.	