Darwin Plus:
Overseas Territories Environment and Climate Fund

Final Report

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

Darwin Project Information

Project reference	DPLUS077
Project title	Sustainable fishery management for St Helena's lobster populations
Territory(ies)	St Helena
Lead organisation	Marine and Fisheries Conservation Section, St Helena Government
Partner institution (s)	CEFAS - Centre for Environment, Fisheries and Aquaculture
Darwin Plus Grant value	198,394.00
Start/end date of project	01/09/2018 – 31/03/2021
Project leader name	Rhys Hobbs
Project website/Twitter/blog etc.	https://www.sainthelena.gov.sh/portfolios/environment-natural-resources-planning/environmental-management/marine-division/ https://www.facebook.com/sthelenaconservation/
Report author(s) and date	Dr Ralf Bublitz and Rhys Hobbs

1 Project Summary

St Helena is a remote volcanic island in the South Atlantic (Figure 1, 2). The island's nearest neighbours are Ascension Island, 1,293km to the northwest, and the west coast of Namibia, 2,648 km to the east. Like all coastal countries, the island has a 200 nautical mile (NM) Economic Exclusion Zone (EEZ) around its coasts covering 444,916 square kilometres; the area within this 200NM limit is governed, used and managed by St Helena Government and the islands population.

In 2016 St Helena declared its entire EEZ a Category VI sustainable use Marine Protected Area (MPA), and implemented a Marine Management Plan. This means that activities in St Helena's MPA, such as commercial fishing by the small local fishing fleet, are permitted but regulated in order to ensure that the activity must be sustainable. Activities that currently occur in St Helena's MPA include commercial operations and recreational activities, such as a commercial fishery, recreational rock and spear fishing, SCUBA diving and marine tourism. Fishing activities, both commercial and recreational are regulated by TAC/quota system and log books.

A key-part of ensuring sustainability and management is to understand the ecology of species and how this relates to current and potential future uses. This project aimed to fill data gaps identified under the Marine Management Plan and address key priorities for DPLUS R6, including (i) improving marine conservation, protection or management (ii) Promoting sustainable fisheries

(iii) Developing tools to monitor biodiversity to inform sustainable development policies and practices.

The island is home to two lobster species, the brown spiny lobster (*Panulirus echinatus*) and the endemic red slipper lobster (*Scyllarides obtusus*). The ecology and population status for both species are largely unknown and detailed information on abundance, distribution, movement, growth rate, sex ratio, size distribution, size at maturity and seasonality of reproductive cycles are needed for the sustainable management of both species. Both species are being caught recreationally as they are a popular source of food, however the scale of catches and impact on population size has been largely unknown. There is also an interest in fishing both species commercially, primarily for the local market, currently commercial activity is sporadic and in small quantities. Part of the outcome of this project is to address the potential for an expansion of the commercial section and how it can be effectively managed.

Throughout this project, lobsters were caught either by hand using SCUBA or with baited traps. For each caught lobster, the following biometrics were recorded: carapace length, sex, state of exoskeleton, weight (caught with traps only), length of pleopods (females only), berry stage (females only), presence or absence of tar spot (females only) and length of first segment of second walking leg (males only). Gonad samples were collected to determine size at maturity, stomach and tissue samples for diet and stable isotope analysis. To determine the fecundity for both species, eggs were collected during the breeding season and for the growth rate lobsters were tagged with T-bar anchor tags.

SCUBA based habitat and abundance surveys were conducted to get a better understanding of possible correlations between different types of habitats, abundance of certain sessile flora and the abundance of lobsters. A one-year feasibility study for acoustic tracking with a fine scale positioning system was also completed looking into diurnal and long-term population movements. The aim of this study was to cover as many coastal areas as possible around the island depending on weather and sea conditions especially on the windward side.

Besides collecting data, part of this project also involved various outreach activities from school visits to public talks, interviews with recreational and commercial fishermen and working closely with local stake holders.

Figure 1: Location of St Helena on world map (source Google maps)

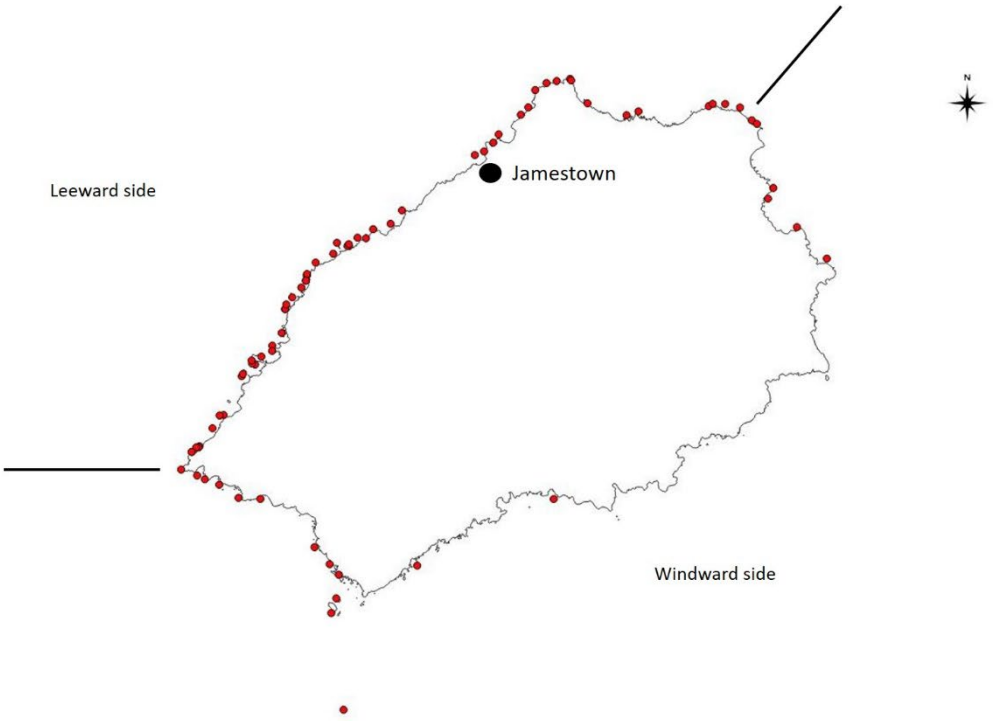

Figure 2: Island outline of St Helena. Red dots indicate dive sites surveyed between Jan 2019 and March 2021

2 Project Stakeholders/Partners

The project has one project partner, the Centre of Environment, Fisheries and Aquaculture Science (Cefas) and a collaborator, the Holderness Fishing Industry Group (HFIG), both UK based organisations.

CEFAS: The role of this project partner was to provide technical advice and support with the analysis of biological and ecological data, assist with the transport of samples to the UK and to process and analyse gonad samples for histology and tissue samples for stable isotope analysis. Throughout the project there has been a very good support from CEFAS with regular email correspondence and Skype meetings. CEFAS assisted with the setup and advice for the habitat analysis using the BIIGLE system and preparing the management plan for St Helena. The project partner also completed the histology of the gonad samples, which was unable to be conducted on island. Originally it was planned for staff of the Marine and Fisheries Conservation Section to visit the Cefas histology lab in Weymouth during the summer 2020 to receive training but this had to be cancelled due to the COVID-19 pandemic. Therefore, a video of the histology of the gonads, and training packages for the Marine Section have been produced for capacity building/upskilling. It is anticipated that the Marine Section team will be able to continue doing similar analysis on the island, in its new Blue Belt funded laboratory, or in collaboration with the histology lab on Ascension Island in the future.

A new project collaborator, the Holderness Fishing Industry Group (HFIG) was brought on board the project to deliver the specialist area of lobster fecundity. In January 2020, the HFIG scientific officer visited St Helena together with the project officer to undertake a fecundity study, collect gonad and stomach samples and to train local staff in extracting these samples. The sample collection and training has been completed successfully during this trip and egg samples were taken back to the UK and analysed. Marine Section staff have been trained to extract eggs, gonads and stomachs from lobsters and are able to continue independently to collect further samples for analysis. Further egg and gonad samples were collected after the visit of the project officer and HFIG scientific officer. The egg samples were processed in St Helena by the Marine Section staff and the results were send to the UK for statistical analysis. The gonad samples were shipped to the CEFAS lab in Weymouth and the histology has been completed. The collaboration with HFIG has been very positive and productive. The project partner assisted with the data analysis of the fecundity study and together with the project officer prepared a publication.

Local Stakeholders, organisations and St Helena Government Departments

Fisheries Co-operative: The collaboration and support from the Fisheries Co-operative, the islands fish processing facility continued in year 2. However, there has only been one landing of slipper lobster during year 2 through the processing plant, and advice was given on how to store, prepare and package the lobsters for the market. The Marine section has also started using the facilities at the processing plant of the fisheries corporation for the dissection of lobsters, extracting gonads and stomachs for further analysis of maturity stages and diet which hopefully be replaced by a purpose-built lab in 2022. A good relationship has been established with the Fisheries Co-operative over the past few years but due to financial factors the fishing industry has been reviewed and is currently in a transitional phase where the future of the landing of fish and lobsters is not clear at the time of writing. A report on the history of the lobster fisheries and historic catches over the past 50 years has been compiled highlighting the occasional landings of commercially fished lobsters.

Fisheries Section: The marine section and the project officer have been working together with the Senior Fisheries Officer and Marine Enforcement Officer to provide science advice for the new fisheries ordinance. Throughout this process both departments have been working closely together to agree minimum landing sizes, a total allowable catch (TAC) and lobster specific updates to legislation.

3 Project Achievements

3.1 Outputs

Output 1: Capacity building, with ENRD staff trained in crustacean data collection methods and sampling techniques.

Baseline: Prior to this project there was no knowledge, skill set or experience in data collection for crustaceans or sampling techniques in St Helena.

First year: Due to delays in staff recruitment and general logistics, staff training did not commence in year 1.

Second Year: From April 2019 on, two members of the Marine Section staff were trained in tagging of lobsters, recording biological data, collecting gonads, conduct abundance and habitat surveys and post-processing of collected data. Additionally, they have also been trained in collecting and processing egg samples. They are now fully competent and able to continue the field work independently, train new members of staff in a train the trainer approach, and to competently continue the monitoring program in the future. The project officer also provided to all Marine Section staff some further scientific diving training. The planned training in year 3 for histology of gonads, stomach analysis and fecundity analysis by CEFAS and HFIG had to be cancelled due to the COVID-19 pandemic. A manual and a training video were produced by the Weymouth and Cefas will look into further training options as soon as travel restrictions have been lifted and funding is available (likely through the UK Governments Blue Belt Programme).

Measurable indicators are: St Helena staff trained in crustacean monitoring techniques, training log maintained and report compiled and verified. The project officer and field work coordinator completed a daily logbook for every field trip which is cross-checked by the project leader. The field work coordinator also sent the project officer a monthly updated record of collected data for verification. An internal monthly report was completed and cross-checked by the marine officer.

The majority of the training was delivered and since the departure of the project officer, who continue to provide support remotely. The marine section staff successfully continued the field work on island independently, which is evidence that this output has been achieved. Besides the training of Marine Section staff, a group of volunteers have also been trained to be able to support the field work, which provided a resource pool for delivering this project and also will assist with

the future monitoring of the lobster population in St Helena. Engagement of the local population in this way also helped to communicate the work being carried out and outputs of the project.

Evidence provided in Annex 6 (files 1-4)

Output 2: Undertake research on existing lobster fishery practices, policies, legislation, biological and catch data.

Baseline: At the start of the project there was sporadic elements of legislation regulating the commercial and recreational fisheries of lobsters. The only restrictions that existed were an ordinance banning the collection of any organisms using SCUBA gear, the collection of lobsters in berries and spearfishing any organisms in the close season (January to March). The only existing sources for biological and catch data prior to this project were a MSc thesis (Ninnes, 1991) and some historical catch data obtained from the fisheries co-operative.

Year 1: A suite of precautionary recommendations, such as seasonality, minimum landing size, ban of 'lancing', recreational licences and banning the catch of berried females were provided by the project officer to St Helena Government's Senior Fisheries Officer to be implemented. Based on a review of literature and an assessment of initial project findings, a new total allowable catch for both Lobster species were also recommended and introduced as part of the Fisheries Licencing policy, applying to both commercial and recreational fishers.

Year 2: A summary report on biological and catch data was completed. The findings showed that there have been very few recorded landings over the past years demonstrating that currently the commercial lobster fishery is insignificant. The future of the lobster fishery is unclear as well at this point due to transition changes in the fisheries sector and processing facilities. The recreational side of the lobster fishery is very difficult to measure and it has proved difficult to engage the majority of the public, which is reflected in the low return of tags and questionnaires. It appears that the majority of people involved in the recreational lobster fishery are very secretive, and this is exacerbated by those who sell lobsters outside of the current regulated units.

Year 3: More efforts for interviews and questionnaires were planned but due to the COVID-19 pandemic there have been delays with one member of staff not being able to return to the island for 6 months causing a staff shortage. Only a total of 18 questionnaires were returned to the Marine Section.

The measurable indicators for this output are the data mining of existing biological and catch data, meetings with relevant stakeholders and members of the public to research relevant data on lobster fisheries and to quantify findings in a summary report. The data mining has been completed with gaps in the recreational lobster fishing and summarized in a report. This report was submitted to SHG before the completion of the questionnaires and was therefore not included.

Evidence provided in Annex 6 (files 5-9)

Output 3: Population size, structure and growth of lobster species established.

Baseline: The study by Ninnes in 1991 (MSc thesis) on the biology and population dynamics of both species in St Helena is the only existing knowledge prior to this project. There are a few other studies on the brown spiny lobster in Brazil but none for the Saint Helena red slipper lobster. present around St Helena, other studies have been carried out on similar species such as the Galapagos Slipper Lobster, *Scyllarides astori* in the Galapagos Islands.

Year 1: Field work started in January 2019 and tagging started in March 2019. During this period a total of 161 lobsters were tagged and biometric data of 651 lobsters were recorded.
Year 2: In February 2020 the aim of tagging 1500 spiny lobsters was completed but for the slipper lobsters the tagging count was 762, short of the set target of 1000 animals. Though this target was not met it was not due to a lack of effort, at safe dive depths the slipper lobsters

tended to be less abundant than the spiny lobsters, with greater numbers found in deeper water. During this period 88 tagged lobsters were recaptured and biometric data from 2344 lobsters (384 spiny and 391 slipper lobsters) recorded. A new study was granted by Darwin and added to the project looking at the fecundity in both lobster species with a new collaborator (Holderness Fishing Industry Group). Both the collaborator and project officer travelled to the island in January 2020 to lead the sample collection for eggs and to train staff from the Marine Section in these sampling methods. Egg samples were then transported back to the UK for further analysis.

Year 3: Due to the staff shortage caused by the COVID-19 pandemic the Marine Section team managed to complete only a few surveys between April and August 2020. A six months extension was granted by the Darwin Initiative and between September 2020 and March 2021 the Marine Section managed to complete all the outstanding surveys and sample collection. A total of 2233 spiny (1297 females and 936 males) and 843 slipper lobsters (337 females and 506 males) were measured. The fecundity study was completed and a training manual provided.

The measurable indicators are the establishment of the tag and release programme with 2500 Lobsters tagged (1500 spiny and 1000 slipper lobsters) and associated biometric data collected and analysed within 24 months. Some of this output was achieved by month 30 (6 months extension) with a total of 2269 lobsters tagged (1512 spiny and 757 slipper lobsters) and a shortfall for the slipper lobsters due to the low capture rates during potting and limited seasonal availability during SCUBA surveys.

The analysis of the population size and structure is completed but it was not possible to complete the growth study due to a low recapture rate (48 slipper and 73 spiny lobsters) with the majority of the re-measured animals not showing any growth for the slipper lobsters or no consistency for the spiny lobsters. Despite the increase in tagged slipper lobster, it was difficult to capture and re-capture enough animals due to their annual migratory behaviour and possible wide spread of habitat (rocky and soft sediment at various depths). Most of the year the slipper lobsters reside in water too deep for dive surveys and we therefore concentrated on using traps.

The potting survey started in October 2019 but progress was low due to delays in shipping, loss of equipment and shortages in bait. However, the team is now fully competent to undertake and continue the monitoring program for the lobster populations and the future management and monitoring plan includes the continuation of tagging and recording of re-captured animals to obtain a more confident data set for growth rate estimates.

The results have been published in the Fisheries Report and Management Plan

Evidence provided in Annex 6 (file 10)

Output 4: Lobster abundance, habitat association and foraging ecology established.
Baseline: The only known data on abundance for both lobster species in St Helena were recorded by Ninnes in 1991 using traps only. There are only a few studies on the brown spiny lobster *P. echinatus* off the coast of Brazil but there are none for the St Helena red slipper lobster present around St Helena red slipper lobster *S. obtusus*.

Year 1: Field work was delayed by 3 months due to timely turn arounds with procurement and shipping and staff shortages. The project officer managed to recruit and train enough volunteers to be able to start the field work in January 2019 and focus on establishing the methods for tagging, biometrics and abundance surveys. For the stable isotope analysis, 20 tissue samples were collected and shipped to CEFAS, UK on the RRS Discovery. The team still managed to complete a total 72 out of 264 dive surveys.

Year 2: Stomach and gonad samples were collected for both species, preserved and shipped to CEFAS, UK for further analysis. Over 170 dive surveys were completed bringing the total up to 242.

Year 3: A total of 316 survey dives have been achieved and the lobster abundance study has been completed. A density map for certain areas around the island has been produced. This has also been used to estimate the total potential biomass for both species in St Helena. Habitat pictures were taken in conjunction with abundance surveys but it was not possible to complete the analysis before the end of this project due to the high amount of data and not enough staff for support. Additionally, it was not possible to analyse the stomach samples either as they arrived in the UK during the second lockdown, and were ready for processing just before the third lockdown. It was not possible to get access to a laboratory for the analysis before the end of this project. The tissue samples for the stable isotope analysis were scheduled to be analysed in January/February 2021 but due to the lockdown and restricted access to lab facilities it was not possible to analyse them. There was also a delay for this analysis as the samples could not be located for a period of time due to misplacement after arrival from St Helena.

Measurable indicators have been set and include the collection of 100 diet and 20 tissue samples for stable isotope analysis, the completion of 120 dive surveys in the first year and another 144 in year 2 and the integration of the data into an existing data set, analysed and summarised.

The collection of stomach and tissue samples has been completed but it was not possible to complete the foraging ecology study for this project. However, the samples are still in storage and the Marine Section staff is now capable of collecting more if needed for future studies. All findings have been summarised in the Fisheries Report and Management Plan.

Evidence provided in Annex 6 (10)

Output 5: Experimental acoustic telemetry technology trialled to monitor lobster population movements.
Baseline: There is no previous knowledge on any diurnal and seasonal migration patterns for the spiny lobsters in St Helena using acoustic telemetry.

Year 1: The acoustic equipment has been ordered in the first 3 months from the arrival of the project officer but it did not arrive on the island in year 1.

Year 2: The equipment arrived on the island in May 2019 and the testing and deployment was completed in August 2019. A total of 25 transmitters were successfully deployed on a mix of male and female spiny lobsters. During the visit of the project officer on the island in January 2020, the receivers were recovered, data downloaded and then re-deployed. The first 6 months data have been sent to Vemco (manufacturer) for analysis and triangulation.

Year 3: The Marine Section team recovered the receivers and data which were send to Vemco for the triangulation analysis.
Measurable indicators for this output are the establishment of an acoustic array grid, the deployment of 15 acoustic transmitters and collection and analysis of the data.

The output has been completed but not enough data for a time series of movements were recorded and therefore it was not possible to demonstrate any migration patterns in this species. The rocky reef habitats around the island are very rugged which makes acoustic telemetry for bottom dwellers less suitable. The use of acoustic telemetry (based on current technology used through this study) does not seem to be an efficient method for tracking lobsters.

Evidence provided in Annex 6 (files 11 - 13)

Output 6: Increase public awareness of the fisheries science research programme and its relevance to sustainable management practices.

Baseline: Similar tag and reward schemes already exist for grouper and tuna but not for lobsters. Public available information within St Helena on any aspects of lobster biology, ecology and fisheries did not exist prior to this project.

Year 1: The tag and reward scheme was launched in March 2019 as soon as the tagging started and posters were displayed at the wharf. Presentations were given to stakeholders, the public and local schools. Two question and answer session were held with stakeholders together with the presentations.

Year 2: The Marine Section team visited all primary schools during the Marine Awareness week to deliver educational sessions on various marine topics including the lobster project. Further public presentations on the lobster project were given on the World Ocean Day and Blue Belt conference. The tagging reward program has been continued in year 2 but the return rates are still very low. Further newspaper articles have been published to increase the awareness of the tagging reward scheme and a radio interview has been given as well.

Year 3: The measurable indicators for this output are to get the St Helena residents actively participating in the tag and reward scheme, to document public talks, produce pamphlets, make presentations and educational resources freely available online, to have question and answer sessions with key stakeholders quarterly and to document monthly newspaper articles and radio interviews produced.

The output was achieved by the end of this project. Further radio interviews and newspaper articles were delivered in year 3 but the general participation in the reward scheme and return of tags remained low.

Evidence provided in Annex 6 (files 14 - 17)

Output 7: Long term lobster fisheries research programme established.
Measurable indicator is a long-term research programme manual prepared for implementation post project.

A regular survey program has been prepared for the Marine Section to continue the monitoring of the spiny and slipper lobster populations and for an annual stock assessment. This will ensure a sustainable management of the spiny and slipper lobster and will support the regulation of the commercial and recreational fishing activities. A lack of data in some areas has also been identified and future necessary research suggested. There is still a need for a better understanding of the ecology and biology for both lobster species, for example of growth rates, larval dispersion and recruitment, physiological size at maturity and habitat association with foraging ecology.

The outcome has been summarized in the Fisheries Report and Management Plan.

Evidence provided in Annex 6 (file 10)

Output 8: Optimal solutions for lobster population management proposed based on integrated biological, habitat data, historic and present fishing pressure, threat assessment and formulate into a lobster population management plan.

Measurable indicators are a bioeconomic analysis of St Helena lobster populations conducted to assess long-term viability under different future management scenarios and lobster population management options report produced based on results and recommendations from outputs 2,3,4 and 5 and circulated for stakeholder review prior to adoption by SHG.

The results of the analysis for the population structure, abundance and biomass estimates, size at maturity and fecundity have been included in the Fisheries Report and Management Plan to formulate recommendations for the future management of the lobster populations. Minimum landing sizes, landing quotas, ban for berried lobsters and closed seasons are some of the recommendations for the St Helena fisheries.

These are preliminary limitations for the fisheries as there are not enough data available yet especially time series for size frequency in the populations and density. There is a need for more accurate analysis of any changes in the lobster populations over a longer time period. SHG has been advised that the currently set targets for quotas and closed seasons should be reviewed on an annual basis and adjusted accordingly.

A bioeconomic analysis has not been completed as only recently a traceable local market has been established. So far it is understood that most sales of lobsters have been unreported. Any possible impacts on the lobster populations can be identified in future through a solid monitoring program, use of logbooks and regular stock assessment. This project has set a baseline for both lobster populations and the Marine Section is now equipped with the knowledge and skills to monitor it for the future. Once landing figures from a market and log books has been established over a longer period of time, more solid data will be available for a bioeconomic analysis.

The outcomes are included in the Fisheries Report and Management Plan and circulated within SHG.

Evidence provided in Annex 6 (file 10)

3.2 Outcome

The outcome for this project was to establish a basic understanding of the population and foraging ecology of two lobster species at St Helena, to evaluate current lobster fishing practices and facilitate sustainable management.

The first measurable indicator for this outcome was to promote the understanding of basic ecological features of the lobster populations and the importance of sustainable fishing practices within St Helena's population (resident and migratory), particularly the fishing community. The second measurable indicator was the management of St Helena’s lobster populations utilising ecological information gained through the project.

Baseline: The only biological and ecological information available on the two lobster species in St Helena is out-dated and incomplete. A new fishery licencing scheme has started in January 2021 with compulsory logbooks for commercial and recreational all fishermen to submit to SHG’s Marine Enforcement Section. At the beginning of this project there was no specific fisheries licencing policy in place for any sustainable management however the new policy and legislation has been approved and implemented.

Achievements: Overall the project has achieved most of the outcomes, except the foraging ecology and the evaluation of the current fisheries was limited. The biometric data collection was extensive, and the analysis has shown some interesting results contributing to a good understanding of the population structure, seasonality and differences in abundance for both lobster species.

Further knowledge has been gained in fecundity and functional maturity but some of the ecological aspects such as growth, foraging and habitat association have not been achieved. This was mainly because of the unforeseen restrictions of the COVID-19 pandemic and no access to any lab facilities. The CEFAS histology lab was able to process and analyse the gonad samples just in time before the third lockdown started. The stomach samples were supposed to be analysed by the project officer using the lab facilities at the Yorkshire Maine lab in collaboration with HFIG. However, the samples arrived at the start of the lockdown and restrictions were lifted after the end of the project. The stable isotope analysis was scheduled in January/February 2021 but was delayed by the COVID-19 restrictions past the project end date.

There was no established commercial fishery for lobsters during the period of the project or before with only a few small landings. This did not provide enough data for evaluation, but since January 2021 a new fishery licencing scheme has been implemented with precautionary limited Total Allowable Catches (TACs) and Minimum Landing Sizes (MLS), which complement existing bans on the taking of Lobster in berry, or whilst on SCUBA. The TACs have now been enforced and the first landings records received by the Marine Section. This is an important

step for the lobster fishery in St Helena, as the landings, the fishing effort and the stock are now being closely monitored by the Marine Section.

The newly established Marine Enforcement Section and the data collection program will provide a better monitoring of the lobster populations and possibly reduce any illegal fishing activity. The use of logbooks also present an opportunity to collect important information on the recreational fishing activities and its impacts on the lobster populations. Together with the completed data collection, these achievements are now able to support a sustainable management for the brown spiny and red slipper lobster in St Helena.

The promotion and outreach were successful and have been achieved through the delivery of various presentations to the public and both primary and secondary schools focusing on informing on this project, the ecology and biology of lobsters and need for sustainable management. Information and engagement was carried out with the fishing community by carrying out questionnaires and informal discussion at the Wharf whenever the marine team was preparing for surveys.

Evidence provided in Annex 6 (files 10, 14 & 15)

3.3 Monitoring of assumptions

Assumption 1: The delivery of training to local staff for capacity building is based on the assumptions that travel arrangements for CEFAS staff can be organised for appropriate time to support the project officer logging the training hours and cross-checking collected data.

Comments: Training of local staff in lobster monitoring has been completed, hours have been logged by the project officer and field work coordinator and cross checked by the project leader. Collected data have been sent to CEFAS and discussed by email or Skype. No specific travel arrangements for CEFAS staff had to be made due to their regular visits to St Helena under the Blue Belt programme. Marine section staff were planning to travel to CEFAS in June/July 2020 for further advanced training but tis had to be cancelled due to the COVID-19 pandemic. The capacity building has been completed.

Assumption 2: Undertaking research on existing lobster fishery practices, policies, legislation, biological and catch data is based on the assumption that data/location of data is accessible (via various routes), stakeholders provide data/location of data and members of the public co-operate with research techniques.

Comments: Some historic catch data from the fisheries department have been received and analysed. The Marine and Fisheries Conservation Officer was actively involved in the development of the policies and legislation and therefore access to information was guaranteed. Local members of the public were involved as volunteers as well. The uptake with the questionnaires and face to face interviews was very low and as a result it was not able to be completed.

Assumption 3: The collection of data on population size, structure and growth of lobster species is based on the assumption that local fishermen assist with data collection by returning tags.
Comments: The majority of lobster fishing at the time of this project was mainly recreational, therefore commercial fishermen were not participating in the data collection. Recreational fishermen were encouraged to return tags for a reward but only a few returns have been received. Dive surveys did focus on the re-capture of tagged animals in year 3 to compensate for the low return rates but only a total of 124 tags were recovered out of 2437 tagged animals. The Marine section will continue to tag lobsters and collect recapture data in the future.

Assumption 4: The assumption for collecting data on lobster abundance, habitat association and foraging ecology is that samples can be collected in sufficient number and sea conditions acceptable for completion of dive surveys.

Comments: Enough data for lobster abundance and habitat association have been collected but not for the foraging ecology. It was not possible to complete the analysis for the tissue and

diet sample collection due to the COVID-19 pandemic. There was also insufficient time and resources available to analyse the majority of the habitat pictures.

Assumption 5: The assumption for the trial of the experimental acoustic telemetry technology to monitor the lobster population movements is based on the setup of a suitable acoustic array and at a suitable location for collecting lobster movement data.

Comments: A suitable location was identified and an acoustic array installed for 12 months. All data were recovered and analysed but the detection rate was very low and it was not possible to establish any time series for movements with any level of confidence.

Assumption 6: Increasing public awareness of the fisheries science research programme and its relevance to sustainable management practices is based on the assumption that St Helena residence will be interested in the fisheries science programme.

Comments: Both lobster species are popular for consumption in St Helena and the delivery of presentations to the public and key stake holders have been well received. This was followed by publications in the local newspaper a radio interview.

Assumption 7: SHG are willing to fund/support research programme.

Comments: SHG has developed a fisheries licencing policy that actively seeks to monitor species in order to inform management decisions. The Marine section will continue to offer the reward programme for Lobster tags returned, and will also conduct a continued but much truncated version of the tagging programme that was undertaken as part of this study, funding for this will come from the sections recurrent budget, as well as assistance from the UK Governments Blue Belt programme.

Assumption 8: Assumes SHG and key stakeholders approve recommendations for sustainable Lobster fisheries management.

Comments: Information provided as part of this study will be considered as part of the Fisheries Licencing policy restrictions, recommend changes such as TACs, minimum landing size and prohibited activities will be incorporated either throughout 2021, or at the renewal of fisheries licences in 2022.

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

St Helena has a number of legislation and policies aimed at protecting and sustainably managing its marine environment, with the Environmental Protection Ordinance (EPO) that was enacted in 2016 the primary piece of legislation. As part of the EPO a Marine Management Plan was created in 2016 which identifies the major existing and potential pressures on the marine environment of St Helena. It specifies the management strategies for St Helena's marine environment so that its rich biodiversity and unique natural ecosystems can be conserved, protecting in particular rare, endangered, globally significant and endemic species and ensuring that its natural resources are used sustainably. A 200 NM IUCN category VI 'Sustainable Use' Marine Protected Area was also designated in 2016. This project contributed to St Helena Government's 10 Year Plan, and its relevant Key Performance Indicator area 'Altogether Greener' and by contributing to food security 'Altogether Wealthier'.

The project contributed to the information required to manage St Helena's marine environment. Although not identified as an existing knowledge gap within the Marine Management Plan a review is currently underway and it has been identified by SHG that there is a lack of understanding of the population status of brown spiny lobster (*Panulirus echinatus*) and endemic red slipper lobster (*Scyllarides obtusus*) on St Helena. Detailed information on abundance, distribution, movement, size at maturity and seasonality of reproductive cycles was collected as part of this project and is critical for ensuring the sustainable management of this species and decisions taken by SHG. It is intended that the outputs from this project will be used to inform and update the Marine Management plan as part of its review.

Given that very little was known about both of the lobster species on St Helena before this project, both in terms of landing and biology, it was possible to fill a large data gap essential for the management decisions with regards to both lobster species. This baseline understanding created by the project came at a key time when there was a greater monitoring of recreational fishing activities and without the knowledge created as part of this project, management decisions with regards to the sustainable fishing of the species cannot be taken by local government.

Capacity building on monitoring techniques for lobsters, analysis and interpretation of data and scientific diving skills with local staff has been completed. Local core staff has also gained more knowledge of the species and their ecology which improved their understanding and quality of advice given to the government and island residents.

5 Sustainability and Legacy

The project has been promoted as described in other sections of this project through outreach, awareness activities and collaborations with Ascension Island and a UK lobster fishery. The collaboration with the Ascension Conservation team has been an important step for knowledge exchange, sharing of equipment and opening up possibilities for using their facilities such as the histology lab in the future.

The information gathered, and management recommendation will play an important part in the management of St Helena's fishery and creates a baseline from which to observe and changes to the population and take resulting action (if necessary). This will form a key part of the Marine Management plan revision in 2021. The training and capacity building has ensured that this monitoring work and the resources purchased for the project can be continued by the Marine section using their in-house team.

The exit strategy has been completed and a management and monitoring program has been introduced which will be implement by the SHG Marine section. The Marine Section staff involved in this project are employed by SHG permanently and will continue lobster surveys as outlined in the monitoring program.

6 Lessons learned

This project set out to cover as many aspects of the biology and ecology for both lobster species as possible with the intention to fill most of the existing data gaps to inform a sustainable fisheries management. The first challenge this project faced was the procurement and shipping of necessary equipment and getting contracts with local boat providers in place causing many delays for the start of the field work. Some of these delays could have been foreseen when drawing up the programme for this project.

Until the project commenced in April 2018 it was not possible to begin recruitment of the project officer meaning he was not appointed until July 2018 and did not arrive on the island until October 2018. As soon as the project officer arrived, he had to start the procurement process and getting contracts into place. Some of the equipment arrived in May/June 2019 and the time table had to be adjusted to accommodate these delay. For future projects it would be of benefit to either have the procurement of equipment in the timetable or a designated member of the local staff to assist the project officer with the purchase before arriving on the island. As recruitment of the project officer cannot begin until the project commences, this should be better catered for in the project programme.

The Marine Section also suffered from human resource issues at times, but the recruitment of local volunteers was very successful and helped to offset this. The mutual benefit of this arrangements with the volunteers showed how important it is to get the public involved in scientific projects as it not only helped to get the field work done but the volunteers benefited from learning about scientific field work and organisms which was well received. The project officer ensured that the Marine Section staff received and completed their training in lobster monitoring methods during the first year of the project. Having well trained volunteers and local

staff was the key to complete the field work and collect enough data to draw up the management plan for the lobsters as well as for long term monitoring post project completion.

The resignation of the project officer for personal reasons mid-way through the contract made it difficult to continue some of the projects momentum, but this was able to be mitigated by him continuing the role overseas in a consultancy format once agreed by Darwin.

The potting activated were only relatively successful, in part due to tampering, and loss of pots due to poor weather conditions. Although this is common the world over, it should be considered as to how effective a means of data gathering it is versus the expenditure of undertaking the activity for future monitoring.

The key lessons learned in this project are to consider carefully the time it takes for recruitment, logistics and shipping out to UKOTs, and to get volunteers involved as well.

6.1 Monitoring and evaluation

The finances for this project have been managed within the Environment, Natural Resources and Planning Portfolio and Corporate Finance of SHG. The overall project progress has been monitored through monthly meetings and discussions with the line manager and Marine Section team. The monitoring and evaluation of the budget and progress towards the outputs and activities was discussed separately between the project officer and leader. Regular meetings were also held with the project partners via skype or face to face meetings when CEFAS staff was present in St Helena. During these meetings, issues have been identified and addressed and sampling frequencies and protocols evaluated and adapted accordingly.

A MOU was in place to document the obligations of all parties for successful delivery of the project against the time frame ensuring all project partners were on track for completing their specific requirements towards the project outputs. Outputs including training is part of the Marine Section staff annual targets and assessed by their line manager on a biannual basis. The project lead reported to the Head of ENRP on a monthly basis, reporting progress and any issues arising, impacts on the project and methods for mitigating against these.

A monthly progress report system was implemented for finer scale monitoring and a more efficient way of dissemination as it is publicly available within the Saint Helena Government network. This has proven to be a very efficient way of monitoring and evaluation.

Evidence provided in Annex 6 (file 1 & see previous evidence)

6.2 Actions taken in response to annual report reviews

Comments raised by the reviewer in AR1 to address in AR2:

Comment: Provide more details on project management and communication between partners (section 2 of AR)

Answer: More details have been provided in section 2.

Comment: It would be useful to re-present the project's implementation timeline, in the light of the delays experienced to date; Comment on any knock-on effect of delays on other activities.

Answer: A revised timetable has been drafted taking any knock-on effect of delays into account. (see annex 6, table 1)

Comments raised by the reviewer in AR2 to address in Final Report:

Comment: AR2 records that the Holderness Fishing Industry Group (HFIG) has joined the project as a new collaborator. Is this the same organisation as the 'Yorkshire Marine Research Centre, which features in a project Facebook post on 10/2/20? Is there a written agreement (MoU) with HFIG/YMRC? If so, please append to next AR

Answer: The MoU is in annex 6 file

Comment: Will the project be producing figures for maximum sustainable offtake of the two species (as an update to those of Ninnes (1991))?

Answer: At this stage it was only possible to set a quota for each species relating to the estimated biomass, 10% of the lowest estimate. Models on maximum sustainable yield using the length frequency and mortality rates have not been used yet as 2 years worth of data is not sufficient to calculate this. With the start new commercial licencing systems, a likely increase in commercial landings, more detailed records of landings will prove crucial for the data time series. Currently the time series is not long enough at this stage to conduct the length cohort analysis.

Comment: Is there a schedule for the updating of the Fisheries Ordinance? (Recognising that this is outside project control)

Answer: The fisheries Licening Policy was adopted in April 2020 and has provided the provision for much more regulation within the fishery under the existing fisheries limits ordinance. The current Fisheries Bill is undergoing public consultation and will likely be ratified in Q3 of 2021

Comment: Is there any information on the size of the domestic market for lobster on St Helena? Is it likely that there will be commercial potential for export?

Answer: Very little information is available on the size of the domestic market on the island and as mentioned previously there has been very little commercial activity. Some export may be possible, however given the relatively small estimated biomass of the two species, it is likely that this will only be able to supply a local market.

Answer:

7 Darwin Identity

The Darwin projects are well known and received amongst the public and councillors in St Helena. The Darwin logo has been used on every presentation for all outreach and awareness activities such as the marine awareness week, school visits, world ocean days and the Nature's Benefits: Natural Capital in the South Atlantic conference hosted in St Helena in March 2019. Darwin's contribution/logo has also been regularly acknowledged when advertising the project and its work/findings in newspaper articles and radio interviews.

The Darwin logo was also placed on some of the diving apparel purchased for the marine section and volunteers so as to publicise the work of the project.

Efforts were made whenever publicising the project to make clear how, although an individual project, the work fitted as part of the wider marine management practices for St Helena, both as part of recurrent monitoring programmes, or complimenting other donor funding such as the UK Governments Blue Belt programme.

Any updates on the EMD Nature Conservation Facebook site is hash tagged with "#DarwinPlus", "#DarwinInitiative" and "#StHelenaLobsters".

8 Finance and administration

8.1 Project expenditure

Project spend (indicative) since last annual report	2020/21 Grant (£)	2020/21 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				
Consultancy Costs				

Project spend (indicative) since last annual report	2020/21 Grant (£)	2020/21 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others				
Audit costs				
TOTAL				

Staff employed (Name and position)	Cost (£)
Martin Cranfield – field work assistant	
Overtime allowances for Marine section staff members due to night fieldwork	
TOTAL	

Consultancy – description and breakdown of costs	Other items – cost (£)
Technical advice and delivery of outputs Analysis of data Delivery of final report	
TOTAL	

Capital items – description	Capital items – cost (£)
Analytical Scale GPS units	
TOTAL	

Other items – description	Other items – cost (£)
Cable ties	
Rope	
Buoys	
Marine Supplies	
Containers	
Telephone Account	
Kitchen Towels	
Foil container	
Lobsters	
Advert for tagging program	
Tag Rewards	
Cutters	

Luggage Scale	
Foil trays	
Lobster Project Items	
Miscellaneous banking charges	
TOTAL (Must match Others total in Section 8)	

8.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
N/A	
TOTAL	

Source of funding for additional work after project lifetime	Total (£)
N/A	
TOTAL	

8.3 Value for Money

The project is considered to have provided good value for money overall. As per St Helena Government policy procurement exercises were carried out on all the services and goods obtained. This (barring specialist equipment) aimed to ensure that the services/goods provided were assed for both the quality of the service/item provided and the cost. As outlined earlier in this report however the procurement exercises can often cause issues at project commencement due to the long lead times for shipping equipment. It is suggested that this is better accounted for in future bids for projects.

The available funds were sufficient to run this project and the flexibility of the Darwin Initiative with the change requests made it possible to complete this project successfully. Without the movements of funds and adding HFIG as a new collaborator the project would not have been run as efficient and some of the knowledge gaps would not have been filled. The employment of an experienced scientist as the project officer and providing funding to collaborate with a UK lobster fisheries organisation has given the Marine Section staff an excellent up-skilling and experience opportunity.

The outputs of the project have directly contributed to the management measures for the protection of St Helena's Lobster species and ecosystems through the fisheries licencing policy and legislation. This has in turn contributed to ensure that St Helena will provide environmental protection (Altogether Greener) and food security (Altogether Wealthier) for the island and its population.

The Marine Section is now capable of continuing independently the lobster monitoring and sampling work. The purchase of acoustic receivers, tagging equipment and a fine scale balance is an important addition for the Marine Section as these will be used for many years to come for lobster and other research. The project has also set out in its long term monitoring

programme a reduced version of the work undertaken by the project which can still be afforded by SHG, providing a long lasting effectiveness in managing the MPA. Utilising the train the trainer approach has also reduced any future cost implications for SHG, as these skills can be passed on by existing members of staff and avoids the need for specialist expenditure to re-learn the skills.

Utilising, the contribution of volunteer and data gathering by members of the public through programmes such as Dive into Science, have proved an efficient and effective way of gathering data in a low cost way, whilst engaging the public on both the projects objectives and the management of the marine environment.

Annex 1 Project's full current logframe as presented in the application form (unless changes have been agreed)

Please insert your project's logframe (if your project has a logframe), including indicators, means of verification and assumptions. N.B. if your application's logframe is presented in a different format in your application, please transpose into the below template. Please feel free to contact Darwin-Projects@ltsi.co.uk if you have any questions regarding this.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: The lobster populations at St Helena are sustainably managed and suitably protected. .			
Outcome: Establish a basic understanding of the population and foraging ecology of two lobster species at St Helena to evaluate current lobster fisheries practices and facilitate sustainable management	0.1 St Helena's population particularly the fishing community understand basic ecological features of the lobster populations and the importance of sustainable fisheries practices. 0.2 Management of St Helena lobster populations utilises ecological information gained through the project.	0.1 Records of newspaper articles, radio interviews, talks and presentations. 0.2 Lobster management report includes revision and recommendations for fisheries licencing, legislation and habitat protection.	Members of the public interpret the information available to them appropriately
Output 1 Capacity building, with ENRD staff trained in crustacean data collection methods and sampling techniques.	1.1 Project Officer and Fieldwork Assistant appointed. 1.2 St Helena staff able to undertake tagging and basic biological data collection independently. 1.3 St Helena staff able to conduct habitat and abundance surveys and maintain a lobster pot network at St Helena independently.	1.1 Employment records. 1.2 SHG staff training hours logged by CEFAS and project officer. Summary training report provided. 1.2 Sub-set of independently collected data will be cross checked by CEFAS/project officer. 1.3 Fieldwork supervision report	1.1 Travel arrangements for CEFAS staff can be organised for appropriate time.
Output 2 Undertake research on existing lobster fishery practices, policies,	2.1 data mining of existing biological and catch data.	2.1 bibliography of existing known data sources, catch data integrated into EMD fisheries database.	Data/location of data is accessible (via various routes) Stakeholders provide data/ location of data

Project summary	Measurable Indicators	Means of verification	Important Assumptions
legislation, biological and catch data.	2.2 meetings with relevant stakeholders and members of the public to research relevant data on lobster fisheries. 2.3 Quantify findings in summary report.	2.3 A minimum of 50 transcribed face to face interviews and 100 questionnaires completed. 2.3 Summary report of findings published online.	Members of the public co-operate with research techniques.
Output 3 Population size, structure and growth of lobster species established.	3.1 Tag and release programme established with 2500 lobsters tagged and associated biometric data collected and analysed within 22 months.	3.1 Publication of article in peer reviewed journal.	Fishermen assist with data collection.
Output 4 Lobster abundance, habitat association and foraging ecology established.	4.1 100 diet samples and 20 tissue samples collected and analysed within first year. 4.2 120 dive surveys completed within the first six months and 144 within the following year. 4.3 integration of data into existing datasets, analysed and summarised.	4.1 & 4.2 Project activities reported in online blogs, social media posts and newsletters. 4.3 Peer-reviewed manuscript accepted for publication in high impact scientific journal.	Assumes samples can be collected in sufficient number and sea conditions acceptable for completion of dive surveys.
Output 5 Experimental acoustic telemetry technology trialled to monitoring lobster population movements.	5.1 Acoustic array grid established and 15 acoustic telemetry devices deployed within first six months. 5.2 Acoustic telemetry data collected and analysed by end of project.	5.1 Project activities reported in online blogs, social media posts and newsletters. 5.2 results incorporated into peer reviewed manuscript.	Acoustic array and location suitable for collection of lobster movement data.
Output 6 Increase public awareness of the fisheries science research	6.1 St Helena residence actively participate in tag reward scheme. 6.2 Documented public talks, pamphlet produced, presentations	6.1 Statistical increase in tag return rate through the course of the project. 6.2 Project and SHG website.	St Helena residence will be interested in the fisheries science programme.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
programme and its relevance to sustainable management practices.	and educational resources freely available online. 6.3 Question and answer sessions with key stakeholders completed quarterly. 6.4 Documented monthly newspaper articles and radio interviews produced.	6.3 Stakeholder meeting minutes. 6.4 local and international media.	
Output 7 Long term lobster fisheries research programme established.	7.1 Long term research programme manual prepared for implementation post project	7.1 Research programme approved by ENRD and protocol published on website.	SHG are willing to fund/support research programme
Output 8 Optimal solutions for lobster population management proposed based on integrated biological, habitat data, historic and present fishing pressure, threat assessment and formulate into a lobster population management plan.	8.1 Bioeconomic analysis of St Helena lobster populations conducted to assess long-term viability under different future management scenarios. 8.2 Lobster population management options report produced based on results and recommendations from outputs 2,3,4 and 5 and circulated for stakeholder review prior to adoption by SHG.	8.1 & 8.2 Population management option report circulated and published online via SHG website.	Assumes SHG and key stakeholders approve recommendations for sustainable lobster fisheries management.
Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1) 1.1 Write Job profiles, devise recruitment panel, prepare job adverts, and advertise posts. 1.2 Recruit suitably experienced project officer and fieldwork assistant 1.3 St Helena staff trained in crustacean monitoring techniques 1.4 St Helena staff gain practical experience in monitoring techniques (tagging, biometics, dive surveys). 1.5 Training log maintained by SHG staff and training/supervision report compiled and verified by CEFAS/Project Officer.			

Project summary	Measurable Indicators	Means of verification	Important Assumptions
2.1 Review and collate existing fisheries biological and catch data. 2.2 Review relevant current lobster legislation, licensing and management. 2.3 Conduct research into the past and present lobster fishery (commercial and recreational) through a questionnaire and face to face interviews. 2.4 Threat analysis completed to identify areas for improvement and compilation of possible solutions. 2.5 Interim report on findings and implications summarised and presented to key stakeholders. 3.1 Establish mobile lobster pot network along coastline. 3.2 Deploy a minimum of 10 pots for 25000 trap hours within the first six months and 29000 trap hours within the following year. 3.3 Tag, measure and release a minimum of 1500 spiny and 1000 slipper lobster from a range of sizes with a subset of 50 (25 of each species) double tagged within 22 months. 3.4 A minimum of 50 gonads collected for examination. 3.5 Integrate tagging and biometric data into existing EMD fisheries database. 3.6 Paper prepared on lobster population size, structure and growth. 4.1 100 diet samples collected for examination and 20 tissue samples for stable isotope analysis 4.2 Completion of 120 habitat, abundance and diet surveys within the first six months and 144 within the following year. 4.3 Stable isotope and diet analysis completed and compiled with existing pelagic data to map St Helena's trophic food web relationships. 4.4 Habitat survey data combined with existing seabed spatial data to identify and map key areas or habitat zones with high lobster abundance. 4.5 Paper prepared on habitat, abundance and foraging ecology. 5.1 Install acoustic receiver array grid inshore. 5.2 Deploy 15 acoustic telemetry devices onto lobster within first 6 months. 5.3 Collect and analyse telemetry data to establish and map movement ranges, residence times, cost effectiveness and evaluation of method as lobster monitoring technique. 6.1 Launch and publicise reward scheme for lobster tagging programme. 6.2 Plain English pamphlets and presentations prepared to inform St Helena stakeholders, public, school children and visitors about the lobster populations and the project. 6.3 Attended regular key stakeholder meetings to inform of project progress 6.4 Produce monthly newspaper articles and radio interviews for local media, other OT's and international media. 7.1. Lobster research programme reviewed to determine appropriate long-term monitoring programme. 7.2. Long-term research and monitoring programme designed and established. 8.1 Bio-economic analysis of St Helena's lobster fisheries conducted to assess its long-term viability under different future management scenarios. 8.2 Lobster management plan options report produced based on project findings and circulated for stakeholder review. 8.3 Lobster fisheries management plan finalised and accepted by SHG.			

Annex 2 Report of progress and achievements against final project logframe for the life of the project (<u>if your project has a logframe)</u>

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Impact: The lobster populations at St Helena are sustainably managed and suitably protected.		A management and monitoring plan has been completed and the following restriction incorporated in the new fisheries policy and legislation. 1. Minimum landing size of 85mm for spiny and 95mm for slipper lobsters 2. Ban of catching females with eggs 3. Ban of using SCUBA for catching lobsters 4. For recreational fishing a maximum of 2 lobsters per person or 6 per boat are allowed to catch 5. Annual Quota of 1 tonne for spiny and 750kg for slipper lobsters
Outcome Establish a basic understanding of the population and foraging ecology of two lobster species at St Helena to valuate current lobster fisheries practices and facilitate sustainable management	1.1 St Helena's population particularly the fishing community understand basic ecological features of the lobster populations and the importance of sustainable fisheries practices. 0.2 Management of St Helena lobster populations utilises ecological information gained through the project.	1.1 public presentations delivered 1.2 collection of ecological information completed
Output 1. Capacity building, with ENRD staff trained in crustacean data collection methods and sampling techniques.	1.1 Project Officer and Fieldwork Assistant appointed. 1.2 St Helena staff able to undertake tagging and basic	1.1 Project Officer appointed 1.2 & 1.3 Training completed *Evidence provided in annex 3 files 1 & 2*

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
	biological data collection independently. 1.3 St Helena staff able to conduct habitat and abundance surveys and maintain a lobster pot network at St Helena independently.	
Activity 1.1 Write Job profiles, devise recruitment panel, prepare job adverts, and advertise posts.		Completed
Activity 1.2. Recruit suitably experienced project officer and fieldwork assistant		Completed
Activity 1.3 St Helena staff trained in crustacean monitoring techniques		Completed
Activity 1.4 St Helena staff gain practical experience in monitoring techniques (tagging, biometrics, dive surveys).		Completed
Activity 1.5 Training log maintained by SHG staff and training/supervision report compiled and verified by CEFAS/Project Officer.		Completed
Output 2. Undertake research on existing lobster fishery practices, policies, legislation, biological and catch data.	2.1 data mining of existing biological and catch data. 2.2 meetings with relevant stakeholders and members of the public to research relevant data on lobster fisheries. 2.3 Quantify findings in summary report.	2.1 Biological data have been found from a previous study and some catch data obtained from the fisheries corporation 2.2 meetings with the fisheries association and fisheries department have been held 2.3 completed *Evidence provided annex 3 file 7*
Activity 2.1. Review and collate existing fisheries biological and catch data.		Completed

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Activity 2.2. Review relevant current lobster legislation, licensing and management		Completed
Activity 2.3 Conduct research into the past and present lobster fishery (commercial and recreational) through a questionnaire and face to face interviews.		Completed
Activity 2.4 Threat analysis completed to identify areas for improvement and compilation of possible solutions		Completed
Activity 2.5 Interim report on findings and implications summarised and presented to key stakeholders		Completed
Output 3. Population size, structure and growth of lobster species established.	3.1 Tag and release programme established with 2500 lobsters tagged and associated biometric data collected and analysed within 22 months.	3.1 tag and release programme has been established and 1672 spiny lobsters and 765 slipper lobsters have been tagged. *Evidence provided in annex 6 file 10*
Activity 3.1 Establish mobile lobster pot network along coastline		Lobster pot network established
Activity 3.2 Deploy a minimum of 10 pots for 25000 trap hours within the first six months and 29000 trap hours within the following year		Not completed due to delayed start and loss of equipment. Using trapping hours is not appropriate. Fishery science uses number of pots and deployments for CPUE.
Activity 3.3 Tag, measure and release a minimum of 1500 spiny and 1000 slipper lobster from a range of sizes with a subset of 50 (25 of each species) double tagged within 22 months.		1672 spiny lobsters and 765 slipper lobsters tagged and 50 double tagged for each species.
Activity 3.4 A minimum of 50 gonads collected for examination		Completed
Activity 3.5 Integrate tagging and biometric data into existing EMD fisheries database.		Data are ready for implementation but database under larger review so data to be integrated at a later stage
Activity 3.6 Paper prepared on lobster population size, structure and growth.		ongoing

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Output 4. Lobster abundance, habitat association and foraging ecology established.	4.1 100 diet samples and 20 tissue samples collected and analysed within first year. 4.2 120 dive surveys completed within the first six months and 144 within the following year. 4.3 integration of data into existing datasets, analysed and summarised	4.1 20 tissue samples have been collected and shipped to CEFAS UK for stable isotope analysis but could not be completed due to COVID-19 restrictions. 100 diet samples collected and shipped to UK but analysis not completed due to COVID-19 restrictions. 4.2 316 dive surveys completed 4.3 collected data are integrated and analysed *Evidence provided and annex 3 file 10*
Activity 4.1 100 diet samples collected for examination and 20 tissue samples for stable isotope analysis		Sample collection completed
Activity 4.2 Completion of 120 habitat, abundance and diet surveys within the first six months and 144 within the following year.		316 habitat, abundance surveys and recapture dives completed
Activity 4.3 Stable isotope and diet analysis completed and compiled with existing pelagic data to map St Helena's trophic food web relationships		Analysis could not be completed due to COVID-19 restrictions
Activity 4.4 Habitat survey data combined with existing seabed spatial data to identify and map key areas or habitat zones with high lobster abundance		Key areas for high lobster abundance mapped and identified
Activity 4.5 Paper prepared on habitat, abundance and foraging ecology		Analysis for foraging ecology and habitat not completed therefore not enough data for publication.
Output 5 Experimental acoustic telemetry technology trialled to monitoring lobster population movements.	5.1 Acoustic array grid established and 15 acoustic telemetry devices deployed within first six months. 5.2 Acoustic telemetry data collected and analysed by end of project.	5.1 acoustic array grid and 25 tags deployed 5.2 Data collected and analysed *Evidence provided in annex 6 files 10-13*
Activity 5.1 install acoustic receiver array grid inshore.		Completed

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Activity 5.2 Deploy 15 acoustic telemetry devices onto lobster within first 6 months		Completed
Activity 5.3 Collect and analyse telemetry data to establish and map movement ranges, residence times, cost effectiveness and evaluation of method as lobster monitoring technique.		Data collected, analysed and mapped but movements could not be established due to lack of time series in data and topography
Output 6 Increase public awareness of the fisheries science research programme and its relevance to sustainable management practices.	6.1 St Helena residence actively participate in tag reward scheme. 6.2 Documented public talks, pamphlet produced, presentations and educational resources freely available online. 6.3 Question and answer sessions with key stakeholders completed quarterly. 6.4 Documented monthly newspaper articles and radio interviews produced.	6.1 Tag reward scheme was launched but only 7 tags with measurements have been returned 6.2 Public talks, pamphlets, presentations and educational material have not been made publicly available online due to limited internet access 6.3 Question and answer sessions have been held 6.4 Occasional Facebook updates *Evidence provided in annex 6 files 14 -18*
Activity 6.1 Launch and publicise reward scheme for lobster tagging programme		Reward scheme was launched and publicised in the local newspaper
Activity 6.2 Plain English pamphlets and presentations prepared to inform St Helena stakeholders, public, school children and visitors about the lobster populations and the project.		Presentations to stake holders and public delivered, activity booklets for school children completed in conjunction with the UK governments Blue Belt Programme
Activity 6.3 Attended regular key stakeholder meetings to inform of project progress		2 meetings were attended
Activity 6.4 Produce monthly newspaper articles and radio interviews for local media, other OT's and international media		Most updates were via Facebook on the project, with some newspaper articles, radio interviews undertaken.

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Output 7 Long term lobster fisheries research programme established.	7.1 Long term research programme manual prepared for implementation post project.	7.1 Completed *Evidence provided in annex 6 file 10*
Activity 7.1. Lobster research programme reviewed to determine appropriate long-term monitoring programme.		The research program has been reviewed by CEFAS and SHG
Activity 7.2. Long-term research and monitoring programme designed and established.		A long-term research and monitoring program has been designed and established
Output 8 Optimal solutions for lobster population management proposed based on integrated biological, habitat data, historic and present fishing pressure, threat assessment and formulate into a lobster population management plan.	8.1 Bioeconomic analysis of St Helena lobster populations conducted to assess long-term viability under different future management scenarios. 8.2 Lobster population management options report produced based on results and recommendations from outputs 2,3,4 and 5 and circulated for stakeholder review prior to adoption by SHG.	8.1 Not completed – as it is only recently an official local market has been established 8.2 Completed *Evidence provided in annex 6 file 10*
Activity 8.1 Bio-economic analysis of St Helena's lobster fisheries conducted to assess its long-term viability under different future management scenarios.		A management strategy has been determined with a preliminary quota for both species. The key for future management is to collect landings data which started in January 2021. Once a data time series of at least 5 years has been recorded a clearer picture of the market and impacts on the lobster populations can be determined.
Activity 8.2 Lobster management plan options report produced based on project findings and circulated for stakeholder review.		A fisheries report and management plan has been completed
Activity 8.3 Lobster fisheries management plan finalised and accepted by SHG.		The Lobster fisheries management plan has been considered and accepted by St Helena Government. Management recommendations and

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
		revisions will be incorporated as part of the fisheries licence conditions for 2022.

Annex 3 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1	Number of (i) students from the UKOTs; and (ii) other students to receive training (including PhD, masters and other training and receiving a qualification or certificate)	0
2	Number of (i) people in UKOTs; and (ii) other people receiving other forms of long-term (>1yr) training not leading to formal qualification	0
3a	Number of (i) people in UKOTs; and (ii) other people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	3 UKOT nationals (1 female and 2 males) received extensive training in monitoring, survey and sampling techniques for lobsters. The training was delivered in English
3b	Number of training weeks (i) in UKOTs; (ii) outside UKOTs not leading to formal qualification	4
4	Number of types of training materials produced. Were these materials made available for use by UKOTs?	1 monitoring method manual
5	Number of UKOT citizens who have increased capacity to manage natural resources as a result of the project	3
Research Measures		
9	Number of species/habitat management plans/ strategies (or action plans) produced for/by Governments, public authorities or other implementing agencies in the UKOTs	1
10	Number of formal documents produced to assist work in UKOTs related to species identification, classification and recording.	2 – Training manual produced for survey fieldwork and training manual produced for fecundity/egg processing
11a	Number of papers published or accepted for publication in peer reviewed journals written by (i) UKOT authors; and (ii) other authors	0
11b	Number of papers published or accepted for publication elsewhere written by (i) UKOT authors; and (ii) other authors	0
12b	Number of computer-based databases enhanced (containing species/genetic information). Were these databases made available for use by UKOTs?	1 – Database produced containing biological data which will be incorporated into existing fisheries science database

Code	Description	Totals (plus additional detail as required)
13a	Number of species reference collections established. Were these collections handed over to UKOTs?	0
13b	Number of species reference collections enhanced. Were these collections handed over to UKOTs?	0
Dissemination Measures		
14a	Number of conferences/seminars/workshops/stakeholder meetings organised to present/disseminate findings from UKOT's Darwin project work	1
14b	Number of conferences/seminars/ workshops/stakeholder meetings attended at which findings from the Darwin Plus project work will be presented/ disseminated	3 Presentations to councillors with regards to project finidings. Information presented at UK Blue Belt symposium. Results also presented to stakeholders and fisheries association
Physical Measures		
20	Estimated value (£s) of physical assets handed over to UKOT(s)	£ – Lobster pots, tagging/survey equipment, acoustic receivers, personal protective equipment
21	Number of permanent educational/training/research facilities or organisation established in UKOTs	0
22	Number of permanent field plots established in UKOTs	0
23	Value of resources raised from other sources (e.g., in addition to Darwin funding) for project work	0

Annex 4 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. weblink, contact address, annex etc)

Annex 5 Darwin Contacts

Ref No	DPLUS077
Project Title	Sustainable fishery management for St Helena's lobster populations
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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.	Yes
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.	N/A
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.	Yes
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	NO
Have you involved your partners in preparation of the report and named the main contributors	Yes
Have you completed the Project Expenditure table fully?	Yes
Do not include claim forms or other communications with this report.	