



Darwin Initiative Annual Report



Important note:

To be completed with reference to the Reporting Guidance Notes for Project Leaders – it is expected that this report will be about 10 pages in length, excluding annexes

Submission deadline 30 April 2009

Darwin Project Information

Project Ref Number	EIDPO027
Project Title	Reducing the impact of feral livestock in and around the Centre Hills
Country(ies)	Montserrat, UK
UK Contract Holder Institution	Royal Society for the Protection of Birds
Host country Partner Institution(s)	Food and Environment Research Agency (FERA), Montserrat Department of Environment, Montserrat Department of Agriculture
Other Partner Institution(s)	Sarah Sanders
Darwin Grant Value	£144,236
Start/End dates of Project	1 st April 2009 – 31 March 2011
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 st April 2009 – 31 March 2010, Annual Report 1
Project Leader Name	James Millett
Project website	
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1. Project Background

Montserrat is a British overseas territory located in the Leeward Islands, part of the Lesser Antilles in the Caribbean Sea. It measures approximately 16 km long and 11 km wide. The island is recognised as being of biodiversity conservation importance, the effects of a series of volcanic eruptions have compounded the impact of habitat loss and introduced species on biodiversity.

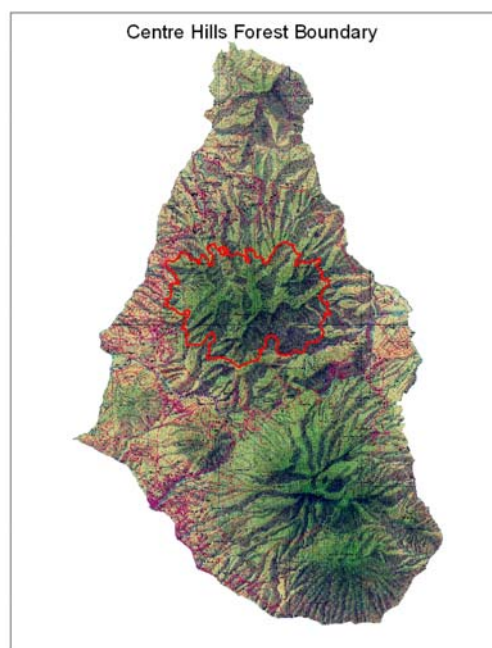
The volcanic eruptions of 1995 resulted in the loss of more than half of its rainforest, the habitat for many threatened native species. The Centre Hills hold the largest intact forest area remaining on Montserrat so are of global biodiversity importance, supporting many key endemic species including the critically endangered Montserrat Oriole, *Icterus oberi*, Montserrat Orchid, *Epidendrum montserratense*, Montserrat Galliwasp, *Dipoglossus montisserati* and Mountain Chicken, *Leptodactylus fallax* and are designated an Important Bird Area (IBA) and Key Biodiversity Area (KBA). The Centre Hills also provide essential environmental services, being the sole water catchment area, and providing protection from soil erosion, landslides and flooding during severe weather. The Centre Hills are also an important nature tourism product to attract visitors to the island.

The assessments undertaken during a previous Darwin project implemented by the RSPB on Montserrat (Project Ref. 14-027) identified the threat of feral and loose livestock on the Centre Hills. The number of loose pigs, goats and cattle making incursions into the Centre Hills had risen, although the data was not quantified. This was believed to be due to the release of livestock when the southern portion of the island was evacuated during the first series of eruptions compounded by the practice of running loose livestock some of which were recruited to the feral population.

The impacts of feral livestock on insular island biodiversity are well documented and threats on Montserrat included: direct predation on globally threatened herpetofauna such as the Mountain Chicken and the Montserrat Galliwasp, destruction of native plants including the native *Heliconia caribaea* plant (causing loss of Montserrat oriole nesting habitat), dispersal of non-native invasive plant species. In addition an increasing feral

livestock population is expected to have socio-economic impacts such the transmission of livestock diseases, pose a threat to people from attacks and contribute to pollution of watercourses.

Assessment of public opinion demonstrated that the majority of the population viewed feral livestock as a threat to the environment and livelihoods, and given the populations of feral livestock would certainly increase without control measures being implemented, the project was developed with the Department of Agriculture, Department of Environment of Montserrat, the RSPB and the Food and Environment Research Agency. The project was designed to provide technical support to in country partners, drawing on lessons learned from feral animal management programmes elsewhere so that these could be applied to Montserrat.



2. Project Partnerships

Project partnerships:

The Project has built on pre-existing partnerships between UK institutions and Montserrat based institutions, and developed new partnerships to draw on specialist expertise. The main project partner in Montserrat is the Ministry of Agriculture, Land, Housing and Environment (MALHE) including Departments of Environment (DOE) and Agriculture (DOA) and in the UK: the Food and Environment Research Agency (FERA) and the Royal Society for the Protection of Birds (RSPB). This partnership was formalised for this project by the signing of a Memorandum of Collaboration in 2009. Roles within the project are summarised as:

- DOE is the lead agency for the implementation of the project activities in Montserrat. This includes data collection, stakeholder engagement and public out reach and DOE will be the lead agency on the implementation of control measures for feral livestock in the second year of the project. DOE along with DOA are the primary beneficiaries of training exercises and capacity enhancement measures. A project coordinator (a UK expert on feral pig monitoring and management) was recruited by DOE in August 2009 to support the project and to provide ongoing training.
- DOA is the agency responsible of the provision of agricultural services, including crop and livestock, fisheries, agricultural policy guidance, legislative advice and compliance. DOA has played an important role in the project during the first year providing information and guidance on loose livestock (i.e. owned and free range livestock, not truly wild feral livestock) and veterinary advice. DOA Staff have been beneficiaries of training and have worked with the RSPB in efforts to gain additional resources to improve animal husbandry.

- Food and Environment Research Agency FERA (formerly Central Science Laboratories) is the UK's lead agency on the management of non-native species with specific expertise and experience on research and management of feral pig populations. FERA have lead on the technical and scientific development of the project, including the development of monitoring systems, advising on control methodologies, the provision of training in the hunting of feral animals, statistical analysis of data, and the presentation of findings at international fora.
- RSPB is a part of the Birdlife International Network of NGOs in over 100 countries, the RSPB operates an international programme in selected European, Asian and African countries and supports work in the UK Overseas Territories. The RSPB maintains enduring partnerships and has been working with the Government of Montserrat since 1997. The RSPB is the project management unit for the project, coordinating over all activities and leading on reporting and budget management. RSPB staff also provide management and training and have guided a number of processes, supported fundraising and provided co-finance for the project.

Communications and project management are undertaken through a variety of media; the RSPB and FERA are in touch with the project team in Montserrat through almost daily email exchanges and regular (every 1 – 2 weeks) phone contacts. The Project Co-ordinator in Montserrat is the focal point. Monthly phone meetings have been implemented except where visits to Montserrat have made these unnecessary. In addition, four field trips have been made: one at the start of the project (1x RSPB and 2x FERA staff), one in December 2009 to induce the new project manager to the project (2x RSPB), one in February 2010 to support the feral animal action planning workshop (1x RSPB and 2x FERA staff) and one to undertake hunting training in March 2010 (1x FERA staff). Locally a project steering group has been established to review activities and advise the project implementers.

The roles of the partners are laid out in the Memorandum. Each partner has been able to contribute to the project using particular institutional strengths, i.e. project management, technical expertise and the UK institutions have been able to support the delivery results by the Montserratian partners. The only significant challenge to arise demonstrated the effectiveness of the partnership; it was not possible to recruit a local project co-ordinator as initially envisaged, due to the small population size in Montserrat and because skilled staff within the Government were already heavily committed. FERA identified a suitable candidate with specific skills in pig monitoring and feral animal management.

A wider stakeholder group has been engaged through the project, in particular through the action planning process including a range of other Government Agencies and interest groups such as National Trust of Montserrat, land owners, hunters and the farming community (see annexed workshop report for participation).

The RSPB has enhanced its capacity to support work in Montserrat and more widely in the UKOTs with the creation of a new position, a Country Programme Officer with a focus on the Caribbean OTs.

Other Collaboration:

The project has collaborated with an initiative in Anguilla to restore Dog Island by the removal of rats and feral goats, the Montserrat-based project co-ordinator and a feral animal management specialist from FERA visited Anguilla and undertook a feasibility study for the goat removal. The development of a Montserratian team trained in feral animal management opens future opportunities to support this and similar projects in the Caribbean OTs or more widely in the Caribbean.

Montserrat is not a signatory to the CBD, however the Department of Environment of Montserrat is responsible for all aspects of biodiversity and undertakes measures outlined in the *UK Government Strategy For Biodiversity Conservation In The UK Overseas Territories*.

3. Project progress

3.1 Progress in carrying out project activities

Activity "0" Project Management and establishment

The project management procedures were established during an induction visit including RSPB staff and two technical experts from FERA in July 2009. An introductory workshop was held to inform stakeholders of the scope and purpose of the project and a Memo of Collaboration was signed between MALHE, FERA and the RSPB and it was agreed to appoint a local project coordinator; an experienced feral pig biologist was recruited and took up position in August 2009. This was in place of the student, it was felt in balance that a more experienced person who could support project management and undertake research was important for delivery of results. The RSPB supported the additional costs of a staff member.

Monthly teleconferences were established to discuss project progress (except where there were regular and extended visits by project staff between December and February) and financial and reporting procedures were defined including weekly and monthly reports from the Project Coordinator for the project team. A group of pig hunters was established, about 30 individuals hunt pigs using traditional methods on Montserrat and a staff member of DOE and a project assistant are both hunters and can represent views.

Activities 1 Knowledge of existing feral livestock in and around the Centre Hills boundary is increased

Activities to establish monitoring protocols and a baseline from which to measure change were key actions for year 1. The Boar Operating System (BOS), which consisted of a feeding platform with a cover that only pigs can lift was constructed and piloted between the 19 – 30 July. A total of 8 were built, however, after the first BOS monitoring (full trial) it became clear that the system was not attracting pigs at the expected levels, it is assumed this was due to high natural food availability, and the system was discontinued. Thirty game cameras were purchased from the US and a monitoring network established, despite the loss of some cameras due to volcanic activity and some problems with humidity, these proved very effective and have been the main monitoring methodology. The cameras have been active for a total of 3202 camera trap nights capturing, 143 goat, 227 pig, 235 cattle, 12 Donkey and 38 sheep independent visits. Other field equipments including camera spare parts and a freezer for the storage of biological materials were purchased. Four pig skulls were collected and have been used for training of local staff in aging methodologies.

Livestock populations have been mapped on the centre hills using the camera data and the mapping of agricultural plots was initiated, but the completion of this was hampered by the increasing volcanic activity preventing access to the southern Centre Hills and surrounding areas. Loose livestock transects (n=18) have been completed and analysed with the help of the GIS department within the Governments Physical Planning Unit. An average of over 60 livestock animals are observed in each of the 13km drives. Data on loose animals impounded and the financial damage reported to the Department of Environment was collected and analysed.

To ensure the decisions on control options coming out of the action planning process were well informed; a range of other information was researched and collated. This included: a public opinion survey that was undertaken with a local market researcher coordinating a team of surveyors that surveyed 375 households. The survey asked a range of questions relating to views on feral livestock and on meat consumption and a preliminary analysis was undertaken in time to be presented to the action planning workshop and a more complete analysis will be undertaken in year 2. In addition, a desk review of feral animal control methods was also completed by FERA and used to inform participants at the action-planning workshop.

One of the key actions alongside the control of feral (wild) livestock is the management of loose (owned free range) livestock. A project was submitted to the Overseas Territories Environmental Programme (OTEP) in 2009 by the Department of Agriculture, but the

application was unsuccessful. In year 2 a revised project-promoting model farming methods will be developed with the currently available funding.

A workshop was held between the 22 – 24 February with the purpose of presenting results of the research to date and using this to inform a draft strategy for the management of feral animals. The workshop proceeded well with both objectives - providing new and compelling data on the scale of the feral animal problem and developed a number of practical solutions.

Activities 2 Technical expertise is enhanced and new skills developed in the monitoring and control of feral livestock

Training materials were prepared by FERA and presented to the project team on 21st July. Thirteen participants attended and were instructed on monitoring methodologies using the BOS system and with game cameras as well as the collection of biological data, such as animal age from tooth eruption patterns (see training reports and materials in annexes). Additional on-the-job training has been given to MALHE staff and project assistants (there are several field guides who work on a *pro rata* basis on this and other projects in Montserrat), this has included looking for field sign, identifying good camera locations, operating the cameras, and using GPS. The on the job training has helped enforce the classroom training to improve the effectiveness of team staff. In March 2010 training was given to 10 staff from DOE and DOA in firearms training by the Montserrat Police Force and further training in hunting methodologies was provided by an experienced marksman from FERA. Additional training was given to 10 participants in firearms use and hunting techniques. The FERA marksman culled several animals and inspired trainees. The Police instructor remarked that the team from the DOE and DOA were better than any classes of Police he had taught. Additional training was given to the four staff of the utilities company to assess animal activity (tracks and signs) in water catchments in October. This training was carried out when the coordinator accompanied utilities company staff into the field, field sheets were provided to support this work.

A local staff member presented a poster at the Society for the Conservation and Study of Caribbean Birds (SCSCB) conference in Antigua 2009. Plans are being made for presentation of the project results in the UK at the International Wild Boar Conference in Sept 2010.

Activities 3: Options to control feral livestock in and around the Centre Hills are assessed

A report on the control and management of feral pigs was completed and presented in summary form at the action-planning workshop. A summary of the findings are included in the action plan introduction and the full report is being disseminated as a part of the workshop outputs.

The action planning workshop was held 22 – 24 February 2010 in Montserrat and comprised of a number of presentations examining management options, the research findings from year 1 of the project, veterinary considerations and public opinion survey results. These were interspersed with group sessions to build consensus for options for the management of feral livestock, (see annexed workshop report and draft action plan). The workshop achieved high and consistent attendance with about 30 attendees participating throughout.

The action tables were captured from breakout group outputs by a drafting group on the last day of the workshop and have subsequently be refined. The action plan is now in working draft format that will guide activities, and be refined and signed off towards the end of year 2 when the impact of control measures have been assessed.

Activities 4: Actions to control feral livestock in and around the Centre Hills are improved

Actions surrounding the control of feral animals are scheduled to be implemented during year 2 of the project, baseline research has been completed and the hunting training undertaken. A loose (owned) livestock management project was drafted and submitted to OTEP, but the application was unsuccessful. The project will be revised and reduced in scope and scale to fit with available resources and be implemented in year 2

Monitoring actions using game cameras for feral livestock and transects (undertaken routinely) will be continued to assess the impacts of the two key animal management actions.

Activities 5: Policies on livestock management are strengthened

Firearms use is important to the success of the project and progress has been made working with the police on the clarification of the use of firearms and in establishing permissions for import and use. It is important to note that because the security situation in a number of Caribbean countries, concerns exist in Montserrat over the availability of firearms. Positive relationships have been established with the Police. Permission for firearms and hunting training was granted and the Police instructed / participated in both courses. A priority action for year 2 is to clarify of the process for importing additional firearms and establish a procedure for accessing firearms that will not hamper culling.

A review existing livestock policy and a report with recommendations and the integration of recommendations in to DOA procedures are scheduled for year 2.

Activities 6: Awareness is raised on Montserrat and in the Caribbean about the impacts of feral livestock on biodiversity and livelihoods

Stephen Mendes (DOE) presented on spatial planning in the Centre Hills at the UKOCTF meeting in the Caymans in 2009 (Mendes, S. 2010. Montserrat Centre Hills Management Plan: an example of planning and implementing protected areas at a site scale. pp 221-225 in *Making the Right Connections: a conference on conservation in UK Overseas Territories, Crown Dependencies and other small island communities*, Grand Cayman 30th May to 5th June 2009 (ed. by M. Pienkowski, O. Cheesman, C. Quick & A. Pienkowski). UK Overseas Territories Conservation Forum <http://www.ukotcf.org/pdf/2009conf/ProcCay06Planning.pdf>

And five of local press releases have been made:

- Reducing feral livestock in and around the Centre Hills – Government press release 24th July 2009 (www.gov.ms);
- Guide to the Centre Hills Launched – Government press release 23rd July 2009 (www.gov.ms)
- Darwin feral livestock project - The Montserrat Newsletter 7th December 2009
- Darwin feral livestock project - The Montserrat Reporter (Newspaper) 5th February 2010
- Attacking feral animals and loose livestock - The Montserrat Reporter, 5th March 2010

And two international (UK) press releases:

- Darwin Newsletter 15
- FERA newsletter *FERA Solutions* Jan 2010

Radio Shows

- Feral livestock workshop opening – 22nd July 2009 (Gerard Gray (DOE), Stephen Mendes (DOE), Sarah Sanders (RSPB));
- Darwin feral livestock project – 25th July (Giovanna Massei (FERA) and Sugoto Roy (FERA));
- Update on project and introduction to Project coordinator – October 2009 (Richard Bunting (DOE) and James Daley (DOE))
- Workshop advertised on Radio Montserrat and featured as a news item with participant interviews (22nd-24th February 2010)
- Darwin Feral livestock project next steps, a 1hr phone in show 'the peoples show' featured the project – 24th February 2010 (James Millett (RSPB), Giovanna Massei, Sugoto Roy (FERA), Richard Bunting (DOE), James Daley (DOE))

Web posting and news

- Reducing feral livestock in and around the Centre Hills – Government press release 24th July 2009 (www.gov.ms) <http://www.gov.ms/?p=618>
- 4th January 2010, www.fera.defra.gov.uk, Press release on FERA's involvement in project) <http://www.fera.defra.gov.uk/showNews.cfm?id=418>
- 7th January 2010, www.gom.ms, press release detailing what the project is about on the official Government of Montserrat Website <http://www.gov.ms/?p=1812>
- 30th January 2010, www.mnialive.com, more informal project overview on a forum style website all about Montserrat. This was to outreach to Montserratians living abroad at present and to give people an opportunity to comment on the project http://mnialive.com/home/index.php?option=com_content&view=article&id=240:darwin-feral-livestock-project&catid=64:mni-view&Itemid=158
- 5th February 2010, www.themontserratreporter.com, Identical copy of general project overview that was published in the local newspaper http://www.themontserratreporter.com/index.pl/article_local?id=4556292
- 4th March 2010, www.gov.ms, press release covering project workshop on Government website <http://www.gov.ms/?p=2043>
- 5th March 2010, www.themontserratreporter.com, a workshop overview that was published in the local newspaper http://www.themontserratreporter.com/index.pl/article_local?id=4714526

Some early discussions and preliminary planning for the pig manual have been undertaken and this activity is scheduled to be progressed in 2010, along with the dissemination. Similarly planning has taken place for the attendance of the International Wild Boar Conference 2010 in York UK.

Scientific publications including those in press:

A peer reviewed paper entitled *Too many pigs? A review of methods to mitigate impact by wild boar and feral pigs* by Giovanna Massei, Sugoto Roy and Richard Bunting was accepted by the Journal *Human-Wildlife Interactions* 2010

A poster entitled: *Reducing the impact of feral livestock in and around the Centre Hills* by Lloyd Martin, Giovanna Massei, Sugoto Roy, Sarah Sanders was presented at the SCSCB conference in Antigua in July 2009

A poster entitled: *Feral pigs and volcanoes: a hot topic* by Richard Bunting, Giovanna Massei, Lavern Rogers-Ryan, Sugoto Roy and James Millett was presented at the 2010 International Wild Pig Conference in Pensacola FL, 11th – 13th April 2010

A paper entitled: *Too many pigs? Population trends and control methods for wild boar and feral pigs* by Giovanna Massei, , was presented to the 2010 International Wild Pig Conference in Pensacola FL, 13th April 2010.

3.2 Progress towards Project Outputs

Output 1. Knowledge of existing feral livestock in and around the Centre Hills boundary is increased

The understanding of the feral animal population levels and distribution has been greatly improved and will guide hunting strategies (see data summary in the draft action plan included in the annex). Game cameras have been very effective and have been used to gather important results, and have compensated for the disappointing results from the BOS system. Importantly they show that pig populations are lower than expected whilst feral cattle are more abundant. The data was presented at the action-planning workshop and provided compelling evidence for the development of a control programme and the selection of options. Further to this, quantitative data on the loose livestock situation has been extremely informative. Feral populations are likely to be augmented by loose livestock and so monitoring loose livestock is key to project goals. By collating the data from the animal pound, loose livestock transects,

and crop damage we have established a baseline by which any drives towards improved husbandry can be measured. To further support this crop and livestock activities around the Centre Hills have been mapped on the northern boundaries but not in the south due to the activity of the volcano. All this information made the production of a report on recommended control options possible.

Output 2. Technical expertise is enhanced and new skills developed in the monitoring and control of feral livestock

A team trained in animal management and monitoring methodologies is in place. Training was delivered through training courses and on the job learning has been undertaken and 9 staff from DOE, DOA and the utilities company as well as freelance project assistants are familiar with the monitoring methodologies. The police gave additional training to 10 government staff in firearms use and the same 10 participants received hunting training from a UK expert; a critical enhancement of the skill base to implement control measures. The indicators are appropriate.

Output 3. Options to control feral livestock in and around the Centre Hills are assessed

A stakeholder agreed action plan has been drafted. High quality inputs including expert advice on control methodologies, local research findings on feral animals and loose livestock, as well as on public opinions facilitated a workshop what was successful at achieving the objective and also garnered a high level of support, evidenced by high attendance over the three days (about 30 participants were present for all or most of the workshop and local staff reported the high attendance and quality of the workshop process). Two control methodologies were identified as suitable and will be trailed in year 2. The action plan is now in an advanced draft and will be revised in light of the experimental control and signed off at EOP. The Outputs have been achieved on schedule and the indicators are fit-for-purpose.

Output 4 Actions to control feral livestock in and around the Centre Hills are improved

The work to date, monitoring, research, and training has prepared the project team to implement control measures in year 2 of the project. The action plan has now defined clear activities for the second year of the project focussing on shooting and corral trapping. The action plan also identifies measures to reduce loose livestock numbers (loose livestock being one of 6 result areas). However, the unsuccessful application for funding is a setback to the development of model animal management systems.

Animal control was not planned for year one prior to the completion of the action plan, however a small number of animals were shot during training. The Indicators are appropriate.

Output 5 Policies on livestock management are strengthened

The Veterinary Department have done an excellent job of improving the understanding of the current policy and legislative context surrounding loose livestock management for the stakeholder group. This information was presented alongside information on animal welfare and meat hygiene requirements at the action-planning workshop. The issues surrounding the management of loose livestock are complicated as can be expected in a small community and effective enforcement is an issue. This has set the scene for the for the policy review in year 2.

Output 6 Awareness is raised on Montserrat and in the Caribbean about the impacts of feral livestock on biodiversity and livelihoods

Awareness raising is an important component of the project, not only to gain public support for the culling of feral animals, but also to support the better management of loose livestock (research has shown that a small proportion of the population own a disproportionately large proportion of loose livestock, whilst the majority of the population view loose livestock as a problem). Accordingly a high media profile has been established in Montserrat with press releases and media releases at project milestones. The project coordinator has also carried out a lot of face-to-face awareness raising. Media and web based dissemination targets have been exceeded.

The project is becoming well known regionally through presentations at the SCSCB meeting and the UKOCTF meeting. This was evidenced by requests to participate in the action-planning workshop in February from St Lucia, Anguilla and Antigua and it is intended to orientate the workshop at the EOP towards a regional audience. This will tie in with the launch and dissemination of the pig management manual. The profile has been raised out side of the region with presentations in the US and press releases in the UK.

3.3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Number planned for this reporting period	Total planned from application
Established codes								** See note below table
6A	Number of people to receive other forms of education/training (which does not fall into categories 1-5 above)	10+					10	
6B	Number of training weeks to be provided	3					3	
7	Number of (ie different types - not volume - of material produced) training materials to be produced for use by host country	1					1	
8	Number of weeks to be spent by UK project staff on project work in the host country	32					30	
9	Number of species/habitat management plans (or action plans) to be produced for Governments, public authorities, or other implementing agencies in the host country	1					1	
10	Number of individual field guides/manuals to be produced to assist work related to species identification, classification and recording	NA					0	
11B	Number of papers to be submitted to peer reviewed journals	1					1	
14A	Number of conferences/seminars/workshops to be organised to present/disseminate findings	2					2	
14B	Number of conferences/seminars/workshops attended at which findings from Darwin project work will be presented/disseminated.	2					2	
15A	Number of national press	13					2	

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Number planned for this reporting period	Total planned from application
	releases in host country(ies)							
15B	Number of local press releases in host country(ies)						2	
15C	Number of national press releases in UK	2					1**	
16A	Number of newsletters to be produced							
16B	Estimated circulation of each newsletter in the host country(ies)							
16C	Estimated circulation of each newsletter in the UK							
19A	Number of national radio interviews/features in host county(ies)	5					2	
19B	Number of national radio interviews/features in UK	0					0	
19C	Number of local radio interviews/features in host country(ies)							
20	Estimated value (£'s) of physical assets to be handed over to host country(ies)	0					0	
22	Number of permanent field plots to be established during the project and continued after Darwin funding has ceased	25					25	

** Note the project application did not specify numbers of output measures against the list. The activity tables did specify numbers outputs but the categories were broader (e.g. 2 media reports / year) and these have been included here. Output measures have been greatly exceeded against targets given in the activity tables

Table 2 Publications

Type (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (contact address, website)	Cost £
Journal*	<i>Too many pigs? A review of methods to mitigate impact by wild boar and feral pigs</i> by Giovanna Massei, Sugoto Roy and Richard Bunting (2010)	Human-Wildlife Interactions (Accepted)		na
Poster*	<i>Reducing the impact of feral livestock in and around the Centre Hills</i> by Lloyd Martin, Giovanna Massei, Sugoto Roy, Sarah Sanders (2009)	SCSCB conference in Antigua		na
Poster	<i>Feral pigs and volcanoes: a hot topic</i> by Richard Bunting, Giovanna Massei, Lavern Rogers-Ryan, Sugoto Roy and James Millett (2010)	2010 International Wild Pig Conference Pensacola FL		na
Paper	<i>Too many pigs? Population trends and control methods for wild boar and feral pigs</i> by Giovanna Massei (2010)	International Wild Pig Conference in Pensacola FL, 13 th April 2010.		na

3.4 Progress towards the project purpose and outcomes

Purpose: A sustainable, locally managed programme to minimise the destructive impacts of feral livestock in and around the Centre Hills is established.

Progress has been made towards the project purpose. Key activities of researching the feral animal population and associated issues have been undertaken and have provided high quality data for the planning process, key training has been undertaken and an action plan to guide the implementation of pilot control measures is in place. In the second year of the project the control measures focussing on hunting with guns and the testing of corral traps will be implemented. All outputs are being delivered according to the planned time line and the project is on course for delivery of results.

Two of the indicators, pertaining to sightings of feral animals and catch per unit effort are relevant, but will be used to assess the impact at the end of the project. The third indicator *number of animals using the BOS decreases...* is no longer relevant as the BOS was found to be unsuitable as a monitoring tool.

3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

The measurement of the project impact against biodiversity, sustainable use and enhanced benefits to communities is difficult at this stage of the project, mainly because the main feral animal management effort will be implemented in year 2. At the end of project, an indication of impacts will be available. However it is apparent at this stage that preparatory actions have positioned the in-country partners to implement a management plan that will extend over 5 years (i.e. 4 years beyond EOP) which will substantially reduce the risk to biodiversity and ecosystem services.

4. Monitoring, evaluation and lessons

Monitoring against the indicators is detailed in Sections 3.1-3.4, and a summary of the monitoring protocols is given here. Project monitoring is carried out through regular communications with the Project Co-ordinator acting as a main focal point, measures include regular (c weekly phone conversations and emails and teleconferences between the main partners (FERA, DOE, DOA and RSPB), weekly and monthly reporting. Activities related to project management, training, development of the action plan, scientific publications, web based and media dissemination are monitored by DOE and the project manager based at the RSPB. A simple activity sheet based on the activity tables (in the application) is used to monitor activities and is regularly updated.

DOE have led on the monitoring of feral livestock (now primarily using game cameras) and also leads on the monitoring of threatened species. Assessments of loose (owned) livestock have been undertaken through transects (goat drives) using a standardised methodology and the DOA compiles data on impounded animals and the registration of livestock. DOA will continue to lead on the monitoring of activities relating to loose (owned) livestock as the project progresses. FERA leads on the monitoring of data quality and has lead responsibility for the analysis of the results

Two indicators have proven to no longer be suitable for measuring project results the BOS system was abandoned as was proving ineffective in Montserrat and first sub-goal indicator is no longer suitable, *Populations of key species (mountain chicken, oriole) remain stable by the end of Y2*. The population of mountain chickens has collapsed following the result of a Chytrid (*Chytridiomycota*) fungus and a large pyroclastic flow that affected the last known refugia of the population in early 2010. Similarly, the high volcanic activity may influence the oriole population because ash fall is implicated in reducing productivity. It is probably a suitable long-term indicator (e.g. 5 years +).

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

Not applicable

6. Other comments on progress not covered elsewhere

Methods have been refined as the project has progressed. Increased monitoring with game cameras has been important for improving data collection and making the monitoring more resilient to the restrictions from the volcanic activity. Other monitoring methods have been refined for example the development of road transects (goat drives) has maximised the amount of data collected per unit time. Adaptation to the challenging local environment has been important. In particular the volcanic activity (identified as a purpose level assumption) has posed difficulties. A volcanic cone built over 2009 and early 2010 before collapsing causing an extensive pyroclastic flow in February 2010. Sections of the southern Centre Hills and surrounding areas were closed to access and this restricted monitoring activities. The pyroclastic flow impacted on monitoring areas and has destroyed a number of cameras and BOS systems. Fortunately the use of the game cameras has allowed the collection of data and some areas of the restriction zone are now re-opened.

The volcano does pose a future risk to the project, but one that on the basis of this years work can be managed. It is worth noting the main concentrations of feral livestock are in the restricted zone and the control effort will have to account for this.

A new project is starting to work on the mountain chicken in 2010 funded by the Darwin Initiative. Previous work supported by the Durrell Wildlife Conservation Trust has worked in the same areas as this project and close coordination and alignment of activities will benefit both projects.

7. Sustainability

The small populations size and resulting limited human and financial capacity provides potential challenges to the sustainability of the project and measures have been taken to mainstream the outputs, enhance cross departmental linkages and maximise the opportunities for the development of skills. The project has had a high profile within Government and represents a major work component for the DOA and DOE, more widely the project is well known in Montserrat due to the strong dissemination through media and web based outlets as well as word of mouth. The results of the public opinion survey indicate that measures will receive public support.

Training has been undertaken with staff from the DOE and DOA in monitoring, firearms use and hunting. In addition freelance workers have been trained in monitoring (The Police did not permit them to undertake firearms training), none the less the freelance workers have a high degree of field skill and are an important support to the project. The participatory approach taken with the action planning has ensured a high level of ownership to the plan and hence buy-in at an institutional level and at an individual level. Moreover, efforts were made to ensure that the action plan objectives are SMART and achievable in the 5-year timeframe.

The integration of activities in to Government (departmental) business plans is critical to implementation of the action plan post project; policy reviews and inclusion in to business plans are accordingly logframe indicators. However, for the action plan to be fully implemented post project additional financial resources will be required, albeit at a reasonably low level. Following the unsuccessful application to OTEP, raising funds to support the work will be a key activity for the project team over the next year.

8. Dissemination

The project has achieved a high level of awareness amongst wider population on Montserrat. People are aware of the issues with loose livestock and feral livestock, due to the social and financial implications such as crop damage. Whilst most people (c.70%) are not livestock owners, the remaining 30% do own livestock (although a very small percentage have large numbers) leading to competing interests. Many landowners are unhappy with loose livestock being run on their land whilst owners of loose livestock frequently feel they have lost their land and have not been compensated. Clear messages that the project is supporting better and more productive management of owned and the planned control of feral animals is important.

Target audiences have been engaged through the steering group, that has representatives from hunters, landowners, livestock owners, conservationists, public utilities and the DOA/DOE. An even wider group was invited to participate in the action planning process to maximise consensus on the way forwards. Other key target audiences engaged have been the Police and the Governors Office.

Wider dissemination in Montserrat has been undertaken through radio (a popular medium in Montserrat), newspapers, the Internet and word of mouth. The national level dissemination will be continued and enhanced, particularly social marketing to promote improved management of loose livestock and to raise awareness when the control phase is implemented.

The project has achieved a good international profile with 2 posters and one conference paper presented. The project has had enquires from several Caribbean states and from as far a way as Fiji. This is indicative of a genuine need for resources on feral animal management and regional dissemination will be enhanced in the second year of the project, through the dissemination of the feral animal control resource and the sharing of lessons learned.

9. Project Expenditure

Please expand and complete Table 3.

Table 3 Project expenditure during the reporting period (Defra Financial Year 1 April 2009 to 31 March 2010)

Item	Budget (please indicate which document you refer to if other than your project application or annual grant offer letter)	Expenditure	Variance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment			
Cameras (Remote monitoring)			
Boar Operated Monitoring System			
GPS			
Computer (not originally budgeted)			
Hunting equipment			
Others (specify)			
Salaries			
Dr Giovanni Massei			
Dr Sugoto Roy			
Statistician			
Local Staff			
TOTAL			

**The equipment budget showed an under spend, this is due to the cameras being sourced below the planned cost and the lower than expected cost of the BOS system

10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

The project has the strong potential to have an outstanding achievement by the end of the second year. Given that feral animals are a widespread environmental and social problem in the Caribbean Region the project has 1) a strong potential to be showcased as a model for the planning and implementation for feral livestock management and 2) the development of a regional team with a number of specific skills who could undertake a role in advising and/or implanting feral livestock projects in the UK Caribbean Overseas Territories or neighbouring countries. This will be reported during the final report when training and pilot management measures are established.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2009/10

Project summary	Measurable Indicators	Progress and Achievements April 2009 - March 2010	Actions required/planned for next period
<p>Goal: <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>		<p>To early to fully assess at this stage of the project, however British expertise has supported preparatory actions that have positioned Montserrat partners to implement a feral livestock action plan that will extent over 5 years (i.e. 4 years beyond EOP) which will substantially reduce the risk to biodiversity and ecosystem services</p>	<p><i>(do not fill not applicable)</i></p>
<p>Purpose A sustainable, locally managed programme to minimise the destructive impacts of feral livestock in and around the Centre Hills is established</p>	<p>Number of sightings of feral livestock in the Centre Hills decreases by the end of Y2</p> <p>Catch per unit hunting effort decreases by the end of Y2</p> <p>Number of animals using BOS decreases by the end of Y2</p>	<p>A monitoring baseline has been established for pre-control population levels. Volcanic activity restricted access to parts of the Centre Hills but did not prevent effective monitoring</p> <p>An action plan is in place to guide the implementation of control measures and training has been undertaken in feral animal management</p> <p>The BOS system was not effective and monitoring has been undertaken using game cameras</p>	<p>Implementation of pilot control measures identified in the action plan in parallel with continued monitoring using game cameras. The optimal approach will be a concerted control effort followed by a cessation of hunting to measure results (with out skewing the data by disturbance).</p> <p>Vigilance over the volcanic activity will be required to ensure compliance with access restriction</p>
<p>Output 0. Project management arrangements in place and operational</p>	<p>NA</p>	<p>Project management arrangements were successfully completed and project initiated with an experienced project co-ordinator in place, agreements were signed and technical and financial procedures established.</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2009 - March 2010	Actions required/planned for next period
<p>Activity 0.</p> <ol style="list-style-type: none"> 1. Memorandum of collaboration signed 2. Identify local project co-ordinator 3. Monthly teleconference to discuss project progress 4. Plan stakeholder workshop 5. Establish hunter group 6. Stakeholder workshop to agree project work plan 7. Project steering committee established and meeting 2/year 8. Inform landowners of monitoring activity 9. Report submitted to Darwin 10. Student starts on Montserrat 		<ol style="list-style-type: none"> 1. Signed by MALHE, FERA and RSPB August 2009 2. Interviews undertaken in July 2009 and a project co-ordinator with experience of pig monitoring appointed 3. Regular teleconferences held 4. A stakeholder workshop to launch the project was held in Montserrat 5. A number of meetings were held with the hunters and several central government staff or project assistants are hunters and are able to represent views 6. Workshop held on 22 July 2009 to introduce the project (see annex) 7. Project Steering group met in July, November, December 2009 and at the workshop in February 2010, a terms of reference has been approved 8. Letters were sent to land owners in October 2009 9. Half year report submitted 10. The role of the student was revised and the research is being undertaken by the project co-ordinator <p>Project management activities in place will be continued.</p>	
<p>Output 1. Knowledge of existing feral livestock in and around the Centre Hills boundary is increased</p>	<p>Baseline assessment completed by end of Y1</p> <p>DOA and DOE use data to inform activities by end of Y2</p>	<p>The understanding of the feral animal population levels and distribution has been greatly improved and will guide management strategies. Game cameras have been very effective and compensated for challenges from volcanic activity and the disappointing results from the BOS system. The data was presented at the action-planning workshop and provided compelling evidence for the development of a control programme and the selection of options. The Action Plan will guide control measures during year 2 of the project. Indicators are appropriate</p>	
<p>Activity 1.</p> <ol style="list-style-type: none"> 1. Build Boar Operating System (BOS) on Montserrat 2. Procure equipment, 3. Plan fieldwork 4. Collect and store feral pigs 5. Test BOS monitoring 6. Agree system to map livestock and agricultural plots on CH boundary 7. Survey existing public attitudes to pig consumption 		<ol style="list-style-type: none"> 1. BOS was constructed – with 8 being built 2. Equipment including game cameras, freezer and field equipment and sourced and purchased 3. Field work was planned and implemented 4. 4 skulls were collected for ageing and training 5. The BOS system was tested from 19 – 30 July in 3 areas, and then further deployed to a total of 7 areas and ran between September and October before being abandoned to low visitation and volcanic activity 6. This was partially undertaken however the volcanic activity and the extension of restricted areas has prevented completion 	

Project summary	Measurable Indicators	Progress and Achievements April 2009 - March 2010	Actions required/planned for next period
<ul style="list-style-type: none"> 8. BOS monitoring (4 times) 9. Desk review of pig and goat control methods 10. Recruit student, 11. Draft demonstration project report 12. Summarise results 13. Workshop to present project results 		<ul style="list-style-type: none"> 7. A public opinion survey was undertaken and completed by February 2010 and results were presented at the action planning workshop 8. BOS monitoring (7 stations September-October 2009) was initially unsuccessful perhaps due to the high availability of natural food, but then was discontinued because of volcanic activity in the areas being monitored. Monitoring using game cameras (23 sites) was successful and operates continuously, where volcanic activity permits 9. A review of feral animal control methods was complete and disseminated at the February workshop 10. Not undertaken, role of student replaced by locally based co-ordinator 11. A project submission was made to OTEP but the application was not successful 12. Data from the cameras, spring patrols, loose livestock transects, animal pound records, crop damage records, was collated and summarised to present at the action plan workshop. Hunting data was difficult to gather and is incomplete, probably due to social conditions making hunters cautious over revealing full extent of activities 13. Preliminary results were presented at the action planning workshop in Feb 2010, these are a baseline for the presentation of the final project results 	
<p>Output 2. 2. Technical expertise is enhanced and new skills developed in the monitoring and control of feral livestock</p>	<p>10 persons trained by Y2</p>	<p>Training through training courses and on the job learning has been undertaken and 9 government and assistant staff are familiar with the monitoring methodologies. The police gave additional training to 10 government staff in firearms use and hunting by a UK expert; a critical enhancement of the skill base to implement control measures. The indicators are appropriate.</p>	
<p>Activity 2.</p> <ul style="list-style-type: none"> 1. Prepare training material 2. Training to deliver monitoring 3. Training to collect biological data 4. Montserratian participation at International Wild Boar Conference 		<ul style="list-style-type: none"> 1. Training materials including presentations and sheets describing tooth eruption patterns were prepared by July 2009 2. Training sessions on monitoring with BOS and cameras were undertaken 19 – 31 July (see training report) and further on the job training has been given to MALHE staff and project assistants. Additional training was given to 10 participants in fire arms use and hunting techniques 3. Training sessions on the collection of biological data (age by tooth eruption, weight, sex, uterus checks for foetuses) were held 19 – 31 July 2009 with 13 persons attending in a classroom and field setting. Further training was given to staff of the utilities company to assess animal activity in water catchments in 	

Project summary	Measurable Indicators	Progress and Achievements April 2009 - March 2010	Actions required/planned for next period
		<p>October 2009</p> <p>4. One local staff member presented a poster at the Society for the Conservation and Study of Caribbean Birds (SCSCB) conference in Antigua 2009. Plans are being made for presentation of the project results in the UK at the International Wild Boar Conference in Sept 2010</p>	
Output 3. Options to control feral livestock in and around the Centre Hills are assessed	Key stakeholders agree on preferred option to control feral livestock and sign off action plan	Key options were researched and presented to the stakeholder group during the action planning process. Two control methodologies were identified as suitable and will be trailed in year 2. The action plan is now in an advanced draft and will be revised in light of the experimental control and signed of at EOP	
<p>Activity 3.</p> <ol style="list-style-type: none"> 1. Review report on the control and management of feral pigs and goats circulated 2. Stakeholder workshop to agree on options 3. Feral livestock control plan produced 4. Agree livestock demonstration project 		<ol style="list-style-type: none"> 1. A report on the control and management of feral pigs was completed and presented in summary form at the action planning workshop in Feb. 2010 and is being disseminated as a part of the workshop outputs 2. A 3-day workshop was held in Feb. 2010 to assess and agree options for the management of feral livestock, (see annexed workshop report and draft action plan 3. An action plan was drafted at the workshop, outlining a strategy for the management of feral livestock 4. A feral livestock management project was drafted and submitted to OTEP, but was unsuccessful. The project will be revised to fit with available resources in year 2 	
Output 4 Actions to control feral livestock in and around the Centre Hills are improved	<p>Number of livestock registered has increased by end of Y2</p> <p>Actions identified in feral livestock action plan are undertaken by end of Y2</p>	<p>The preparatory work to implement control actions on feral livestock have been undertaken and the action plan can be rolled out in year 2</p> <p>The action plan also identifies measures to reduce loose livestock numbers (loose livestock being one of 6 result areas). A revised project the development of model animal management systems will be developed from the original OTEP application with a reduced budget. The indicator of number of animals measured may be less useful than population of loose live stock derived from transect data</p>	
<p>Activity 4</p> <ol style="list-style-type: none"> 1. Actions implemented to control feral livestock 2. Complete analysis on control data 3. Livestock demonstration project (fencing, tethering, fodder crops 		<ol style="list-style-type: none"> 1. Actions were agreed and documented in the Action Plan (March 2010), training was undertaken in hunting and firearms use and a key activity for the next project is to implement a monitored control programme using hunting with guns and trialling coral traps 	

Project summary	Measurable Indicators	Progress and Achievements April 2009 - March 2010	Actions required/planned for next period
<p>etc.) implemented</p> <p>4. Rapid assessment of tethered livestock at start and end of project</p>		<p>2. To be undertaken following the initial control effort</p> <p>3. To be undertaken in the second year of the project, the OTEP application was unsuccessful and activities to be revised under current resources</p> <p>4. The assessment of loose and tethered livestock (owned) is undertaken each week and is ongoing</p>	
<p>Output 5 Policies on livestock management are strengthened</p>	<p>Review of existing policy completed by mid Y2</p> <p>Recommendations integrated into DOA and DOE business plans by end of Y2</p>	<p>The Veterinary Department have improved the understanding of the current policy and legislative context of loose livestock management and a policy review will be undertaken in year 2. Progress has been made on the policies and procedures over the use of firearms, but further clarifications are required</p>	
<p>Activity 5</p> <p>1. Clarify procedures on use of firearms</p> <p>2. Review existing livestock policy and prepare report with recommendations</p> <p>3. Circulate draft livestock policy report and integrate recommendations into DOA</p>		<p>1. Progress has been made on the clarification of the use of firearms and in establishing permissions for import and use. Concerns exist over security and associated security considerations, however progress was made towards the end of year 1 with the Police undertaking firearms training and granting permission for hunting training (see reports). Further clarification of the process for importing additional firearms and for routine use is a priority action</p> <p>2. To be undertaken by the veterinary department in the first quarter of year 2</p> <p>3. Year 2 Activity</p>	
<p>Output 6 Awareness is raised on Montserrat and in the Caribbean about the impacts of feral livestock on biodiversity and livelihoods</p>	<p>2 reports in media/yr</p> <p>2 updates posted on DOE website/yr</p> <p>>3 islands receive copy of pig manual</p> <p>Project is presented at 2 conferences by end of Y2</p>	<p>A strong project profile has been established, with a wide understanding on Montserrat and dissemination more widely in the region. Media and web based dissemination targets have been exceeded and the project has already been presented at two international meetings with one more planned for 2010. Indicators are appropriate.</p> <p>The project has already presented at two international meetings, and a presentation is scheduled for 2011</p> <p>The production and dissemination of the pig manual will be undertaken in year 2</p>	
<p>Activity 6.</p> <p>1. Present project at Cayman Conference</p> <p>2. Produce press releases</p>		<p>1. Stephen Mendes presented on spatial planning in the Centre Hills</p> <p>2. Reducing feral livestock in and around the Centre Hills – Government press release 24th July 2009 (www.gov.ms); Guide to the Centre Hills Launched – Government press release 23rd July 2009 (www.gov.ms); Darwin News letter article; Fera news letter Jan 2010; Darwin feral livestock project - The Montserrat Newsletter 7th December 2009, Darwin feral livestock project</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2009 - March 2010	Actions required/planned for next period
<ul style="list-style-type: none"> 3. Radio Interviews 4. Website postings, 5. Feral pig manual 6. Dissemination of manual 7. Presentation of papers 8. Poster 		<ul style="list-style-type: none"> - The Montserrat Reporter (Newspaper) 5th February 2010, Attacking feral animals and loose livestock - The Montserrat Reporter, 5th March 2010 3. Feral livestock workshop opening – 22nd July 2009 (Gerard Gray, Stephen Mendes, Sarah Sanders); Darwin Feral livestock project – 25th July (Giovanna Massei and Sugoto Roy); Update on project and introduction to project coordinator – October 2009 (Richard Bunting and James Daley); Workshop advertised on Radio Montserrat, news item with interviews and 1hr phone in on the People show (Feb 2010 Darwin Feral livestock project next steps, a 1hr phone in show ‘the peoples show’ featured the project – 24th February 2010 (James Millett, Giovanna Massei, Richard Bunting, James Daley 4. Web posting and news <p>Reducing feral livestock in and around the Centre Hills – Government press release 24th July 2009 (www.gov.ms) http://www.gov.ms/?p=618 4th January 2010, www.fera.defra.gov.uk, Press release on FERA’s involvement in project) http://www.fera.defra.gov.uk/showNews.cfm?id=418 7th January 2010, www.gom.ms, press release detailing what the project is about on the official Government of Montserrat Website) http://www.gov.ms/?p=1812 30th January 2010, www.mnialive.com, more informal project overview on a forum style website all about Montserrat. This was to outreach to Montserratians living abroad at present and to give people an opportunity to comment on the project) http://mnialive.com/home/index.php?option=com_content&view=article&id=240:darwin-feral-livestock-project&catid=64:mni-view&Itemid=158 5th February 2010, www.themontserratreporter.com, Identical copy of general project overview that was published in the local newspaper http://www.themontserratreporter.com/index.pl/article_local?id=4556292 4th March 2010, www.gov.ms, press release covering project workshop on Government website http://www.gov.ms/?p=2043 5th March 2010, , www.themontserratreporter.com, Identical copy of workshop press release that was published in the local newspaper http://www.themontserratreporter.com/index.pl/article_local?id=4714526</p> <ul style="list-style-type: none"> 5. Discussions and preliminary planning for the pig manual held, to be progressed in 2010 6. Dissemination of pig manual to be undertaken in year 2 7. Planned presentation at the International Wild Boar Conference 2010 in York UK 8. Poster presentation at the SCSCB meeting in the Caymans and a paper was presented at the 2010 International Wild Pig Conference in the US 	

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal:</p> <p>Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.</p>			
<p>Sub-Goal: Support the conservation of biodiversity and improve livelihoods in and around the Centre Hills</p>	<ul style="list-style-type: none"> Populations of key species (mountain chicken, oriole) remain stable by end of Y2 Water quality does not deteriorate and supply remains at the same level by end of Y2 Livestock management around the Centre Hills boundary is improved by end of Y2 	<ul style="list-style-type: none"> Montserrat biodiversity databases MWU water quality reports Rapid loose livestock assessment report 	
<p>Purpose</p> <p>A sustainable, locally managed programme to minimise the destructive impacts of feral livestock in and around the Centre Hills is established</p>	<ul style="list-style-type: none"> Number of sightings of feral livestock in the Centre Hills decreases by the end of Y2 Catch per unit hunting effort decreases by the end of Y2 Number of animals using BOS decreases by the end of Y2 	<ul style="list-style-type: none"> Forest patrol and MWU reports Hunting records BOS monitoring reports 	<ul style="list-style-type: none"> Volcanic activity impacts on the forest are minimal Hurricanes do not destroy island infrastructure
<p>Outputs (add or delete rows as necessary)</p> <p>1. Knowledge of existing feral livestock in and around the Centre Hills boundary is increased</p>	<ul style="list-style-type: none"> Baseline assessment completed by end of Y1 DOA and DOE use data to inform activities by end of Y2 	<ul style="list-style-type: none"> Centre Hills boundary map (crops, livestock areas) Report on pig and goat control methods DOA, DOE business plans 	<ul style="list-style-type: none"> Human resource capacity is available on Montserrat to collect data

Project summary	Measurable Indicators	Means of verification	Important Assumptions
2. Technical expertise is enhanced and new skills developed in the monitoring and control of feral livestock	<ul style="list-style-type: none"> • 10 persons trained by Y2 	<ul style="list-style-type: none"> • Training certificates • Training reports 	<ul style="list-style-type: none"> • Persons are interested to undertake training on Montserrat
3. Options to control feral livestock in and around the Centre Hills are assessed	<ul style="list-style-type: none"> • Key stakeholders agree on preferred option to control feral livestock and sign off action plan 	<ul style="list-style-type: none"> • Workshop report • Feral livestock control plan 	<ul style="list-style-type: none"> • Continued co-operation between stakeholders
4. Actions to control feral livestock in and around the Centre Hills are improved	<ul style="list-style-type: none"> • Number of livestock registered has increased by end of Y2 • Actions identified in feral livestock action plan are undertaken by end of Y2 	<ul style="list-style-type: none"> • Livestock register • DOE/DOA monthly reports 	<ul style="list-style-type: none"> • Trained staff remain on Montserrat
5. Policies on livestock management are strengthened	<ul style="list-style-type: none"> • Review of existing policy completed by mid Y2 • Recommendations integrated into DOA and DOE business plans by end of Y2 	<ul style="list-style-type: none"> • Review of policy report • DOA business plan • DOE business plan 	<ul style="list-style-type: none"> • There is political will on Montserrat to improve livestock management
6. Awareness is raised on Montserrat and in the Caribbean about the impacts of feral livestock on biodiversity and livelihoods	<ul style="list-style-type: none"> • 2 reports in media/yr • 2 updates posted on DOE website/yr • >3 islands receive copy of pig manual • Project is presented at 2 conferences by end of Y2 	<ul style="list-style-type: none"> • Newspapers, radio bulletins • Website hits 	<ul style="list-style-type: none"> • Media continue to support project

Annex 3 Onwards – supplementary material (optional but encouraged as evidence of project achievement)

- Annex 3.1 Press Releases and Articles
- Annex 3.2 Action Planning – Input Papers, PowerPoints and Action Plan
- Annex 3.3 Reports
- Annex 3.4 Posters and Papers
- Annex 3.5 Training Materials and Reports
- Annex 3.6 Public Opinion Survey Questionnaire

Annexes are included as zip files on a CD

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	N
Is your report more than 5MB? If so, please advise Darwin-Projects@ltsi.co.uk that the report will be send by post on CD, putting the project number in the Subject line.	Y
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.	Y
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.	Y
Have you involved your partners in preparation of the report and named the main contributors	Y
Have you completed the Project Expenditure table fully?	Y
Do not include claim forms or other communications with this report.	