



Darwin Initiative Annual Report 2009/10



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

Submission deadline 30 April 2010

Darwin Project Information

Project Ref Number	17-022
Project Title	Conservation of the lowland savanna ecosystem in Belize.
Country	Belize
UK Contract Holder Institution	University of Edinburgh
Host country Partner Institution(s)	University of Belize, Belize Botanic Garden, Programme for Belize, Belize Forest Department and the Belize Biodiversity Monitoring Service
Other Partner Institution(s)	Royal Botanic Garden, Edinburgh
Darwin Grant Value	£ 287,951
Start/End dates of Project	1 st April 2009 – 31 st March 2012
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1st April 2009 – 31st March 2010. First Annual Report.
Project Leader Name	Dr Neil Stuart
Project website	http://www.eeo.ed.ac.uk/sea-belize/
Author(s) and main contributors, date	Drs Neil Stuart and Iain Cameron (UofE); Zoe Goodwin (RBGE); Dr Elma Kay and German Lopez (UB); Jane Beard (BBG). 30 th April 2010.

1. Project Background

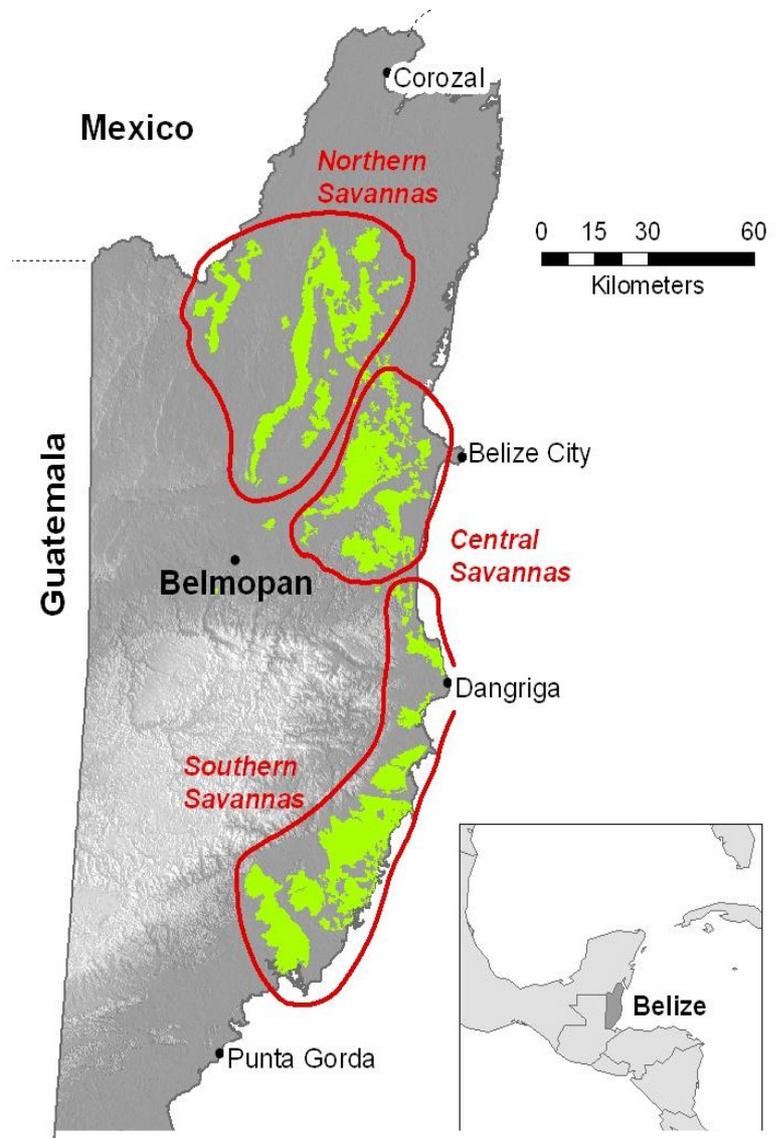
The savannas of Belize occupy about 10% of the country's land area, furnishing distinctive landscapes of ecological and economic value. Despite their national biodiversity importance, Belize's lowland savannas remain neglected in comparison with forests in terms of both botanical research and level of protection. Gap analysis in 2005 revealed that savannas are under-represented in the National Protected Areas System. This needs to be addressed urgently because savannas are experiencing an increasing variety and severity of threats. There is pressure to burn and clear savannas for settlement and for infrastructure. Despite their unsuitability, savannas are being converted for agriculture. The Forest Department seeks to harvest pine, palms and other plant resources from savannas, but presently lacks the botanical information needed to ensure that harvesting does not target areas of high conservation value.

One of the key problems is the insufficient information available on which to base a national conservation strategy for this ecosystem. There is no comprehensive checklist of savanna species, information on species distribution is incomplete and little is known about patterns of endemism or the usage and value of the plant resources. Many savanna areas, particularly in the south, remain unexplored botanically and there is therefore no basis for making informed conservation decisions. Although some plant collections have been made, the national herbarium is under-resourced. Specimens are not correctly curated, named or data-based and are thus of restricted value.

Belize's National Capacity Self-Assessment (2005) highlighted limited skills in plant identification and in monitoring and mapping, together with poor public awareness about the biodiversity of the savanna ecosystem as factors constraining local organisations from addressing Belize's responsibilities under the CBD for conserving the resources of this ecosystem.

The report to UNDP recommended the strengthening of in-country capacities in taxonomy, field botany and plant collection, together with the use of GPS/GIS technology to identify priority areas for conservation and to recognise gaps in the present National Protected Area System.

This project responds to these needs by undertaking baseline botanical surveys, by producing a comprehensive new mapping of the nationwide extent and condition of savannas and by providing training of staff and students that will enhance the capacity of local organisations in Belize to maintain and continue this scientific research in the future.



Remaining savannas, identified from new satellite data, have been grouped into 3 regions for survey.

2. Project Partnerships

2.1 Existing Partnerships

Our project partners in Belize are the University of Belize (UB); Belize Botanic Gardens (BBG); Programme for Belize (PfB) and the Government Forestry Department (FD). In the UK, the University of Edinburgh (UoE) co-ordinates the project and is responsible for the savanna mapping work, whilst our partner organisation the Royal Botanic Garden Edinburgh (RBGE) leads the botanical aspects of the project. This year the project has employed one member of staff at UoE (Iain Cameron, the GIS Specialist) since April 1st, one member of staff at RBGE (Zoe Goodwin, the UK Darwin Botanist) since July 1st and one member of staff at the ERI in Belize (German Lopez, the Belize Darwin Botanist) since 4th January 2010.

UB is our lead partner in Belize and specifically Dr Elma Kay and her colleagues at the newly established Environmental Research Institute (ERI) which was inaugurated in January. Staff at the ERI co-ordinate our in-country training activities, including making teaching and seminar rooms available at UB for project activities and our regular partner meetings in Belize. The field botany and plant collecting is undertaken jointly by the UK and the Belizean Darwin Botanists. The intention is for UB to be the recipient of all the botanical data collected by the project and for them to have built up a capacity to maintain and continue this work after the end of this project. They act as both recipients and providers of training to other agencies. Over the course of the project, UB will assume responsibility for disseminating outputs and will incorporate project findings into their nationally important undergraduate degree courses in ecology and natural resources management.

BBG is the most established botanical garden in Belize, with an education centre and the largest source of botanical reference material in country. A partner on previous Darwin projects in Belize, BBG's role in this project is to establish a savanna habitat and a new attraction, the *Darwin Savanna Trail*, which school groups and the general public can visit to learn about the plants of the savanna ecosystem. BBG will also develop educational materials about the savanna in the form of a Trail Guide and as materials for use by secondary school teachers.

PfB manage the largest protected lowland savanna area in Belize and were the first NGO to develop a management plan for their savannas. This plan was informed by botanical collections made by RBGE and mapping from satellite data generated by UoE. The present nationwide project up-scales some of this initial work at the Rio Bravo. PfB acts as a demonstration site for land managers in other parts of Belize wishing to assess the ecological and economic value of savanna lands under their care. PfB hosts some of our field based training courses at their Hillbank Research Station, where PfB Rangers and Foresters receive on-site training in GPS, vegetation survey and plant identification techniques.

FD is the National Focal Point for the CBD in Belize FD and has an important role to play in shaping the project to ensure that the project's capacity building activities will assist Belize in meeting its target for curbing biodiversity loss and reducing degradation of the savanna ecosystem. FD is presently responsible for maintaining Belize's National Herbarium, with very limited resources. As part of the project, an assessment will be made of the herbarium's savanna collections and these will be systematically re-curated over the course of the project by the Belize Darwin Botanist. In conjunction with the ERI, FD assisted us to run the first of a series of courses in *Herbarium Techniques* in January 2010. FD staff are able to benefit from attending the project's capacity building activities such as the courses in the collection and curation of plant specimens. As a permanent member of the National Protected Areas System Committee, FD also has a role in ensuring that the outputs and recommendations from this project are communicated to this committee to inform future decisions about which savanna areas in Belize are particularly worthy of protecting and conserving.

Regular contact is maintained with the local partners by email, telephone calls and by regular meetings of the Belize and UK project partners, of which there have been two in the first year of this project. With UK staff spending a total of 26 weeks in Belize this year, regular communication with local partners is possible. With the appointment of the Belizean Botanist, the project now has a continuous presence in country. The UK partners have held two further meetings this year in Edinburgh to monitor overall progress, with additional staff meetings at roughly two monthly intervals to report progress, adjust activity schedules, plan fieldwork and to arrange the visit of the Belize Darwin Botanist to the UK.

2.2 New partnerships and collaborations

During its first year, the project has collaborated with a number of other organisations in Belize, many with a specific interest in conservation or with the savanna ecosystem. We have consulted with the Belize Office of the US Nature Conservancy, Ya'axché Conservation Trust (YCT), the Toledo Institute for Development and Environment (TIDE), the Belize Foundation for Research and Environmental Education (BeFree) and the Association of Protected Areas Management Association (APAMO).

We have collaborated with Wildtracks and the Land Information Center (LIC) of the Ministry of Natural Resources, obtaining and disseminating geographic information for the savanna mapping with them.

We have formed further partnerships with the charity Planet Action, which has donated to the project satellite imagery, GIS software and training manuals to the value of £ 40,000, which we have shared with the ERI and another new partner, the Belize Environmental Resource Data Service (BERDS). BERDS is the *de facto* clearing house for environmental data in Belize and the producer of the previous ecosystems map of the country. BERDS has agreed to act as the custodian for the new savanna mapping to be produced by this project, pledging to maintain and disseminate the data within Belize.

We have also successfully applied for a donation of high resolution IKONOS satellite data from the GeoEye Foundation. In March 2010 The project PI was invited to represent Belize at a meeting of the NASA Terrestrial Ecology group and contributed to the formulation of a new NASA field experimental programme being proposed for global monitoring of the savanna ecosystem from satellite imagery.

We have also liaised with the other DI project presently running in Belize (17012: large mammal corridor project), inviting them to jointly attend our project launch event in September and our project meetings in Belize. We have negotiated access for them to our mapping and imagery and offered other technical support with their project.

Dr Kay, our lead partner at the ERI attended the Darwin partners meeting in Brazil in November 2009 which led to new contacts with other DI project partners.

3. Project progress

3.1 Progress in carrying out project activities

Activity 1.1 Project website launched and periodically updated;

The project website (<http://www.eeo.ed.ac.uk/sea-belize>) was launched in July 2009 and is updated regularly with news items and reports. The website has proved to be an effective means for rapidly disseminating news about project activities and for sharing provisional results with the project team and with our colleagues in Belize. For example, the data set of optical satellite imagery that we assembled for the savanna mapping work was published on the website in September 2009 and the entire set of over 200 A4 image-map extracts used to support fieldwork can be downloaded from the site.

Activity 1.2 Annual meeting of project partners

There have been several meetings of project partners this year. There was a project inception meeting for UK partners on 23rd April, with a second planning meeting on 4th June. Following individual meetings with all project partners between the 28th August – 3rd September, the Annual Meeting of all project partners was held this year on 3rd September 2009 at the University of Belize, followed by a project Launch Event hosted by the British High Commission and arranged jointly with DI project 17012. A second exceptional partner meeting was held in Belize on 25th January to consult all the partners about their requirements for the savanna mapping products which will be delivered in June 2010. The next meeting of all partners to plan year 2 activity will be at University of Belize on 14th May 2010.

Output 1. Enhanced capacity to conduct savanna field surveys, collect and name plants and curate specimens.

Activity 1.3 Plant diversity surveys and vegetation habitat surveys conducted in lowland savanna areas;

Reconnaissance vegetation surveys were conducted at 17 sites in Sept/October 2009. 300 botanical collections were then made at 10 savanna sites distributed throughout the country. A further 200

species observations were recorded. Collecting activity is described in more detail in the Activity Report from RBGE and in appendix 1.

Activity 1.5 Determination of savanna collections using UK herbaria and international research literature;

Over 200 savanna specimens in the existing savanna collections held at RBGE have been identified by the UK Darwin Botanist. Two weeks were also spent consulting the savanna collections of the NHM in London to aid determinations. The Belizean Botanist spent four weeks at RBGE shadowing the UK Botanist and learning herbarium procedures. His weekly activities are recorded in UBs Activity Report.

Activity 1.8 Training workshops in field botany, taxonomy, herbarium curation and GPS/GIS;

A total of 15 person-weeks of botanical training were delivered in year 1. Four Belizeans received 10 days of botanical training from UK staff during the RBGE *Taxonomy of Plants* field course in January 2010 (Course handbook as Appendix 2.). The course received very good feedback, presented in appendix 3. University of Belize technicians received 10 days training and practical experience in plant collection and surveying while working with the UK Darwin Botanist in October 2009. A three day Herbarium User Course in January 2010 was attended by thirteen local professionals (Monitoring form and a summary of feedback from the participants are given in Appendix 4).

3 person-weeks of GIS/GPS training were delivered, with 4 Belizeans receiving one day of GPS training from UK staff during the RBGE *Taxonomy of Plants* field course, two staff of UB receiving 2.5 days of training in GIS and the Belize Darwin Botanist gaining practical field training in GPS by working with the UK GIS Specialist for 8 days of fieldwork in January 2010 and a further 4 days of dedicated GIS training at UofE during his visit to the UK in February 2010.

Output 2 Checklist of savanna plants highlighting threatened rare and endemic species..

Activity 1.7 Developing the database of savanna plant distributions and habitats

Collection data for approximately 4000 savanna specimens has been collated and imported to create the Darwin Savanna Plant database from three herbaria: Missouri Botanical Garden (MO) 2872, RBGE (E) 707 and the Natural History Museum, London (BM) 406.

Activity 2.1 Developing a checklist of savanna plants

A checklist of Belizean savanna plants has been available in pre-draft form since November 2009, with frequent exports of the checklist from the database aiding analysis to check and 'clean' plant names in the database. The checklist includes an indication of habit (tree, shrub, herb etc), habitat preference (forest, savanna, wetland etc) and a list of voucher specimens. The most recently exported version of the Checklist is included as Appendix 5).

Output 3 Updated mapping of savanna habitats to support field collecting and identification of conservation hotspots.

Activity 3.1 Interpretation of remote sensing of savanna areas to guide field data collection programme;

A nationwide mapping of the main savanna areas and their constituent land cover has been derived by image processing and mosaicking six SPOT satellite images dated from 2005-2009. The draft mapping produced in September 2009 was published as a single A0 sheet and as two series of maps at 1:40,000 and 1:20,000 scales to assist the field teams in selecting and navigating to particular savanna areas of interest. This activity has been completed on schedule. The mapping work is described in detail in the UoE Activity Report. An example of one of some 150 map extracts produced at 1:20,000 and used to support fieldwork is included as Appendix 9.

Output 4 Scientific Reports and Papers

Activity 4.1 Paper on flora of Belizean savannas written and submitted

A poster entitled "A new mapping of the savanna ecosystem of Belize from SPOT imagery" was presented at the 13th International Congress of the Meso- American Society for Biology and Conservation on Oct. 27th 2009 in Belize City. A low resolution version is provided as appendix 8.

The results of a survey of one area of savanna within the Mountain Pine Ridge Reserve have been written up this year by Hicks and Goodwin. This was submitted to the *Edinburgh Journal of Botany* in March 2010 and the submission forms appendix 7.

Output 5 Photographic Field Guide to the commoner savanna plants, trees and shrubs

Activity 5.1 Photographic field guide to savanna plants developed and field tested

A first draft of a photo-guide was produced in December 2009. This was first tested in the field by student botanists in January 2010. The photo guide is still being actively developed using newly acquired photography and updated identifications and feedback from field-testing, which will continue until January 2011. Sample pages are included as Appendix 6 to illustrate state of progress.

Output 6 Darwin Savanna Trail to be established at BBG

Activity 6.1 Creation of the Darwin Savanna Habitat and Educational Trail at the Belize Botanic Garden

Work commenced on the new savanna habitat at BBG in October 2009, with ground clearance and import of soil. Landscaping of the habitat has been completed, although progress slowed due to staff changeover. There were also minor delays due to slow delivery of materials by some contractors. The illness of the UK Darwin Botanist, requiring her return to the UK in October 2009, occurred before she was able to collect any live specimens for the savanna habitat this year. That activity will now take place when she returns to Belize for field collecting in April-May 2010. BBG's Activity Report contains a full report on progress this year to create the savanna habitat.

3.2 Progress towards Project Outputs

Although this is only the completion of the first year, from the indicators we can see that output 3 (savanna mapping) is close to completion. Despite a shorter period of field data collection in year 1 than envisaged due to ill health of the UK Darwin Botanist, good progress has been made towards creating outputs 2 (Database and Checklist) and 5 (PhotoGuide), with first drafts of both already produced and now undergoing field testing. All training courses planned for year 1 have been delivered and we were delighted to bring the Belize Darwin Botanist for a month's training in Edinburgh with UK based staff, which allowed him to consolidate his knowledge and gain experience in a major herbarium. In these ways we have met or slightly exceeded the training indicators for output 1 (enhancing local staff capacity) this year. Belize Botanic Gardens have also made good progress despite some delays with output (6) - the construction of the Darwin Savanna Trail. Finally, although publications were not anticipated in the first year, results from early and ongoing research have been successfully incorporated into three publications this year (output 4).

All the output level assumptions presently still hold true. If they continue to do so and the same rate of progress is maintained, the project is on course to achieve all the project outputs by the end of year 3.

3.3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Number planned for this period	Total planned
2	Number of people to attain Masters qualification	1	1	4
4A	Number of undergraduate students to receive training	2	2	6

4B	Number of weeks provided per student in 4A	2	2	6
4C	Number of postgraduate students to receive training	16	15	40
4D	Number of weeks provided per student in 4C	2	2	6
6A	Number of people to receive other forms of education or training (not categories 1-5 above)	16	15	40
6B	Number of weeks provided (annual total)	12	8	16
7	Number of different types of training materials produced for use by host country	1	1	5
8	Number of weeks spent by UK project staff on project work in the host country	26	28	60
10	Number of individual field guides/checklists to be produced to assist work related to species identification, classification and recording	0	0	2
11A	Number of papers published in peer reviewed journals	0	0	2
11B	Number of papers submitted to peer reviewed journals	1	0	2
12B	Number of computer based databases to be enhanced and handed over to host country	0	0	1
13B	Number of species reference collections to be enhanced and handed over to host country	0	0	1
14A	Number of consultation meetings/workshops organised to present/disseminate findings	2	1	3
14B	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	1	1	3
15B	Number of local press releases in host country	2	1	3
15C	Number of national press releases in UK	1	1	2
15D	Number of local press releases in UK	1	1	2
17A	Number of dissemination networks established	1	1	1
17B	Number of dissemination networks enhanced	1	1	1
18C	Number of TV programmes/features in host country	0	0	1
19A	Number of radio interviews in host country	1	1	2
19C	Number of local radio interviews in host country	1	1	2
20	Estimated value (£'s) of physical assets handed over to host country	£ 1,300	£ 1,000	£ 1,500
21	Number of permanent educational/ training/ research facilities/organisations established and continued after Darwin funding has ceased	1	1	1
23	Value of resources raised from other sources (in addition to Darwin funding) for project work	£ 45,000	£ 30,000	£ 45,000

Table 2 Publications

Type	Detail (title, author, year)	Publishers	Available from (eg contact address, website)	Cost £
Poster Paper	"A new mapping of the savanna ecosystem of Belize from SPOT imagery" by Cameron, I, Stuart, N, Moss, D, Bridgewater, S and Goodwin, Z., 2009	University of Edinburgh UK.	http://www.eeo.ed.ac.uk/seabelize/data/data/msbc_seabelize09.jpg	nil

3.4 Progress towards the project purpose and outcomes

The project level assumptions still hold true and the indicators appear adequate for monitoring progress towards the overall purpose.

According to these indicators of activity, the project has made good progress this year towards completing baseline vegetation mapping and botanical surveying needed to meet the overall purpose of identifying priority areas for conservation within the lowland savanna ecosystem. By involving local staff in these activities wherever possible, by giving field-based training courses and by providing significant donations of software, data and reference material to UB as well as equipping and training the Belize Darwin Botanist, the project can also claim to have enhanced the capacity of local organisations to undertake these activities.

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

The project is in its early stages and its present impact on the long term goal can only be small. However, its potential impact on biodiversity conservation in Belize in the long term may be considerable if the staff being trained now remain with the organisations such as the Environmental Research Institute and other Belizean NGOs, creating a network of individuals with the skills to continue to collect data and monitor the condition of the savannas and to educate people about the value of maintaining a healthy savanna ecosystem.

On the 26th of March, 2010 our lead partner Dr Kay, the present Director of the ERI was invited to a consultation workshop to identify activities that should be reported in Belize's 4th National Report to the Convention on Biological Diversity. Various capacity building projects, including this Darwin Savanna Project were identified by the consultees as assisting Belize in meeting its commitments particularly with respect to biological monitoring, capacity building and dissemination of information.

4. Monitoring, evaluation and lessons

For the first year, this has mostly focused on monitoring of project activities. In addition to the regular annual meeting of all the project partners in Belize in April, a second partner meeting was held in Belize in January 2010 to discuss mapping requirements. The presence of UK project staff in Belize at regular intervals throughout the year has made it possible to monitor the progress of most activities. Since the appointment of the Belize Darwin Botanist in January, the project now has a presence in Belize until the EoP and this will enable more continuous monitoring of activities.

Each staff member employed full time on the project provides a brief report on their weekly activity to their line manager. Line managers alert the PI to achievements, setbacks or issues requiring action. This activity log forms the basis of six-monthly progress reviews for all the employed project staff. Project monitoring meetings take place quarterly in the UK. Regular contact is maintained with the Dr Kay, the lead partner in Belize (UB) primarily by email and telephone calls when UK staff are not in country.

For annual reporting, each project partner provides their own individual report on progress and these are appended in full as supplemental information to this summary annual report. The individual reports allow each partner to highlight issues of priority or concern for them.

Training activities are monitored by collecting attendance records and individual feedback forms from everyone attending field courses or training workshops. The comments are summarised to evaluate the quality of the training, the value of the content to the participants and suggestions from attendees and trainers as to how future training could be improved. Feedback reports from courses are in Appendix 3.

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

As this is the first annual report, we have not received detailed reviewer comments as yet.

6. Difficulties encountered and steps taken to overcome these

Whilst each partner has experienced some minor setbacks and slippages with their timelines, the illness of the UK Darwin Botanist and a delay in hiring the Belize Darwin Botanist are the two main, unanticipated events that led to revision of the activity schedules for year 1 and required some carry forward of activities and associated resources into year 2 to allow the project to stay on schedule. A detailed account is contained in the Change Request sent to DEFRA on 19/1/2010 following a meeting with LTS on 16/10/2009 to advise them of the illness of the UK Botanist and the need to reschedule.

The first period of botanical collecting originally planned to take place in the dry season between September – December 2009 terminated prematurely due to the unexpected illness of the UK Darwin Botanist which necessitated her return to the UK on October 15, 2009. The work plan was adjusted so that work on some activities (mainly 1.7, 2.1 and 5.1) originally planned for the first quarter of year 2, were undertaken by the UK Darwin Botanist between October-December 2009 while she recuperated. This has enabled work with determining names of the plant collections and on the checklist and database to become slightly ahead of schedule.

The other deviation from the proposed schedule was that the process of advertising, interviewing and hiring the Belizean Darwin Botanist was only completed on 4th January 2010. As a result, another member of UB staff (Eduardo Barrientos) accompanied the UK Darwin Botanist for botanical collecting in September and October. Overall, these two setbacks were not as problematic as first anticipated, since had the Darwin Botanist been hired in November or December, they would not in fact have been able to undertake fieldwork with the UK botanist at that time. The delayed hiring of the Belize Darwin Officer instead resulted in a strong field of 10 candidates from whom the appointee, German Lopez is proving to be an excellent selection.

When it became clear the UK Botanist would not return to Belize before April 2010, the decision was taken to bring the Belizean Botanist to the UK for a 4-week period of training during March at the Herbarium of the RBGE and also for GIS training at UofE. Training activities and the validation work for the mapping that the UK Botanist would have undertaken were instead handled by the project PI and the GIS specialist who returned to Belize in January.

The rescheduling of activities was agreed in consultation with LTS. DEFRA approved a carry forward of resources into next financial year to enable the UK Botanist to travel to Belize for two four-week periods of plant collecting in May and November 2010 in order to make up the requisite number of collections from sites across the country. The GIS specialist who undertook additional fieldwork in Belize during January-February while the UK Botanist had to remain in the UK will remain employed until the end of May 2010 to complete the required mapping work.

7. Project profile / Sustainability

Through its training activities and consultations with many organisations throughout the country, the project has successfully established its identity with government agencies, NGOs and other conservation organisations with interests in the savanna ecosystem. In this first year, activities have focused on publicising this new project in the UK and by seeking a wide engagement with relevant organisations in Belize. The two lead partners (Universities of Edinburgh and Belize) issued simultaneous press releases announcing the new project on 1st April 2009, which were followed by radio interviews and an official project launch event at the British High Commission in Belize on 3rd September, attended by over 50 senior staff from the government and NGOs.

Over the year we have made contact with all the major organisations in Belize with an interest in savanna conservation and have either visited these organisations or invited them to a meeting organised in their local area of the country. In the UK, the project provides regular progress reports to the Belize High Commission and presents progress to expatriate Belizeans attending the UK-Belize Association Annual Meeting.

Our UK staff have attended all DEFRA Darwin events in 2009/10 and established contacts with leaders of other current Darwin projects. Dr Kay from University of Belize attended the meeting for local project leaders in Brazil in November 2009 which developed her regional contacts. Project staff were interviewed by the international magazine 'RICS Business'. A colour feature about the new project was published in July 2009 and distributed to an audience of over 96,000 land managers and land surveyors worldwide. http://www.ricsbusiness.com/index.php/feature/article/face_belize/

Although only our first year, the project has built some sustainability by being closely tied with the newly inaugurated Environmental Research Institute at the University of Belize. The Darwin Botanist from this project is a foundation member of staff for this institute, (as is a second staff member funded by project 17012). These two staff members will gain skills and expertise whilst employed by DI projects until March 2012, after which they will be sufficiently skilled to be taken on as permanent staff. The vision of this project is to build up capacity in the form of human resources so that once the baseline data collection is completed by this project, the ERI will have staff with the skills to continue this work.

Another key aspect of the project's evolving exit strategy has been the identification this year of Belizean organisations with capacity to become long term custodians of the data we will produce. University of Belize (UB) and the Belize Environmental Resource Data Service (BERDS) have been identified as two organisations with capabilities for maintaining national databases of herbarium collections and digital mapping respectively. In January 2010, BERDS agreed to become a project partner with responsibility for the long term maintenance and dissemination of the projects' mapping outputs.

8. Dissemination

In addition to the project publicity and awareness raising activities described above which all disseminate information about present and future project activity, the project website has been used to disseminate project news, to publicise project activities, to advertise training opportunities and to recruit participants for events such as the consultative meetings in January 2010 to elicit from the government and NGO community their needs for a new national mapping of savanna lands.

One measure of the success of these awareness raising activities has been the many organisations (outlined in section 3) that have approached the project requesting closer engagement and to make inputs and contributions to various project outputs.

9. Project Expenditure

Table 3 Expenditure in reporting period (Defra Financial Year: 1 April 2009 - 31 March 2010)

Item	Budget (Line items as per 2009/10 grant letter)	2009/10 Expenditure	Variance
Total Staff Costs* ¹⁻⁵			
Overhead Costs			
Travel and subsistence			
Operating costs			
Capital items			
Other costs* ⁶⁻⁷			
TOTAL			

* ¹ Dr Ian Cameron (GIS Specialist)	
* ² Ms Zoe Goodwin (UK Darwin Botanist)	
* ³ Mr German Lopez (Belize Darwin Botanist)	
* ⁴ Mr Eduardo Barrientos (UB Lab. Technician)	
* ⁵ Dr Sam Bridgewater (Tropical Ecologist)	
Sub-Total	

* ⁶ BBG sub-contract	
* ⁷ HEI Staff Consultancy	
Sub-Total	

*⁸ **£21,850** approved Transfer Request carried forward to next financial year

10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes (I agree for LTS and the Darwin Secretariat to publish the content of this section)

- Provision of a foundation member of staff who will be employed for 3 years in Belize's first Environmental Research Institute at the national University of Belize.
- New nationwide mapping of the savanna ecosystem produced from SPOT satellite imagery;
- 'Fledgling' Darwin Savanna Trail created at Belize Botanic Gardens;
- Darwin identity used to leverage a further £ 45,000 of funding and donations in kind from other organisations to support this project (part in cash and part as donations of software, data and reference materials for the new ERI.

Annex 1 Progress and achievements against Logical Framework for Financial Year 2009/10

Project summary	Measurable Indicators	Progress & Achievements April 09 - March 10	Actions required/planned for next period (year 2)
<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 the conservation of biological diversity.</i></p>		<p><i>Strong working partnerships have been established with the key scientific and conservation organisations. An Environmental Research Institute has been inaugurated at the University of Belize (UB), with the Darwin Initiative providing foundation staff members. Belize Botanic Gardens have completed landscaping work on the Darwin Savanna Trail.</i></p> <p><i>Several influential organisations have joined the project as further partners.</i></p>	<p><i>(do not fill not applicable)</i></p>
<p>Purpose</p> <p>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</p>	<p>Savanna specimens in national herbarium re-curated;</p> <p>Partners' capacity in taxonomy, field collecting and mapping increased by joint working with UK partners;</p> <p>Consolidated species database and checklist created and published.</p> <p>Field Guide to savanna plants published;</p> <p>Summary report and</p>	<p><i>A new baseline vegetation map for the whole country is almost complete. The mapping from newly acquired satellite imagery is guiding the selection of sites for reconnaissance surveys and for botanical collecting. The capacity of the lead partner (UB) to provide training in GIS has been increased by training of their trainers and by a significant donation of GIS software and reference materials.</i></p> <p><i>A first season of botanical collecting has been undertaken and 15 person-weeks of botanical</i></p>	<p><i>In year 2, the new baseline savanna mapping will be completed and made freely available to project partners and to other organisations. We will drive the adoption of the mapping by helping organisations use it to support conservation of savannas across Belize.</i></p> <p><i>In year 2, two further four-week periods of botanical collecting will be undertaken to complete the baseline botanical surveys. The UK</i></p>

	mapping to be distributed to NPAC, FD and other agencies managing savanna lands by EoP.	<i>training have been given to local staff. The capacity of UB to carry out plant collecting and curation has already increased with the hiring and training of the Belize Darwin Botanist and the delivery of the first training courses at the ERI</i>	<i>and Belizean Darwin Botanists will continue working together on the collecting, naming and databasing of collections; a draft Checklist and Photo - Guide will be field tested.</i>
Output 1. Enhanced capacity to conduct savanna field surveys, collect and name plants and curate specimens.	Measurable Indicators	<p><i>An inspection visit has revealed the poor condition of some savanna specimens in the FD Herbarium. The selection of material that is fit to be kept will be undertaken in year 2 by the Belize Darwin Botanist with guidance from UK staff.</i></p> <p><i>300 new collections and determinations were made in the first year. As the fieldwork period was shorter than expected due to illness, and two collecting periods are now scheduled for year 2, we expect to achieve 1,000 new collections by EoP.</i></p> <p><i>15 person-weeks of botanical training were delivered in year 1. As part of this, 18 individuals have benefited from training periods ranging from 3 days for short courses to 3 month's duration for the Belize Darwin Botanist. 3 person-weeks of GIS training have been delivered. This has been intensive training for five local staff, two of whom are in training positions. We are half way to attaining the target of having 40 individuals trained, but we have chosen to vary the intensity of the delivery to focus training onto those staff in more permanent positions who are more able to subsequently train others.</i></p>	
	<p>Savanna specimens in national herbarium to be re-curated in years 2 and 3;</p> <p>1,000 new collections made and names determined;</p> <p>40 local Belizean staff in total trained in plant collecting, curation and GPS/GIS as appropriate to their needs.</p>		
Activity 1.3 Plant diversity surveys and vegetation habitat surveys conducted in lowland savanna areas;		<p>Reconnaissance vegetation surveys were conducted at 17 sites in Sept/October 2009. 300 botanical collections were then made at 10 savanna sites distributed throughout the country. A further 200 species observations were recorded. Activities are described in more detail in the Botanical Report in Appendix 3. In year 2, two further 4-week periods of field collecting will take place sufficient to provide a good geographical coverage of the country. This is expected to generate ca. 700 further collections.</p>	
Activity 1.4 Live plant collections made for Belize Botanic Garden		<p>This is primarily a year 2 activity. However, RBGE botanists worked this year with BBG landscapers to agree the planting lists and BBG staff worked alongside the UK and Belizean Darwin Botanists to collect seeds of savanna plants for planting.</p>	

<p>Activity 1.5 Determination of savanna and collections using UK herbaria and international research literature;</p>	<p>Over 200 savanna specimens in the existing savanna collections held at RBGE have been identified by the UK Darwin Botanist. Two weeks were also spent consulting the savanna collections of the NHM in London to aid determinations of the RBGE collections. The Belizean Darwin Botanist spent four weeks at RBGE shadowing the UK Botanist and learning herbarium procedures.</p>	
<p>Activity 1.6 Re-curation of savanna collections in Belize's national herbarium;</p>	<p>This is an activity that the Belizean Darwin Botanist will mainly undertake in years 2 and 3, following initial supervision & training by the UK Botanist. An inspection visit was however made in January 2010 by the Head and Assistant Curators of the RBGE Herbarium and this will inform the guidance given about re-curation.</p>	
<p>Activity 1.8 Training workshops in field botany, taxonomy, herbarium curation and GPS/GIS;</p>	<p>A total of 15 person-weeks of botanical training were delivered in year 1. Four Belizeans received 10 days of botanical training from UK staff during the RBGE Taxonomy of Plants field course in January 2010. University of Belize technicians received 10 days training and practical experience in plant collection and surveying while working with the UK Darwin Botanist in October 2009. A three day Herbarium Course in January 2010 was attended by 13 local professionals (</p> <p>A further 3 person-weeks of GIS/GPS training were delivered, with 4 Belizeans receiving one day of GPS training from UK staff during the RBGE Taxonomy of Plants field course, two staff of UB receiving 2.5 days of training in GIS and the Belize Darwin Botanist gaining practical field training in GPS by working with the UK GIS Specialist for 8 days of fieldwork in January 2010 and a further 4 days of dedicated GIS training at UofE during his visit to the UK in February 2010.</p>	
<p>Output 2. Checklist of savanna plants highlighting threatened rare and endemic species.</p>	<p>Measurable Indicators</p> <p>Consolidated species database created and checklist drafted by end of year 1</p>	<p><i>This has been one of the most significant efforts by the UK Darwin botanist in year 1, which brings together for the first time much of the pre-existing but scattered records of plant collections from the savannas of Belize that have been made by different collectors around the world and makes it consistent and accessible. Checklists and other forms of output can then be produced and refined as the database is updated.</i></p>
<p>Activity 1.7 Database developed of savanna plant distributions and habitats;</p>	<p>Collection data for approximately 4000 savanna specimens has been collated and imported to create the Darwin Savanna Plant database from three herbaria: Missouri Botanical Garden (MO) 2872, RBGE (E) 707 and the Natural History Museum, London (BM) 406.</p>	
<p>Activity 2.1 Checklist of savanna plants drafted in year 1, Updated and revised by EoP based on field usage.</p>	<p>A checklist of Belizean savanna plants has been available in pre-draft form since November 2009, with frequent exports of the checklist from the database aiding analysis to check and 'clean' plant names in the database. The checklist includes an indication of habit (tree, shrub, herb etc), habitat preference (forest, savanna,</p>	

		wetland etc) and a list of voucher specimens (Draft list included in Appendix 3). As the database is updated, the list will be refined and more complete information about the habitats and locations where certain species are found will be included.
Output 3 Updated mapping of savanna habitats and conservation hotspots.	Measurable Indicators	Producing a more current and detailed nationwide mapping showing the extent and condition of the remaining savanna areas of the whole country has been the main activity of the UK GIS Specialist, who was originally to be employed only for year 1 of this project. Although the mapping was intended mainly to serve internal project purposes, we have responded to the strong demand for us to make the mapping widely available to partners and other organisations in Belize. The UK GIS Specialist will continue to work until June 2010. This will allow more complete map data originally not planned for delivery until the end of year 2 to be available to the partners early in year 2.
	Mapping to guide field collecting produced in yr 1; Maps identifying priority areas for conservation by end yr 2;	
Activity 3.1 Interpretation of remote sensing of savanna areas to guide field data collection programme;		A nationwide mapping of the main savanna areas and their constituent land cover has been derived by image processing and mosaicking six SPOT satellite images dated from 2005-2009. The draft mapping produced in September 2009 was published as a single A0 sheet and as two series of maps at 1:40,000 and 1:20,000 scales to assist the field teams in selecting and navigating to particular savanna areas of interest. This activity has been completed on schedule.
Activity 3.2 Maps produced of diversity, habitat variety and recommended priority conservation areas within lowland savannas;		The imagery is now being re-processed to incorporate the further ground data collected in September 2009 and January 2010 as well as information from two recently acquired IKONOS images. The revised savanna ecosystems mapping is now expected to be produced in a format suitable for dissemination to in-country users by June 2010. This mapping will allow savanna areas which are under evident threat of alteration or which show high diversity of cover types to be identified. This activity is therefore progressing ahead of schedule.
Output 4 Scientific Reports and Papers	Measurable Indicators	
	At least 2 articles presented at international meetings and published in peer reviewed journals by EoP; At least 3 professional reports produced.	
Activities 4.1/2 Paper on flora of Belizean savannas written and		Although we plan for a paper to be written in year 2 based on the secondary databases and the primary data from field collections, we have successfully

submitted		<p>achieved the publication of preliminary findings in three outlets this year.</p> <p>A poster entitled “A new mapping of the savanna ecosystem of Belize from SPOT imagery” was presented at the 13th International Congress of the Meso-American Society for Biology and Conservation on Oct. 27th 2009 in Belize City.</p> <p>The book ‘A Natural History of Belize’ by Samuel Bridgewater was accepted for publication after peer review by Texas University Press in the autumn of 2009. The chapter describing the savanna ecosystem of Belize includes text, maps and photographs about the lowland savannas produced by this Darwin Project.</p> <p>The results of a survey of one area of savanna within the Mountain Pine Ridge Reserve have been written up by Hicks and Goodwin. This was submitted to the Edinburgh Journal of Botany in March 2010.</p>
Output 5 Photographic Field Guide to the commoner savanna plants, trees and shrubs, with descriptive notes.	Measurable Indicators	This activity started in October 09 and there has been good progress to collect enough high-quality photographs at appropriate time of the year (e.g. flowering periods) to allow a first draft to be produced this year. Consolidation, testing and refinement of this guide is planned to continue until January 2011, after which a first version will be made ready for publication and distribution.
	Initial version of the guide published in year 2; final version by EoP; report of number of photographs & number of copies distributed	
Activities 5.1 /2 Photographic field guide to savanna plants developed, tested and distributed		A first draft of a photo-guide was drafted in December 2009. This was first tested in the field by student botanists in January 2010. The photo guide is still being actively developed using newly acquired imagery and refined with updated identifications and feedback from field-testing, which will continue until January 2011. (Sample pages are included as Appendix 6 to illustrate state of progress).
Output 6 Darwin Savanna Trail established at BBG	Measurable Indicators	This activity was originally planned to start in year 2, but at the first project partners meeting it was agreed that it should commence in year 1 as time would be needed to allow the planting to naturalise. Activity remains ahead of schedule because of this early start, but various unexpected setbacks have slowed progress this year. Nevertheless, all the hard landscaping has been completed by the end of year 1 and live collections will be made early in year 2.
	Trail constructed and open to public	
Activity 6.1 Creation of the Darwin Savanna Habitat and Educational Trail at the Belize Botanic Garden		Work commenced on the new savanna habitat in October 2009, with ground clearance at BBG and import of soil from a nearby area of savanna that was about to be developed. Landscaping of the habitat has been completed, although progress slowed when the previous foreman of BBG resigned in January 2010 and his replacement required time to understand how to fulfil the project

		<p>requirements. There were also minor delays due to slow delivery of materials by some contractors. The illness of the UK Darwin Botanist, requiring her return to the UK in October 2009, occurred before she was able to collect any live specimens for the savanna habitat in year 1. This activity will now take place when she returns to Belize for field collecting in April-May 2010. BBG's Activity Report contains a full report on progress this year to create the savanna habitat</p>
<p>Output 7. Educational materials prepared for higher education, schools and for general public.</p>	<p>Measurable Indicators</p>	<p>This activity will commence in year 2 with meetings with the Ministry of Education, UG, BBG and other NGOs to identify partners to lead the drafting of materials on savanna botany and geography that can support higher education and school curricula.</p>
	<p>Reports on materials generated by partners (UB, BBG) and wider NGO community.</p>	

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:</p> <p>Conservation and sustainable use of lowland savannas in Belize.</p>	<p>Areas of greatest conservation value within savannas receive protection;</p> <p>Remaining areas managed for timber and non-timber products and to develop sustainable livelihoods.</p>	<p>Findings inform revision of National Protected Area Systems Plan (NPASP)</p> <p>Data assimilated into Sustainable Forest Management Plans by FD and PfB</p> <p>Progress reported in Belize's 4th National Report to the CBD.</p>	
<p>Purpose</p> <p>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</p>	<p>Existing savanna specimens in national herbarium re-curated;</p> <p>Partners' capacity in taxonomy, field collecting and mapping increased through training programmes and extensive joint working with UK partners;</p> <p>Consolidated species database and checklist created and published.</p> <p>Field Guide to savanna plants</p>	<p>Data accessible on CHM by EoP;</p> <p>Specimens available for consultation;</p> <p>Checklist and Field Guide widely distributed;</p> <p>Local staff begin to undertake national biodiversity monitoring currently done by foreign researchers;</p> <p>Acceptance of final report by National Protected Areas</p>	<p>Belize continues to work towards meeting its obligations under the CBD;</p> <p>Support for national herbarium continues;</p> <p>CBD Focal Point continues to prioritise the need to improve capacity for taxonomy and for monitoring and assessment;</p> <p>Partner institutions in Belize continue to receive similar levels of resourcing;</p>

	<p>published;</p> <p>Summary report and mapping distributed to NPAC, FD and other agencies managing savanna lands;</p> <p>Curriculum-focused educational materials disseminated to scientific, educational and public sectors.</p>	<p>Commission (NPAC)</p> <p>Recommendations assimilated into revised NPASP;</p> <p>National educational programmes incorporate teaching materials;</p> <p>Visitor information and facilities at BBG; visitor counts at BBG increase.</p>	<p>Belize's Biodiversity Resource Database (BERDS) and the National Clearing House Mechanism (CHM) remain supported;</p> <p>Ministry of Education continues to support testing of curriculum-focused teaching materials in local schools.</p>
<p>Outputs (add or delete rows as necessary)</p> <p>1. Enhanced capacity to conduct savanna field surveys, collect and name plants and curate specimens.</p>	<p>Existing herbarium savanna specimens re-curated;</p> <p>~1,000 new collections made and determined. New specimens incorporated in national herbarium;</p> <p>~ 40 people trained in (i) plant collecting, (ii) taxonomy & curation, (iii) GPS/GIS for field surveys.</p>	<p>Fieldwork reported; specimens present in herbarium; records accessible in database;</p> <p>Reports on training courses, materials delivered and evaluation of quality of the training by participants.</p>	<p>Fieldwork completed;</p> <p>Access to reference collections and herbarium.</p>
<p>2. Checklist of savanna plants, highlighting threatened, rare and endemic species and local names.</p>	<p>Checklist drafted in yr 1; Revised and updated by EoP.</p>	<p>Copy submitted with annual report.</p>	<p>Botanical Fieldwork completed; Access to reference collections and herbarium.</p>
<p>3. Updated mapping of savanna habitats, localities of the data collections and conservation hotspots.</p>	<p>Mapping to guide field collecting produced during yr 1;</p> <p>Maps identifying priority areas for conservation by end yr 2;</p> <p>Maps revised using local knowledge by EoP.</p>	<p>Maps submitted with annual report.</p>	<p>Good quality imagery available.</p> <p>Areas accessible for ground validation.</p>

4. Scientific papers and reports	At least 2 articles presented at international meetings and published in peer reviewed journals by EoP; At least 3 professional reports produced.	Copies of all oral presentations and publications submitted with annual report.	Material of acceptable quality.
5. Photographic Field Guide to the commoner savanna plants, trees and shrubs, with descriptive notes.	Numbers of entries included in initial version of the guide published in yr 2 and in final version by EoP; Number of hard copies distributed	Copy of Guide/ URL of latest digital version submitted with annual report; Numbers of copies downloaded, printed and sold yearly.	Areas accessible for fieldwork.
6. Savanna trail established at BBG	Trail constructed and open to public	Log of visitor numbers to trail and number of Trail guides distributed.	Continued support from BBG
7. Educational materials prepared for use in higher education, schools and for general public.	Reports on materials generated by partners (UB, BBG); Reports on use of materials by partners and wider NGO community.	Samples of materials/ URLs submitted with annual report; Materials assessed by university and school teachers.	Support from Govt Ministry of Education.

Activities

- 1.1 Project website launched and periodically updated;
- 1.2 Annual meeting of project partners
- 1.3 Plant diversity and vegetation habitat surveys in lowland savanna areas;
- 1.4 Live plant collections made for Belize Botanic Garden Trail and educational displays;
- 1.5 Determination of savanna collections using UK herbaria and international research literature;
- 1.6 Re-curation of savanna collections in Belize's national herbarium;
- 1.7 Development of database of savanna plant distributions and habitats;
- 1.8 Training workshops in field botany, taxonomy, herbarium curation and GPS/GIS;
- 1.9 Database available on-line;
- 2.1/2 Checklist of savanna plants (highlighting spp. of conservation importance) developed and published;
- 3.1 Interpretation of remote sensing of savanna areas to guide field data collection programme;
- 3.2 Maps produced of diversity, habitat variety and recommended priority conservation areas within lowland savannas;
- 3.3-- 3.5 Consultation and reporting to Forestry Department on savanna areas of high conservation value and areas of potential economic value
- 4.1 – 4.4 Peer-reviewed academic research papers on Belizean savanna plant biodiversity, phytogeography and conservation (2);
- 5.1 -5.2 Photographic savanna plant fieldguide developed, tested and distributed(hard copies and on-line version)
- 6.1 -6.3 Creation of savanna educational trail at Belize Botanic Garden and conduct of visits to trail by local schools and university students.
- 7.1 -7.4 Educational resources for a) school and b) university use drafted, tested and delivered

Monitoring activities:

the Darwin Initiative's own reporting procedures;

Edinburgh University and the RBGE's internal project assessment system;

annual meetings in Belize between UK and Belize project partners;

biennial updates on project website; provision of web-based feedback opportunities for Belizean and UK project staff and other stakeholders;

annual reports from Belize Botanic Garden to project PI on delivery of savanna plant trail;

collation of Belize Botanic Garden visitation records related to savanna plant trail;

attendance records & feedback forms from project training workshops;

teacher and professor feedback/evaluation forms on education resources;

report by independent educational consultant and savanna specialist on the school and higher education resources;

records of numbers and location of field guides distributed (year 3);

assessment of re-curated savanna collections by Forest Department herbarium staff;

commitment by partners at final planning workshop to use the findings to recommend amendments to the National Protected Areas Systems Plan;

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

Four Individual Activity Reports are attached from the four principal project partners.
3.1 Activity report from University of Belize
3.2 Activity report from Belize Botanic Gardens
3.3 Activity report from University of Edinburgh
3.4 Activity report from Royal Botanic Garden
Nine appendices contain examples of training course handbooks, monitoring reports and draft outputs:
Appendices 1 Report on first fieldwork period (Sept-Oct 2009) 2. Plant Taxonomy Field Course Handbook 3 Report on the Plant Taxonomy field course at Hillbank, January 2010 4 Evaluation of Introductory Herbarium Techniques course, January 2010 5 Draft of the Savanna Species Checklist 6 Page extract from the PhotoGuide to the savanna plants 7 Submitted paper on the San Pastor savanna by Hicks et al 8 Poster paper presented at the MSBC International Congress, Oct 2009 9 Example of one of some 150 maps produced at 1:20,000 for field use

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.	✓
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.	✗
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.	✓
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	✗
Have you involved your partners in preparation of the report and named the main contributors?	✓
Have you completed the Project Expenditure table fully?	✓
Do not include claim forms or other communications with this report.	