Darwin Initiative – Final Report

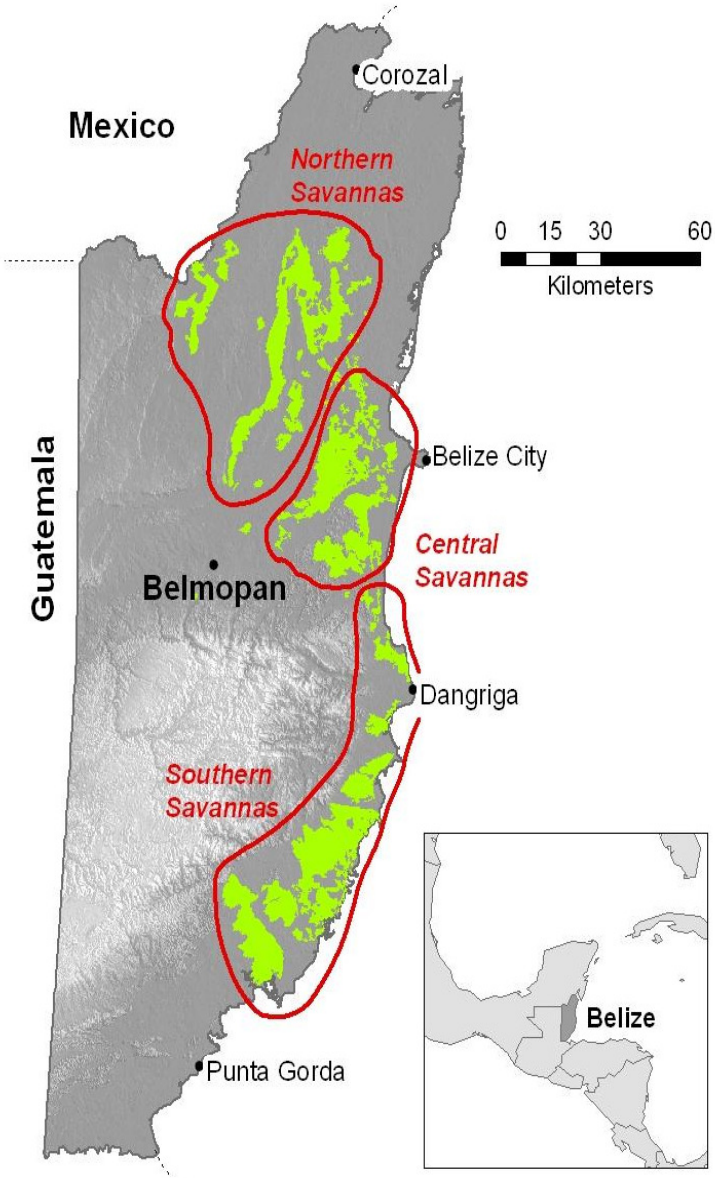
(http://darwin.defra.gov.uk/resources/reporting/) -
*it is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)*

Darwin project information

Project Reference	**17-022**
Project Title	**Conservation of the lowland savanna ecosystem in Belize.**
Host country(ies)	Belize
UK Contract Holder Institution	University of Edinburgh
UK Partner Institution(s)	Royal Botanic Garden Edinburgh (RBGE)
Host Country Partner Institution(s)	Environmental Research Institute (ERI) of the University of Belize, Belize Botanic Gardens (BBG), Programme for Belize (PfB), Government of Belize Forest Department (FD) and Belize Tropical Forest Services (BTFS)
Darwin Grant Value	£ 287,951
Start/End dates of Project	1st April 2009 – 31st March 2012
Project Leader Name	Dr Neil Stuart
Project Website	http://www.eeo.ed.ac.uk/sea-belize
Report Author(s) and date	Dr Neil Stuart (UofE); Zoe Goodwin (RBGE); Dr Elma Kay and German Lopez (ERI); Mario Teul (BBG).

1 Situation before the project and achievements

In 2009, there was very little scientific information available on which to base a conservation strategy for the savannas which make up 10% of the land of Belize in Central America. The biodiversity of these areas was being rapidly degraded as land was converted to agriculture, aquaculture, pasture and for urban development. Little was known about plant distribution nationwide. Although it was postulated that the savannas contained most of the country's endemics, information about species distributions was based on only a few areas of plant collecting. Although a national herbarium existed in the Government Forest Department, it was under-resourced, with some specimens incorrectly named and poorly catalogued, so the resource was unusable. Belize's National Self-Assessment in 2005 highlighted that few local people had skills in plant identification or in monitoring and mapping and this was constraining many local organisations from addressing Belize's responsibilities under the CBD to conserve the resources of this ecosystem.



Remaining savanna land, identified from new satellite data were grouped into 3 regions for study

What did we achieve?

By mapping the remaining areas of savanna from satellite imagery, a nationwide inventory was created and used to guide botanical surveys of the savannas. This has yielded the first detailed and comprehensive account of the flora of these savannas and its distribution nationwide, so that the conservation of the ecosystem can now be planned at a national as well as local level.

Over 40 people have been trained to carry out botanical surveys, plant collecting and recording using GPS. The plant specimens collected are now identified by trained staff, recorded in a database and curated into larger and properly catalogued cabinets in the herbarium.

The mapping is now used to inform national land use planning decisions, whilst many of the individuals trained by this project are now employed in government agencies and conservation NGOs. The botanist employed and trained by this project is continuing as member of staff of the first Environmental Research Institute, established in Belize during and with the support of this Darwin project. The Institute now has the staff skilled to continue to undertake monitoring surveys of the ecosystem as part of Belize's reporting under the CBD. The new findings about the rare, endangered and interesting plants of the savanna have also been used to create a variety of public awareness initiatives. These include the building of new interpretive trails and the creation of various resources to help students, children and the general public understand and come to value this ecosystem for the plants and animals it contains.

2 Project Partners and their support to the Convention on Biological Diversity (CBD)

Our lead partner in Belize was the Environmental Research Institute of the University of Belize. The ERI was established during this Darwin project (January 2010) with this being one of three inception projects for the new Institute, (another one of which was the Darwin small mammal corridor project 17012). The mission of the ERI is to undertake environmental research and monitoring to support conservation initiatives so that Belize can meet its CBD obligations. During this foundation period, the ERI had one staff member supported by this Darwin project (German Lopez - the Belizean Darwin Botanist) and another staff member supported by Darwin project 17012. ERI has been both a recipient and a provider of training, co-ordinating our training events in Belize and recruiting participants using its nationwide network. It hosted several of our project management and training meetings in Belize. The ERI was the main recipient of both the botanical data collected by the project but also of the human resource capacity building, with UK staff training the Darwin botanist intensively over a period of 9 months of field training in Belize and two months of training him in UK institutions including RBGE, Kew, the Natural History Museum and the University of Edinburgh. One of our proud achievements is that German is now trained sufficiently in plant collecting and curation that he now undertakes training, continues the plant collecting and maintains the collections in the national herbarium as their 'de facto' curator. Since the end of the project, the ERI has assumed responsibility for maintaining and disseminating botanical data and has incorporated many project outputs into their Biology and Natural Resources Management programmes.

The Government Forest Department (FD) is the National Focal Point for the CBD in Belize, responsible for reporting Belize's progress in meeting its target for curbing biodiversity loss and reducing degradation of national ecosystems. FD is responsible for maintaining Belize's National Herbarium and has signed an MOU laying out a plan for the eventual transfer of the herbarium to a purpose built facility that the ERI plans to construct by 2020. In preparation for this eventual transfer to the ERI, the existing collections needed to be systematically re-organised, with the collections given more space and expanded to occupy additional storage. The re-curation of the existing savanna plant specimens and the incorporation of specimens newly collected by our project is one of the legacies of this Darwin project. As a member of the National Protected Areas Secretariat, FD can ensure that the outputs and recommendations from this project are communicated to government agencies including the Ministry of Natural Environment.

3 Project Partnerships

The University of Edinburgh established an MOU with the University of Belize during the scoping period for the project. The partnership developed significantly after the ERI was inaugurated in January 2010, with the new institution having more autonomy and employing staff funded for the first 3 years through the two Darwin projects. Several of the scientific monitoring and training objectives of the project were jointly written in the expectation that the ERI would come into being during the project. Once established, the ERI was able to articulate its particular needs in terms of capacity building much more clearly to the UK partners. The main support has been in terms of building the human resource capacity for the ERI, both for its new employees and through the training courses the ERI wanted to run for a wider nationwide network with the support of the UK Darwin staff expertise. Although the ERI has often led the specification of local needs, all our partners have been involved in project planning and decision making, through regular in-country partner meetings and through frequent communication, helped by our staff being in the country for 80 weeks out of this 150 week project. ERI staff also spent 3 months in the UK, gaining experience of the operation and culture of several larger international research institutes.

Two of our other partners were NGOs. Belize Botanical Gardens (BBG) is an established botanical garden in Belize, with an education centre and the largest set of botanical reference material in the country. BBG's role was to first establish a new attraction, the *Darwin Savanna*

Trail at the Garden, which school groups and the general public now visit to learn about the savanna ecosystem. BBG then developed educational materials for the school children and the teachers who visited this attraction.

Programme for Belize (PfB) manage the largest area of protected lowland savanna in Belize and were the first NGO to develop a management plan for their savannas. This plan was informed by previous botanical collections made by RBGE and mapping from satellite data generated by UoE. The nationwide surveys conducted in this project scaled up this prior work in PfB's Rio Bravo area. PfB have received our new digital mapping and checklists for the savannas under their protection and have hosted several of our field based training courses at their Hill Bank Research Station. Over 40 staff from other organisations have attend these training courses at PfB and used techniques and new resources that they have taken back to train others in their own organisation.

During the project we were pleased to welcome Belize Tropical Forest Services (BTFS) as an additional project partner. BTFS maintains the Belize Environmental Resource Data Service (BERDS), the *de facto* clearing house for all environmental data in Belize. BTFS also produced the two previous editions of the National Ecosystems Maps for Belize in 2000 and 2005, widely used by NGOs for national land use policy making. We have worked increasingly closely with BTFS over the last year since they agreed to be the custodian for the new savanna mapping produced by this project and pledged to maintain and disseminate the data within Belize. BTFS was also leading a UNDP-commissioned project to create a *National Integrated Planning Framework for Land Resource Development* and a *National Land Use Policy* for the Government of Belize (http://www.landusepolicy.bz/). BTFS took the mapping produced from this Darwin project and used this as an input to inform the land suitability mapping in this government supported project. BTFS then assimilate our mapping into the latest edition of the National Ecosystems Map which was published in 2012. These developing partnerships have enabled the project to hand over all the data we have created to number of trusted organisations who are now maintaining and enhancing these data sets.

As well as these main partners, we also developed closer collaborations with a number of NGOs operating in remoter parts of Belize. Our botanists undertook joint fieldwork with staff from the Toledo Institute for Development and Environment (TIDE) who manage the extensive savannas in the Payne's Creek Nature Reserve in the south of the country. TIDE offered their Ranger Station facility for us to use for our savanna plant identification training course in November 2010, which we delivered in conjunction with another NGO from the south of the country, the Belize Foundation for Research and Environmental Education (BFREE). This and other training courses were advertised to all NGOs in the country through the Association of Protected Areas Management Association (APAMO), with whom we maintain regular contact. We also established contact with the Chief Education Officer from the Ministry of Education, who approved our plans for educational materials to support the school curriculum and granted BBG permission to trial these in selected schools in the Cayo District in the last year of the project. The project continues to build new contacts. In the last few months of the project, we were contacted by the Belize Zoo, who had heard about the savanna trail created at the BBG. The Zoo wishes to upgrade an existing but underutilised network of trails in its savanna habitat as a means of creating a new visitor attraction. We have started to assist them with the design of signage for interpreting their Trails and this is one of several activities that will continue through the remainder of 2012.

We have also maintained regular contact with the other DI project running concurrently in Belize (*17012: large mammal corridor project*). The PIs of both these Darwin projects (Stuart, Doncaster) gave talks together at the Annual Conference of the UK-Belize Association, held at the University of Oxford in September 2010. Staff from project 17012 routinely attended our partner meetings and training courses in Belize and we worked together in the ERI on overlapping projects. The two projects have co-operated in a number of ways, such as by sharing our mapping and imagery. There has been genuine synergy between the two projects, especially since it was found from camera trap data that jaguars are actually utilising the savanna areas in the new Jaguar Corridor protected area much more than had been thought.

Our main UK partner throughout the project has been the Royal Botanic Garden Edinburgh. Our two organisations are closely linked with our staff previously contributing joint teaching of Masters courses and co-researching. The UK botanist for the project was employed and line managed through RBGE, although she worked closely with UoE staff especially during the establishment of the field sites using satellite imagery. Staff from both institutions worked together to deliver the training and field courses in Belize, with RBGE curation staff advising on requirements to bring the herbarium in Belize up to international standards.

In the UK we also developed closer collaborations with the Department of Plant Science at the University of Oxford. In June 2010, Dr Elma Kay from the ERI visited Oxford to take part in a course on plant databases and since January 2011 Dr Denis Filer and colleagues have assisted us to host the Darwin savanna plant database online using their well respected Brahms online website.

4 Project Achievements

4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

This Darwin project was mainly geared to building institutional capacity and training staff to carry out the monitoring of biodiversity, while conducting the baseline scientific surveys so that the nature, extent and biodiversity status of the remaining areas of the savanna ecosystem in Belize could be recorded. The project has shown that more than 10% of the ecosystem has been lost in the last 30 years, with significant conversion of savanna lands to pasture, shrimp farming and for road and housing developments. Many other areas of savanna, especially those outside protected areas have had their biodiversity reduced by increased fire frequency.

Some of the positive impacts upon biodiversity that may be anticipated from this project will stem from the new knowledge that has been gained about this ecosystem and its constituency. Examples of how these positive impacts on savanna biodiversity are occurring are:

1. There is now an increased ability of many governmental and NGO managers of protected areas to monitor biodiversity in savanna areas; many rangers and NGO staff have attended training courses and can now use the specially produced checklists and mapping (3 are included in our output reports) to identify and map rare and endemic plants in their areas; this information is now feeding into management plans for protected areas and the information used to strengthen the case for conservation or protection.
2. We have gained an increased understanding of how to propagate rare or endangered savanna plants. Our colleagues at BBG created a savanna ecosystem and have learnt which soil and drainage conditions are most effective for propagation and survival of various savanna plants. This experience with *ex situ* conservation has allowed them to rescue many plants that would otherwise have been lost when savanna land was cleared for other uses;
3. With the maps and botanical data, we can now recognise specific locations in the country where combinations of rare/endangered or localised clusters of species are found, sometimes in relatively unique habitats. This provides a basis for recommending areas (including existing protected areas) where the effectiveness of conservation management needs to be enhanced.
4. With our data being input into the new National Land Use Planning Policy, there is a means to ensure that savanna lands that are unsuitable for certain alternate uses (e.g. agriculture) are zoned so they are less likely to be temporarily exploited for such purposes and then abandoned, a process which is noted to severely degrade many savanna areas.
5. A further and growing impact over and beyond the project has been the raising of public awareness about the use and value of savanna areas. Overall, the project has provided considerable evidence that savanna areas contain more biodiversity than commonly

was imagined. It has shown that savannas are valuable habitats for endemic plants, migratory birds and serve important water purification and flood control functions, amongst other benefits. By working to educate school children and university students who will go on to become decision makers about the environment, we have begun to raise public awareness about the services provided by the ecosystem in general and by the plant diversity in particular. In the longer term, this should mean that savanna areas are likely to be more valued in their own right, and as connecting elements within an overall network of protected areas in Belize. This information is also being conveyed via our partners to the National Protected Areas Secretariat, the governmental body which is charged with planning and reviewing the effectiveness and coherence of the country's protected area system.

4.2 Outcomes: achievement of the project purpose and outcomes

The two purposes of the project were to undertake baseline taxonomic research and vegetation mapping of this ecosystem to enable areas for conservation priority within the lowland savannas of Belize to be identified, and to build the capacity of local institutions to continue this this activity beyond the lifetime of the project.

These two purposes have been achieved. Extensive baseline botanical surveys have been carried out, guided by the new mapping, while significant numbers of local staff have been trained and can now continue this work after the project has ended. The assets created in terms of the mapping and plant databases, but also the skilled staff in the new Environmental Research Institute and the network of NGOs managing savanna lands across the country are assets created by this project which will enable Belize to be much more effective in monitoring the state of its biological resources in future and reporting these to the CBD.

The project findings were discussed at a consultative meeting in country which agreed recommendations about areas that should be given priority for conservation either through improving the effectiveness of areas that are presently protected, or by reaching agreements with private landowners over sustainable management to protect biodiversity. These findings were reported to the CBD Focal Point and to the Association of Protected Areas Management Organisations in a report from the meeting in April 2011 attended by their representatives. The ERI will now follow this up by providing a policy briefing for ministers on this subject which will be presented to the National Protected Areas Secretariat of the Ministry of Natural Resources.

4.3 Outputs and activities

The project has successfully delivered all the planned outputs as laid out in the logical framework. It has exceeded its targets for numbers of people trained, numbers of reports and publications and volume of training materials produced.

% completion of each output

	1	2	3	4	5	6	7
Output	Plant collecting &Herbarium recuration	Checklists	Mapping	Reports &Publications	Photo Guides	Savanna Trail	Educational materials
% target complete	100%	150%	100%	150%	200%	100%	100%

All the training courses were delivered as planned. As a result of spending less on consultancy we were able to provide an additional month of training for the Belize Darwin Botanist in the UK in year 2 and further training of NGO staff in botany and in forest mensuration in year 3. By delivering 30 rather than a planned 16 weeks of training over the last two years, we significantly exceeded our expectation for delivery of training (enhancing local staff capacity).

One of the major activities completed in this year was the completion of the re-curating all the savanna plant specimens into the Herbarium by the Darwin botanist. All 9,546 savanna plant specimens in the Forest Department herbarium of acceptable condition have been mounted, curated into new cabinets and recorded in a Brahms database from which a catalogue has been created. This brings the Belizean collections up to international standards and enables the CBD focal point to make the collections available for research and monitoring.

A second major output completed in this final year was the assimilation of our savanna map data into the National Ecosystem Map and the National Land Use Strategy. This map analysis was also one of the inputs, along with other key biological data into the Consultative Workshop on Savanna Biodiversity and Conservation Planning that was held in Belize in April 2011.

The Photographic Field Guides (photo-guides for short) were further tested in the field this year with the intended local users. Instead of the single photo-guide to savanna plants originally envisaged, a set of 5 photo-guides aimed at different types of users have now been published online. Some 50 sets of each were distributed in laminated from to users in Belize this year. Our expectations for Output 5 have therefore been exceeded.

Belize Botanic Gardens made excellent progress completing the Darwin Savanna Trail within just one year of the project. This enabled the Trail to become established so that over 800 children and more than 80 teachers were able to visit this trail in year 3. By allocating residual unspent funds to BBG, we believe more than 200 children from at least 5 more schools will be able to enjoy this educational experience during 2012.

BBG completed the production of the materials to support the school visits whilst UofE and RBGE partners completed the planned set of 20 Educational Fact Sheets for High School/University students. These have been incorporated into lectures and field teaching at the University of Belize and support a variety of classes in botany, ecology and biology as part of the Natural Resource Management programme.

Reports on final year activities by our project partners are available on the project website at

http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/BBGyr3reportweb.pdf

http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/ERIyr3annual.pdf

As was previously reported, the project did encounter unforeseen difficulty in year 1 when the UK botanist was taken unexpectedly ill. The first field season was therefore terminated early. Fortunately as we were permitted to transfer unspent funds forward into the second year, the fieldwork was able to still be completed with adequate resources. By adjusting the schedule of activities, it was possible for the Belizean partners to visit the UK in year 1, which had not been originally planned but was found to be very useful. Fuller details of all these adjustments to the project have been documented in the change requests and annual reports for years 1 and 2.

4.4 Project standard measures and publications

All the project standard measures are quantified in the table in Annex 4

Annex 5 provides details of all publications and material that can be publicly accessed. All these publications can be freely downloaded from our project website, which will continue to be maintained as a lasting legacy for the project. Many of these materials have also been delivered to the ERI so they will also be available on their website.

4.5 Technical and Scientific achievements and co-operation

Botanical collecting, identification and databasing

Botanical surveys were undertaken mainly by Zoe Goodwin of the RBGE and German Lopez of the ERI, assisted by colleagues including Sam Bridgewater, Elma Kay, Eduardo Barrientos, Dave Harris, Elspeth Haston, Steven Brewer and by successive years of botany students on the training course in Plant Taxonomy at the Hillbank Research Station in Rio Bravo reserve. We also gratefully acknowledge the help of staff from many protected areas who assisted us.

1,080 specimen collections and around 2,200 species observations were made at 79 field sites well distributed across the country. A summary of the three field seasons of plant collecting can be browsed here: http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/allfieldwork.pdf whilst fuller details of methods and descriptions of every site and the data collected is at: http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/fieldworkappendix.pdf

Details of the scientific work to re-organise the Belize herbarium according to present state of taxonomic knowledge and the data-basing of the plant records is described here: http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/Darwin_Final_Herbarium_Report_Oct2011.pdf

Three specific species checklists and localised mapping were produced for three areas of the country with significant amounts of savannah land, much of it under protection. An example of one of these reports is here: http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/rbcma.pdf

Two academic papers were written regarding the botanical collecting and the resulting findings about the floristic diversity of the savannas of Belize. The main findings are reported in an article by Goodwin et al (2012) that has been accepted and is soon to appear in the refereed academic journal *Phytotaxa.* An earlier draft of the paper prior to revision is included here: http://www.eeo.ed.ac.uk/sea-belize/outputs/Papers/goodwin.pdf. A second article, focusing on one relatively distinct area of savanna was published earlier in the project by Hicks and Goodwin http://www.eeo.ed.ac.uk/sea-belize/outputs/Papers/Hicks_2011_San_Pastor_Online.pdf

A copy of the savanna plant database was published online in March 2010, hosted by the Department of Plant Sciences, University of Oxford at http://www.ox.ac.uk/bol/seabelize/). A second copy of the database has been delivered to the ERI and where it continues to be updated and maintained beyond the end of the project. In order to facilitate access to the botanical collections data by non-specialist users, a web mapping service was created by Go Sato and Neil Stuart which allows users to browse maps of Belize and locate plant collections in different areas. The web mapping tool can be explored here: http://xweb.geos.ed.ac.uk/~belize/

Savanna Mapping

Mapping was undertaken by Dr Ian Cameron, Dr Neil Stuart, Duncan Moss and Dimitrios Michelakis from the UoE, with assistance by Sam Bridgewater, Zoe Goodwin, and German Lopez. The map was validated by Jan Meerman of BTFS using a combination of field checking and reference to prior mapping.

An overview of the mapping work, written for non-specialists at Planet Action is available here: http://www.planet-action.org/web/88-project-publications.php?type=contributions&projectID=2831

Fuller details of all the data sets, the methodology and the results are described in this comprehensive report http://www.eeo.ed.ac.uk/sea-belize/data/sav_eco_2011/sea-belize_sav-eco-map-2011_tech-report.pdf

Following a 'soft launch' at the *First Annual Belize GIS User Conference* on 26th January 2011 (http://www.gis.com.bz/), where the project was represented by Jan Meerman of BTFS, the new mapping of the lowland savannas (now entitled the Savanna Ecosystem Map 2010) by Iain Cameron at UoE was published on http://www.eeo.ed.ac.uk/sea-belize/savanna_map.html and also on the Belize Environmental and Resource Data Service of Belize (BERDS) website http://www.biodiversity.bz/find/resource/profile.phtml?dcid=121384

4.6 Capacity building

The capacity of Belize to carry out biodiversity monitoring has substantially increased as a result of this project. Host country partners have been supported by training and human resources development, with some 42 local conservation professionals receiving training of periods from 2 days up to 2 weeks, and with the focused, intensive and sustained training of the Darwin Botanist over the last three years. As a result, the Darwin botanist is now training other staff in the ERI, staff from other NGOs and teaching students on the University's first natural resource management programme. This cascade training of further generations of staff and students is a major long term return on the training invested in this person.

The capacity of several institutions have been strengthened and enhanced by this project. The Forest Department has had its former capacity to record, store and make available plant specimens for consultation in a herbarium restored to them. This deficiency had been noted as a constraint in Belize's previous capacity self-assessment report to the CBD and has been corrected by this project. NGOs managing savannah areas have seen a substantial increase in materials available to aid their conservation and monitoring activities, with many now routinely using the checklists and photo guides created for them through this project. The University of Belize has also seen their students gain from enhanced fieldwork training in botany and plant collecting that is now taught by former Darwin project staff on their Biology, Ecology and Natural Resources courses. The most obvious example of institution building and strengthening was of course the inauguration of the Environmental Research Institute in Belize during the course of this project. This project and our 'sister' project 17012 provided foundation members of staff to the new ERI in botany and animal biology, enabling the new institute to begin with two high profile international biodiversity research studies as its inception projects.

The project has also enhanced the capacity of the UK partners to carry out Darwin projects. Through jointly delivering training workshops and field courses in Belize staff from both institutions have worked closely together and this has fostered a greater understanding of the complementary nature of our research and teaching and the ways in which botany and geography are both needed to address many of the challenges of conserving biodiversity worldwide. This has led for example to further joint teaching such as co-supervision of students on each of our different Masters programmes in Taxonomy & Biodiversity (RBGE) and Geographic Information Science (UofE). Personally, as the PI of this DI project Dr Stuart feels he has gained many skills in the management of teams of diverse research partner groups and has been very pleased to have been able to conduct a project where impact and capacity building are at the heart of the project, rather than being a minor addition to the science.

4.7 Sustainability and Legacy

The project leaves a substantial legacy including:

- National Herbarium in Forest Department restored to full functioning as a biodiversity resource;
- New Environmental Research Institute established, with core staff fully trained;
- Savanna Trail open at Belize Botanic Gardens, with know-how in ex-situ conservation of savanna plants established;
- New nationwide mapping of savanna areas in use by government agencies and maintained by Belizean partners.
- Comprehensive database of the savanna flora of Belize assembled, published and handed over to Belizean partners who continue to maintain it.
- Network of over 40 professionals across Belize working on the conservation and management of savanna areas established.
- Extensive training materials created and distributed to support ongoing collection, monitoring and curation activities.
- Since the end of the project, all our project staff have secured full time employment in conservation/research organisations in Belize and in the UK or have gone on to PhD study in this area.

All resources created by this project have been handed over to Belizean institutions that are now maintaining and developing them. The partners continue to work together. Currently, we have 4 Masters students working on analysis of the project data in our institutions, and one undergraduate student from Edinburgh is presently in Belize undertaking a dissertation on a follow-up topic.

5 Lessons learned, dissemination and communication

Many lessons have been leant. Two will serve as examples. 1) project plans sometimes have to be altered on account of unexpected situations and 2) by being flexible, this can create unexpected benefits. In our case, the sudden illness of the UK Botanist during the first year meant that we had to reschedule most of the field work into this second year, whilst using some of year 1 resources to bring the Belize Darwin botanist to the UK for training. We then observed that this training at UoE and at RBGE had significantly augmented his skills and so we further adjusted work-plans and resources so that German Lopez could make a second one-month visit to the UK in year 2, to gain further experience working in UK institutions.

We also learnt that it is important not just to do the work, but to let everyone know what has been done. Our dissemination has therefore been through as wide a variety of channels and to as many different audiences as reasonably possible. Beyond conventional academic articles which our UK research staff need to publish to justify their involvement, results have been disseminated at meetings in the UK, in Belize and internationally, using the Darwin Network's communication channels such as their workshops and the Darwin Newsletter, and using our partners dissemination networks and websites. To widen dissemination, we used networks in Belize such as the communications office of the Association of Protected Areas Management Organisations (APAMO), the mailing lists for the Meso-American Congress on Biodiversity, contact lists of biodiversity and conservation professionals in and beyond Belize maintained by the University of Belize, the ERI and various NGOs including TIDE, PfB and Belize Zoo For the educational outreach activities, information was disseminated to schools by our NGO the Belize Botanic garden through the Ministry of Education.

Project findings have been customised for many different audiences. Slides, fact sheets and photographs have been developed alongside the map and database products for use by researchers and university teachers. Checklists and photo guides have been created for Rangers and staff managing protected areas and also for use by students. General purpose field guides and Trails have been created for the general public at BBG and at Belize Zoo. For children, board games and colouring books have been produced to supplement school sessions. All of these resources will continue to be made available after the project through our website and those of our partners in Belize.

Further dissemination in the form of further briefings to government on the state of the savanna environment will be made by the ERI and through the publication this year of the 'Geo Belize' regional outlook report. We are presently editing a video of interviews with project partners who tell the story of the project in their own words. Some of these videos may be on the project website by the time this report is read.

6 Darwin identity

Viewing the website at http://www.eeo.ed.ac.uk/sea-belize illustrates how the project has established a clear brand identity through its characteristic savanna logos which have been used on all our communications, on all our factsheets, photo guides and on the interpretive signboards installed at Belize Botanic Gardens and the Belize Zoo, The Darwin 'finch' has also featured prominently on all these communications and in all our written and oral presentations of the project, and in all our reports to Government and NGOs.

In comparison to our sister project 17012, this project was not part of a larger project with other international NGOs and this in fact helped us to portray the distinct identity and purpose of the savanna project. The Darwin logo and the Savanna Project logos are now widely recognised by professionals across Belize and the website receives traffic daily from within and beyond Belize. Tourists will have some awareness through visiting our Trails and by links to the project from some Ecotourism operators. The general public will have some awareness of the project through the programme of school visits arranged for over 1,000 children, which will have been discussed enthusiastically with family members on their return home!

7 Monitoring and evaluation

The project was monitored using a variety of mechanisms:

1. Darwin Initiative's own reporting procedures;
2. Edinburgh University, RBGE and the ERI internal staff monitoring/reporting systems;
3. Annual and ad-hoc meetings in Belize and UK between UK and Belize project partners;
4. Feedback opportunities for Belizean and UK project staff and other stakeholders;
5. Six monthly and annual reports from UoE, RBGE, Belize Botanic Garden and ERI.
6. Review of Belize Botanic Garden visitation records and evaluation sheets from teachers and children visiting the savanna plant trail;
7. Attendance records and feedback forms from all project training workshops;
8. Users feedback on the education resources;
9. Comments from recipients of all photo guides and checklist distributed;
10. Assessment of re-curated savanna collections by international botanical experts;

All reports were scrutinised internally and reviewed by the PI prior to publication. Academic articles were subject to both internal and external peer review. The educational materials were reviewed by an independent botanist, Dr Steven Brewer of the BFREE organisation prior to publication. The Belize herbarium was inspected at three stages during the re-curation by Forest Department staff, by senior curators from the RBGE and by the curator of the herbarium of the University of Merida, Yucatan.

The most useful outcomes of these evaluations were local corrections to activities, the more effective use of project resources, more effective sharing of effort to achieve common purpose and external validation of the quality of the materials and findings. Although the full logical framework required for annual reporting was found to be an overly complex and means for monitoring and adapting to the dynamic and fluid real world situation in which our and many Darwin projects actually take place, we found the list of activities and milestones to be a practical and effective means to monitor completion of outputs in the timeframe.

7.1 Actions taken in response to annual report reviews

All comments we received from reviewers were circulated to the partners and acted upon.

8 Finance and administration

8.1 Project expenditure

Item	Budget	Expenditure	Variance
Staff Costs by individual			
Dr Iain Cameron (UK GIS Specialist)			
Zoe Goodwin (UK Darwin Botanist)			
German Lopez (Belize Darwin Botanist)			
Overhead Costs			
Travel and subsistence			
Other research costs			
Consultancy			
BBG sub-contract			
Audit			
TOTAL			

Travel & subsistence was overspent partly because we had failed to budget for travel and subsistence inside the UK to attend required annual Darwin workshops etc., which were very useful for the overall management and delivery of the project. This overspend on travel was counterbalanced by an underspend on consultancy and by avoiding some costs for data and equipment that was borrowed rather than purchased. By using these funds for travel and subsistence, we were able to fund a second visit to the UK by the Darwin botanist for more UK staff to participate in a third training field course in January 2012 in Belize. This investment in further training was much appreciated by the local participants.

8.2 Additional funds or in-kind contributions secured

Satellite imagery, software licenses and computer manuals were gifted to the project by various companies through the co-ordination of the Planet Action International Charity. These donations enabled the ERI to set up a GIS Laboratory. Had these licenses and data had to have been paid for, the real cost would have been around £ 45,000. Many of the partners made in-kind contributions, ranging from the secondment of their staff to assist in fieldwork and data collection, to the provision of meeting rooms and use of vehicles etc. Such support often allowed more staff to participate in training courses than would otherwise have been possible.

8.3 Value of DI funding

Among the activities that would clearly not have happened without this project are:

- New national mapping of the savannas of Belize from satellite data;
- Collation of all Belize's plant collection records from the various international herbaria into a single consolidated database;
- Comprehensive, nationwide botanical field surveying over three field seasons;
- Work over two years to recurate nearly 10,000 plant collections and the databasing & cataloguing of specimens to bring the national herbarium up to international standards
- Creation of a landscaped and interpreted Savanna Trail at Belize Botanic Gardens.

Annex 1 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress & Achievements	Actions continuing post-project
Goal: *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* *the conservation of biological diversity.* *The sustainable use of its components, and* *The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*		New Institution for biodiversity monitoring has been established and human resource capacity and resources has been built. CBD focal point now has resources needed for biodiversity monitoring. All scientific data now owned, maintained and updated by local institutions in Belize. Findings assimilated into the government's land use policy framework, management plans of the NGOs and a briefing to the National Protected Areas Secretariat.	
Purpose To identify priority areas for conservation within the lowland savannas of Belize, by undertaking baseline taxonomic research and vegetation mapping of this ecosystem and enhancing the capacity of local institutions to continue this activity	Savanna specimens in National Herbarium to be re-curated; Plant database and checklist to be created and published. Partners' capacity in taxonomy, field collecting and mapping to be increased by working with UK partners; Data and mapping to be handed over to agencies managing savanna by EoP. Photo-guide to savanna plants to be published;	All the savanna plant specimens in the National Herbarium have now been re-curated and re-housed into new cabinets. The Savanna Plant Database has been published online and delivered to the ERI who are continuing to update it. Belizean Darwin Botanist now works unsupervised as 'de facto' curator of Belize's national herbarium. Mapping has been integrated into Govt. National Land Use Strategy & Belize National Ecosystems Map 2011 Five photo-guides have been completed and published online.	Specimens are now accessible and catalogued. Forest Department has permitted ERI staff to maintain and update plant collections. Database can be browsed online through web mapping interface. Darwin botanist has secured continuing employment in the ERI. Mapping will be updated in future by BTFS and used to support national conservation planning. Local partners now create their own trail guides with these resources

Output 1. Capacity of local institutions to conduct botanical field surveys, collect and name plants and curate specimens to be enhanced.	Measurable Indicators	All 9,546 savanna plant specimens in the Forest Department herbarium of acceptable condition have been mounted, curated into new cabinets and recorded in a Brahms database from which a catalogue has been created. This brings the Belizean collections up to international standards and enables the CBD focal point to make the collections available for research and monitoring. 1,080 specimen collections and around 2,200 species observations have now been made from 79 field survey sites well distributed across the country. 42 individual Belizeans benefited from training in plant collecting, curation and GPS/GIS as appropriate to their needs, for periods ranging from 2 day short courses up to 2 week residential courses in plant taxonomy. 30 person-weeks of training were delivered during the project (almost double the target of 16 person-weeks).
	~ 10,000 existing savanna specimens in national herbarium to be re-curated. ~1,000 new collections to be made and names determined; ~40 local Belizean staff to be trained in plant collecting, curation and GPS/GIS as appropriate to their needs.	
Activity 1.3 Plant diversity surveys and vegetation habitat surveys conducted in lowland savanna areas;		1,080 savanna plants have been collected and 2,200 species observations been recorded from 79 sites across the country. Cross-checking with the mapping of savanna land cover and with locations of pre-existing plant collections suggests that an adequate coverage of the lowland savannas has been obtained.
Activity 1.4 Live plant collections made for the Savanna Trail at Belize Botanic Garden		During April–June and October–December 2010, and Dec 2011 Darwin botanists assisted staff from BBG on 6 fieldtrips to collect live plants for the Savanna Trail.
Activity 1.5 Determination of savanna collections using UK herbaria and international research literature;		Over 500 unidentified or misidentified savanna specimens in the existing savanna collections held at RBGE and BRH have now been correctly determined and correctly named by Zoë Goodwin and German Lopez during the project.
Activity 1.6 Re-curation of savanna collections in Belize's national herbarium;		9,546 existing mounted specimens in the Belize National Herbarium have been re-curated. This includes a further 1,200 savanna specimens mounted during the project and 500 new specimens collected during the project. The collections previously stored in 11 old cabinets have been expanded to fill 20 new ones.
Activity 1.7 Database developed of savanna plants of Belize.		Records for 9,546 herbarium specimens for savannah plants found in Belize (including historical records obtained from nine international herbaria) have been entered into the Brahms project database and handed over to the ERI in June 2012. The ERI now maintain/update this database for the Forest Department.
Activity 1.8 Training workshops in field botany, taxonomy, herbarium curation and GPS/GIS;		42 local individuals received training delivered using over 30 person-weeks of UK project staff time during the project. The Darwin Botanist also received focused 1-1 training by the UK botanist from 9 months of working together in Belize and from 2 one-month training periods in the UK (February 2010 and February 2011).

Activity 1.9 Savanna Plant Database available on-line		The savanna plant database was published in March 2010 on the BRAHMS online website hosted by the Department of Plant Sciences, University of Oxford. In December 2011 a web-mapping interface to the plant database was launched which is aimed at more general users wishing to browse plants by location.
Output 2. Checklist of savanna plants highlighting threatened, rare and endemic species.	Measurable Indicators Checklist drafted in year 1; revised by EoP.	
Activity 1.7 Database developed of savanna plant distributions and habitats;		Where possible, records have also been attributed with the characteristic habitat where the plant is typically found. This enables further studies of habitat niches of the plants and the identification of savanna specialists. This data also assisted geo-tagging records required to search using the web-mapping interface.
Activity 2.1 Checklist of savanna plants drafted in year 1, Updated and revised by EoP based on field usage.		The 'final' checklist was submitted as an article to the open access journal Phytotaxa in June 2011 and has been accepted for publication. The checklist is also available on the project website. Specific checklists have been developed as requested for land managers in the Rio Bravo, Paynes Creek and Northern Belize protected areas.
Output 3 Updated mapping of savanna habitats and conservation priority areas.	Measurable Indicators Mapping to guide field collecting produced in yr1; Maps identifying priority areas for conservation in yr2	Draft mapping was produced in September 2009 to guide botanical fieldwork. The accuracy has been improved by checked against ground data collected in September 2009, January 2010 and April 2011 and using high resolution imagery in selected areas. The savanna data was then assimilated into the new National Ecosytems Map of Belize published in 2011 by BTFS and input into the government of Belize National Land Use Policy framework.
Activity 3.1 Interpretation of remote sensing of savanna areas to guide field data collection programme;		The Savanna Ecosystem Map 2010 was published on 1st February 2010 on the project website and on the website of BERDS. Full metadata, *Release Notes* and a *Technical Report* have also been published. Activity 3.1 was completed in February 2011 with the handover of the digital mapping to BTFS.
Activity 3.2 Maps produced of diversity, habitat variety and recommended priority conservation areas within lowland savannas;		Maps have been produced showing savanna land cover subtypes broken down according to protected area and also by major watershed This mapping will be one of the inputs to the consultative meeting on savanna conservation to be held in Belize in year 3. Activity 3.2 will continue during year 3 since BTFS have agreed to validate the mapping and assimilate it into the National Ecosystems Map of Belize due to be published in 2012.

Activity 3.3 Consultative workshop on savanna conservation convened in Belize with governmental and NGO stakeholders.		Savanna Science Meeting held at the Tropical Education Center at Belize Zoo on 13th April 2011. Project staff and partners present the project's scientific results to a consultative meeting attended by 30 representatives of Belizean NGOs and government departments with responsibilities for managing savanna.
Activity 3.4 Dissemination of results to stakeholders in various forms.		A 120 page document summarising scientific knowledge about savannas in Belize and their levels of protection assembled for the Savanna Science Meeting was prepared and distributed to attendees, who have revised it with further input and comment. 3 organisations managing protected areas (PAs) with substantial savanna extents requested and received customised reports containing detailed mapping and specific checklists of plant species including rare and endemics found in their PAs, together with photo guides to aid in their identification. The ERI has agreed to produce and deliver a briefing to the National Protected Areas Secretariat based on these recommendations.
Output 4 Scientific Reports and Papers	Measurable Indicators 2 articles to be published in peer reviewed journals and 3 reports produced by EoP.	Two academic papers have already been published (Hicks, 2010; Goodwin 2011) and 2 further papers are in advanced stages of preparation. Nine reports have been produced for the Government of Belize Forest Department, NGOs and other government ministries (refer Annex 5). A further 9 Masters theses on topics related to the project have been completed over the past 3 years.
Activities 4.1& 4.2 Two papers on flora of Belizean savannas written and submitted for publication		The results of a survey of one area of savanna by Hicks and Goodwin was accepted in August 2010 by *Edinburgh Journal of Botany*. The national checklist was accepted as an extended article by *Phytotaxa* in December 2011.
Output 5 Photographic Field Guide to the commoner savanna plants, trees and shrubs created and distributed.	Measurable Indicators Photo-guide to be published in year 2; Number created and distributed reported.	
Activities 5.1, 5.2 Photographic field guide to savanna plants developed, tested and distributed		The Photographic Field Guides (photo-guides for short) have been extensively tested in the field this year with the intended local users. Instead of the single photo-guide to savanna plants originally envisaged, a set of 5 photo-guides (totalling 22 pages and containing over 400 original high resolution photographs) have now been published online. The photo guides are downloaded from http://www.geos.ed.ac.uk/research/eeo/sea-belize/education.html and used for various training and educational activities. Partners are now customising these for their own purposes.

Output 6 Darwin Savanna Trail established at BBG	Measurable Indicators New Savanna Trail to be constructed at BBG and open for public and school visits. Numbers of visitors to be recorded.	Belize Botanic Gardens constructed, planted out and fully interpreted the Darwin Savanna Trail within their property. They advertised the Trail to primary schools across the North of Belize and brought schoolchildren and their teachers by bus for structured educational visits to the Trail. To date, 880 students and 88 teachers from 22 schools have taken part in these visits to raise children's awareness about the plants and animals of the savanna ecosystem.
Output 7. Educational materials prepared for higher education, schools and for general public.	Measurable Indicators Educational materials to be created for both higher education and suitable for children.	With approval of the Ministry of Education, BBG have designed materials to support school children visiting the savanna trail. 2,500 self-guided tour books have been produced to support visits to the Trail. 2,500 copies of the 'Savanna Sam Play and Learn Board Game' have been produced which reinforces concepts learnt from the tour. 1,000 colouring sheets have been produced for younger visitors. 900 copies of the game and the colouring sheets have been distributed to date, with a further ten further school trips still to take place with remaining project funds. BBG have been provided with colour printing facilities to allow them to print and sell further materials, which pays for the re- reprinting. A set of 20 Educational Fact Sheets have been produced by the project partners aimed at High School/University students, together with a collection of over 400 high quality photographs of savanna plants. These have been incorporated into lectures and field teaching at the University of Belize and support a variety of classes in botany, ecology and biology as part of the Natural Resource Management programme. http://www.eeo.ed.ac.uk/sea-belize/education.html

Annex 2 Project's final logframe, including criteria and indicators

As above – no changes

Annex 3 Project contribution to Articles under the CBD

Project Contribution to Articles under the Convention on Biological Diversity

Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use		Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	**40**	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
9. Ex-situ Conservation	**10**	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity		Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	**30**	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	**15**	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Other Contribution	**5**	***Items 16,17***
Total %	100%	Check % = total 100

Annex 4 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
2	Number of Masters qualifications obtained	9 (4 planned)
4a	Number of undergraduate students receiving training	24
4b	Number of training weeks provided to undergraduate students	28
4c	Number of postgraduate students receiving training (not 1-3 above)	36
4d	Number of training weeks for postgraduate students	6
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e. not categories 1-4 above)	1
6a	Number of people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	42
6b	Number of training weeks not leading to formal qualification	30
7	Number of types of training materials produced for use by host country(s)	4 types (5 photo guides , 20 fact sheets; 3 sets of teaching slides; 1 set of school materials)
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country	80
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other agencies	1 report recommending priority areas for savanna conservation submitted to NPASP.
10	Number of formal documents produced to assist work related to species identification, classification and recording.	12 (1 national checklist; 3 checklists for individual protected areas; 5 identification photo guides for endemics/rare/3 families; 1 field training guide to plant characters; 1 guide to using a herbarium; 1 guide to using the plant database)
11a	Number of papers published or accepted for publication in peer reviewed journals	2
11b	Number of papers published or accepted for publication elsewhere	2
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	1
12b	Number of computer-based databases enhanced and handed over to host country	1 (enhanced by web mapping)

Code	Description	Totals (plus additional detail as required)
13a	Number of species reference collections established and handed over to host country(s)	1
13b	Number of species reference collections enhanced and handed over to host country(s)	Plant reference collections from 9 herbaria around the world were collated into a single database.
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	3
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work were presented/ disseminated.	6
15a	Number of national press releases or publicity articles in host country(s)	4
15b	Number of local press releases or publicity articles in host country(s)	4
15c	Number of national press releases or publicity articles in UK	2
15d	Number of local press releases or publicity articles in UK	2
16c	Estimated circulation of each newsletter in the UK	1,000? (Darwin News)
17a	Number of dissemination networks established	1
17b	Number of dissemination networks enhanced or extended	1
18a	Number of national TV programmes/features in host country(s)	2
18c	Number of local TV programme/features in host country	2
19a	Number of national radio interviews/features in host country(s)	1
19c	Number of local radio interviews/features in host country (s)	1
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	£4,000
21	Number of permanent training/research facilities or organisation established	2 (1 Institute and 1 Trail)
23	Value of additional resources raised for project	£45,000

Annex 5 Publications

Type	Detail (title, author, year)	Publisher	Available from	£
Online Database	"Belize Savanna Plant Database" Goodwin et al 2010	University of Oxford	http://dps.plants.ox.ac.uk/bol/seabelize/Home/Index	Nil
Online Database	"Web map interface to Belize savanna database"	Edinburgh University	http://xweb.geos.ed.ac.uk/~belize/	Nil
Digital Mapping	Savanna Ecosystems Map of Belize Cameron, I. & Stuart N	Edinburgh University	http://www.eeo.ed.ac.uk/sea-belize/savanna_map.html	Nil
Report	Checklist and mapping of the savanna of the protected areas of Toledo District	Royal Botanic Garden	http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/toledo.pdf	Nil
Report	Checklist and mapping of the savanna and wetlands of the Rio Bravo Conservation Area	Royal Botanic Garden	http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/rbcma.pdf	Nil
Report	Checklist and mapping of the savanna and wetlands of Corozal District	Royal Botanic Garden	http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/corozal.pdf	Nil
Report	"Belize savanna plant collection – Web User Guide"	Edinburgh University of	http://xweb.geos.ed.ac.uk/~belize/BSPCWMI_UserGuide.pdf	Nil
Report	"*Savanna Ecosystem Map of Belize 2010"* Cameron, I., Stuart, N. & Goodwin Z. 2010	University of Edinburgh	http://www.eeo.ed.ac.uk/sea-belize/data/sav_eco_2011/sea-belize_sav-eco-map-2011_tech-report.pdf	Nil
Report	"A new interpretation of the savanna ecosystem in Belize by SPOT imagery: Report to Planet Action", Cameron, I & Stuart, N.	University of Edinburgh	http://www.planet-action.org/web/88-project-publications.php?type=contributions&projectID=2831	Nil
Report	Final Report to GOB Forest Department on Herbarium Curation Work	Royal Botanic Garden	http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/Darwin_Final_Herbarium_Report_Oct2011.pdf	Nil
Report	"Report on the Eriocaulaceae of Belize" Goodwin et al	Royal Botanic Garden	http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/Eriocaulaceae_Report_Oct_2011.pdf	Nil
Report	Savannas in Belize: report on the Savanna Science Meeting April 2011	University of Edinburgh	http://www.eeo.ed.ac.uk/sea-belize/outputs/progress_reports/savannareport.pdf	Nil
Journal Article	Hicks, Jeff, Goodwin, Zoë A., Bridgewater, Samuel G.M., Harris, David J. & Furley, Peter A. 2011. A Floristic Description of the San Pastor Savanna Belize, Central America.	Royal Botanic Garden	*Edinburgh Journal of Botany*. 68(2): 273–296 Pre-publication draft http://www.eeo.ed.ac.uk/sea-belize/outputs/Papers/Hicks_2011_San_Pastor_Online.pdf	Nil
Journal Article	Goodwin, Z.A. Harris, D.J., Bridgewater, S.G.M., Lopez, G.N., Haston, E.M.,Cameron, I.D., Michelakis, D, Ratter, J., Furley, P.A., Kay, E. Whiteford, C. Solomon. J and Stuart, N. 2011. Checklist of the vascular plants of the lowland savannas of Belize.	Royal Botanic Garden	*Phytotaxa* Pre-publication draft http://www.eeo.ed.ac.uk/sea-belize/outputs/Papers/goodwin.pdf	Nil

Poster Paper	"*Botanical Inventory of the Lowland Savannas of Belize*" Goodwin, Z., Lopez, G., Bridgewater, S., Harris, D, Cameron, I., Stuart, N. & Kay, E.	University of Edinburgh	http://www.eeo.ed.ac.uk/sea-belize/outputs/posters/ukbza_botany_2010.pdf	Nil
Poster Paper	"*Savanna Ecosystems Map of Belize 2010*" Cameron, I., Stuart, N., Furley, P. Bridgewater, S. & Goodwin, Z.	University of Edinburgh	http://www.eeo.ed.ac.uk/sea-belize/outputs/posters/ukbza_savmap_2010.pdf	Nil

Annex 6 Darwin Contacts

Ref No	17022
Project Title	**Conservation of the lowland savanna ecosystem in Belize.**
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Partner 1	
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