Department for Environment Food & Rural Affairs

DARWIN INITIATIVE

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Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

Darwin Plus 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
Contract holder institution	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 – 30/09/2019
Reporting period (e.g., Apr 2017-Mar 2018) and number (e.g., AR 1,2)	Apr 2017 – Mar 2018, AR1
Project leader name	Dr Sam Weber
Project website/blog/Twitter	
Report author(s) and date	Sam Weber, 30th April 2018

1. Project overview

The creation of a large-scale MPA around Ascension Island is a flagship commitment of the UK Government's "Blue Belt" initiative, and the most high-profile conservation issue currently affecting the Territory. An important milestone was reached in January 2016 with the announcement of a "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 addressed in order to identify those areas that would benefit most from protection. 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 are compiled and management plans can 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 aims to build an integrated understanding of Ascension's offshore pelagic ecosystem and develop evidence-based recommendations for the siting of marine reserves. Crucially, it will also plan for the legacy of the ASIOS, ensuring that the Territory learns from experiences elsewhere to deliver world-class MPA management and enforcement.

2. Project stakeholders/partners

The primary stakeholders in the project are the Ascension Island and UK Governments, with scientific input and advice being provided by the project partner institutions. Project leader Dr Sam Weber is based at the University of Exeter (the primary academic partner) and is in at least weekly contact with the Darwin Project Officer based on Ascension Island (Senior Marine and Fisheries Scientist Dr Andy Richardson). In January 2018 Dr Weber visited Ascension Island for one month to participate in offshore data collection and conduct project monitoring and evaluation with on-island partners. Following the inception of the project, the Marine Management Organisation (MMO) and Centre for Fisheries and Aquaculture Science (Cefas) have also assumed an advisory and coordination role for delivering the UK Government's Blue Belt objectives and the project has actively engaged with these new partners who provide the primary channel for engaging with the Foreign and Commonwealth Office. Dedicated desk officers have been assigned at both organisations (Cefas: Paul Whomersley; MMO: Hannah Thomas) and are in regular Skype contact with the Project Leader and Project Officer on Ascension Island to discuss project progress and integration with the wider Blue Belt programme. In February 2018, representatives from MMO and Cefas travelled to Ascension Island for a familiarisation visit and to work alongside the Darwin Project Officer (see blog post here). Both organisations are providing support and expertise towards delivering project objectives, including analysis of datasets and advice on future enforcement options. A mini-workshop is also planned for May 2018 at the University of Exeter to begin structuring the evidence documents and management plan that will underpin designation of the ASIOS in 2019.

3. Project Progress

3.1 Progress in carrying out project Activities

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

1.1–1.3: A postGIS cloud database and public-facing webGIS have been created, with assistance from a SAERI GIS specialist, to manage spatial datasets created during the project and work on populating these is ongoing. The webGIS is hosted at the University of Exeter and can be accessed at http://asios.cles.ex.ac.uk/. A marine vertebrate tracking map has been created as the first product within this online system to collate telemetry data held by various partner organisations along with those collected as part of this current Darwin project. Additional maps are currently being developed to summarise oceanographic/habitat data, fisheries data and the results of at-sea biodiversity surveys. Two access database front ends have been created for recording metadata related to marine vertebrate tagging and at-sea biological surveys, and local users have been trained in their use. The postGIS and webGIS systems are currently managed by the Project Leader to ensure data integrity; however, training in the use of these resources will be provided to local marine managers on Ascension Island before the end of the project.

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: All available tracking data for marine vertebrates tagged within Ascension Island's Exclusive Economic Zone (EEX) have now been collated and analysis of these data is in its late stages. The dataset currently includes more than 270 tracks from 17 species. Movement models (Bayesian state-space, hidden Markov) have been applied to these data to separate tracks into discrete behavioural phases (e.g. migrating/resident or feeding/travelling), estimate residence times and produce gridded probability-density surfaces for each species. Most tracks and derived datasets can be browsed in the project webGIS. Results of yellowfin tuna tracking have been accepted for publication in the journal *Aquatic Conservation* (see Annex 3) and seabird tracking data have now been published in two peer-reviewed manuscripts[1,2].

2.2.1: Partners from University of Birmingham and the Army Ornithological Society visited Ascension Island in February-March 2018 for 4 weeks to assist in the deployment of GPS loggers on sooty terns. This trip was delayed from Q2 of Y1 due to air access issues. Although the work was hampered by colony abandonment and nest failures, 15 individuals have now been tracked for at least one complete foraging trip, with further deployments planned in Y2 of the project. A short video of the work in progress produced by BBC Somerset can be found here.

2.2.2–2.2.3: In May-June 2017, a major research expedition to Ascension Island's three shallow water seamounts was carried to map the "sphere of influence" of these features on the pelagic ecosystem and develop recommendations for the designation of seamount marine reserves. The expedition was co-funded by an EU BEST grant (project 1599) awarded to the Ascension Island Government and carried out in collaboration with National Geographic Pristine Seas and the British Antarctic Survey (see Annex 4 for further details). During the expedition, a total of 48 seamount-associated sharks and tuna were fitted with pop-up satellite archival tags, fin-mounted PTTs and surgically-implanted acoustic transmitters which will allow residence times and ranging behaviour to be assessed. Fixed acoustic receiver arrays were deployed on the summits of two seamounts and retrieved during offshore surveys in January 2018 to download detections of acoustically tagged animals. More than 700,000 detections were recorded during this period, with high levels of residency and site fidelity apparent in shark assemblages. These data are currently being analysed and will be prepared for publication during Y2 of the project.

2.2.4–2.2.5: Following additional tag deployments in January-February 2018, 14 oceanic sharks (11 blue shark and 3 oceanic whitetip) and 10 Atlantic blue marlin have now been equipped with pop-up satellite archival tags in Ascension Island's waters. Three dorado were also tagged with satellite telemetry devices, this species having been observed in pelagic, multispecies (including seabirds) feeding aggregations. The majority of tracks can be viewed on the project's webGIS.

2.3: Spatio-temporal variation in Ascension Island's physical oceanography (currents, temperature, productivity, eddy kinetic energy) has now been mapped using a range of remote-sensing products and summary datasets will shortly be uploaded to the project webGIS. Although the intention was to complete most of the oceanographic analyses 'in house', it became apparent that technical support would be beneficial for more complex analyses, such as the production of composite front maps. An application was successfully submitted to the NERC Earth Observation Data Acquisition and Analysis Service (NEODAAS) in December 2017 to support real-time front mapping (see 6.2 and Annex 5) and a follow-up application to provide long-term composite images and archive locations for species distribution models (SDMs) is planned for 2018.

2.4: The project has already exceeded its target for at-sea abundance surveys of marine megafauna and prey taxa (> 100 sites surveyed by Q4 of Y2) with 109 baited underwater video (BRUV) deployments, 189 vessel-based visual transects and 114 zooplankton tows completed to date. The BRUV footage is currently being analysed by partners at the University of Western Australia to develop predictive models of marine megafauna abundance, with results expected to be published during 2018. Plankton samples are currently being analysed by partners at Cefas.

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

3.1: A single license to fish within Ascension Island's EEZ was sold in the 2017-2018 season. Unfortunately, the short notice on this license purchase combined with ongoing air access issues on Ascension Island meant that it was not possible to fly in an external fisheries observer in time. The vessel was boarded for an inspection by Project Officer Dr Andy Richardson who was able to inspect the catch and check vessel standards to ensure compliance with new local fishery legislation.

3.2: All currently available data from Ascension's historical longline fishery has been collated and work on analysing this will begin in Y2. Unfortunately, much of the high resolution (set level) fisheries observer data that are needed to support this analysis are held by foreign fishing authorities and are not currently accessible to Ascension Island Government. Attempts to obtain these data directly have so far been unsuccessful and assistance from Cefas and the FCO has now been sought to request access at a higher level (e.g. through ICCAT). In September 2017, Ascension Island Government and the University of Exeter signed a research collaboration

agreement with Global Fishing Watch to access their high-resolution, daily gridded datasets of global fishing effort which has significantly improved our ability to map the spatio-temporal distribution of fishing activity in the region. A Global Fishing Watch blog post describing the collaboration with the ASIOS project can be found here. Monthly maps of apparent long-lining effort for 2012-2017 have been produced and reveal clustering of fishing effort in international waters right up to the periphery of the Ascension EEZ (see Annex 6). Until recently there was an embargo on the publication of these data, but now that this has been lifted fishing effort layers will shortly be incorporated into the project webGIS. A collation of existing vulnerability indices for bycatch species, available in scientific and industry literature will also start in Y2, being used to help evaluate locally analysed threats.

3.5–3.6: Collection and analysis of tissue and diet samples from marine megafauna in Ascension Island's waters are now well underway and form part of a PhD project being undertaken at the University of Exeter by Kate Downes, a former employee of Ascension Island Government now based at Cefas. More than 500 samples have so far been collected from a range of teleosts, sharks, seabirds and prey taxa (e.g. flying fish, squid), and work on analysing these is underway. Preliminary findings of tuna diet analyses were presented by Ms Downes at the 2017 Fisheries Society of the British Isles (FSBI) Annual Conference (see Annex 7). Ms Downes has also broadened the biomarker analyses of tuna to consider trace elements in otoliths which will hopefully allow the spawning grounds of the Ascension Island stock to be identified.

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

5.1–5.3: Ascension Island Government has been working with the UK Satellite Applications Catapult to identify potential illegal fishing activity using synthetic aperture radar (SAR) coupled with vessel AIS data. One hundred and seventy 'uncorrelated detections' (i.e. apparent vessels not linked to an AIS transmission) were recorded during the 2016 and 2017 peak fishing seasons (see Annex 8), although further filtering of these is needed to remove known military vessels. No interceptions have yet been made by the Ascension patrol vessel, and the Ascension Island Government and project staff are currently working with MMO to assess how best to use this information for risk-profiling and enforcement operations. Unfortunately, an unexpected change in the provider of SAR images prior to the 2018 offshore patrol led to an interruption of this service and meant that intelligence was not available for targeted interceptions. The project team is currently working with MMO to ensure that these data are restored for 2019. In addition to SAR imaging, the project team has also been exploring 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. The Project Leader has been in contact with 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 noise that they are currently unable to filter.

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

6.1: As a result of the research expedition described in Output 2, comprehensive biodiversity baselines have now been established for Ascension Island's three shallow-water seamounts which will help to develop their role as ocean observatories for monitoring change in the pelagic ecosystem. A standard offshore survey protocol has been developed which measures abundance and diversity associated with a site at multiple trophic levels (plankton, flying fish, seabirds, sharks and other top predators) along with oceanographic variables and will be incorporated in long-term monitoring and management plans. Progress with establishing inshore monitoring sites has been hindered by the lack 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 rib and inshore work boat (see Section 7). AIG Conservation & Fisheries Department's rib is due to be in service again imminently and we are confident that this objective can be delivered in Y2.

6.2: In December 2017, the project team was awarded funding-in-kind by the NERC Earth Observation Data Acquisition and Analysis Service (NEODAAS) to provide near-real-time locations of frontal zones for targeted sampling during the 2018 offshore research/patrol cruise (see Annex 5). Biological surveys were carried out in putative fronts and non-fronts to try to establish the importance of these features for pelagic megafauna in Ascension's waters and explore the feasibility of monitoring dynamic open-ocean habitats. In addition, a towed underwater vehicle carrying a CTD was used to collect surface oceanographic profiles and ground truth the presence of frontal zones in surveyed areas. Preliminary inspection of the data suggests that ocean fronts in this region may be too weak and/or transient to be reliably targeted for monitoring, although more detailed analyses still need to be carried out.

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, 7.2 & 7.4: In September 2017, project scientists Drs Sam Weber and 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 9). 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 discuss the process for Ascension Island joining their peer-learning network (see Annex 10). Although membership of Big Ocean cannot be formalized until after the designation of the Ocean Sanctuary, there was a clear willingness to support Ascension throughout the planning and designation process, with numerous useful contacts made. During IMPAC4, Big Ocean and IUCN also launched their Best Practice Standards for Large Scale MPAs which will provide a valuable reference resource to assist with the planning process. Hard copies of this document were obtained for the Ascension Island Government and effectively deliver many of the activities planned for output 7.4 ("review best practice in large scale MPA design and management").

7.5–7.6: Project outputs have been disseminated through social media, blog posts and a public presentation on Ascension Island hosted by National Geographic and Darwin project team following the 2017 seamounts expedition (see 2.2.2 and Annex 11). The latter was attended by > 100 people – a record for a conservation-themed public talk. 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. A short film documenting the work carried out during the seamounts expedition was produced by National Geographic but has not yet been made public.

3.2 Progress towards project 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

As detailed in section 3.1, delivery of this objective is largely complete. The relational database backend and web front end for managing and displaying spatial data have been created and work has begun on populating this with outputs from the project. The webGIS is publicly accessible and can be accessed here. As datasets have been generated and evolved rapidly during the data creation phase in Y1, it has been hard to keep the webGIS system current at all times. Work is now needed to update the existing tracking map and upload additional mapping projects to ensure this system is fully operational before the stakeholder MPA consultation phase at the end of Y2.

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

As described in section 3.1, the project is well on course to deliver its target of > 300 seabirds, sharks, billfish, tuna and turtles tracked by Q4 of Y2 (Output 2.1), with 272 individuals from 17 species already tagged. The project has also already exceeded its target of > 100 at-sea abundance surveys completed by Q4 of Y2 (Output 2.3), with 109 BRUV deployments and 189 vessel-based visual transects carried out to date covering the majority of the EEZ. The majority of satellite tracking data is now publicly accessible through the project webGIS and a summary of at-sea abundance surveys will follow shortly once data from the 2018 offshore patrol have been processed. Translating these various data streams into policy relevant outputs is now the priority for Y2. As described above, many of these analyses are now well advanced and we see no reason why these outputs cannot be delivered in full and on time.

In addition to general offshore tagging and survey work, in May-June 2017 a major expedition was carried out to map the distribution and diversity of pelagic life around Ascension's three shallow water seamounts (Output 2.4). A combination of BRUVs, vessel-based visual surveys and plankton trawls was used to characterise biological communities along transects radiating out from the seamount summits, with the aim of defining their 'biodiversity footprints'. Satellite and acoustic tagging of seamount-associated sharks and tuna was also carried out to generate complementary data on the residency and ranging behaviour of individual animals. The expedition report from this trip is still being finalised by project partners; however, data analyses are progressing well with support from Cefas and the University of Western Australia, and we are confident that a comprehensive summary of findings will be available to stakeholders by Q2 of Y2.

Production of composite front and eddy maps (Output 2.2) is behind schedule due to a lack of 'in house' technical expertise in this area (see above). However, we remain confident that this output can be delivered through the collaboration developed with NEODAAS.

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

As described in section 3.1, very limited uptake of commercial licenses during recent fishing seasons has largely negated the target of achieving 10% observer coverage for the duration of the project (Output 3.1). Unfortunately, the single fishing license that was sold in 2017-2018 was bought at short notice and it was not possible to bring in a contracted fishery observer on the recently reduced air service to Ascension Island (see section 7). All available catch and effort data for Ascension's longline fishery have now been collated (Output 3.3) and will be processed and analysed during Y2, although the resolution (spatial and taxonomic) and coverage of the data may limit the 'depth' of analysis that is possible. Delivering this output in full (e.g. risk modelling) may depend on whether steps taken to obtain higher resolution, historical observer data from foreign fishing authorities are successful (see above). Unravelling the indirect impacts of fisheries, and hence benefits of MPAs (e.g. through trophic cascades and disrupted feeding associations), is complex. Nevertheless, the project aimed to lay the groundwork for such analyses by using stable isotope analysis (SIA) to attempt to map the pelagic food chain. A large set of biological samples has now been assembled from a broad range of pelagic predators and potential prey species sampled in Ascension Island's EEZ and analysis is ongoing. Characterising the trophic relationships of tunas (the principal target of the longline fishery) is a high priority and is particularly well-advanced, and preliminary results were presented at the 2017 FSBI conference. Analysis of the remaining stable isotope samples will begin in Q1 of Y2.

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

Although work towards this output is not scheduled to begin until Q2 of Y2, the Project Leader and Project Officer have been in discussion with partners at Cefas and MMO concerning the scope and intended outcomes of a bioeconomic review of Ascension's offshore fishery (Output 4.1). In light of limited license uptakes in recent years, this will likely seek to establish the long-term economic viability of maintaining a commercial fishery within a portion of Ascension Island's

EEZ and incorporate advice into the MPA evidence document to be submitted to UK and Ascension Island Governments in advance of designation (Output 4.2).

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

As described in Section 3.1, locations of potential 'dark vessels' identified using satellite synthetic aperture radar are now available for two years (2016 and 2017) during the peak fishing season (January–March), providing a basis for estimating the level and distribution of illegal IUU fishing occurring in Ascension Island's EEZ (although further post-processing is first needed to remove military vessels not transmitting on AIS; see Annex 8). Unfortunately, during the most recent season, service provision was interrupted by a change of provider (see above). Despite a number of attempts to respond to this intelligence, AIG's offshore patrol charter has not yet been able to verify the presence of illegal fishing activity, either because the target had moved away or could not be located. These experiences have highlighted a number of deficiencies in the current patrol asset which will allow improvements to be made. In the short term, a mobile internet receiver has been purchased to allow the patrol to receive real-time data streams which should improve response times (intelligence was previously passed on during scheduled calls with a shore-based operator). However, moving forward a more rapid, fit-for-purpose vessel may be needed to deliver effective enforcement. The project team is currently working with maritime enforcement specialists at MMO to assess how information provided by satellite surveillance systems can be best utilised for compliance monitoring and enforcement in the ASIOS, and will incorporate recommendations into the MPA evidence document to be submitted to stakeholders in Q4 of Y4.

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

As detailed above, some progress towards this objective has already been made, particularly with regards to establishing biodiversity baselines for the Territory's three shallow water seamounts which provide valuable fixed reference sites for monitoring abundance of marine species. Seamount summits have now been surveyed on three separate occasions over a one year period with additional surveys planned for early 2019 (Y2 Q3). Unfortunately, major faults with Ascension Island Government Conservation & Fisheries Department's (AIGCFD's) rib combined with the unexpected closure of most local commercial fishing charters following the suspension of civilian flights between Ascension Island and the UK have severely impacted our ability to establish inshore monitoring sites during Y1 of the project (see Half Year Report 1). AIGCFD's rib is expected to be back in service shortly and we are hopeful that we can still deliver our target of 10 fixed monitoring stations established by Q4 of Y2; however, the temporal coverage of surveys will be reduced to one year instead of two. In offshore areas away from seamounts and islands, the dynamic nature of open ocean habitats means that site-based monitoring is unlikely to be meaningful. In January 2018 (Q3 of Y1), the project team therefore initiated trials of a stratified, habitat-based monitoring approach using near-real-time oceanographic data to guide the research vessel into frontal zones which may be hotspots for pelagic megafauna (see above). Further data analysis is needed; however, initial experiences have cast doubts on the feasibility of this method, which will help to inform monitoring recommendations included in the MPA management plan.

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

As outlined in Section 3.1 the project has already taken steps to ensure that best practice is incorporated into the planning of the ASIOS. In September 2017, project representatives travelled to Chile to present at the 4th International Marine Protected Congress (IMPAC4) and participate in the annual meeting of the Big Ocean Network (see Annexes 7 and 8). This provided an opportunity to receive feedback on the direction of the project, build networks and participate in themed workshops discussing the latest ideas in MPA management and research. Project outputs have been publicised wherever possible although, as outlined in Section 5, we feel that

project visibility and branding could be strengthened. We estimate that around 10 dissemination products have been produced to date including four blog posts, three conference presentations, one public talk on Ascension Island, one scientific publication and one newsletter article (see links in Section 3.1 and Annexes 3, 6, 7 and 9 for evidence), along with a number of social media posts.

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

Work towards this output is not scheduled to start until Y3 of the project. However, during Y1 the National Protected Area's Ordinance was updated to include specific legal powers to designate an MPA out to the 200 nm limit. The legal framework is therefore now in place to allow designation of the ASIOS once the scientific evidence is assembled and a management plan has been prepared. The revised legislation can be viewed here.

3.3 Progress towards the project Outcome

The UK and Ascension Island Governments have publicly committed to designating a large-scale MPA in at least 50% of Ascension's maritime zone by the end of the project in 2019 and the timing of this designation is highly unlikely to change. As such, the project's ultimate outcome is almost certain to be achieved. As outlined in sections 3.1 and 3.2, a considerable amount of scientific data has already been assembled to support the designation of the ASIOS and work on translating these data into recommendations for decision makers is well underway. This is rare for large-scale MPAs, where scientific data to evaluate their effectiveness have often been collected retrospectively, and we are therefore confident that the project can set a high standard in terms of transparency and quality of evidence informing the designation process.

3.4 Monitoring of assumptions

The project has relatively few critical assumptions and monitoring of these has been relatively straightforward. Continued availability of the patrol vessel chartered by Ascension Island Government from St Helena is an important assumption underpinning many of the planned offshore science and enforcement activities, and was threatened following concerns surrounding safety standards raised during the 2018 patrol. A solution to this issue appears to have been negotiated but the AIG Project Manager is continuing to monitor this situation closely and is in regular contact with the owner, the master and the St Helena Fisheries Corporation to confirm availability and to make contractual arrangements. In the original project application it was recognised that our ability to quantify and model by-catch risks robustly was contingent upon being able to deploy fishery observers on licensed commercial vessels and accessing historical, high-resolution observer data held by foreign fishing authorities. As outlined in sections 3.1 and 3.2, these assumptions have not held during Y1 of the project. License uptake has been very limited, with only a single commercial vessel operating in Ascension's EEZ during Y1 and at a time when observers could not be deployed. Despite our best efforts to obtain archive observer data through ICCAT, these have also not been forthcoming. If this situation cannot be resolved by Q2 of Y2, a scaled back analysis will be carried out using geographically and taxonomically summarised data recorded by St Helena Government (who formerly managed the Ascension fishery) along with the small amount of high-resolution data available from more recent years.

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

The project aims to support the designation of the Atlantic's largest marine reserve by providing local decision-makers and marine managers with the scientific evidence, practical experience, support networks and management tools they need. The project is currently at too early a stage to demonstrate positive impacts for biodiversity; however, as outlined in previous sections, considerable progress has already been made during the data creation phase in Y1 which will contribute to this overarching objective.

4. Monitoring and evaluation

Overall monitoring and evaluation of the project have been led by the Project Leader and AIG Darwin Project Officer and have broadly followed the M&E plan set out in the project application. The first general M&E session was held immediately following the seamounts expedition in May/June 2017 (Q1 of Y1), when multiple partners were present on Ascension Island, and focussed on reviewing results of this major fieldwork phase and planning analyses. A lack of 'in house' technical expertise for some analyses (e.g. bioacoustics and plankton taxonomy) was identified during this session allowing additional collaborations to be initiated with specialists within Cefas. A second general M&E session to review progress in Y1 was held following the 2018 offshore patrol in Q4 of Y1 when the Project Leader was on-island and able to meet face-to-face with the AIG team. Separate M&E sessions have also been held with individual partners with responsibilities for specific elements of the project to ensure that the wider project team are working towards common deadlines. Due to considerable geographic spread of partners, these have generally been held via Skype with the Project Leader and AIG Project Manager present, and have typically been timed to coincide with key milestones (e.g. the completion of a field trip or the start of a specific set of analyses). Success has been measured against the indicators and timeline set out in the original application. The Project Leader explored the utility of creating formal reports and minutes from M&E meetings; however, the time taken to compile these was typically longer than delivering the actions themselves. Instead, a simple, itemised list of agreed actions or roles is typically circulated to the partners involved at the end of the meeting so that work on addressing these can quickly begin. More frequent M&E sessions involving partners from Cefas and MMO will be held during Y2 of the project to ensure that outputs are coordinated in advance of the publication of the key project reports and that these are consistent with the overarching goals of the Blue Belt programme.

5. Lessons learnt

The project team is primarily comprised of scientists and marine managers whose primary interests and responsibilities have been data creation and the logistics of offshore operations. While this has enabled the efficient delivery of a majority of the core objectives, publicity and promotion of project activities have often suffered from not having staff dedicated specifically to this role. During the January 2018 M&E session it was felt that the level of visibility achieved in Y1 has probably not reflected the novelty and importance of the work being undertaken and that efforts should be made to rectify this in subsequent years. In Y2, partners and core team members will each be asked to produce one general interest piece promoting project activities. The project will also seek to engage with a proficient amateur film-maker to document offshore research activities and produce a short film to coincide with the designation of the ASIOS in 2019. Future projects should consider setting aside a small budget and/or nominating a specific individual or organisation to coordinate project visibility and to ensure that this project element is not overlooked.

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

N/A

7. Other comments on progress not covered elsewhere

In April 2017, the Royal Air Force unexpectedly announced the suspension of all direct civilian flights between Ascension Island and the UK mainland until 2019-2020 to allow essential runway maintenance to be undertaken. A replacement air link via Johannesburg and St Helena has since been established, although the cost of this route is considerably higher and flights operate only once per month. This development has had a number of knock-on effects on the project timetable and budget, which were outlined in more detail in the first half year report and in a change request that was approved by Darwin in March 2018. The principal impact has been a reduction in the amount of international travel by AIG and partner organisations. Only a single representative from AIG was able to attend the IMPAC4 conference in Chile, compared to the two initially

budgeted for, a planned training visit of AIG staff to the University of Western Australia following the seamounts expedition was cancelled and the first phase of sooty tern tagging by University of Birmingham and the Army Ornithological Society was postponed. Travel disruption has also indirectly impacted our ability to charter a vessel for inshore survey work as local commercial operators have temporarily suspended their operations while their clients cannot reach the Island. Unfortunately, this has coincided with a period of essential maintenance for Ascension Island Government's own inshore work boat, leaving no suitable vessel options for establishing monitoring sites during Y1 (see section 3.1, Output 6)

Ascension Island Government's Director of Conservation & Fisheries (Dr Judith Brown), who was originally named as a joint project leader, moved on in November 2017 and many aspects of this role have since been covered by Senior Marine & Fisheries Scientist and Darwin Project Officer Dr Andrew Richardson while a suitable replacement is appointed. This has inevitably had an impact on project progress, particularly on steering at a policy level. The new Director will be in position from June 2018 meaning the project team will be restored to full capacity. Dr Richardson's salary was due to be paid in full from the project from April 2018 onwards; however, in light of his current responsibilities AIG have agreed to fund his position from core budgets until the new Director is in post. A request to reallocate salary was included in the change request submitted to Darwin in March 2018 and will allow the Project to fund short-term contracts to work on specific datasets.

8. Sustainability and legacy

The project will culminate in the designation of one of the world's largest marine reserves and is therefore assured of a sustained impact on biodiversity conservation in the Territory. 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 – and efforts have been made to engage the local community and wider audiences in these discoveries wherever possible (see Output 7 in section 3.1). The project team has 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. Offshore patrols are organised almost exclusively by local staff within AIG and many valuable lessons have been learned which will ensure that future management frameworks are robust and achievable. Ensuring that these datasets and experiences are published and translated into formats that can be used to inform MPA designation and management is a priority for Y2, and will be vital for cementing the legacy of the project.

9. Darwin identity

Darwin branding and acknowledgement of Darwin funding has been incorporated into publicly-available outputs wherever possible. This has included prominent positioning of the Darwin logo in conference presentations and public talks, and an explicit acknowledgement of Darwin Initiative funding in scientific publications and blog posts authored by the project team. As outlined in section 5, we feel that project's publicity and visibility have sometimes been overlooked during the delivery of the 'core' outputs and we will aim to strengthen this for the remainder of the project. Nevertheless, Darwin has been the principal external funder of conservation initiatives on Ascension Island in recent years and the Initiative's name, brand and mission are already familiar to many island residents, particularly those associated with Government.

10. Project Expenditure

Table 1: Project expenditure <u>during the reporting period</u> (1 April 2017 – 31 March 2018)

Project spend (indicative) in this financial year	**2017/18 D+ Grant (£)**	**2017/18 Total actual D+ Costs (£)**	**Variance %**	**Comments (please explain significant variances)**
Staff costs				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others (Please specify)				
TOTAL				

*Budget lines amended through a change request approved by Darwin on 9th March 2018. This included £9,000 of Travel and Subsistence and £5,000 of Operating Costs redistributed to Y2 and Y3.

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2017-2018

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
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 is still at too early a stage to demonstrate positive impacts for biodiversity. However, activities carried out to date have considerably advanced our knowledge of Ascension Island's offshore ecosystem and provided local marine managers with practical experience in MPA management and enforcement which will stand the Territory in good stead for the designation and future operation of the ASIOS.	[redacted]
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 Y3, **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 Y3, Ascension Island Government has **the necessary plans, monitoring tools and international support network to manage its MPA effectively**, and to develop its potential as an Ocean Observatory	Designation of the ASIOS is not planned until Y3; however, the National Protected Areas Ordinance was updated during Y1 to provide the legal framework to designate an MPA out to the 200 nm limit in preparation for this designation. The updated legislation can be found here	During Y2, work will begin on preparing the MPA evidence document and draft MPA management plan for submission to stakeholders and decision-makers.
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 Web GIS system and spatial database backend has been built and is publicly accessible at http://asios.cles.ex.ac.uk. Work has begun on populating the web maps and further updates will follow during Y2 (see section 3.1)	

	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. Creation of a PostGIS database and QGIS/MS Access user interfaces for managing spatial data gathered during the project		Completed (see Output 1). Population of the databases is ongoing and will continue during Y2
1.2. Creation of a public-facing web GIS interface for disseminating spatial data gathered during the project (using QGIS/LizMap)		Completed (see Output 1). Population of the web GIS is ongoing and will continue during Y2. New interactive maps will be created for oceanographic, fisheries and at-sea survey data
1.3. Training day for AIG staff on the operation and maintenance of the spatial database and web GIS system		AIG staff have contributed to the design of the web GIS and have been shown how to operate it. Data input is currently managed by the Project Leader to ensure data integrity, but further training will be provided in Y3
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 multiyear timescales	Tracking data for 272 individuals representing 17 different species of marine vertebrate are now stored in the ASIOS tagging databases and spatial analyses are well underway. Many tracks can be browsed using an interactive Marine Vertebrate Tracking Map hosted on the project Web GIS. Tracking data for yellowfin tuna and some seabird species have been accepted for publication in peer-reviewed journals (see section 3.1 and Annex 3). Finalising spatial analyses and publishing tracking data for remaining taxa are a priority for Y3
	2.2. Composite ocean **front and eddy maps** of Ascension's EEZ 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**)	Progress on this output is less advanced than we had hoped due to a lack of in-house technical expertise. However, composite front maps for the peak fishing months (January-March) have now been produced for 2016-2018 through a new collaboration with the NERC Earth Observation Data Acquisition and Analysis Service (see section 3 and Annex 5), and we expect to be able to deliver this output in full by the end of Y2.
	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	The project has already exceeded this target, with 109 BRUV, 189 vessel-based visual transects and 114 zooplankton tows completed to date. Footage from BRUVs is currently being analysed by partners at the University of Western Australia and plankton samples are being analysed through a new collaboration

	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 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	with Cefas. Finalising these analyses and publishing results is a priority for Y2. Geo-referenced survey data will be uploaded to the web GIS system once results of ongoing analyses are completed A 2-week expedition to survey the biodiversity of Ascension's offshore seamounts was carried out in Q1 of Y1 and data from this expedition are now in the latter stages of analysis. Fifty-six sites were surveyed along transects radiating out from the seamount's summits to characterise gradients in the abundance and diversity of pelagic organisms across multiple trophic levels. This included 50 BRUV deployments, 28 visual transects for seabirds, flying fish and cetaceans, 55 surface and mid-water zooplankton collections and 48 CTD deployments. In addition, 48 seamount-associated sharks and tuna were tagged with pop-up satellite archival tags, fin-mounted PTTs and acoustic transmitters. Further details are available in Annex 4
2.1. Collate and analyse existing tracking data for marine turtles and seabirds to identify key foraging habitats and migration routes		Existing tracking data have been collated and analyses to extract home ranges, foraging areas and migration routes are largely complete. The majority of tracks and derived datasets can now be viewed on the project Web GIS. Finalisation and publication of these analyses will take place during Y2.
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		2.2.1. GPS tagging of sooty terns took place in Q4 of Y1 and tracks for 15 complete foraging trips are now available (see section 3.1). Further deployments are planned for Q3 of Y2. A sample of tracks can be viewed on the project Web GIS, with further updates to follow. 2.2.2–2.2.3. Forty-eight sharks and tuna were tagged on Ascension's seamounts in Q1 of Y1 using a range of telemetry devices and fixed acoustic receiver arrays were established on the summits of two mounts (see section 3.1 and Annex 4). Data from acoustic receivers were downloaded in Q4 of Y1 and analyses are now underway 2.2.4. Fourteen oceanic sharks (11 blue shark, three oceanic whitetip) have now been tagged in Ascension's EEZ using pop-up satellite archival tags. Tracks from tags that have released can be viewed on the project Web GIS 2.2.5. Ten Atlantic blue marlin have now been tagged with pop-up satellite archival tags and tracks can be viewed on the project Web GIS 2.2.6. Analyses of telemetry datasets are at varying stages of completion and finalising these is a priority for Y2. Many derived datasets, including foraging areas

		and utilisation distributions of tagged animals, are available in the web GIS and results of additional analyses will be uploaded as they become available
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		See summary for Output 2 and section 3.1. Some composite front maps have already been provided by NEODAAS (Annex 5) and additional mapping is planned for Y2
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		At-sea abundance surveys were carried out during the seamounts expedition in Q1 of Y1 and during a 4-week offshore research and patrol cruise in Q4 of Y1 (see Output 2 and section 3.1). Further surveys are planned for a second offshore patrol in Q3 of Y2
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		Species distribution modelling has been done for the Ascension Frigatbirds and results are published here. The SDMs will be constructed for other species for which sufficient tracking data are available during Y2. The data from BRUV are currently being analysed in conjunction with environmental variables by partners at University of Western Australia and these analyses will be finalised and published during Y2
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	At the application stage it was recognised that the ability to deliver this output was contingent upon fishing vessels purchasing licenses at a time when observers could be deployed. Only a single commercial fishing license was sold during Y1 and no seats were available on the recently reduced civilian air link to Ascension Island to bring in an observer at the time that the vessel was fishing in the Ascension Island EEZ (see section 7). Flag-state observer data were provided and the project team was able to board for a mandatory inspection. Attempts will be made to deploy observers if licenses are sold in Y2
	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	To be initiated in Q1 of Y2
	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	Available catch and effort data from the Ascension longline fishery have been collated and analyses of these will begin in Y2. A concerted effort has been made to obtain high resolution catch and effort data held by foreign fishing authorities through contacts at ICCAT; however, this has not yet been forthcoming. Given the generally low taxonomic and spatial resolution of available data, the 'depth' of

	zones with elevated risk to individual species and broader taxa **3.4** By Q3 of Y2, the diets and trophic positions of at least **seven 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.	analysis and modelling of catch and risk that is achievable will likely depend on whether access to these set-level data can be negotiated Analysis of tuna diets progressed well during Y1 and preliminary results have been presented at the FSBI Annual Conference (Annex 7). It is currently being incorporated into a manuscript for submission to a peer-reviewed journal. Tissue and prey samples have been collected for 11 species of marine vertebrate (three seabirds, four sharks and four teleosts) and stable isotope analyses of these will begin in Q1 of Y2
Activities 3.1 – 3.6		See progress reports for Outputs 3.1–3.4
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	Work not scheduled to start until Y2, but meetings have been held with Cefas and MMO to discuss the scope of this analysis and additional support and expertise they may be able to provide through the Blue Belt programme. Work not scheduled to start until Y2. A planning workshop to create a template for the MPA evidence document that will be circulated to stakeholders has been organised for Q1 of Y2 and will be attended by representatives from Ascension Island Government (remotely), University of Exeter, Cefas and MMO
4.1 Carry out a bio-economic analysis of Ascension's commercial longline fishery to model spatio-temporal 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		Planned for Q2 of Y2. Full economic costs of running a commercial fishery will be estimated with the support of AIG Finance and will be compared to realised and project license revenue
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		Planned for Q4 of Y2 once all necessary spatial layers have been created
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		Planned for Q4 of Y2. A planning workshop to prepare the template for this document has been organised for Q1 of Y2

Output 5. Experimental satellite surveillance technologies are trialled as a cost-effective method for MPA compliance monitoring and enforcement.	**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.	Locations of possible illegal fishing events identified using synthetic aperture radar (SAR) are now available for two years (2016-2017), although none of these has yet been verified by the patrol vessel (see section 3.2 and Annex 8). Unfortunately SAR imagery was not available the most recent patrol in Q4 of Y1 due to a change in service provider. The project team is working with MMO to ensure that that this intelligence feed is restored during Y2
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		Uncorrelated detections from SAR imaging are now available for a 2 year period, although further filtering Is required to remove known military vessels (see Output 5.). Unfortunately, the Project Leader has been advised by specialists at NOAA that detection of illegal fishing activity from light signatures using the VIIRS Boat Detection service will not be possible in Ascension Island's EEZ due to a high level of noise that existing algorithms cannot remove (see section 3.1)
5.2 Report the findings of vessel detection trials to local marine managers with recommendations for future deployment of the technology		To be incorporated into the MPA evidence documented and draft management plan to be circulated to stakeholders in Q4 of Y2
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		Attempts to intercept illegal fishing vessels using intelligence from SAR imaging have so far been unsuccessful for reasons explained in section 3.1. These experiences have highlighted a number of deficiencies in the current patrol vessel and recommendations for strengthening AIGs enforcement capabilities and making best use of available satellite intelligence will be incorporated into the MPA evidence documented and draft management plan to be circulated to stakeholders in Q4 of Y2.
5.4 Train local users in the operation of vessel detection systems for long-term self-sufficiency in compliance monitoring and enforcement.		This activity was primarily in relation to light-based vessel detection services which are unfortunately inappropriate for Ascension Island (see section 3.1)
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**	Fixed monitoring sites have now been established on the summits of three shallow water seamounts and surveyed on two occasion during Y1, with follow-up surveys planned in Q4 of Y2 (see section 3 and Annex 4). The lack of an available vessel has so far prevented the establishment and quarterly surveys of inshore monitoring sites (see sections 3.2 and 7) but we are hopeful that the imminent return of AIGCFD's rib to service following major repairs in the UK will allow us to deliver this output during Y2
	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	Work is scheduled to commence in Y2. A review of best practice in large-scale MPA monitoring was included in the IUCN guidelines launched at IMPAC4 in 2017 and the ASIOS monitoring framework will build upon this existing set of principles.

	Ascension Island's needs and resources (see also **7.3**)	
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		See general progress report for Output 6.1
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		Trials were conducted during the 2018 offshore research and patrol cruise in Q4 of Y1 supported by near-real-time ocean front mapping provided by NEODAAS (see section 3 and Annex 5). Analysis of data collected during this research trip are needed to fully evaluate the feasibility of this approach and will take place during Y2
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 Y1** to present plans and receive feedback	The Project Leader and AIG Darwin Project Officer attended the 4th International Marine Protected Areas Congress (IMPAC4) in Chile in September 2017 and delivered oral presentations summarising project objectives, methods and preliminary results (see Annex 9). The project team also presented at the annual meeting of Big Ocean Network held prior to IMPAC4 and discussed the process for Ascension Island becoming a member site (see section 3.2 and Annex 10).
	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	Not scheduled until Y3; however, the Project Leader has arranged to meet with the Cefas Blue Belt team in Q1 of Y2 to begin planning this event and to ensure that it delivers maximum impact and value across the UKOTs involved in the Blue Belt programme
	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	Work scheduled to commence in Y2. A major review of best practice in large-scale MPA design and management was launched by IUCN and Big Ocean at IMPAC4 and effectively delivers much of the work that was planned for this input. Hard copies were obtained for AIG and the key recommendations and principles will be incorporated into the ASIOS management plan.
7.1. AIG engages with peer-learning networks, including joining Big Ocean Managers Network		Project representatives presented at the Big Ocean Network Annual Meeting in September 2017 (See Output 7 and Annex 10)
7.2 Representatives from AIG attend a major international meeting of MPA managers, provisionally the 4th International Marine Protected Areas Congress		Completed. See Output 7 and Annex 9

7.6 Publicise and disseminate project activities and findings through social media, local newspaper articles, scientific blogs, peer-reviewed publications, online repositories and public lectures		Ten dissemination products produced including four blog posts, three conference presentations, one public talk on Ascension Island, one scientific publication and one newsletter article (see links in section 3.1 and Annexes 3, 6, 7 and 9 for evidence)
Output 8. Threats to marine megafauna from commercial fisheries are quantified, including both direct (by-catch) and indirect (food chain) impacts.	**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-term scientific, political and fundraising support and steering.	Work on these outputs is not scheduled until Y3. However, as explained in previous sections, local legislation was updated during Y1 to ensure that the legal framework for designation is in place and a planning workshop has been organised for Q1 of Y2 to create templates for the MPA evidence document (8.1) and management plan (8.2) which can be populated during the course of Y2

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed) - <u>if appropriate</u>

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,	**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	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)	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.	Web GIS is also dependent on this step, so delivery of Output 1.2 will be an additional source of verification. **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)	**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-	**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.

	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.	documentaries and social media outputs (see 7.4). **2.4** Seamounts expedition report; spatial datasets added to Web GIS; peer-reviewed manuscripts; publicity and outreach activities associated with expeditions (see 7.4).	**2.2** Assumes that spatial coverage and temporal resolution of remote sensing data for Ascension's EFZ is sufficient. **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	**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	**3.1** 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

	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.	**3.4** Results summarised in a University of Exeter PhD thesis; peer-reviewed manuscripts and reports prepared to disseminate the technical findings.	vessel reporting will be carried out, alongside high-resolution datasets gathered during the project. **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	**5.1** Targeted patrol vessel deployments assume that IUU vessels are detected during patrol charters and are within reach.

		cruise reports compiled by AIG Director of Fisheries & Conservation.	
6. Pelagic biodiversity baselines are established and a robust monitoring framework is developed for evaluating the long-term conservation benefits of the ASIOS. **(Objectives 5.1 and 7 of the MPA Roadmap).**	**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**. **6.3** 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**)	**6.1** Monitoring sites and data layers added to project Web GIS; long-term monitoring targets incorporated into MPA management plan (**8.2**). **6.3** 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.	**7.1** 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.	**7.1** 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.

	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.	**7.3** 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.	
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-term scientific, political and fundraising support and steering.	**8.1** Memorandum to the Island Council and formal Council minutes. **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.	See assumptions for **0.1**
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 3 – Richardson et al. (in press) Residency and reproductive status of yellowfin tuna in a proposed large-scale marine protected area. *Aquatic Conservation*.

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.	
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.	