Darwin Plus:
Overseas Territories Environment and Climate Fund

Final Report

*To be completed with reference to the "Writing a Darwin Report" guidance: (http://www.darwininitiative.org.uk/resources-for-projects/reporting-forms). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)*

Darwin Project Information

Project reference	DPLUS063
Project title	The Ascension Island Ocean Sanctuary (ASIOS): planning for the Atlantic's largest marine reserve
Territory(ies)	Ascension Island
Lead organisation	Ascension Island Government
Partner institutions	University of Exeter, University of Windsor, University of Western Australia, University of Birmingham, Army Ornithological Society, South Atlantic Environmental Research Institute
Grant value	£279,122
Start/end date of project	01/04/2017 – 31/12/2019
Project leader name	Dr Sam Weber
Project website/Twitter/blog etc.	
Report author(s) and date	Sam Weber, Diane Baum & Andrew Richardson

1 Project Overview

The creation of a large-scale MPA around Ascension Island was a flagship commitment of the UK Government's "Blue Belt" initiative, and is the most high-profile conservation issue currently affecting the Territory. An important milestone was reached in January 2016 with the announcement of a temporary "no-take" zone covering 50% of Ascension's ~440,000 km^2 maritime zone. However, it was recognised that there were still substantial knowledge gaps that needed to be bridged in order to identify those areas that would benefit most from protection and to assess whether a sustainable, economically viable fishery could be maintained in the remainder of the Ascension exclusive economic zone (EEZ). A period of planning and consultation was also needed to ensure that the Territory was prepared to manage and enforce one of the world's largest marine reserves. For this reason, Ascension Island Government deferred formal designation of an MPA until 2019 while scientific data were compiled and management plans could be put in place. In April 2016, a stakeholder workshop was held at the Foreign and Commonwealth Office (FCO) with the aim of drawing up a list of priority actions needed to inform the placement of the ASIOS and ensure its long-term success. The current project was developed to deliver the roadmap agreed at that meeting. Using a range of modern scientific methods, the project aimed to build an integrated understanding of Ascension's offshore pelagic ecosystem and develop evidence-based recommendations for the siting of marine reserves. Crucially, it also aimed to plan for the legacy of the ASIOS, ensuring that the Territory learned from experiences elsewhere to deliver world-class MPA management and enforcement.

2 Project Stakeholders/Partners

The principle aim of project was to gather, collate and communicate scientific and economic evidence to enable policymakers to make informed decisions about future management of the Ascension Island EEZ. The project was conceived and led by the Ascension Island Government, with the University of Exeter acting as the lead scientific partner and other partners contributing technical expertise to specific work packages.

From the outset, the project team worked to develop new partnerships outside of the original consortium, including strengthening links with the Marine Management Organisation (MMO) and Centre for Fisheries and Aquaculture Science (Cefas) – co-leads on the Blue Belt Initiative – who contributed extensively to the preparation of key project reports (**Annex 6: Appendices 7 & 10**). The project also integrated well with the JNCC-led "*Natural Capital in the Caribbean and South Atlantic Overseas Territories*" project, which provided valuable supporting evidence for the MPA Evidence & Options (E&O) document (**Annex 6: Appendices 5 & 8**), and enlisted the support of a National Geographic Pristine Seas Expedition to markedly increase offshore research capacity during planned surveys of Ascension's previously-unstudied seamounts (**Annex 6: Appendix 2**). As a result of these evolving collaborations, the project was able to significantly over deliver on a number of key outputs (see Section 3).

The primary stakeholders in the project were the Ascension Island administration (Island Council, Administrator and Governor of St Helena) and the UK Government, who together hold ultimate responsibility for the designation, financing and implementation of any proposed marine management regime. These stakeholders were regularly updated on project activities through Island Council meetings, culminating in a major phase of consultation coinciding with the first draft of the Ascension Island MPA Evidence and Options document in Q3 of Y2 (**Annex 6**). The Evidence and Options report was primarily intended as a decision-support tool for policymakers and set out competing designs and management options for a large-scale MPA in Ascension's waters along with a detailed summary of the supporting scientific and economic evidence. A first draft of the report was presented to the Island Council for feedback in September 2018 (**Annex 6: Appendix 11**) and a modified draft was then submitted for external public consultation with UK Government, non-governmental organisations (NGOs) and other stakeholders in late-November and December 2018. A total of six consultation responses were received (**Annex 6: Appendix 12**) and incorporated into the final report that was accepted by the Island Council in February 2019 (Q4 of Y2).

In addition to the key decision-makers, the project aimed to engage actively with a wide range of groups with a direct interest in the MPA planning process. These included the Ascension Island public, representatives from other UK Overseas Territories (UKOTs) and the international marine management community. At key milestones, public meetings were held on Ascension Island to share exciting findings or discuss the implications of important policy decisions (see Section 3.1 Output 7). A variety of media was also used to share project findings and experiences outside of our immediate network, most notably through the flagship *Blue Belt Overseas Symposium* (see Section 3.1 Output 7). Overall, we are pleased with the level of collaboration and stakeholder engagement we achieved throughout the project and aim to build on this foundation as the implementation of the Ascension Island MPA enters its next phase.

3 Project Achievements

3.1 Outputs

Output 1. Information systems for managing and disseminating spatial datasets gathered during the project are established and local conservation managers are trained in their use.

Databases for managing marine spatial datasets collated during the project have been created and are in routine use by Ascension Island Government Conservation Department (**Annex 7**). These databases have also been linked to a public-facing web GIS which allows content to be browsed online. The web GIS portal was not used as extensively as planned during the

stakeholder consultation phase of the MPA designation in process, in part because the accelerated timeframe for this objective did not allow for full updates of the system (see Section 3 Output 4 and Section 5), but also because it was felt that the range of spatial information contained within it would have been unintelligible for the target audience without an accompanying written narrative. Nonetheless, the web GIS has proven to be valuable as a data organisation and visualisation tool and has demonstrated its potential as a repository for a wide range of spatial datasets relating to Ascension Island's marine environment. Currently, the system architecture is not conducive to easy updates by multiple stakeholders. We had originally considered that the system would be hosted locally on Ascension Island but internet bandwidth and reliability is not sufficient to serve an outward facing web portal. A solution was found for the purposes of the project by hosting the web GIS on one of the University of Exeter's main departmental servers; however, this is closed to external connections for security purposes meaning updates are currently managed internally by UoE partners. Future data management and visualisation needs for AIG are currently being considered as part of the MPA management planning process and could include migrating the existing spatial database system and web GIS front end to a dedicated cloud server that can be updated easily from anywhere in the world. This solution would require a small amount of start-up funding and ongoing maintenance, but could be integrated into plans for expansion of regional data management services through the Falklands-based South Atlantic Information Management System and would probably provide the best legacy option.

Output 2. Distributions of species impacted by commercial fisheries are mapped and modelled in order to identify key usage areas and risk areas

Prior to the project, knowledge of Ascension's offshore pelagic ecosystem was extremely limited, which represented a major barrier to effective, evidence-based marine spatial planning. To address these data gaps, the project partnership used a combination of aquatic telemetry, at-sea abundance surveys and oceanographic mapping to significantly advance our understanding of the distribution of pelagic species and habitats in the Ascension Island EEZ and identify key areas for protection.

During the project, electronic tracking data were gathered from 286 individual animals representing 16 species of sharks, turtles, billfish, seabirds and tuna (**Output 2.1**) and was close to achieving the original target of 300 animals tracked (**Annex 6: Appendices 2 & 3**). This target was heavily based on the assumption of being able to deploy micro-GPS tags on >100 sooty terns (*Onychoprion fuscatus*); however complications with tag harness attachments along with air access issues which prevented project partners visiting Ascension Island during key breeding periods (see Section 5) meant that only 16 individuals of this species were ultimately tracked. This shortfall was partially offset by reallocating funding to a tracking study on brown boobies (*Sula leucogaster*) in Y2, which contributed the first data on the at-sea distribution of this species at Ascension Island (**Annex 6: Appendix 3**).

Baited remote underwater video surveys (BRUVs) and vessel-based visual transects were also used to gather direct data on the abundance and diversity of pelagic predators at > 150 sites distributed throughout the Ascension Island EEZ (**Output 2.3**), exceeding the original target of 100 (**Annex 6: Appendices 2 & 3**). Survey effort was particularly focussed on three previously unexplored shallow-water seamounts lying within the Ascension EEZ which held the potential to be significant biodiversity hotspots (**Output 2.4**). In May-June 2017 (Q1 Y1) a major expedition was organised to study the marine megafauna communities associated with these features and map their radius of influence on the pelagic ecosystem (**Annex 6: Appendix 2**). The expedition was co-financed by the EU BEST initiative and bolstered by a new collaboration with National Geographic Pristine Seas which funded the British Antarctic Survey vessel *RRS James Clark Ross* to work alongside the Project's own research charter, considerably increasing the range of work and quantity of sampling that could be achieved.

Results from telemetry studies and at-sea surveys were summarised in the MPA Evidence & Options document submitted to stakeholders at the end of Y2, and were used extensively in the MPA planning process. For example, data were used to demonstrate the importance of Ascension Island's near-shore environment and its outlying seamounts as hotpots for pelagic biodiversity and recommend suitable protection buffers (**Annex 6: Main Report and Appendices 2 & 3**). The principle migration corridor used by the Island's globally-important green turtle (*Chelonia mydas*) nesting population and the foraging ranges of key breeding seabird

species were also mapped and used to inform these plans (**Annex 6**). Results of yellowfin tuna (*Thunnus albacares*) tracking have been published in the journal *Aquatic Conservation* while seabird tracking data have now been published in two peer-reviewed manuscripts[1,2] with a further synthesis combining seabird tracking, at-sea counts and prey abundance surveys due to be submitted shortly (**Annex 8**).

Due to an accelerated timeline for submitting MPA proposals to the Island Council we were unable to finalise species distribution models (SDMs) for many species in time for the publication of the Evidence and Options report (See Output 4 and Section 5); however, those analyses that could be completed indicated that proximity to topographic features is the main predictor of abundance and diversity for many marine megavertebrates which was captured in proposed feature buffers (e.g. seabirds, turtles, carcharinid sharks; **Annex 6: Main Report and Appendices 2 & 3**). SDMs were subsequently finalised and presented at the 2019 Blue Belt Symposium (**Annex 12**) and in scientific manuscripts currently in preparation (**Annex 8**). These analyses corroborated preliminary findings presented in the E&O report: i.e. that distance from seamounts and Ascension Island itself are the key predictors of marine megafauna abundance and diversity, with low spatial predictability in offshore areas using a suite of common oceanographic variables.

All planned oceanographic data layers were produced, including annual and seasonal climatologies of key biophysical variables (e.g. current velocity, temperature, productivity) and composite maps of mesoscale oceanographic features such as thermal fronts, transport barriers and eddies (**Output 2.2**; see web GIS). The latter were provided by the NERC Earth Observation Data Acquisition and Analysis Service (NEODAAS) through two successful support grant applications submitted in Y1 and Y2 of the project (**Annex 9**; see Section 5.1). In order to generate outputs useful for marine spatial planning, oceanographic datasets were integrated using a bioregionalisation analysis to identify spatially discrete pelagic habitat zones within the Ascension Island EEZ (Annex 14). Given the low predictive power of oceanographic layers in SDMs they were not used extensively in the MPA planning process (see above). Nevertheless, the datasets produced and the bioregions identified still provide a valuable resource for future marine ecological research.

Output 3. Threats to marine megafauna from commercial fisheries are quantified, including both direct (by-catch) and indirect (food chain) impacts.

Although commercial longline fisheries had been licensed to operate within Ascension EEZ since the mid-1980's, there had been no comprehensive assessments of the relative risk posed by this industry to different species or of the spatial distribution of this threat. All available fisheries catch and effort data have now been collated, analysed and incorporated into the MPA Evidence & Options report presented to stakeholders in Q3 of Y2 (**Annex 6**). Unfortunately, the very low resolution of the data available severely limited the depth of analysis that was possible (e.g. environmental modelling of bycatch hotspots). With the exception of small amounts of local observer data collected since 2015, all historic set-level catch data are held by foreign fishing authorities and efforts to obtain this information directly or through diplomatic channels at ICCAT were not successful. Very low license uptake in recent fishing seasons (one in Y1 and two in Y2) combined with ongoing air access disruptions to Ascension Island also prevented the deployment of further local observers during the project. The assumptions that licenses would be sold at a time when observers could be deployed and that historic data would be made available by flag state authorities were both acknowledged in the original project application and possible mitigation measures were suggested. As proposed, in the absence of high-resolution data, a number of coarser scale analyses of direct fishery impacts were instead carried out using spatially and taxonomically summarised data available from ICCAT supplemented with weekly catch reports submitted by vessels operating in the Ascension Island EEZ. These analyses demonstrated that: 1) commercial fishing exhibits a spatially and seasonally predictable distribution, being primarily concentrated in the north-west of the EEZ between December and February; 2) that Ascension Island does not appear to be a regional by-catch hotspot of any species; 3) that marlin (*Makaira nigricans*) and blue shark (*Prionace glauca*) make up the majority of the recorded by-catch; and 4) that marlin bycatch per unit effort appears to be highest in the south-eastern quadrant of the EEZ where key topographic features are situated (e.g. ocean ridge and shallow seamounts; **Annex 6: Appendix 6**). A ranked risk assessment of direct threats

posed by fisheries to 24 species of marine turtles, fish, sharks and seabirds was also compiled and included in the MPA Evidence & Options report (Output 3.2; **Annex 6: Main Report & Appendix 6**). This analysis was intended as a prioritization tool to assess the degree of weighting that should be applied to different species in proposed MPA scenarios.

In addition to quantifying direct risks to biodiversity posed by fisheries, the project also aimed to undertake the more challenging task of assessing indirect threats mediated through food web disruption. To enable such studies, more than 460 tissue samples from 19 species of seabirds, sharks and fish were collected and analyzed for stable isotopes of carbon and nitrogen (Annex 7b). Faced with an accelerated timeline in the preparation of the MPA Evidence and Options document (see Output 4) it was felt that preliminary analyses of stable isotope data were of lower relevance to decisions on the demarcation of an MPA and could confuse already complex messages. As a result, these data were not included in the materials circulated to stakeholders. Nonetheless, a number of important findings have been made with regard to possible indirect threats of fisheries to seabirds in particular (Output 3.4). Using stable isotope data collected as part of previous projects, project partners were recently able to demonstrate a long-term shift in the diet of sooty terns breeding at Ascension Island coinciding with an apparent population collapse, potentially caused by a regional decline in the large pelagic fish species they associate with (Reynolds et al. 2019). Research carried out during the project has also revealed that seabirds nesting at Ascension Island naturally deplete their prey base over a very large marine area, highlighting their potential sensitivity to additional anthropogenic food web disruption (see **Annex 8**). Both of these findings support the precautionary approach to MPA designation ultimately adopted by the Island Council (Output 8).

Output 4. Optimal solutions for MPA placement are proposed based on an integration of species distribution data, threat assessments and economic costs/values within a formal marine spatial planning framework

In February 2019 an MPA Evidence and Options document summarising key findings from the project was submitted to the Island Council and the Ascension Island Government following a one-month public consultation. Two competing MPA designs, or scenarios, were developed and presented to stakeholders based on the range of biodiversity and fisheries data analysed (**Annex 6**). Several different management tiers including options for a dormant fishery or withdrawal of all forms of management from the Ascension EEZ were also considered at the request of the Island Council. Each option was accompanied by a structured cost-benefit analysis comparing the level of biodiversity protection achieved, economic implications for the Island and potential reputational consequences. Mounting political pressure to ensure that MPA designation could occur within the first half of 2019 meant that production of the Evidence & Options report was brought forward by approximately five months compared to the original project timeline (from Q1 of Y3 to Q2 of Y4). This rescheduling had inevitable consequences for work planned for the second half of Y2; for example, we were unable to carry out species distribution modelling in the depth we would have liked. Nevertheless, we are content that the scientific evidence presented in the Evidence & Options document reflected the current state of knowledge and met the expectations of policymakers (responses in Annex 6: Appendices 11 & 12).

While data collected during the project clearly highlighted the conservation value of features such as seamounts, the green turtle migration corridor and Ascension Island itself, for the majority of pelagic species threatened by fisheries, encounter rates were either too low or their distributions too unpredictable to single out specific areas for protection. Given these remaining uncertainties, bio-economic analyses presented in the Evidence and Options document (**Output 4.1**) were particularly influential in informing MPA scenario development (**Annex 6: Main Report and Appendix 7**). This analysis, conducted in collaboration with economists at Cefas, used data from a range of sources to describe long-term trends in commercial fishing license uptake, model potential drivers and forecast future profitability as a basis for assessing the long-term economic sustainability of the fishery. The analysis concluded that external drivers such as a shift in global market preferences for tuna products and the decline of the Atlantic bigeye (*Thunnus obesus*) stock have largely been responsible for a recent drop in license uptake, although more stringent licensing conditions and penalties within the Ascension Island EEZ may also have been a contributory factor (**Annex 6: Appendix 7**). Given low forecasted future revenue from license

sales largely being exceeded by the fixed costs of administering and enforcing the scheme, it was concluded that the Ascension Island fishery is unlikely to be an economically viable proposition in the short- to medium-term. This output proved to be formative in the decision subsequently reached by the Island Council (see **Output 8** and **Annex 6: Appendix 11**).

Output 5. Experimental satellite surveillance technologies are trialled as a cost-effective method for MPA compliance monitoring and enforcement.

As planned, the level of potential illegal fishing in Ascension Island's EEZ was assessed over a two year period using satellite-based synthetic aperture radar (SAR) and results have been incorporated into a peer-reviewed manuscript and into the MPA Evidence & Options report submitted to stakeholders in Q3 of Y2 (**Annex 6: Main Report & Appendix 10**). Real time intelligence from SAR was also used to target patrol vessel movements to areas of possible illegal activity, although no interceptions have been made to date. The slow response time of the current patrol vessel and the size of the area involved were identified as major obstacles to the use of satellite-based surveillance tools for asset tasking. Nevertheless, the Ascension Island Government and project staff have been working with the Marine Management Organisation to assess how best to use this intelligence for risk-profiling and future enforcement operations. For example, the frequency and distribution of potential illegal fishing events was used extensively in costing of different management scenarios in the MPA Evidence and Options document (**Annex 6: Appendix 10**). In addition to SAR imaging, the project team also explored the potential of light-based vessel detection as a complementary method for identifying illegal fishing activity at night. An automated boat detection system using VIIRS images is already available through the US National Oceanic and Atmospheric Administration (NOAA), although current coverage does not include the South Atlantic (https://ngdc.noaa.gov/eog/viirs/download_boat.html). The Project Leader contacted NOAA to request the expansion of the service to Ascension Island but was advised that, while they were happy to do so, the Territory lies in an area of very high atmospheric noise that makes the detection algorithm unreliable at present. Further trials of this technology were therefore suspended.

Output 6: Biodiversity baselines are established and a robust monitoring framework is developed for evaluating the long-term conservation benefits of the ASIOS

A first draft of the Ascension MPA management plan has been produced (see Output 8) and includes SMART performance indicators which will form the basis for future monitoring (**Annex 10**). The project has established protocols for monitoring pelagic species using visual surveys and baited remote underwater video, as well as creating databases to manage the information collected (**Annex 7**). Excellent biodiversity baselines have been established for Ascension Island's three shallow-water seamounts, facilitating their role as 'ocean observatories' (**Annex 6: Appendix 2**), although AIG's capacity to routinely survey these sites will depend heavily on the availability of a suitable offshore-capable vessel. Progress with establishing inshore monitoring sites has been hindered by the availability of a suitable vessel. The Island's commercial charter companies suspended their operations following the unexpected closure of the airfield in 2017 and this unfortunately coincided with a period of major structural repairs to AIG's inshore work boat. The AIG Conservation & Fisheries Department's (AIGCFD) own RIB has been intermittently out of service and has nonetheless proved to be unsuitable for deploying and retrieving BRUVs for planned inshore monitoring activities (Output 6.1). Opportunities to carry out inshore BRUV monitoring have therefore been limited to short periods when the offshore fishery patrol vessel is present on the Island when it has had to compete with more pressing enforcement and surveillance commitments. As part of the MPA management planning process, AIGCFD have therefore been considering monitoring objectives that can be achieved using available resources alongside more aspirational indicators requiring additional investment (see **Annex 10**).

Output 7: International best practice is incorporated into the design and planning of the ASIOS, and experiences and knowledge gained during the project are widely shared

In September 2017, project leader Dr Sam Weber and project scientist Dr Andy Richardson attended the 4th International Marine Protected Areas Congress (IMPAC4) in Chile to represent

Ascension Island Government and deliver presentations on the plans for the Ocean Sanctuary and project outputs achieved to date (see **Annex 11**). The Congress also provided an opportunity to network with other scientists and practitioners working on issues surrounding large-scale MPAs and receive feedback on the approach adopted by Ascension Island. This included attending the annual Big Ocean steering group meeting to initiate the process of Ascension Island joining their peer-learning network. During IMPAC4, Big Ocean and the IUCN also launched their Best Practice Standards for Large Scale MPAs, which largely negated the need to carry out a planned independent review during the project (Output 7.3). Hard copies of this document were obtained for AIG and have been a valuable reference manual during the preparation of the Ascension MPA management plan. Representatives from Big Ocean and IUCN Large Scale MPA task force also participated in the *UK Overseas Blue Belt Symposium* in Y3 of the project which provided further opportunity to benefit from experiences across the large-scale MPA network.

The Blue Belt Symposium, which was held at the University of Exeter's Cornwall Campus from 29th – 31st July 2019 (https://bluebeltsymposium.org.uk/; now deactivated), was one of the key dissemination outputs of the project and was widely agreed to have been a resounding success. The Symposium, which was co-hosted by University of Exeter, Ascension Island Government, Great British Oceans Coalition and the Blue Belt Initiative, grew considerably in size and scope from the event proposed in the original project application and resembled a small international conference, attended by more than 100 people, including delegates from 11 of the UKOTs along with representatives from UK Government, NGOs, academic institutions and charitable foundations. Over three days, the programme addressed three cross-cutting challenges facing large, remote marine management zones in the UKOTs: sustainable financing and stakeholder engagement, evidence-based decision making, and surveillance and enforcement (**Annex 12**). These complex topics were approached through a combination of 29 oral presentations delivered by a diverse group of speakers, interspersed with workshops, Q&A sessions and debates. The symposium also provided a forum for side events, including workshops focussing on the future of the Blue Belt programme in the Caribbean OTs (organised by the Marine Conservation Society and the Foreign & Commonwealth Office) and on the management of marine plastics (organised by Zoological Society of London as part of Darwin Plus project DPLUS090). The meeting opened with a welcome address from Lord Ahmed, Minister of State for the UKOTs, and attracted a number of well-respected keynote speakers from the international marine conservation community which helped to boost the profile event (**Annex 12**). Live social media coverage orchestrated by #ExeterMarine achieved a potential reach of 5.3 million people (**Annex 12**; see highlights here) and a pair of short films promoting and documenting the event were produced for online viewing. An article on the event has also featured in the UK Government's Marine Developments blog.

The designation of the Ascension MPA has been a subject of considerable local and international interest and efforts have been made to continuously engage a wide range of audiences in the process through a variety of different media. On Ascension Island, at least seven public presentations were organised to share key discoveries and update the community on the process. As part of the MPA Evidence and Options consultation, the AIG team visited all of the major Island employing organisations and the school, reaching at least 250 people (~30 % of the population). A public talk hosted by National Geographic following the 2017 seamounts expedition was one of the best attended events of this type to date (Annex 8). Outside of Ascension Island, in addition to the 2017 IMPAC4 conference and 2019 Blue Belt Symposium, results and experiences from the project were presented at the 2019 St Helena Natural Capital Conference and at the February 2019 Darwin Plus Advisory Group meeting. Wider awareness of the Ascension Island MPA designation was clear when it was highlighted as part of the BBC's *Blue Planet Live* week in March 2019. Blog posts related to the seamount expedition featured on the National Geographic and British Antarctic Survey websites. Seabird tracking work has featured on the BBC Somerset Facebook page. The project has also featured on the Global Fishing Watch blog, the Marine Management Organisation blog and in the February 2018 edition of the Darwin Newsletter. Several peer-reviewed papers linked to project activities have now been published with project staff as contributing authors (Barnes et al. 2018; Richardson et al. 2018; Reynolds et al. 2019; Rowlands et al. 2019; Richardson et al. 2019).

AIG Project Scientist Dr Andy Richardson delivering a presentation at Two Boats School, Ascension Island.

Project leader Dr Sam Weber speaking at the 2017 Big Ocean annual meeting

Output 8: The ASIOS is formally designated and management structures are put in place to ensure its long-term success.

Finalisation and stakeholder review of the Ascension Island MPA Evidence and Options Report and submission to the Ascension Island administration, originally planned for Y3 of the project, was completed ahead of schedule in Q3 of Y2. Based on the range of scientific and economic data presented in this report, on 22nd August 2019 (Q2 of Y3) the Ascension Island Council voted in favour of designating a marine protected area covering 100% of Ascension Island's ~440,000 km^2 EEZ, with full implementation subject to guarantees of long-term funding from the UK Government (see Section 3.2). A draft 5-year management plan has now been prepared in collaboration with Blue Belt project partners (**Annex 10**), although this will not be implemented until a long-term funding arrangement is agreed with UK Government. Similarly, establishment of local and international steering groups to help guide the implementation of this plan have been deferred pending the conclusion of this political process, expected around November 2020.

3.2 Outcome

On 30th August 2019 the Governor of St Helena designated an MPA covering the entirety of Ascension Island's ~440,000 km^2 EEZ (see Council Minutes). This decision by councillors to recommend this designation was taken based on the range of scientific and economic evidence presented to them in the MPA Evidence and Options document (**Annex 6**) and judged to provide the best long-term outcome both for biodiversity and for the Island. In the 2019 Spring Statement the Chancellor of Exchequer provided strong indication that the UK Government "*will support the call from the Ascension Island Council to designate 443,000 square kilometres of its waters as a Marine Protected Area*". We are therefore content that the project has achieved its ultimate goal

of establishing a “large scale marine protected (MPA) at Ascension Island, underpinned by strong science and long-term monitoring and enforcement capabilities”.

While the creation of one of the world’s largest MPAs at Ascension Island is in itself a notable achievement for the Territory, the process by which this decision was reached is also significant. Since its conception, the designation of a pelagic MPA at Ascension Island has been contentious among Island residents due to the perceived role of commercial fisheries in ensuring the future economic security of the Territory. By presenting an impartial assessment of both the ecological and economic costs and benefits of alternative management regimes, the project empowered policymakers to make informed decisions that deliver positive outcomes for wildlife and people. In closing what was shown to be an increasingly unviable fishery, the Island Council has achieved the maximum level of protection for biodiversity, raised the international profile of the Island and accessed potential new revenue streams (see Section 3.3). Indeed, feedback from delegates at IMPAC4 and the Blue Belt Symposium noted that the Ascension MPA is relatively rare among LSMPAs in the level of evidence gathering and consultation that has preceded it. Data gathered and lessons learned through this process, the management plans they have contributed to, and the networks strengthened through new collaborations and events such as the Blue Belt Symposium, will hopefully stand AIG in good stead as it enters the next implementation phase.

3.3 Long-term strategic outcome(s)

The designation of one of the world’s largest MPAs in the Ascension Island EEZ represents an important landmark in efforts to conserve the Island’s biodiversity that will undoubtedly shape the conservation agenda in the Territory for the foreseeable future. Along with climate change, commercial fisheries ranked as one of the principle threats to a range of marine species in the Island’s Biodiversity Action Plan. The decision to permanently exclude these fisheries from Ascension waters is thus a significant achievement and effectively implements several major strategic objectives, including the Millennium Sustainability Goal of protecting 10% of marine habitats by 2020, along with the more ambitious target of 30% by 2030 recently announced by UK Government. However, the benefits of the designation are not solely ecological. As outlined in the Evidence and Options report submitted to stakeholders, the MPA and the global platform that it brings also have the potential to contribute significantly to the long-term social and economic development of the Island; for example through enhanced sports fishing and ecotourism opportunities and access to new revenue streams such as philanthropy, carbon trading and external research funding (**Annex 6: Main Report and Appendices 8 & 9**). While such outcomes will inevitably take time to materialise fully, there is evidence that the Island is already benefiting from the conservation leadership it has shown. For example, a £2 million endowment fund established by the Blue Marine Foundation using private donations promises to provide sustainable financing for community and infrastructure projects on Ascension once the MPA is fully implemented. Ensuring that the MPA continues to “*promote the sustainable development of socio-economic activities that are compatible with protection of the marine environment*” is one of four strategic objectives in the draft Management Plan which seeks to contribute to a sustainable future for the Island and its near-pristine marine ecosystem (**Annex 10**).

4 Sustainability and Legacy

The project has resulted in the designation of one of the world’s largest no-take marine reserves and is therefore assured of a lasting impact on biodiversity conservation in the Territory. Through its scientific programme, the project has already made substantial contributions to our understanding of Ascension’s offshore, pelagic ecosystem and shallow-water seamounts – habitats that were virtually unexplored a few years ago (Section 3.1 Output 2). Many of these findings are now part of the public record and have contributed to the development of a robust monitoring and research plan to guide future work. The project team have also gained first-hand experience of policing and monitoring large ocean areas and had opportunities to network with large-scale MPA managers and enforcement specialists from around the world, which has noticeably strengthened local capacity for marine management. Indeed, recent offshore patrols and research expeditions have been organised almost exclusively by local staff within AIG and many valuable lessons have been learned. These experiences have been reflected in the MPA Management Plan (**Annex 10**) which is a key document for consolidating the legacy of the

project. As a result of long-term funding committed by the UK Government, AIG will also now have the resources to retain staff locally and begin implementing these plans. Many of the partners involved had a close working relationship prior to the project and are continuing to collaborate to publish the remaining outputs in the peer-reviewed literature and develop new funding proposals to carry key elements forward. For example, the University of Exeter have partnered with AIG on a new Darwin proposal to assess remaining threats to the MPA from climate change and are collaborating on a PhD studentship to develop novel satellite-based surveillance tools for large MPAs; the University of Windsor (Canada) have deployed a PhD student to continue acoustic telemetry in Ascension's inshore marine environment; and, following initial stakeholder meetings at the 2019 Blue Belt Symposium, the University of Western Australia and University of Exeter have recruited a PhD student to extend a BRUV monitoring programme across the UKOT network. The AIG are fully committed to formalising these ongoing relationships through an MPA technical steering committee once a long-term funding arrangement is reached with UK Government (see Section 3.1 Output 8).

5 Lessons learned

In addition to the many insights gained concerning the functioning of Ascension Island's offshore ecosystem, the impacts and economics of its former fishery and the practicality of different surveillance and enforcement options (Section 3.1), a number of more general project management lessons have also been learned.

As noted by one external reviewer, the project potentially suffered from having too many outputs which has complicated monitoring and evaluation. In many ways the ASIOS project became an umbrella for diverse work streams leading towards designation. While we still feel that a majority of these outputs were important to achieving the overall objective, we have not been able to address all of the areas in the depth that we would have liked with the time available. In retrospect, some scientific outputs that proved to be not directly relevant to MPA designation or that required no dedicated resourcing from Darwin (e.g. pelagic food chain analyses; Section 3.1 Output 3) could have been continued in parallel outside of the project which would have reduced reporting and monitoring loads.

Secondly, while project visibility received a major boost in Y3 through the Blue Belt Symposium (Section 3.1 Output 7), during earlier years this element suffered somewhat from not having dedicated people or resource assigned to it. Instead, communication and publicity tended to be the responsibility of project scientists and was often neglected due to heavy workloads involved with delivering the 'core' outputs. Future projects could benefit from incorporating a clear communications strategy with a modest budget for a simple website, media production and some dedicated staff time.

5.1 Monitoring and evaluation

Project monitoring and evaluation (M&E) has largely proceeded as outlined in the original project application through regular teleconferences involving the core project partners (i.e. AIG, University of Exeter and, towards latter stages, Blue Belt leads at MMO and Cefas), typically timed to coincide with the delivery of key outputs. Over its lifespan, the project was required to adapt to two major external influences which affected our ability to deliver some outputs. The first was the sudden and unexpected closure of the Island's runway to commercial flights from the UK shortly after the project began in April 2017 and which has remained closed throughout. This added significant time and cost to travel for AIG and UK-based partners and interfered with several planned outputs, as well as face-to-face M&E meetings which instead often took place via teleconference. For example, scheduled tagging of seabirds in Y1 had to be re-scheduled and scaled back due to a lack of alternative travel options for the partners involved. Overall, we feel the project adapted well to these unforeseen challenges, either by re-organising planned activities (e.g. sooty tern tagging was substituted for work on an alternative species in Y2; see Section 3.1 Output 2) or through submission of timely change requests to Darwin to transfer unspent travel and subsistence budget (T&S) to Y3 of the project where it enabled significantly increased OT participation at the flagship Blue Belt Symposium (Section 3.1 Output 7).

The second major change affecting the project was the evolving political conversation between UK Government and AIG regarding the timeline for MPA designation. The submission of the Evidence & Options report in Q3 of Y2 was one of the key milestones in the project and was the main focus for stakeholder engagement, consultation and external evaluation of project outputs. Political pressure to publish this document five months ahead of schedule required some coordinated reorganisation of project activities in the second half of Y2 and joint decisions on which areas to prioritise. While this shortened timeframe meant some analyses needed to be 'down-graded' (see previous sections), we feel that the body of evidence submitted to decision makers nevertheless provided a sufficiently detailed and balanced account of the state of knowledge of Ascension's marine ecosystem and fishery to allow them to make an informed decision regarding MPA designation. Earlier drafts of this report and its annexes were commented on by the Island Council (**Annex 6 Appendix 11**) and in six public consultation responses received from external organisations (**Annex 6 Appendix 12**) which allowed us to refine and improve them as necessary.

In addition to adapting to changing circumstances, one of the strengths of the project M&E process, we feel, was in retrospectively acknowledging areas where the core partners lacked the technical skills to deliver specific outputs to the desired standard and finding alternative solutions. For example, specialised oceanographic modelling was delivered through two support grants submitted to NEODAAS following M&E in Y1 (**Annex 9**) while the bio-economic analysis of the Ascension longline fishery – a key output in MPA designation - was achieved through a new collaboration with fisheries economists at Cefas established following M&E in Y2 (**Annex 6 Appendix 7**). This willingness to seek additional external support ensured that the information presented to stakeholders was both authoritative and accurate to the best of our ability.

5.2 Actions taken in response to annual report reviews

No substantial comments or concerns were raised by the reviewer following the Y1 annual report, although it was noted that the project was overly complex in terms of the numbers of outputs and indicators which complicated monitoring and evaluation. Overall, we agree with this assessment and have reflected further on some of these issues above. The Y2 annual review made recommendations for the preparation of the final report which we have endeavoured to incorporate into this document. Specifically, the reviewer suggested that we reflect on the lessons learned from adapting to changing circumstances (see Sections 5 & 5.1), discuss how partners worked together (see Section 2) and present a more detailed evaluation of the original assumptions and whether these held (see Section 3 and Annex 2).

6 Darwin Identity

Darwin branding and acknowledgement of Darwin funding have been incorporated into publicly-available outputs wherever possible. This has included prominent positioning of the Darwin logo in project reports (**Annex 6**), conference presentations (e.g. **Annex 12**), and in all materials linked to the Blue Belt Symposium, including the programme, the website (http://bluebeltsymposium.org.uk/), the promotional show reel (online and at the opening event) and Symposium mini-documentary, and throughout the conference venue. Darwin funding has also been acknowledged in peer-reviewed publications authored by project staff (e.g. Richardson et al. 2018; Richardson et al. 2019). The review of the Y1 annual report noted that use of the Darwin logo could be improved and was lacking from certain outputs, such as the project web GIS. Unfortunately the software used to publish the web GIS has limited customisation options and only allows the use of a single logo without modifying the underlying html. We have, however, acknowledged Darwin support in the metadata of published maps. As acknowledged in section 5, prior to the major phase of public engagement associated with the publication of the MPA Evidence and Options document, we feel that the project's publicity and visibility on the Island were sometimes overlooked during the delivery of the 'core' outputs. Nevertheless, the Darwin Initiative has been the principal external funder of conservation initiatives on Ascension Island in recent years and the Initiative's name, brand and mission are familiar to many island residents, particularly those associated with Government.

7 Finance and administration

7.1 Project expenditure

Project spend (indicative) since last annual report	2019/20 Grant (£)	2019/20 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Others				
TOTAL				

Staff employed (Name and position)	Cost (£)
Dr Sam Weber (Project Leader/Postdoctoral Research Fellow)	
Dr Andy Richardson (AIG Project Officer/Conservation Scientist)	
TOTAL	

7.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
University of Exeter (overheads in kind)	
Ascension Island Government (salaries in kind)	
Foreign and Commonwealth Office (Conflict, Security and Sustainability Fund). Directly incurred costs for staff time, vessel charters, AIS surveillance, wildlife tags and satellite time and sample analysis.	
EU BEST project 1566 (A baseline assessment of Ascension Island's shallow water seamounts as candidate MPAs)	
NEODAAS grants in kind.	
Additional Blue Belt Symposium revenue (Exeter & FCO contributions, registration fees etc.)	
TOTAL	

7.3 Value for Money

Marine conservation and fishery projects such as this, involving large numbers of partners, multiple outputs and considerable offshore working, are inherently costly. However, from the outset, the project consortium has attempted to provide value for money by committing considerable amounts of institutional match funding (in terms of staff and overheads), combining funding from several major donors to deliver specific work packages and generating new revenue streams through small grants and registration fees levied on the Y3 Blue Belt Symposium. As a result of this funding portfolio, many costs associated with capital equipment, vessel charters and satellite fees were met through other sources, with Darwin Plus funding providing the dedicated staff resource needed to manage project activities and collate, analyse and report findings. In total, more than £840,000 of directly incurred costs were secured as matched funding, representing approximately 75% of the total project costs. In all three financial years spanned by the project, the planned work has been delivered under budget with change requests submitted to the Darwin Secretariat as needed to ensure the best use of available funds. For example, the

redistribution of underspend on travel and subsistence resulting from travel disruptions on Ascension Island enabled significantly increased UKOT participation in the Blue Belt Symposium which enhanced its reach and impact. Like many of the UKOTs, Ascension Island's remoteness, limited access options and the need to import expertise and equipment tend to increase the cost of delivering conservation projects relative to what would be achievable in the UK. However, as in the current project, this can often be offset by the efficiencies of working at local scales with small teams and considerable Government support. Given the various logistical and political constraints that had to be overcome (Section 5), overall we feel that the ASIOS project delivered good return on investment in terms of the amount of work that has been delivered in a relatively short period for a budget of < £280,000.

Annex 1 Project's full current logframe as presented in the application form

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: **The project aims to significantly enhance the conservation and sustainable use of marine biodiversity in the central tropical Atlantic through the planning, designation and resourcing of the region's largest marine reserve.**			
Outcome: **The designation of a large-scale marine protected area (MPA) at Ascension Island, underpinned by strong science and long-term monitoring and enforcement capabilities.**	**0.1** By Q1 of Yr3, **at least 220,000 km^2 of ocean is protected within a Category 1 MPA** based on the outcomes of a data-driven marine spatial planning exercise. **0.2** By Q2 of Yr3, Ascension Island Government has **the necessary plans, monitoring tools and international support network to effectively manage its MPA**, and to develop its potential as an "Ocean Observatory".	**0.1** An Order issued under the Ascension Island National Protected Areas Ordinance and published in the Gazette declaring MPA boundaries and management regulations; public-facing project Web GIS presenting all data products generated (see below). **0.2** Legacy planning activities coordinated and reported through the project, including the adoption of a best-practice MPA management plan and monitoring framework, and the resourcing of this plan through local and international capacity building (e.g. formation of an Ascension Island Oceans Partnership and membership of the Big Ocean Network).	**0.1** Assumes that the Ascension Island Council and Governor approve proposals for MPA designation(s). The Island Council will be fully engaged in the ASIOS project through quarterly meetings of the Biodiversity & Fishery Committee and regular presentations to Councillors, ensuring their involvement in the development of proposals from the outset. The UK Government have already expressed their commitment to an MPA covering at least 50% of Ascension's maritime zone to Councillors and there is now an understanding that this will proceed.
Outputs: **1. Information systems for managing and disseminating spatial datasets gathered during the project are established and local conservation managers are**	**1.1** By Q1 of Y1, a **GIS-linked spatial database system is created** for hosting telemetry and at-sea survey data, remote sensing layers, fishery information (vessel locations, catch reports), and other datasets relevant to	**1.1** Screen shots of PostGIS database administrator and Microsoft Access and QGIS "front ends" created for data input and visualisation. The publication of a Web GIS is also dependent on this step, so delivery of Output 1.2 will be an additional source of verification.	There are no important assumptions, we are confident that these outputs can be delivered as stated.

trained in their use. (Objective 6.1 of the MPA Roadmap)	the designation and future monitoring of the ASIOS; and, **1.2** A **public-facing Web GIS is created** for displaying and browsing marine spatial data online.	**1.2** Web GIS is accessible online (see here for an example).	
2. **Distributions of species impacted by commercial fisheries are mapped and modelled in order to identify key usage areas and risk areas.** (Objectives 1 & 4 of the MPA Roadmap)	**2.1** By Q4 of Y2**, telemetry data for >300 seabirds, sharks, billfish, tuna and turtles are collated, collected and analysed** in conjunction with environmental data to map key foraging areas and migration routes, and model species' distributions over multiyear timescales. **2.2** Composite ocean **front and eddy maps** of Ascension's EFZ are constructed using the previous **5 years of remote-sensing data** by Q3 of Y1 to identify any persistent or seasonally-persistent habitat zones that may be candidates for protection (also feeds into **2.1**). **2.3** By Q4 of Y2, **at-sea abundance surveys** for marine megafauna and important prey taxa (e.g. zooplankton and flying fish) are carried out at **> 100 sites** using vessel-based visual surveys, plankton tows and baited remote underwater video systems (BRUVs) to identify and ground truth potential hotspot areas. **2.4** By Q4 of Y2, the **importance and radius of influence of Ascension Island and its offshore**	**2.1** Project Web GIS, online wildlife tracking data repositories (MoveBank, Global Seabird Tracking Database, seaturtle.org) and peer-reviewed manuscripts prepared by project scientists. **2.2** Oceanographic layers added to project Web GIS and incorporated into peer-reviewed manuscripts prepared by project scientists. **2.3** Geo-referenced survey data added to project WebGIS and summarised in peer-reviewed manuscripts and reports prepared by project scientists. Baited remote underwater video (BRUV) footage incorporated into project micro-documentaries and social media outputs (see 7.4). **2.4** Seamounts expedition report; spatial datasets added to Web GIS; peer-reviewed manuscripts; publicity	**2.1** Estimated sample sizes are based on a summary of existing telemetry data for seabirds (≈ 120 individuals), turtles (≈ 25), yellowfin tuna (≈ 10) and inshore sharks (≈ 15), along with planned deployments on marlin (≈ 10), offshore sharks (≈ 40) and tuna (≈ 40) and sooty terns (≈ 100 individuals) that will occur during the project. Planned deployments reflect the number of telemetry devices budgeted for and assume that 1) commercial vessels buy licenses and fish in Ascension's EFZ, 2) sufficient animals can be captured for tagging and 3) that devices are successfully recovered or transmit data. A certain level of tag loss or failure is anticipated and this is incorporated into the indicator value. If commercial vessels do not fish, the AIG patrol vessel (a fully equipped offshore long-liner) will be used to support these elements. If difficulties are encountered capturing any particular species, tags will be re-distributed among other taxa to ensure that they still yield policy-relevant information. **2.2** Assumes that spatial coverage and temporal resolution of remote sensing data for Ascension's EFZ is sufficient.

	seamounts as aggregation areas for pelagic biodiversity are established using telemetry (**2.1**) and at-sea survey data (**2.3**) to develop recommendations for MPA placement and sizing.	and outreach activities associated with expeditions (see 7.4).	**2.1, 2.3 & 2.4** assume that 1) the patrol vessel chartered by AIG in previous fishing seasons continues to be available to support offshore science and 2) the BEST Seamounts project is funded. If these assumptions are not met, stated indicators will need to be adjusted to reflect the amount of vessel time and number of telemetry devices available.
3. **Threats to marine megafauna from commercial fisheries are quantified, including both direct (by-catch) and indirect (food chain) impacts.** **(Objectives 2, 3 & 6.2 of the MPA Roadmap)**	**3.1** At least **10% local observer coverage** is established in the commercial fishery for the **duration of the project** and is used to validate vessel catch reporting. **3.2** By Q1 of Y2, a **ranked risk assessment** is produced identifying those species most threatened by commercial fisheries following a synthesis of all available fishery data and relevant ecological information. **3.3** By Q2 of Y2, **the distribution of commercial fishing effort, catch and by-catch in Ascension's EFZ** in all years for which data exist are mapped and, where possible, modelled as a function of environmental covariates to identify any specific areas or habitat zones with elevated risk to individual species and taxa. **3.4** By Q3 of Y2, the diets and trophic positions of at least **7 species of tuna, seabirds and sharks** as well as all key prey taxa are characterised as a basis	**3.1** Annual patrol cruise reports compiled by AIG Director of Fisheries & Conservation. **3.2** Results incorporated into the Ascension Island "Future Marine Management" report to be circulated at the end of Yr2 and then made available online. **3.3** Fishery layers and by-catch risk surfaces added to project Web GIS; datasets summarised in peer-reviewed manuscripts and in the Ascension Island Future Marine Management report **3.4** Results summarised in a University of Exeter PhD thesis; peer-reviewed	**3.1** Assumes that commercial fishing vessels purchase licenses and fish within Ascension Island's EFZ during the project and at a time when observers can be deployed by the patrol vessel. **3.2 & 3.3** Some progress towards these outputs has already been made through the Darwin-funded Ascension Island Marine Sustainability project (DPLUS021). The value that can be added will depend on the willingness of foreign fishing authorities to release fine-scale national observer data and vessel positioning information that are currently not publically accessible. AIGCFD will pursue these datasets through direct contact or via diplomatic channels and ICCAT if necessary. If these efforts are unsuccessful, a reduced analysis using geographically and taxonomically summarised data available from ICCAT and pre-2014 vessel reporting will be carried out, alongside high-resolution datasets gathered during the project.

	for mapping Ascension's pelagic food web and modelling the impacts of fisheries (and fishery closures) on food web dynamics.	manuscripts and reports prepared to disseminate the technical findings.	**3.4** Assumes that sufficient samples can be gathered for diet and stable isotope analysis from each taxon. Sampling of offshore populations will be conducted in parallel with tagging work and at-sea surveys and therefore has a similar set of assumptions.
4. Optimal solutions for MPA placement are proposed based on an integration of species distribution data, threat assessments and economic costs/values within a formal marine spatial planning framework. (Objective 6 of the MPA Roadmap)	**4.1** By Q3 of Y2, a **bio-economic analysis of Ascension's commercial long line fishery** has been conducted to assess its long-term viability under different future management scenarios. **4.2** By Q4 of Y2 an **MPA options report is produced** based on results and recommendations from outputs 2, 3 and 4 and circulated for stakeholder review prior to AIG submitting to Council for final decision.	**4.1 & 4.2** Ascension Island Future Marine Management report to be circulated at the end of Yr2 and then made available online.	As delivery of Output 4 depends on data gathered through Outputs 2 & 3, assumptions and mitigation options outlined above also apply.
5. Experimental satellite surveillance technologies are trialled as a cost-effective method for MPA compliance monitoring and enforcement. (Objective 8 of the MPA Roadmap)	**5.1** By Q4 of Y2, the level of **Illegal, Unlicensed and Unreported (IUU) fishing** in Ascension's EFZ has been estimated over a **2 year period** and, where possible, has been verified by targeted patrol vessel deployments.	**5.1** Report to AIG produced by project scientists. Results incorporated into a peer-reviewed manuscript and Ascension Island "Future Marine Management" report. Outcome of patrol vessel deployments recorded in annual cruise reports compiled by AIG Director of Fisheries & Conservation.	**5.1** Targeted patrol vessel deployments assume that IUU vessels are detected during patrol charters and are within reach.
6. Pelagic biodiversity baselines are established and a robust monitoring framework is developed for evaluating the long-term conservation benefits of the ASIOS.	**6.1** By Q1 of Y1 at least **10 fixed BRUV monitoring sites** have been established for assessing trends in the abundance and diversity of key pelagic species, such as sharks. By Q4 of Y2, baselines have been drawn using	**6.1** Monitoring sites and data layers added to project Web GIS; long-term monitoring targets incorporated into MPA management plan (**8.2**).	

(Objectives 5.1 and 7 of the MPA Roadmap).	seasonally-stratified **surveys over a 2 year period**. **6.2** By Q4 of Y2, best practice in pelagic MPA monitoring has been reviewed and incorporated into a **"good monitoring framework"** that is appropriate for Ascension Island's needs and resources (see also **7.3**)	**6.2** Monitoring framework is outlined in Ascension Island Future Marine Management report (**4.2**) and is incorporated into the final MPA Management Plan (**8.2**).	
7. International best practice is incorporated into the design and planning of the ASIOS, and experiences and knowledge gained during the project are widely shared. (Objective 10 of the MPA Roadmap).	**7.1** Ascension Island Government joins the Big Ocean Network and representatives attend **at least one major international MPA symposium by Q4 of Yr1** to present plans and receive feedback. **7.2** UoE and AIG host a **UKOT "Blue Belts" conference** in Q2 of Y3 as a forum for strengthening links, promoting collaborations and improving knowledge transfer between Territories responsible for managing large-scale MPAs. **7.3** By Q4 of Y2, a **literature review of best practice in large-scale MPA design and management** has been produced and incorporated into plans for the ASIOS. **7.4** By Q3 of Y2, **at least 30 dissemination products** have been produced in **7 different media**, including micro-documentaries, public lectures, newsletters and articles, technical manuscripts, social media posts and online blogs.	**7.1** The ASIOS is named as a member site of Big Ocean; AIG conference abstract in online proceedings; project publicity materials, including photographs, social media etc. **7.2** Conference background documents and proceedings; publicity and awareness-raising activities surrounding the meeting. **7.3** Literature review and recommendations are incorporated into Ascension Island Future Marine Management report (**4.2**) and MPA Management Plan (**8.2**) **7.4** Most dissemination products will be accessible online and easily verifiable; products in other media will be evidenced through photographs added to online content, or through digital files appended to project reports.	**7.1** Assumes that AIG can secure a nomination from an existing member (this should be straightforward through links with British Indian Ocean Territory). Timing of delivery will depend on whether membership is permitted pre-designation.
	8.1 By Q1 of Y3, proposed **MPA boundaries and regulations are**	**8.1** Memorandum to the Island Council and formal Council minutes.	See assumptions for **0.1**

8. The ASIOS is formally designated and management structures are established to ensure its long-term success.	**presented to the Island Council** for recommendation to the Governor. **8.2** By Q2 of Y3, **AIG adopts a 5 year MPA management plan**, guided by Outputs 2-7. **8.3** By Q2 of Y3, a **working group of local and international stakeholders** is formed to provide coordinated, long-term scientific, political and fundraising support and steering.	 **8.2** Management plan hosted within the Ascension Island NBAP and made available online. **8.3.** Minutes of founding meeting and memorandum of understanding between the parties.	
Activities. Corresponding actions from the ASIOS Roadmap (http://www.ascension-island.gov.ac/wp-content/uploads/2013/12/Scientific-roadmap-Summary-of-workshop-final.pdf) are also shown in blue.			
Output 1. Information systems for managing and disseminating spatial datasets gathered during the project are established and local conservation managers are trained in their use.			
1.1 Creation of a PostGIS database and QGIS/MS Access user interfaces for managing spatial data gathered during the project (Roadmap Action 6.1) **1.2** Creation of a public-facing Web GIS interface for disseminating spatial data gathered during the project (using QGIS/LizMap). **1.3** Training day for AIG staff on the operation and maintenance of the spatial database and Web GIS system.			
Output 2. Distributions of species impacted by commercial fisheries are mapped and modelled in order to identify key usage areas and risk areas.			
2.1 Collate and analyse existing tracking data for marine turtles and seabirds to identify key foraging habitats and migration routes. (Roadmap Action 1.1) **2.2** Conduct further tracking of tunas, sharks, seabirds and billfish, particularly in offshore areas and around seamounts, to address taxonomic and spatial gaps in species distribution data. (Roadmap Actions 1.2, 4.1, 4.3 and 7.3). Priority actions include: **2.2.1** Deploy micro GPS-accelerometer tags on breeding sooty terns. **2.2.2** Install acoustic receiver arrays on seamounts and in inshore shelf areas. **2.2.3** Deploy satellite and acoustic telemetry devices on sharks and tunas associated with shallow-water seamounts. **2.2.4** Deploy satellite telemetry devices on oceanic shark species (particularly blue sharks) caught as by-catch in the commercial fishery. **2.2.5** Deploy satellite and acoustic telemetry devices on Atlantic blue marlin caught in the inshore sports fishery. **2.2.6** Analyse telemetry data to establish and map foraging ranges, residence times and migratory routes of tagged species.		

2.3 Use remote-sensing data to identify and map persistent frontal systems, eddies and other bio-aggregating oceanographic features in Ascension Island's EFZ as potential high-value habitats for conservation. (Roadmap Action 3.3)

2.4 Undertake at-sea abundance surveys of marine megafauna and important prey taxa (e.g. zooplankton and flying fish) to identify and ground truth potential "biodiversity hotspots" and link these to environmental drivers. (Roadmap Actions 1.3, 4.1 and 4.2). This will involve:

- **2.4.1** Vessel-based visual transects for seabirds and surface-orientated marine vertebrates
- **2.4.2** Baited remote underwater video (BRUV) deployments for quantifying abundance and diversity of sharks and other predatory fishes
- **2.4.3** Mid-water plankton tows for estimating biomass and secondary productivity.
- **2.4.4** CTD deployments for characterising physical oceanography (temperature, salinity and dissolved oxygen profiles of the water column) and primary productivity (chlorophyll A) of study sites.
- **2.4.5** Analysis of BRUV footage using video analysis software to generate indices of abundance and estimate size classes.

2.5 Analyse telemetry and at-sea abundance data (**2.4**) in conjunction with environmental variables (**2.3**) to estimate movement parameters and residence times and construct species distribution models (SDMs) for predicting long-term distribution dynamics (Action 6.1 of the ASIOS Roadmap).

Output 3. Threats to marine megafauna from commercial fisheries are quantified, including both direct (by-catch) and indirect (food chain) impacts.

3.1 Deploy local fisheries observers on commercial vessels to record and validate catch composition (Action 2.1 of the ASIOS Roadmap).

3.2 Collate all available vessel location and catch-effort data from Ascension's commercial long-line fishery, including those held by foreign fishing authorities, into the local information management system (Action 2.2 of the ASIOS Roadmap).

3.3 Produce a ranked risk assessment of by-catch threats to marine vertebrates within Ascension's EFZ, incorporating local fishery data and ecological information derived from other sources, to help parameterise subsequent analyses (Action 2.2 of the ASIOS Roadmap).

3.4 Analyse fishery data in conjunction with environmental layers to identify and map any specific areas or habitat zones with high by-catch ratio or disproportionate risk to particular species or taxa. (Action 6.2 of the MPA Roadmap).

3.5 Collect diet samples (e.g. stomach contents, regurgitates) and tissues for stable isotope analysis (e.g. blood, feathers, muscle) from pelagic megafauna and potential prey taxa for food web analysis (Actions 3.1 and 3.2 of the MPA Roadmap).

3.6 Stable isotope analysis of biological samples (**3.5**) to map trophic relationships in Ascension's pelagic food web (Action 3.1 of the ASIOS Roadmap).

3.7 Interim report on the findings and implications of the food web project circulated to stakeholders.

Output 4. Optimal solutions for MPA placement are proposed based on an integration of species distribution data, threat assessments and economic costs/values within a formal marine spatial planning framework.

4.1. Carry out a bio-economic analysis of Ascension's commercial longline fishery to model spatiotemporal variation in fishing values, investigate factors influencing license uptake, and assess the long-term economic viability of the fishery under different management scenarios, considering alternative economic models where appropriate (Roadmap Actions 5.2 and 5.4).

4.2. Use systematic conservation planning software to identify MPA designs that optimise biodiversity conservation objectives and sustainable financing from fisheries under different sets of assumptions and constraints (Roadmap Action 6.3).

4.3. Report the findings and proposed MPA boundaries from Outputs 2, 3 4.1 and 4.2 and circulate to stakeholders for peer-review (Roadmap Action 6.5).

Output 5. Experimental satellite surveillance technologies are trialled as a cost-effective method for MPA compliance monitoring and enforcement.

5.1. Identify and map potential Illegal, Unreported and Unregulated fishing in Ascension's EFZ using nocturnal light signatures from vessels and SAR imaging overlaid with local AIS/VMS data (Roadmap Action 8.2).

5.2. Report the findings of vessel detection trials to local marine managers with recommendations for future deployment of the technology.

5.3. Trial targeted patrol vessel deployments using near-real-time vessel detection to ground-truth the technology and test its application as an enforcement tool.

5.4. Train local users in the operation of vessel detection systems for long-term self-sufficiency in compliance monitoring and enforcement.

Output 6. Historical and contemporary biodiversity baselines are established and a monitoring framework is developed for evaluating the long-term conservation benefits of the ASIOS.

6.1. Identify suitable pelagic monitoring sites in inshore areas and on seamounts and initiate quarterly (inshore) and annual (seamount) BRUV surveys to establish baselines of abundance and community composition (Roadmap Actions 7.1 & 7.2).

6.2. Trial targeted monitoring of dynamic open-ocean habitats using near-real-time front and eddy mapping to direct BRUV deployments and vessel-based abundance surveys.

Output 7. International best practice is incorporated into the design and planning of the ASIOS, and experiences and knowledge gained during the project are widely shared.

7.1. AIG engages with peer-learning networks, including joining Big Ocean Managers Network (Roadmap Action 10.3).

7.2. Representatives from AIG attend a major international meeting of MPA managers, provisionally the 4th International Marine Protected Areas Congress (IMPAC4) in La Serena, Chile (Roadmap Action 10.3).

7.3. UK Overseas Territories “Big Oceans” conference hosted by University of Exeter and AIG (Roadmap Action 10.3).

7.4. Review published and online resources related to the design, management and monitoring of large-scale MPAs and synthesise into a set of recommendations that are appropriate for Ascension Island’s needs and resources (Roadmap Action 10.1).

7.5. Production of Darwin-branded micro-documentaries for online consumption showcasing scientific work, Ascension marine life and MPA designation.

7.6. Publicise and disseminate project activities and findings through social media, local newspaper articles, scientific blogs, peer-reviewed manuscripts, online repositories and public lectures (Roadmap Action 10.2).

Output 8. The ASIOS is formally designated and management structures are established to ensure its long-term success.

8.1. Preparation of the Ascension Island “Future Marine Management” report.

8.2. Future Marine Management report made available for public consultation and stakeholder peer-review (Roadmap Action 6.5).

8.3. Submission of proposed MPA boundaries and regulations to the Island Council and Governor for enactment (Roadmap Action 6.6).

8.4. Development and adoption of a best practice MPA management plan and monitoring framework (Roadmap Action 6.4).

8.5. Formation of an ASIOS Working Group to provide long-term steering and support. First order of business will be to review and provide comment on the management plan (**8.2**). (Roadmap Actions 9.2 and 6.5).

Annex 2 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Impact: **The project aims to significantly enhance the conservation and sustainable use of marine biodiversity in the central tropical Atlantic through the planning, designation and resourcing of the region's largest marine reserve.**		The project has culminated in the designation of the 8th largest fully no-take marine reserve in the world following a process of extensive evidence gathering, planning and public consultation (**Annex 6**).
Outcome **The designation of a large-scale marine protected area (MPA) at Ascension Island, underpinned by strong science and long-term monitoring and enforcement capabilities.**	**0.1** By Q1 of Yr3, **at least 220,000 km^2 of ocean is protected within a Category 1 MPA** based on the outcomes of a data-driven marine spatial planning exercise. **0.2** By Q2 of Yr3, Ascension Island Government has **the necessary plans, monitoring tools and international support network to effectively manage its MPA**, and to develop its potential as an "Ocean Observatory".	**0.1** In August 2019 the Ascension Island council voted to designate 100% of the Territory's EEZ (~440,000 km^2) as a MPA based on the range of scientific and economic data presented in the Evidence & Options document and associated appendices (**Annex 6**). The MPA prohibits all forms of commercial extractive activity (fishing and mining), although recreational, sport and subsistence fishing by local people is permitted in near shore areas. **0.2** A draft MPA Management Plan has been produced (**Annex 10**) but will not be formally adopted until a long-term financing agreement is reached with UK Government. Public statements made by ministers have indicated that requested funding of ~ £150,000 per annum will be made available following the Comprehensive Spending Review in autumn 2020. Formalisation of an MPA technical steering group has also been deferred awaiting the conclusion of this political process; although it is clear through participation in events such as IMPAC4, Big Ocean and the 2019 Belt Symposium that the Territory has significantly strengthened its international network to provide this long-term technical support.
Output 1. **Information systems for managing and disseminating spatial datasets gathered during the project are established and local conservation managers are trained in their use.**	**1.1** By Q1 of Y1, a **GIS-linked spatial database system is created** for hosting telemetry and at-sea survey data, remote sensing layers, fishery information (vessel locations, catch reports), and other datasets relevant to the designation and future monitoring of the ASIOS; and, **1.2** A **public-facing Web GIS is created** for displaying and browsing marine spatial data online.	**1.1 – 1.2** Three Access databases for hosting animal telemetry, at-sea survey and stable isotope data have been created and are in routine use by AIG (**Annex 7**). These databases have been linked to a public-facing web GIS that can be browsed online (see Section 3.1). The very low level of commercial fishing that occurred during the project (see Section 3.1 Output 3), followed by the decision to permanently exclude commercial fishing from the Ascension EEZ (Section 3.1 Output 8), meant that the creation of specific fisheries databases was not necessary.

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Activity 1.1 Creation of a PostGIS database and QGIS/MS Access user interfaces for managing spatial data gathered during the project.		3 x MS Access databases created (**Annex 7**)
Activity 1.2 A Creation of a public-facing Web GIS interface for disseminating spatial data gathered during the project (using QGIS/LizMap).		Databases have been linked to a public-facing web GIS
Activity 1.3 Training day for AIG staff on the operation and maintenance of the spatial database and Web GIS system.		Web GIS can only currently be updated from within the University of Exeter and cannot be administrated by AIG staff (see Section 3.1 for explanation and possible solutions).
Output 2. **Distributions of species impacted by commercial fisheries are mapped and modelled in order to identify key usage areas and risk areas.**	**2.1** By Q4 of Y2**, telemetry data for >300 seabirds, sharks, billfish, tuna and turtles are collated, collected and analysed** in conjunction with environmental data to map key foraging areas and migration routes, and model species' distributions over multi-year timescales. **2.2** Composite ocean **front and eddy maps** of Ascension's EFZ are constructed using the previous **5 years of remote-sensing data** by Q3 of Y1 to identify any persistent or seasonally-persistent habitat zones that may be candidates for protection (also feeds into **2.1**). **2.3** By Q4 of Y2, **at-sea abundance surveys** for marine megafauna and important prey taxa (e.g. zooplankton and flying fish) are carried out at **> 100 sites** using vessel-based visual surveys, plankton tows and baited remote underwater video systems	**2.1** Telemetry data for 286 individuals representing 16 species of seabirds, sharks, billfish, tuna and turtles have been collated and analysed (see web GIS; **Annex 6: Appendices 2 & 3; Annex 7; Annex 8**; Richardson et al. 2017 Data have been used to map the green turtle migration corridor and inter-nesting habitats and to propose appropriately sized feature buffers for seamounts and Ascension Island itself in MPA scenarios developed in the Evidence & Options document (**Annex 6**). Targets for numbers of individuals tagged were based heavily on a planned study of sooty terns which had to be scaled back due to travel disruptions (see Section 3.1). **2.2** Composite ocean front and eddy maps of Ascension's EFZ have been constructed using the previous 10 – 15 years of remote sensing data and combined with seasonal climatologies of various other biophysical variables using a pelagic bioregionalisation analysis to identify discrete habitat zones (see web GIS; **Annex 9; Annex 14**) **2.3** More than 150 sites were surveyed using vessel-based visual transects (n = 226) and baited remote underwater video surveys (n = 151) (see web GIS and **Annex 7**). Survey data were used extensively in MPA planning process, particularly in defining biologically relevant feature buffers around seamounts and Ascension Island (**Annex 6: Main report and Appendices 2 & 3**). Prey abundance data (flying fish) were also used to define the 'ecological footprint' of Ascension's

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
	(BRUVs) to identify and ground truth potential hotspot areas. **2.4** By Q4 of Y2, the **importance and radius of influence of Ascension Island and its offshore seamounts as aggregation areas for pelagic biodiversity are established** using telemetry (**2.1**) and at-sea survey data (**2.3**) to develop recommendations for MPA placement and sizing.	globally-important seabird community, which highlight the need for broad-scale protection of pelagic food webs (see Output 3.4 and **Annex 8**). **2.4** In May-June 2017 (Q1 Y1) a major expedition was organised to study the marine megafauna communities associated with Ascension's shallow water seamounts and map their radius of influence on pelagic ecosystem. The resulting report submitted to stakeholders and incorporated into the 2019 Evidence & Options document was able to develop an exceptionally strong scientific case for greater protection and propose biologically-relevant MPA boundaries (**Annex 6: Appendix 2**)
Activity 2.1. Collate and analyse existing tracking data for marine turtles and seabirds to identify key foraging habitats and migration routes.		All marine turtle tracks collated and analysed to delineate migration corridor and inter-nesting habitats (Annex 6: Main Report & Appendix 3). Seabird tracking data collated and analysed to delineate at-sea foraging habitats (**Annex 6: Main Report & Appendix 3**; **Annex 8**; see also Oppel et al. 2017).
Activity 2.2. Conduct further tracking of tunas, sharks, seabirds and billfish, particularly in offshore areas and around seamounts, to address taxonomic and spatial gaps in species distribution data. **2.1.1** Deploy micro GPS-accelerometer tags on breeding sooty terns. **2.1.2** Install acoustic receiver arrays on seamounts and in inshore shelf areas. **2.1.3** Deploy satellite and acoustic telemetry devices on sharks and tunas associated with shallow-water seamounts. **2.1.4** Deploy satellite telemetry devices on oceanic shark species (particularly blue sharks) caught as by-catch in the commercial fishery. **2.1.5** Deploy satellite and acoustic telemetry devices on Atlantic blue marlin caught in the inshore sports fishery. **2.1.6** Analyse telemetry data to establish and map foraging ranges, residence times and migratory routes of tagged species.		**2.1.1.** 16 breeding sooty terns tracked (web GIS; **Annex 6: Main Report & Appendix 3**). **2.1.2.** 2 acoustic receiver arrays (each containing 7 receivers) established on the summits of the Grattan and Young seamounts (**Annex 6 Appendix 2**). **2.1.3.** 36 sharks tagged with acoustic tags on seamounts. 40 tuna, billfish and sharks fitted with satellite transmitters (**Annex 6 Appendix 2**). **2.1.4. – 2.1.5.** 11 blue sharks (principle by-catch species) and 12 blue marlin fitted with satellite transmitters (**Annex 6: Main Report & Appendix 3**; web GIS). **2.1.6.** Tracking data analysed to assess residence times, migration routes, foraging ranges and utilisation distributions of selected species (**Annex 6: Main Report and Appendices 2 & 3**; **Annex 8**; Richardson et al. 2017; Oppel et al. 2017; web GIS)

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Activity 2.3 Use remote-sensing data to identify and map persistent frontal systems, eddies and other bio-aggregating oceanographic features in Ascension Island's EFZ as potential high-value habitats for conservation.		Sea surface temperature and productivity fronts mapped with support from NEODAAS (**Annex 9**) and incorporated into pelagic bioregionalization analysis (**Annex 14**).
Activity 2.4 Undertake at-sea abundance surveys of marine megafauna and important prey taxa (e.g. zooplankton and flying fish) to identify and ground truth potential "biodiversity hotspots" and link these to environmental drivers: **2.4.1** Vessel-based visual transects for seabirds and surface-orientated marine vertebrates **2.4.2** Baited remote underwater video (BRUV) deployments for quantifying abundance and diversity of sharks and other predatory fishes **2.4.3** Mid-water plankton tows for estimating biomass and secondary productivity. **2.4.4** CTD deployments for characterising physical oceanography (temperature, salinity and dissolved oxygen profiles of the water column) and primary productivity (chlorophyll A) of study sites. **2.4.5** Analysis of BRUV footage using video analysis software to generate indices of abundance and estimate size classes.		**2.4.1** 226 vessel-based visual transects completed (web GIS; **Annex 7**) **2.4.2 & 2.4.5** 151 BRUV deployments completed and data analysed (web GIS; **Annex 6: Appendices 2 & 3**; **Annex 7**) **2.4.3. & 2.4.4.** 135 zooplankton tows and 143 CTD deployments completed at offshore sites (**Annex 7**), although data not used extensively in MPA planning process or related analyses.
Activity 2.5 Analyse telemetry and at-sea abundance data (**2.4**) in conjunction with environmental variables (**2.3**) to estimate movement parameters and residence times and construct species distribution models (SDMs) for predicting long-term distribution dynamics.		Formal SDMs for most species could not be completed in time for the expedited publication of the MPA Evidence & Options document, but were completed subsequently (e.g. symposium presentation: **Annex 12**) and are included in manuscripts in preparation (**Annex 8**). See Section 3.1 for details.
Output 3. Threats to marine megafauna from commercial fisheries are quantified, including both direct (by-catch) and indirect (food chain) impacts.	**3.1** At least **10% local observer coverage** is established in the commercial fishery for the **duration of the project** and is used to validate vessel catch reporting. **3.2** By Q1 of Y2, a **ranked risk assessment** is produced identifying those species most threatened by commercial fisheries following a	**3.1.** Very low license uptake in recent fishing seasons (one in Y1 and two in Y2) combined with on-going air access disruptions to Ascension Island (Section 5.1) prevented the deployment of local observers (provided by an international agency) on commercial vessels during the project. The assumption that licenses would be sold at a time when observers could be deployed was acknowledged in the original project application, but the additional constraints created by the runway closure could not have been anticipated. **3.2** A ranked risk assessment was produced for 24 species of marine vertebrates using established methods. The risk assessment was included in the supporting

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
	synthesis of all available fishery data and relevant ecological information. **3.3** By Q2 of Y2, **the distribution of commercial fishing effort, catch and by-catch in Ascension's EFZ** in all years for which data exist are mapped and, where possible, modelled as a function of environmental covariates to identify any specific areas or habitat zones with elevated risk to individual species and taxa. **3.4** By Q3 of Y2, the diets and trophic positions of at least **7 species of tuna, seabirds and sharks** as well as all key prey taxa are characterised as a basis for mapping Ascension's pelagic food web and modelling the impacts of fisheries (and fishery closures) on food web dynamics.	materials in the MPA Evidence & Options report submitted to stakeholders in Y2 (**Annex 6: Main report & Appendix 6**). **3.3** The distribution of commercial fishing effort, catch and by-catch has been mapped using all available data and included in the supporting materials of the MPA Evidence & Options Report (see **Annex 6: Appendix 6**; see also Rowlands et al. 2019). Our ability to carry out detailed environmental modelling of bycatch risk was based on the assumption of being able to gather new high-resolution fisheries data during the project and/or access detailed records held by foreign fishing agencies. Unfortunately, neither of these assumptions held (see Section 3.1). In accordance with proposed mitigation (**Annex 1**), in the absence of high resolution catch and position data, a number of coarser scale analyses were carried out using ICCAT databases and archived weekly catch position reports from the Ascension fishery (**Annex 6: Appendix 6)** **3.4** In order to enable pelagic food web modelling and dietary studies, > 460 tissue samples from 19 species of seabirds, sharks and fish were analysed for stable isotopes of carbon and nitrogen, with results deposited in a central database held by AIG (see **Annex 7**). As discussed in Sections 3.1 and 5.1, faced with a significantly shortened deadline for the submission of the MPA Evidence and Options, the relative importance of this output was downgraded following M&E in Y2 of the project. Nevertheless, several important findings were made regarding possible trophic impacts of fisheries on seabirds in particular and are discussed further in Section 3.1.
Activity 3.1. Deploy local fisheries observers on commercial vessels to record and validate catch composition.		As above, very low commercial license uptake and air travel disruptions prevented agency observer deployments during the project.
Activity 3.2. Collate all available vessel location and catch-effort data from Ascension's commercial long-line fishery, including those held by foreign fishing authorities, into the local information management system.		All available fisheries data collated, analysed and used to assess impacts on marine vertebrates (Annex 6: Main Report & Appendix 6). As detailed above and in Section 3.1, the low resolution of historical catch and position reports, and the unavailability of high-resolution raw data held by foreign fishing authorities limited the depth of analysis that was possible (e.g. environmental modelling).
Activity 3.3. Produce a ranked risk assessment of by-catch threats to marine vertebrates within Ascension's EFZ, incorporating local fishery data and ecological information derived from other sources, to help parameterise subsequent analyses.		
Activity 3.4. Analyse fishery data in conjunction with environmental layers to identify and map any specific areas or habitat zones with high by-catch ratio or disproportionate risk to particular species or taxa.		

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Activity 3.5. Collect diet samples (e.g. stomach contents, regurgitates) and tissues for stable isotope analysis (e.g. blood, feathers, muscle) from pelagic megafauna and potential prey taxa for food web analysis.		**3.5 – 3.7** A total of 466 tissue samples from 19 species of pelagic fish, sharks, seabird, squid and other taxa have been collected and analysed for stable isotopes of carbon and nitrogen and deposited in a centralised database (**Annex 7**). As detailed above and in previous annual reports, faced with an expedited deadline for the publication of the MPA Evidence & Options paper, analysis and reporting of results from food chain was deemed to be of lower priority. However, the SIA database created remains in use and is regularly updated with new samples as a basis for long-term pelagic food web monitoring in the MPA (e.g. seabird diets).
Activity 3.6. Stable isotope analysis of biological samples (**3.5**) to map trophic relationships in Ascension's pelagic food web.		
Activity 3.7. Interim report on the findings and implications of the food web project circulated to stakeholders.		
Output 4. Optimal solutions for MPA placement are proposed based on an integration of species distribution data, threat assessments and economic costs/values within a formal marine spatial planning framework.	**4.1** By Q3 of Y2, a **bio-economic analysis of Ascension's commercial long line fishery** has been conducted to assess its long-term viability under different future management scenarios. **4.2** By Q4 of Y2 an **MPA options report is produced** based on results and recommendations from outputs 2, 3 and 4 and circulated for stakeholder review prior to AIG submitting to Council for final decision.	**4.1** A bio-economic analysis of the Ascension Island longline fishery was completed in collaboration with Cefas and incorporated into the supporting material and cost-benefit analyses of proposed scenarios in the MPA Evidence and Options document (**Annex 6: Main report & Appendix 7**). Further details of the work undertaken are provided in section 3.1. This output proved to be particularly influential in the decision-making process. **4.2** In February 2019 (Q3 of Y2) an MPA Evidence & Options document was submitted to the Island Council and the Ascension Island Government following a one-month public consultation which resulted in six formal responses (**Annex 6**). The report proposed several competing MPA designs along with an assessment of the ecological, economic and reputational implications associated with each and was accompanied by a considerable body of supporting evidence spread across 11 appendices.
Activity 4.1 Carry out a bio-economic analysis of Ascension's commercial longline fishery to model spatiotemporal variation in fishing values, investigate factors influencing license uptake, and assess the long-term economic viability of the fishery under different management scenarios, considering alternative economic models where appropriate.		Bioeconomic analysis of the Ascension longline fishery completed as planned (**Annex 6: Appendix 7**) and economic data included in MPA scenario development (**Annex 6: Main report**).
Activity 4.2 Use systematic conservation planning software to identify MPA designs that optimise biodiversity conservation objectives and sustainable financing from fisheries under different sets of assumptions and constraints.		Marxan software used to identify MPA designs that optimise biodiversity conservation objectives and sustainable financing from fisheries under different sets of assumptions and constraints (**Annex 6: Main report & Appendix 3**).
Activity 4.3 Report the findings and proposed MPA boundaries from Outputs 2, 3 4.1 and 4.2 and circulate to stakeholders for peer-review.		MPA Evidence and Options document circulated to stakeholders (Annex 6). Feedback received from Island Council and external public consultation responses (**Annex 6: Appendices 11 & 12**).
Output 5. Experimental satellite surveillance technologies are trialled	**5.1** By Q4 of Y2, the level of **Illegal, Unlicensed and Unreported (IUU)**	**5.1** As planned, the level of potential illegal fishing in the Ascension Island EEZ was assessed over a two year period using satellite-based synthetic aperture radar

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
as a cost-effective method for MPA compliance monitoring and enforcement.	**fishing** in Ascension's EFZ has been estimated over a **2 year period** and, where possible, has been verified by targeted patrol vessel deployments.	(SAR) and results have been incorporated into a peer-reviewed manuscript co-authored by one of the project team. Findings were also incorporated into the MPA Evidence & Options report submitted to stakeholders Y2 (**Annex 6: Main Report & Appendix 10**). Real time intelligence from SAR was used to target patrol vessel movements to areas of possible illegal activity over two fishing seasons, although no interceptions have been made to date. Limitations of satellite surveillance and the current patrol asset are discussed further in Section 3.1.
Activity 5.1. Identify and map potential Illegal, Unreported and Unregulated fishing in Ascension's EFZ using nocturnal light signatures from vessels and SAR imaging overlaid with local AIS/VMS data.		**Activity 5.1 & 5.2.** IUU fishing monitored using AIS/SAR over a two year period and reported to stakeholders as above.
Activity 5.2. Report the findings of vessel detection trials to local marine managers with recommendations for future deployment of the technology.		
Activity 5.3. Trial targeted patrol vessel deployments using near-real-time vessel detection to ground-truth the technology and test its application as an enforcement tool.		**Activity 5.3.** Real time AIS/SAR used to target patrol vessel over two fishing seasons but no IUU interceptions made (see section 3.1).
Activity 5.4. Train local users in the operation of vessel detection systems for long-term self-sufficiency in compliance monitoring and enforcement.		**Activity 5.4.** Satellite-based IUU fishing detection determined to be too specialist for local managers. The best model for long-term intelligence gathering is through Marine Management Organisation as part of overarching Blue Belt programme objectives for the UKOTs.
Output 6. Pelagic biodiversity baselines are established and a robust monitoring framework is developed for evaluating the long-term conservation benefits of the ASIOS.	**6.1** By Q1 of Y1 at least **10 fixed BRUV monitoring sites** have been established for assessing trends in the abundance and diversity of key pelagic species, such as sharks. By Q4 of Y2, baselines have been drawn using seasonally-stratified **surveys over a 2 year period**. **6.2** By Q4 of Y2, best practice in pelagic MPA monitoring has been reviewed and incorporated into a **"good monitoring framework"** that is appropriate for Ascension Island's needs and resources.	**6.1** Three fixed BRUV monitoring sites have been established on Ascension Island's outlying seamounts and re-surveyed annually during routine offshore fishery patrols (**Annex 6: Appendix 2**), providing good baselines of the current status of pelagic predators associated with these features. The remaining 7 sites had been planned for inshore areas around Ascension Island itself. While initial BRUV surveys of suitable sites were carried out in Y1, the lack of a suitable inshore research vessel has prevented regular monitoring (see Section 3.1 for further details). **6.2** A first draft of the Ascension MPA Management Plan has been produced (see Output 8) and includes SMART performance indicators which will form the basis for future monitoring (**Annex 10**). A draft Monitoring and Research Strategy for measuring progress against indicators is also being prepared and will build on baselines and techniques established in ASIOS. Formal adoption of both plans by AIG has been deferred at the request of the Island Council pending the conclusion

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
		of political discussions with UK Government regarding long term funding for MPA management.
Activity 6.3. Identify suitable pelagic monitoring sites in inshore areas and on seamounts and initiate quarterly (inshore) and annual (seamount) BRUV surveys to establish baselines of abundance and community composition.		3 x seamount monitoring sites established as part of the 2017 seamounts expedition and re-surveyed in all subsequent years (**Annex 6: Appendix 3**). Establishment of inshore monitoring sites hindered by lack of suitable vessel (Section 3.1).
Activity 6.2. Trial targeted monitoring of dynamic open-ocean habitats using near-real-time front and eddy mapping to direct BRUV deployments and vessel-based abundance surveys.		Real time front mapping trialled in offshore surveys in Y1 of the project with NEODAAS support (Annex 9) but fronts determined to be too weak and ephemeral for this to be a viable monitoring strategy.
Output 7. International best practice is incorporated into the design and planning of the ASIOS, and experiences and knowledge gained during the project are widely shared.	**7.1** Ascension Island Government joins the Big Ocean Network and representatives attend **at least one major international MPA symposium by Q4 of Yr1** to present plans and receive feedback. **7.2** UoE and AIG host a **UKOT "Blue Belts" conference** in Q2 of Y3 as a forum for strengthening links, promoting collaborations and improving knowledge transfer between Territories responsible for managing large-scale MPAs. **7.3** By Q4 of Y2, a **literature review of best practice in large-scale MPA design and management** has been produced and incorporated into plans for the ASIOS. **7.4** By Q3 of Y2, **at least 30 dissemination products** have been produced in **7 different media**, including micro-documentaries, public lectures, newsletters and articles, technical manuscripts, social media posts and online blogs.	**7.1** AIG representatives have presented project findings at three international symposia, including the 4th International Marine Protected Areas Congress (4-8 September 2017, La Serena, Chile; **Annex 11**) the 2019 St Helena Natural Capital Conference (11th – 15th March, Jamestown, St Helena) and the 2019 UK Overseas Blue Belt Symposium (see 7.2). Representative also attended and spoke at the 2017 Big Ocean Network annual general meeting (see Section 3.1) **7.2** The "Blue Belt Overseas" symposium was held at the University of Exeter from 29th – 31st July 2019 and was attended by > 100 people, including representatives from 11 UKOTs, international academics, NGOs, UK Government and funding bodies. This event was one of the flagship outputs from the project and considerably surpassed the conference that was originally planned in terms of scale and scope (**Annex 12**). **7.3** As detailed in Section 3.1, this output was rendered redundant by the launch of best practice guidelines for large-scale MPA design and management by Big Ocean and the IUCN at the 2017 IMPAC4 conference attended by the project team (see 7.1). The guidelines have been used as a reference throughout. **7.4** Appropriate indicators for dissemination are challenging as formats are very varied and often difficult to quantify (e.g. at least 50 unique Tweets were associated with the Blue Belt Symposium alone; **Annex 12**). Excluding social media, we estimate that work from the project featured in 5 international meetings or conferences, 7 public talks on Ascension Island, 4 blog posts, the Darwin newsletter and two online films/micro-documentaries. Four relevant peer-reviewed

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
		manuscripts were also authored or co-authored by the project team (see Section 3.1 for evidence and links).
Activity 7.1 AIG engages with peer-learning networks, including joining Big Ocean Managers Network.		AIG representatives attended 2017 Big Ocean general meeting (Section 3.1); Big Ocean representatives attend 2019 Blue Belt Symposium (**Annex 12**). AIG membership of network pending formal implementation of MPA but is assured.
Activity 7.2. Representatives from AIG attend a major international meeting of MPA managers, provisionally the 4th International Marine Protected Areas Congress (IMPAC4) in La Serena, Chile.		2 x AIG representatives presented at IMPAC4 conference (**Annex 11** and Section 3.1)
Activity 7.3. UK Overseas Territories "Big Oceans" conference hosted by University of Exeter and AIG.		Blue Belt Overseas Symposium held at University of Exeter Cornwall Campus July 2019 (**Annex 12**). See Section 3.1. for further details.
Activity 7.4. Review published and online resources related to the design, management and monitoring of large-scale MPAs and synthesise into a set of recommendations that are appropriate for Ascension Island's needs and resources.		Need for this activity was largely negated by subsequent production of IUCN Specialist Group best practice guidelines for large-scale MPA management and monitoring. Guidelines were used as a reference during management plan drafting (**Annex 10**).
Activity 7.5. Production of Darwin-branded micro-documentaries for online consumption showcasing scientific work, Ascension marine life and MPA designation.		Opportunities for on-island media production severely constrained by air access issues. 2 x online mini-documentaries/show reels produced as part of 2019 Blue Belt Symposium (see Section 3.1).
Activity 7.6. Publicise and disseminate project activities and findings through social media, local newspaper articles, scientific blogs, peer-reviewed manuscripts, online repositories and public lectures.		See Section 3.1. for full list of communication/publicity activities.
Output 8. The ASIOS is formally designated and management structures are established to ensure its long-term success.	**8.1** By Q1 of Y3, proposed **MPA boundaries and regulations are presented to the Island Council** for recommendation to the Governor. **8.2** By Q2 of Y3, **AIG adopts a 5 year MPA management plan**, guided by Outputs 2-7. **8.3** By Q2 of Y3, a **working group of local and international stakeholders** is formed to provide coordinated, long-	**8.1** On 30th August 2019 the Governor of St Helena designated a 100% MPA covering the entirety of Ascension Island's ~440,000 km^2 exclusive economic zone). This followed a recommendation from the Island Council based on the range of scientific and economic evidence presented to them in the MPA Evidence and Options document and judged to provide the best long-term outcome both for biodiversity and for the Island. **8.2 – 8.3.** A draft 5-year management plan has been prepared in collaboration with Blue Belt project partners (**Annex 10**), although this will not be implemented until a long-term funding arrangement is agreed with UK Government. Similarly, establishment of local and international steering groups to help guide the implementation of this plan have been deferred pending the results of this political process.

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
	term scientific, political and fundraising support and steering.	
Activity 8.1. Preparation of the Ascension Island "Future Marine Management" report.		MPA "Evidence & Options" paper submitted to Ascension Island council following external peer review; 100% MPA designated by Order of the Governor in August 2019 following recommendation by Island Council (see above).
Activity 8.2. Future Marine Management report made available for public consultation and stakeholder peer-review.		
Activity 8.3. Submission of proposed MPA boundaries and regulations to the Island Council and Governor for enactment.		
Activity 8.4. Development and adoption of a best practice MPA Management Plan and monitoring framework.		Draft MPA Management Plan has been produced by a working group including AIG, project leaders and Blue Belt initiative partners (**Annex 10**). Formal adoption of the plan and establishment of as ASIOS technical steering committee pending a political and funding settlement between AIG and UK Government (see Section 3.1).
Activity 8.5. Formation of an ASIOS Working Group to provide long-term steering and support. First order of business will be to review and provide comment on the management plan.		

Annex 3 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1	Number of (i) students from the UKOTs; and (ii) other students to receive training (including PhD, masters and other training and receiving a qualification or certificate)	0
2	Number of (i) people in UKOTs; and (ii) other people receiving other forms of long-term (>1yr) training not leading to formal qualification	0
3a	Number of (i) people in UKOTs; and (ii) other people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	(i) 7 (members of AIG Conservation and Fisheries Department trained in offshore research techniques and seabird ringing/tagging by partners)
3b	Number of training weeks (i) in UKOTs; (ii) outside UKOTs not leading to formal qualification	(i) 3 (training/mentoring in BRUV surveys and marine vertebrate tagging for AIGCFD staff) (ii) 1 (training in web GIS development by SAERI)
4	Number of types of training materials produced. Were these materials made available for use by UKOTs?	0
5	Number of UKOT citizens who have increased capacity to manage natural resources as a result of the project	(i) 7 (as above)
Research Measures		
9	Number of species/habitat management plans/ strategies (or action plans) produced for/by Governments, public authorities or other implementing agencies in the UKOTs	2
10	Number of formal documents produced to assist work in UKOTs related to species identification, classification and recording.	0
11a	Number of papers published or accepted for publication in peer reviewed journals written by (i) UKOT authors; and (ii) other authors	(i) 5 (authors or co-authors employed on Ascension at time of publication, although some have subsequently left)
11b	Number of papers published or accepted for publication elsewhere written by (i) UKOT authors; and (ii) other authors	0
12b	Number of computer-based databases enhanced (containing species/genetic	3 (all databases are hosted locally by Ascension Island Government

Code	Description	Totals (plus additional detail as required)
	information). Were these databases made available for use by UKOTs?	Conservation and Fisheries Department)
13a	Number of species reference collections established. Were these collections handed over to UKOTs?	0
13b	Number of species reference collections enhanced. Were these collections handed over to UKOTs?	0
Dissemination Measures		
14a	Number of conferences/seminars/workshops/stakeholder meetings organised to present/disseminate findings from UKOT's Darwin project work	1 international conference hosted (2019 Blue Belt Symposium), 7 public meetings on Ascension Island
14b	Number of conferences/seminars/ workshops/stakeholder meetings attended at which findings from the Darwin Plus project work will be presented/ disseminated	3 international conferences or meetings attended.
Physical Measures		
20	Estimated value (£s) of physical assets handed over to UKOT(s)	0 (physical assets purchased through matched-funding)
21	Number of permanent educational/training/research facilities or organisation established in UKOTs	0
22	Number of permanent field plots established in UKOTs	3 (seamount pelagic monitoring sites)
23	Value of resources raised from other sources (e.g., in addition to Darwin funding) for project work	

Annex 4 Publications

Including all relevant publications authored or co-authored by project staff during the lifetime of the project

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. weblink, contact address, annex etc)
Report *	Weber, S.B. et al. (2018) A baseline ecological assessment of Ascension Island's shallow water seamounts as candidate MPAs.	British	UK	Male	Ascension Island Government, Georgetown	https://www.ascension.gov.ac/seamount-eport-document **Annex 6: Appendix 2**
Report *	Baum, D. et al. (2019). Ascension Island MPA Evidence and Options document.	British	Ascension Is.	Female	Ascension Island Government, Georgetown	https://www.ascension-island.gov.ac/wp-content/uploads/2018/11/Ascension-Island-Marine-Protected-Area-Evidence-and-Options-Document-Second-draft-Nov-18-final.pdf; **Annex 6**
Journal Paper	Richardson, A.J. et al. (2018) Residency and reproductive status of yellowfin tuna in a proposed large-scale pelagic marine protected area. *Aquatic Conservation* 28 (6), 1308-1316.	British	Ascension Is.	Male	Journal of	https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.2936
Journal Paper	Richardson A.J. et al. (2019) First record of an Odontaspidid shark in Ascension Island waters. *Arquipelago. Life and Marine Sciences* 36: 79-84	British	Ascension Is.	Male		http://www.okeanos.uac.pt/storage/2019/10/Richardson_et_al.pdf
Journal Paper	Rowlands et al. (2019) Satellite surveillance of fishing vessel activity in the Ascension Island Exclusive	British	UK	Male		https://www.sciencedirect.com/science/article/pii/S0308597X18303002

	Economic Zone and Marine Protected Area. *Marine Policy* 101, 39-50					
Journal Paper	Reynolds et al. (2019) Long-term dietary shift and population decline of a pelagic seabird - A health check on the tropical Atlantic? *Global Change Biology* 25, 1383-1394	British	UK	Male		https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14560
Journal Paper	Barnes, D.K.A. et al. (2018) Marine plastics threaten giant Atlantic Marine Protected Areas. *Current Biology* 28 (19), PR1137 - 1138	British	UK	Male		https://www.cell.com/current-biology/fulltext/S0960-9822(18)31148-5

Annex 5 Darwin Contacts

Ref No	DPLUS063
Project Title	The Ascension Island Ocean Sanctuary (ASIOS): planning for the Atlantic's largest marine reserve
Project Leader Details	
Name	Dr Sam Weber
Role within Darwin Project	Overall project and budget management, science lead
Email	
Project Leader 2 Details	
Name	Dr Diane Baum
Organisation	Ascension Island Government Conservation and Fisheries Department
Role within Darwin Project	Overall project and budget management, policy lead
Email	
Partner 1	
Name	Prof Annette Broderick
Organisation	University of Exeter
Role within Darwin Project	University of Exeter principle investigator
Email	
Partner 2	
Name	Prof. Jessica Meeuwig
Organisation	University of Western Australia
Role within Darwin Project	Principle collaborator on pelagic BRUV programme
Email	
Partner 3	
Name	Prof. Nigel Hussey
Organisation	University of Windsor
Role within Darwin Project	Principle collaborator on shark telemetry work packages
Email	
Partners 4 & 5	
Name	Dr Jim Reynolds[1]; Roger Dickey[2]
Organisation	University of Birmingham[1]; Army Ornithological Society[2]
Role within Darwin Project	Principle collaborators on seabird tracking and dietary analysis work packages
Email	

Supplementary material

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	X
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	X
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	
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.	