



Darwin Initiative Annual Report



Darwin Project Information

<i>Project Ref Number</i>	16-004
<i>Project Title</i>	<i>Conservation of the Cerrados of Eastern Bolivia</i>
<i>Country(ies)</i>	<i>BOLIVIA (with involvement of Brazil)</i>
<i>UK Contract Holder Institution</i>	<i>Department of Plant Sciences, University of Oxford</i>
<i>Host country Partner Institution(s)</i>	<i>Herbario del Oriente Boliviano, Museo de Historia Natural, Santa Cruz, Bolivia</i> <i>Fundación para la Conservación del Bosque Chiquitano, Santa Cruz, Bolivia</i> <i>Herbario Nacional de Bolivia, La Paz, Bolivia</i>
<i>Other Partner Institution(s)</i>	<i>Royal Botanic Gardens, Kew</i> <i>Universidade de Brasília, Brazil</i>
<i>Darwin Grant Value</i>	£265,405
<i>Start/End dates of Project</i>	1 May 2007 – 30 April 2010
<i>Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)</i>	1 April 2008 – 31 March 2009 Annual Report No. 2
<i>Project Leader Name</i>	<i>Dr R.W. Scotland & Dr C.E. Hughes</i>
<i>Project website</i>	www.darwincerradosdebolivia.org
<i>Author(s) and main contributors, date 19 May 2009</i>	<i>John R.I. Wood with contributions from Scotland, Hughes (Oxford), Roberto Vides (FCBC), Stephan Beck (La Paz)</i>

1. Project Background

The cerrado vegetation of South America is one of the principal tropical savannah formations, occupying extensive areas of central Brazil and eastern Bolivia with an estimated flora of 6500-10,000 species, of which about 35% of the trees and 70% of the herbs are estimated to be endemic to the biome, making it one of the richest of the world's top 25 biodiversity hotspots. While the cerrados of Brazil have been the focus of considerable botanical research in recent years, the extensive areas in Bolivia remain neglected in terms of botanical inventory and data. There are many undescribed species, no checklist of Bolivian cerrado species, little data on species distribution and almost none on patterns of endemism or what species are endangered. Some areas are totally unexplored botanically. There is an urgent need for more detailed scientific information to underpin conservation planning.

In recent years the cerrados have come under intense pressure principally through soya cultivation in Brazil and cattle ranching in Bolivia. Observations by the FCBC and the Museo Noel Kempff Mercado (MNKM) have drawn attention to the ease and rapidity by which the cerrados are being grubbed up and sown with imported grasses resulting in the loss of the original vegetation and fauna. Only very few cerrados are currently within protected areas and effective conservation action within the next decade is likely to be critical, thus it is a matter of urgency to explore the region and identify the most important cerrados for conservation. Previous studies by the MNKM on the Serrania de Huanchaca in the extreme NE of the region suggest that hilltop mesetas are especially rich in endemics and still largely immune from grazing. The mesetas could play an important role in conservation planning and our project would ascertain how far they could fulfil this role. The FCBC is anxious for well-founded scientific data to help promote more sustainable grazing practices so traditional grazing can be combined with conservation.

The need for the project has grown out of the long-standing involvement of all parties in the cerrados and their awareness of the need for information on specific threats to species and habitats to help the Bolivian government fulfil its commitments under the CBD. MNKM is the Bolivian institution with prime responsibility for biological research in eastern Bolivia and has conducted surveys and other projects in the region but, like all similar Bolivian institutions, lacks resources to carry out survey work of the kind proposed here.

The project operates essentially within Santa Cruz Department of Bolivia as outlined in the accompanying map (**attached**). Although a few cerrado-like vegetation types occur in other departments all major areas of cerrado are within the project area. It should be noted that the project area is in fact a mosaic of vegetation types and is covered predominantly with Chiquitano dry forest (although often cleared for cattle ranching in some areas) with chaco lying to the south and Amazonian rainforest to the north. The cerrado biome lies within the Chiquitano forest region and consists of a range of subtypes or physiognomies, known by their Brazilian names as campo limpo, campo sujo, campo cerrado (sensu stricto), cerradao, campo humedo and campo rupestre. All except the last are characterised by periodic burning (both natural and anthropogenic) and soils low in nutrients and high levels of aluminium, all derived from the rocks of the Pre-Cambrian Shield. The project studies all these types and also pays attention to the granite domes and "lajas" (rock platforms), which are a feature of the Bolivian part of the biome. Additionally we pay some attention to a vegetation form known as "Abayoy" or Cerrado Chaqueño" which lies between the true cerrados and the chaco and contains significant chaco elements. However it differs in physiognomy being essentially a dense scrub formation on sandy soils and is largely immune from burning

2. Project Partnerships

Our first annual report described the roles of the partners in the project and how they functioned. That information is not repeated here as no change has taken place in these roles or in project personnel during the reporting period. Instead this report focuses more on how these relationships have developed through the second year of the project.

The management structure of the project likewise remains the same. Overall responsibility for the project in the UK rests with Robert Scotland and Colin Hughes but the personal link between them and our project partners and team of workers in Bolivia rests with John Wood, who is effectively field manager with responsibility for project finances. General planning takes place through informal meetings between Wood and the project leaders and through formal and informal meetings with our project partners in Bolivia. Most but not all, project activities take place over two three-month periods of the year (October to December and February-May approximately) coinciding with the rainy season and Wood's presence in Bolivia and reflecting the fact that the project team (John Wood, Daniel Villarroel, Daniel Soto, Fabiana Mamani and Paola Pozo) are employed by the project for only six months of each year. Day to day planning of project activities takes place within this group of five people. Some activities, especially training outside Bolivia, is programmed to take place outside these two three month periods. Communication is mostly by personal contact and by e-mail or telephone. Field work is carried

out by all team members except Fabiana Mamani together with the occasional participation of consultants, students, park guards and landowners.

Our principal partner is the Museo de Historia Natural in Santa Cruz and throughout the year our relationship has remained excellent. The project pays salaries to the three project workers from the Museum through the Museum's pay roll and depends on the Museum for IT and administrative support within Bolivia. Meetings and consultation with the director (Patricia Herrera) and Herbarium director (Mario Saldias) take place regularly and project purchases, workshops, field work and other activities are discussed and planned together. We have been concerned that Mario Saldias has been increasingly occupied with his university teaching job leaving the herbarium relatively neglected at a managerial level. This has had no effect on project activities but is potentially prejudicial to some of the longer term, indirect benefits of the project, which the Museum is not taking full advantage of. No progress, for example, has taken place in the databasing or imaging of the herbarium's general collection, nor with strengthening the regional links with other institutions that are being developed by the project. It is expected, however, that Mr Saldias will resign his herbarium responsibilities in the near future. Our three project workers from the Museum continue actively and enthusiastically involved in the project. Daniel Villarroel is involved in all aspects of the project with a particular interest in trees, the families *Myrtaceae* and *Vochysiaceae* and in the different physiognomies and ecology of the cerrados. Daniel Soto is likewise involved in all aspects of the project with a particular interest in *Rubiaceae* and *Sapindaceae* and in vegetation surveys. Fabiana Mamani is mainly based in the herbarium and acts as liaison with all regional organisations as well as being in charge of all specimen processing and curation and administrative matters when Wood is in the U.K.. Her primary interest is *Euphorbiaceae*.

We also have excellent working relations with another Bolivian partner, the National Herbarium in La Paz. In terms of management the National Herbarium acts as our liaison with national biodiversity institutions, particularly the Dirección General de Biodiversidad (DGB) and the National Parks Service (SERNAP). It is also our link with the IUCN. We make use of staff from the National Herbarium in a consultancy capacity including Stephan Beck for plant identification, Rosa Meneses for conservation issues and Hibert Huaylla on ferns. Staff from the National Herbarium (and other Bolivian herbaria) attend project workshops and some of these are jointly organised, particularly those related to the Botanical Research and Herbarium management system (BRAHMS) for data basing and imaging. Project workers have also participated as speakers in the 30th anniversary Congress of La Paz's Instituto de Ecología to which the National Herbarium is affiliated. One of the project team (Paola Pozo) is from the National Herbarium but is employed technically as a project consultant and is not on her institution's payroll. Like the Santa Cruz staff she is involved in all aspects of the project's activities but her particular interests are the taxonomy of *Asteraceae* and the morphology of plants adapted to cerrados conditions.

We also have very good relations with the Fundación para la Conservación del Bosque Chiquitano (FCBC), with whom we have regular meetings to keep them informed of project progress and plans as well as making use of their contacts in the region. There remains every reason to expect that the FCBC will be able to fulfil its principal role in the project structure, that of promoting and implementing project recommendations within the Chiquitania region (this more or less coincides with the area of project activity) during the later stages of the project and after its end. Our only concern at this stage is that after receipt of a major EU grant the FCBC appears to be focussing its attention on the sustainable use of under-exploited plant resources rather than the conservation of biodiversity.

Our only UK partner is the Royal Botanic Gardens at Kew. This is a valuable link for us as we make use of Kew's expertise to help with the identification of plants particularly in the families *Leguminosae*, *Asteraceae*, *Apocynaceae* and *Gramineae*, all of importance in the cerrados. Two members of the Kew staff have made consultancy visits to Bolivia funded wholly or in part by the project, Nicholas Hind in March-April 2008 and Steve Renvoize in March 2009. These visits have involved workshops on *Asteraceae* and *Gramineae* respectively as well as field work with the project team and identification of specimens in both the La Paz and Santa Cruz herbaria. Another aim of the link is to develop links between the Bolivian Institutions and Kew and in particular between individual experts and project workers. In the case of *Asteraceae* this

has resulted in a planned visit in summer 2009 for Paola Pozo to work with Nicholas Hind at Kew and the production of an on-line checklist of Bolivian *Asteraceae* by Hind, partly as the result of the stimulus of this and an earlier Darwin project (16/11/010).

Our only formal regional partner is the Universidade de Brasilia in Brazil. Our links are primarily through the director of the botany department, Carolyn Proença, who visited Bolivia in December 2008 to give a workshop on *Myrtaceae* and advise on this family and *Bignoniaceae*. We rely on the Universidade de Brasilia for consultancy visits of this sort (another on *Melastomataceae* is planned) for literature and information on the biodiversity and conservation of cerrados in Brazil and also for participation in the training of project workers. In this context, plans are well-advanced for Daniel Villarroel to visit Brasilia to do research on the *Myrtaceae* of Bolivia under Carolyn Proença's supervision to complete a publication on the *Myrtaceae* of the Bolivian cerrados and an MA, if funding from Brazilian sources can be confirmed to complement Darwin funding. Our only difficulty with our relationship Brazil relates to the logistics of sending specimens to Brazil and receiving literature.

During the year we have developed good relations with the Botany Department of the Universidad de Corrientes in Argentina, which has an international reputation for its work on *Rubiaceae*, *Malvaceae* and *Arachis* amongst other groups. Our main purpose in this was to further the training of one of the project workers (Daniel Soto) in *Rubiaceae*. Soto spent two weeks in Corrientes with Dr Cabral and her team in March 2009. Joint field work is planned for June 2009 with a further visit later this year. Two publications are already under preparation.

As noted in the first annual report any missing element in Oxford Plant Sciences' capacity was covered by skills available from our partner institutions.

The project has links with the Dirección General de Biodiversidad (Bolivia's CBD focal point), who approved the project in the first place. An annual report is submitted in September each year (**Attached with this report**). As well as reporting project progress, the report provided information on probable areas and species for conservation. This will obviously be developed and expanded in the project's final report for the DGB. Similarly reports are presented to the National Parks organisation in La Paz (SERNAP) and to the environmental section in the Santa Cruz prefectura to meet our obligations and help in their conservation planning.

3. Project progress

3.1 Progress in carrying out project activities

The project is advancing in accordance with its implementation schedule (Section 21 of project proposal) with only minor differences which are discussed below.

The project has visited an increased number of cerrados during the year making repeat visits at different seasons to those identified as being of major interest in the previous reporting period. We have succeeded in entering the Lomerio area and the Serranias de Sunsas as well as the Meseta to Huanchaca in the Noel Kempff Park after several failed attempts to reach both these last areas because of bad weather conditions and/or flooded rivers. On one occasion we made use of light aircraft to enter one of these inaccessible areas and may repeat this in the project's final year if funds allow. There still remain a few areas, particularly near the Brazilian border, that we are anxious to visit. Arrangements and contacts with landowners and officials have been made in preparation for this (Activity 1).

The project team now have the skills to identify almost every specimen to family and most to genus; in consequence the proposed general workshop on plant identification by Beck in the project implementation timetable is unnecessary and will not be implemented. Our capacity to identify plants at species level is rapidly improving and is now excellent in many families where we have expertise (*Acanthaceae*, *Lamiaceae*, *Vochysiaceae*) or where we have had extensive help from visiting consultants or outside experts (*Apocynaceae*, *Asteraceae*, *Bignoniaceae*, *Bromeliaceae*, *Gramineae*, *Leguminosae*, *Pteridophyta*, *Rubiaceae*). There remain problem groups but in some such as *Malvaceae*, *Euphorbiaceae* and woody plants in general, the team

is developing its knowledge rapidly. This is a major step towards the evaluation of the plant diversity of individual cerrados (Activity 2).

The project now has a large and growing bank of photographs, mainly of plant species (eight gigabytes of selected photographs by plant family (**a selection of these is submitted with this report**)) but also of habitats, conservation issues and project activities. All project collections are data based as are preliminary data from our vegetation surveys. Although a few drawings have been prepared for the Red Data book, our assembly of drawings is behind schedule because of the ill-health of Rosemary Wise who was unable to make the consultancy/training visits to Bolivia during the reporting period. (Activity 3).

During the reporting period there have been four formal training workshops (Nicholas Hind on *Asteraceae* begun in March 2008 (about 8 participants), Michael Hopkins on BRAHMS (6 participants but repeated in La Paz with some additional participants invited and funded by La Paz), Carolyn Proença on *Myrtaceae* (6 participants) and Steve Renvoize on Grasses (7 participants)). Botanists from other Bolivian institutions attended all four workshops and training booklets were distributed with the *Asteraceae* and Grass workshops (**training booklets submitted with this report**). Nicholas Hind and Carolyn Proença also gave lectures to groups of around 30. Training was also given by William Hawthorne on Rapid Botanical Survey methods and plant photography, and this visit as well as those by Hind and Renvoize involved practical training in the field for the project team. On-going training on collection methods and plant identification takes place on all field trips with Wood. The first of three planned study visits for project team members outside Bolivia (by Daniel Soto to Corrientes, Argentina) took place In March 2009 ahead of schedule (**Annex 3(1) summarises work and outcomes of this visit**). All workshops are reported as useful but it is clear that the main beneficiaries are always those with a pre-existing interest in the main theme of the workshop. In two cases (*Asteraceae* and *Myrtaceae*), this has led to links with the visiting expert and concrete plans for further research under their guidance in the UK and Brazil. The project team's capacity to identify plants and carry out botanical surveys and take photographs is evidence of the success of the training (Activity 4).

Meetings with community leaders, landowners have taken place informally but mainly at this stage to explain the project purpose and obtain access. Some discussion of the conservation importance of specific plants and habitats has taken place with individual landowners. Access whether to private land, protected areas or community land has never, consequently, been a problem (Activity 5, mislabelled 6 in logframe)

The project website (www.darwincerradosdebolivia.org) has been operational since May 2008. The symposia and exhibitions are programmed for the end of the project but posters related to the project have been displayed on the open day at the Museum (MNKM) and project workers have made presentations at the 30th anniversary conference of La Paz Instituto de Ecología. (Activity 6, mislabelled 7 in logframe).

The herbarium paper purchased in the previous reporting period arrived from the United States in October and the mounting of specimens at both Santa Cruz and La Paz is advancing steadily. All specimens collected by the project till December 2008 have now been mounted. Three good but used binocular microscopes have been acquired from Kew and have been brought to Bolivia. Various smaller items including an additional camera, dissecting equipment, a tent have been acquired. Purchase of herbarium furniture was postponed because Santa Cruz is considering the purchase of compacters and we need to negotiate with other organisations and projects (principally Missouri Botanical Garden) for a joint purchase as with the herbarium which actually involved over six different funding sources headed by and organised by the project (Summary documents available if required by reviewer). (Activity 7, mislabelled 8 in the logframe).

No lobbying will take place till the final of the year of the project when Output 1 is substantially in place. (Activity 8, mislabelled 9 in the logframe).

3.2 Progress towards Project Outputs

We should have little difficulty in completing Output 1 by the end of the project. We already have basic checklists of the cerrado species of many important families (**samples attached**); it is clear that although the mesetas are botanically diverse, their flora is significantly different to that of the lower altitude cerrados and so cannot serve as refuges for all cerrado species and that overgrazing is only a minor threat compared to the other threats to the biodiversity of the cerrados. Most importantly it is becoming clear which areas are most important in terms of plant diversity and habitat. These are: 1. The cerrados of the Noel Kempff Mercado National Park with some 15-20 species endemic to Bolivia growing in the cerrados sensu lato of this area. Of these species two are also known in the Roboré area, and at least five are undescribed. There are many Brazilian species only known from this area in Bolivia. This area is very extensive with high quality cerrado, largely unexplored and very difficult of access without resources beyond those of the project. 2. The Serranias of the Roboré area. There are about 40 species endemic to Bolivia here of which over 30 are restricted to this small area. At least 12 are undescribed. There are also 20 or more species known nowhere else in Bolivia. Of the 11 Pteridophytes restricted to the cerrados biome in Bolivia, eight are only known from this serrania. The project has explored this area well and the cerrados are mostly of high quality but some are very threatened. The area needs national legislation for its protection. 3. The Rincón del Tigre area. Within close proximity are three very unusual habitats, two enjoying some degree of legal protection but, in fact, very exposed to habitat change. This is an area “discovered” by the project with about ten putatively undescribed species, all presumably endemic to the region as well as a number of species unknown elsewhere in Bolivia. The area is very rich in wild relatives of manihot and peanuts. 4. Cerro Mutún. This is an isolated hill on the Brazilian border threatened by iron ore mining. There is one endemic species known from two other stations in Bolivia but about six species known nowhere else in Bolivia (although present in Brazil), one being globally very rare. 5. The Concepción area, which is duplicated further east in part of Velasco, the two areas being similar in character with good campo cerrados and campo humedo and both very threatened. There are at least five endemic species mostly common to these two areas and an interesting group of species unknown elsewhere in Bolivia although present in Brazil. 6. The Lajas of Lomerio region. A centre of local endemism on the isolated granite domes of the area, which are unprotected but without immediate threat. We are aware of about five Bolivian endemic species from this area, most restricted to the area and some undescribed. (Output 1)

We have a working list of species to be included within the red data book, which is being modified as distribution data and taxonomic studies advance (**Annex 3(2)**). We will have to exclude species from the Noel Kempff Park as the area is so extensive and so little known that we cannot make any realistic assessment of the conservation status of any species known only from this area. However, these plants, although rare, are probably not threatened and we hope to include only those that are genuinely threatened because of small populations, habitat change or other factors. One complication is that several of the most threatened species are undescribed, which presents problems for inclusion in lists of threatened species. In terms of the book production we have a good collection of photographs of many species and art work has begun by our Bolivian artist (Eliana Calzadilla) but was delayed by the postponement of Rosemary Wise’s visit through ill-health. However, we do not think this will be a problem for the completion of the task before the end of the project. (Output 2).

We have accumulated sufficient information and photographs to construct leaflets and posters but will use more photographic material than art work than was originally proposed. We plan at the moment to produce posters or information leaflets on threatened species from the two principal tourist areas, where the most threatened cerrados are found (Concepción and Santiago), perhaps also for Cerro Mutún threatened by mining with the aim that landowners, mining operatives and local communities will become more aware of the rich plant diversity threatened in their area. Other posters will have a more obvious educational focus with general applicability to schools and communities throughout the cerrados regions. (Output 3).

The only scientific paper actually submitted to date is a paper on *Selaginella chiquitana* by Huaylla, Wood and Scotland, which should be published before the project’s end. However, two

papers related to *Rubiaceae* are under preparation for submission to *Brittonia* by Daniel Soto and there are plans for papers on *Asteraceae* and *Myrtaceae* by Paola Pozo and Daniel Villarroel following their work at Kew and Brasilia. A draft paper on the morphology of cerrado plants by Pozo is well-advanced. A paper on a new species of *Plantago* is in preparation by Villarroel and Wood. Papers by our consultants on *Asteraceae*, *Leguminosae*, *Gramineae* and *Hyptis* are all promised for submission before the project ends. We will have no difficulty in completing this output although it is unlikely the papers will actually be published until after the end of the project. (Output 4)

The quality and number of project specimens have been commented on by a number of scientists and there is no doubt that we will leave an outstanding reference set at the end of the project. There will also be a large collection of digital photographs, data on our collections and information generally on the cerrados. Combined with the skills learned during the project the capacity of our partners in Bolivia to carry out similar work will be significantly enhanced. We will leave behind a substantial knowledge of and capacity for plant taxonomy in eastern Bolivia, which can be built on in the future (Output 5).

Table 1 Project Standard Output Measures

Code No	Description	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned from application
4A	Undergraduate work experience	3 x 1 week	1 x 1 week		4x 1 week	10 x 1 week
5	Long term training/work experience	3 x 4 months 1 x 3 month	4 x 6.5 months		4 x 11.25 month	4 x 18 months
6A	Guided research in UK/Brazil	0	0		0	>24 weeks
6B	Bolivian botanists training workshops	3 weeks (BRAHMS workshop)	3 weeks (Grass, Compositae, BRAHMS Myrtaceae)		6	10
7	Training manuals	Available on line (not project specific)	2 manuals, one for Compositae, one for grasses		2 + 1 online	Not specified
8	UK staff work in host country	16(Wood) 2(Filer) 1(Hind)	25 (Wood) 2 (Hind) 2.5 (Hawthorne) 3(Renvoize)		51.5	80 (Total)
9	Management plans/reports	0	0		0	2
10	Field guides	0	0		0	1
11	Peer-reviewed papers	0	1 submitted and positively reviewed			4
12B	Data bases enhanced	Process begun	Steady progress in La			2

Code No	Description	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned from application
			Paz; only project in Santa Cruz			
13A	Reference collections	c. 980	c.1800		2780	>3000
13B	Reference collections enhanced i.e renamed	c. 500	Uncertain c. 750		1250	0
14A	Symposia	0	0			2
14B	Public meetings	0	0			Not specified
15A	Press releases	0	0			At least 3
15B	Museum newsletter	0	1 + 1 submitted		2	3
15C	Oxford Plant Systematics	0	1 + 1 submitted		1	3
18C	TV programmes	0	0			Unspecified
20	Value of equipment to be handed over	c. £14000	c. £10000		£24000	£21000
23	Funding from other sources: KEW Conservation International	c.£700 for Hind flight	3 good 2nd-hand binocular microscopes @c.£3K each Mike Hopkin's flight to Bolivia (c. £500)		£10200	
New Project specific measures						
6A	Guided research in Argentina		2 weeks		2	
8	Brazilian staff work in host country		2 weeks		2	
	Bolivian consultants for project		3 weeks (Huaylla)		3	
14B	Conference posters		1		1	
14B	Conference presentations		2 x presentations partly related to project		2	

In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, eg title, name of publisher, contact details, cost. Mark (*) all publications and other material that you have included with this report.

Table 2 Publications

Type	Detail	Publishers	Available from	Cost £
Newsletter	Taller sobre Familia Asteraceae - Daniel Soto (May 2008)	Boletin Patuju No 7, MNKM, Santa Cruz	www.museonoelkem pff.org/sitio/patuju	Free
Newsletter	New Darwin Project in Bolivia- John Wood May 2008)	Oxford Plant Systematics no. 15 Dept of Plant Sciences, Oxford	herbaria.plants.ox.ac .uk/OPS	Free

3.3 Progress towards the project purpose and outcomes

The project is making progress towards its purpose of identifying conservation priorities within the cerrados biome of Eastern Bolivia. Priorities in terms of priority locations have been discussed under Output 1 and in terms of priority species for conservation under Output 2. In terms of general threats to the biome, we now regard overgrazing as a minor threat, burning as possibly positive (article by Wood submitted for publication on this issue) and mining only of importance at Cerro Mutún. The two main threats are habitat change (principally the clearance of cerrado vegetation and its replacement by pasture with imported grasses, but also drainage of wetland and growth of settlements around villages) and invasive species, particularly the two grasses *Hyparrhenia rufa* and *Brachiaria brizantha* but other potentially dangerous invaders such as *Melinis minutiflora*, *Melinis repens* and *Pennisetum polystachyon* are also present. Combating these two major threats is important and perhaps the most important conservation priority in this biome. The threat posed by invasive species is especially challenging as the establishment of protected areas will, in fact, offer little protection.

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

The potential impact of the project is considerable since it should raise awareness of conservation priorities in eastern Bolivia so reducing habitat loss and promoting sustainable human use of the cerrados. It will also significantly increase Bolivian capacity to assess the country's biodiversity in an objective manner. The project is playing an important role in providing Bolivia scientists with the capacity to investigate and conserve the country's rich biodiversity.

4. Monitoring, evaluation and lessons

Essentially project progress is evaluated against the implementation timetable and the logframe, both of which have proved themselves to be reliable and useful instruments for this purpose. We continue to believe that the project outputs contribute to the project purpose and do not require reformulation. Minor redefinitions are occasionally necessary; for example, under Output 3 we believe that at least some of our posters should have a clear conservation, rather than a merely educational objective. As long as we carry out the project activities extensively and efficiently (surveys of all major cerrados, collection and identification of cerrados plants, training of project team and other biodiversity workers including the artist, collection of a large

bank of good quality photos and data, development of good working relations with conservation organisations, communities and landowners, careful management of the budget etc, we will be in a good position to achieve the project outputs. There will be time pressure but even at this stage, we would be able to produce adequate outputs, though not of the quality we would like in a year's time.

Although the project team has regular meetings in Bolivia, monitoring is mostly informal, taking the form of reviewing work completed and discussing the next steps towards achieving the project objectives. Efforts are made to keep up with the project implementation schedule and to reschedule any postponed activity to an early date.

The main lesson that we have learnt this year is the necessity for flexibility in response to problems such as weather conditions, the falling pound or political problems while at the same time keeping projective objectives and priorities firmly in view.

5. Actions taken in response to previous reviews

Our previous review was very positive but the reviewer raised three general concerns, which are discussed here:

a. Lack of publicity for the project. This has been partly addressed. Our website had in fact been set up by the time the review had been received. Information about the project had been submitted to the newsletters of both Oxford Plant Sciences and MNKM and these have been published. Further reports have been submitted and may be available on-line by the time this report is reviewed. Others are planned including a complete volume of the MNKM online journal near the end of the project. We discussed the issue of wider publicity and press releases with our project partners and with the British Embassy and we all feel it is better to wait till near the end of the project when factual information and recommendations can be fully confirmed before approaching the national and regional press. This proposal was raised with ECTF in March who accepted our strategy for publicity.

b. Lack of coverage of project area. This remains a concern for us but we are having some success in closing the gaps. Two areas are likely to be inadequately surveyed by the end of the project: the Meseta de Huanchaca in the Noel Kempff Park and the Serranias de Sonsas. From a conservation point of view this is relatively unimportant as both areas are protected by legislation and difficulty of access. From a scientific point of view this is unfortunate but difficult to correct without more time and funds. However, aerial inspection of the Serranias de Sonsas as well as some visits suggest that this area is not outstandingly diverse although it includes some unusual elements. No endemic species have yet been confirmed from this area.

c. Sustainability of institutional capacity for biodiversity/conservation work. Like the reviewer we are concerned about the long-term involvement/employment of the project team by their institutions, a problem made worse by the lack of leadership in the Santa Cruz herbarium. There is little that we can do about this at an institutional level – British Institutions are often equally reluctant to give longer term employment to those employed in projects related to conservation, biodiversity and taxonomy. However, we expect that the skills and experience obtained through the project will ensure that conservation and academic institutions will continue to make use of our team. Certainly all six project workers from a previous project (16-11-010) are still active in biodiversity work in Bolivia, one being employed as a university lecturer, one as curator of a herbarium and four in biodiversity projects based in their institution. Two of these have gone on to further studies in related fields, one at PhD level. There is no reason to believe that the present team will fare less well.

6. Other comments on progress not covered elsewhere

The project design and exit strategy have not been enhanced during the reporting period but some changes to the project design have been made with approval from the Darwin Secretariat received in March (**Attached to this report**). Our mid-year report in October 2008 highlighted three problems the project faced: political instability in Bolivia, physical difficulties of access to

some important parts of the project area and a reduced budget as a consequence of the falling value of the pound. The first of these problems has receded and we have replaced one and plan to replace the second cancelled consultancy visit from Brazil. Access to some areas remains and will continue to be problematic but we have solved access problems to one area by the use of light aircraft and plan to repeat this if the budget permits. Our real difficulty relates to the rising value of the Boliviano (one US dollar now purchases seven Bolivianos whereas it purchased eight at the start of the project) and the fall in the value of sterling (one pound now purchases about 1.60 US dollars whereas at the start of the project it purchased two dollars). Consequently all costs in Bolivia have risen by approximately one third. The effect is easily illustrated in our salary bill. At the start of the project, four local salaries for one month cost £1600. In March 2009 it costs £2250, an annual increase of nearly £4000 for a single item. With the agreement of the Darwin secretariat, we plan to maintain all local salaries, project activities (basically the travel budget), training and activities related to project outputs (basically printing and dissemination) while cutting our expenditure on equipment (fortunately purchased before the fall in the value of the pound) and UK consultants.

The project does not face any special risk.

7. Sustainability

The project continues to have a very positive profile within the biological community in Bolivia and enjoys the full support of the DGB, SERNAP (National Service for Protected areas), the prefectural conservation office and similar institutions. Our partner institutions clearly have increased capacity for biodiversity work through the training work of the project.

We believe that the project's exit strategy is sound, being that our partner institution, the FCBC, will follow up the project's recommendations and initiatives and continue to promote these in the years after the project's conclusion. This is not without danger as it depends on the FCBC's continuing commitment to the project's final recommendations. We also continue to have concerns over the long-term financial support of the Museum's parent organisation (Universidad Autónoma Gabriel Rene Moreno) for biodiversity and in particular for staff salaries. There is a risk that the skills acquired through the project will be lost if our staff are not employed and adequately remunerated after the project's end although previous experience suggests they will continue to work in biodiversity-related projects..

8. Dissemination

At this stage of the project we have not prioritised dissemination activities as noted above. However we have exhibited posters for the Museum's open day, made a presentation to all the staff of the FCBC, participated in the 30th anniversary Congress of the Instituto de Ecología and produced articles for the Museum's newsletter. It is for the final six months of the project that major dissemination activities are planned. It is expected that all our Bolivian partners will continue dissemination activities after the project's end. The FCBC in particular has the funds and organisation to do this.

9. Project Expenditure

Expenditure is estimated in sterling based on transactions in sterling, US dollars, Bolivianos and Argentinean pesos. Exchange rates vary daily and bank charges also vary but we have added 5% to cover bank charges for expenditure in currencies other than sterling.

Table 3 Project expenditure during the reporting period (Defra Financial Year 1 April 2008 to 31 March 2009)

Item	Budget (based on revised budget approved by DEFRA on 12 March 2009, copy attached)	Expenditure	Variance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment (specify)			
Others: indirect costs Training in UK/Brazil/Argentina			
Salaries: UK salaries UK consultants Bolivian salaries			
TOTAL			

Arrangements for Soto's study visit to Argentina materialised earlier than expected (March 2009) and it was necessary to purchase Pozo's ticket to the UK although both items were budgeted for in the next financially year. To compensate purchase of herbarium furniture for MNKM was delayed because of the failure of the compacter company to produce a pro-forma and for joint participants in the purchase to reach agreement. This was not referred to LTS since it has no overall impact on project plan or budget.

We are not exactly sure of the amount claimed by Oxford University for indirect costs and rents. The total for these two items is £21599 but as this figure is based on budgeted figure for Oxford salaries, which was actually less than the amount budgeted, this should have been reduced proportionately.

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

We have a large number of photographs of plants, habitats, environmental issues (burning, scrub destruction etc) and people which we would be happy to share. Contact John Wood jriwood@hotmail.com

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2008/09

Note 1. In general we are happy that the indicators in the logframe are valid. A few comments are added in specific cases

Note 2. In the original log frame, the project activities were not designed to fit specific outputs on a one-to-one basis. Most activities contribute in some way to most outputs. The more obvious links are indicated below but some repetition is inevitable.

Project summary	Measurable Indicators	Progress and Achievements April 2006 - March 2009	Actions required/planned for next period
<p>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</p> <p>The conservation of biological diversity,</p> <p>The sustainable use of its components, and</p> <p>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</p>		<p>It is too early to report on this other than to indicate we have endeavoured to involve all relevant stake holders</p>	<p>(do not fill not applicable)</p>
<p>Purpose</p> <p>The identification of conservation priorities within the cerrado formations of the Chiquitano region of Eastern Bolivia</p>	<p>Acceptance of report by FCBC/government</p> <p>Steps taken to conserve priority areas recognised</p> <p>Progress in meeting CBD commitments by Bolivia</p>	<p>Six areas of priority for conservation provisionally identified</p> <p>Major threats to area identified</p>	<p>Refine recommended areas for conservation</p> <p>Collect additional details/justification for conserving these areas</p> <p>Prepare/Discuss steps to promote conservation of key areas and biome in general</p>
<p>Output 1.</p> <p>Report to FCBC and Bolivian government detailing priority cerrados for conservation with map</p>	<p>Completion of comprehensive report and checklist</p>	<p>Provisional identification of key cerrados made but will need revision as more information is obtained</p> <p>Checklists of individual families partially prepared with some provisional</p>	

<p>of hotspots, checklist of cerrado species with provisional conservation data, role of mesetas as refugia and assessment of impact of grazing.</p>	<p>Existence of map Detailed conservation assessment of species Existence of assessments of mesetas and grazing impact</p>	<p>conservation assessments The indicators are all sound Data mostly collected using RBS methods to compare mesetas of Santiago with lower level cerrados. Analysis still to be done but clear flora is different. Further assessment of threats needed but grazing appears low threat</p>
<p>Activity 1. Rapid assessment of plant diversity of potentially diverse cerrados.</p>	<p>Whole region now covered reasonably well but some remote and inaccessible areas still unvisited and some likely to remain unsurveyed. Six areas provisionally identified as being of high diversity</p>	
<p>Activity 2. Identification of specimens from zone.</p>	<p>Very good progress with team members able to identify to family and mostly to genus. Individual team members developing good knowledge of individual plant families and groups esp Woody plants, Acanthaceae, Apocynaceae, Asteraceae, Lamiaceae, Gramineae, Myrtaceae, Polygalaceae, Rubiaceae etc with support from experts at Kew, Brasilia and Corrientes</p>	
<p>Activity 6. Meetings with cattle ranchers, community representatives and schools to promote conservation and use of posters/pamphlets.</p>	<p>Activity 6 (also 7 and 9) relate more to the goal than the output or purpose and work best in the final of the project and as follow-up activities. We have had preliminary meetings and some discussion of conservation of individual species, habitats and areas with some landowners, conservation officials and others</p>	
<p>Activity 7. Symposia, website, and exhibition to publicise results</p>	<p>This Activity will be acted on in the final stages of the project. Project website online since May 2008.</p>	
<p>Activity 9. Lobbying of authorities to support conservation</p>	<p>This will only take place near the end of the project when we have assembled sufficient data.</p>	

Output 2. A colour illustrated red data book of the endemic/ endangered plants of the zone.	Completion, publication and distribution of book	Provisional list of endangered species prepared species but subject to review and development till end of project Art work begun since March but delayed because drawing consultancy postponed. Bank of photographs growing and covering many of the endangered species The indicators are sound
Activity 3. Assembly of bank of photographs, artwork and data.		Good progress on assembly of data and photographs. Artwork begun but delayed because of postponement of drawing consultancy because of artist's ill-health
Activity 4 Training/workshops in plant identification, esp. grasses, use of BRAHMS, botanical illustration, project proposal design, survey methods, conservation priorities and assessment		Description of activity is inadequate as should include research methods, academic writing skills, taxonomic principles and perhaps other elements which would contribute to this output. Good progress here with consultancy visits related to key plant families (Asteraceae, Myrtaceae, Gramineae), BRAHMS and survey methods. On-going mentoring in plant identification .
Output 3. Information leaflets and posters on the flora and vegetation of the zone for public education.	Existence of leaflets and posters	We are steadily collecting photographs and information for these products. We have identified probable targets (species focus conservation for Santiago, Concepcion and Mutun) but educational focus on cerrados habitat adaptations and flora for general education purposes. There is a delay in getting artwork completed but we have enough photographs as an insurance policy if our consultant does not come.
Activity 3 Assembly of bank of photographs, artwork and data.		Good progress on assembly of data and photographs. Artwork begun but delayed because of postponement of drawing consultancy because of artist's ill-health
Activity 2. Identification of specimens from zone.		Very good progress with team members able to identify to family and mostly to genus. Individual team members developing good knowledge of

		individual plant families and groups esp Woody plants, Acanthaceae, Apocynaceae, Asteraceae, Lamiaceae, Gramineae, Myrtaceae, Polygalaceae, Rubiaceae etc with support from experts at Kew, Brasilia and Corrientes
Output 4. At least 4 scientific papers related to the plants/vegetation of the Bolivian cerrados	Papers completed and accepted for publishing	All four Bolivian team members have selected topics for study Two papers on Rubiaceae (Soto) are under preparation with Argentinian colleagues. A revision of Myrtaceae of the cerrados (Villarroel) is under preparation. A draft paper on morphology of cerado species has been prepared (Pozo). A paper on a new species of Plantago is under preparation (Villarroel & Wood). Other papers should emerge from the training visits to the UK and Brazil. A paper on Selaginella chiquitana has been submitted by Huaylla, Wood & Scotland. John Wood is also working with Stephan Beck on Polygala and may also study Convolvulaceae of the cerrados. Emphasis is on work by Bolivian team members but it is expected that papers based on project collections will be prepared by visiting consultants related to Asteraceae and Gramineae and perhaps other groups. Papers should be written and submitted but actual publication cannot be expected before project end.
Activity 4 Training/workshops in plant identification, esp. grasses, use of BRAHMS, botanical illustration, project proposal design, survey methods, conservation priorities and assessment		Description of activity is inadequate as should include research methods, academic writing skills, taxonomic principles and perhaps other elements which would contribute to this output. Good progress here with consultancy visits related to key plant families (Asteraceae, Myrtaceae, Gramineae), BRAHMS and survey methods. On-going mentoring in plant identification .
Activity 3. Assembly of bank of photographs, artwork and data.		.Artist is available for drawings to support papers and bank of photographs also available
Output 5	Number of collections made	Approximately 2780 specimens have been collected so target of 3000 likely to be exceeded. Identification is advancing rapidly and an

Enhanced capacity in botanical survey, conservation assessment, taxonomy	Number identified	<p>unplanned-for benefit of bringing out experts is the improved naming of collections in Bolivian herbaria. This will undoubtedly enhance capacity. In general the skills being developed by the project team in areas such as plant taxonomy, botanical survey, academic writing, data basing, photography, plant identification, conservation assessment etc, will all help Bolivian institutions improve their capacity for biodiversity work.</p> <p>The indicators are insufficient as they do not measure team members capacity in research, writing etc. Number of papers, number of plant descriptions, number of reports prepared might be appropriate indicators</p>
Activity 3 Assembly of bank of photographs, artwork and data		Good progress on assembly of data and photographs. Artwork begun but delayed because of postponement of drawing consultancy because of artist's ill-health
Activity 4 Training/workshops in plant identification, esp. grasses, use of BRAHMS, botanical illustration, project proposal design, survey methods, conservation priorities and assessment		Description of activity is inadequate as should include research methods, academic writing skills, taxonomic principles and perhaps other elements which would contribute to this output. Good progress here with consultancy visits related to key plant families (Asteraceae, Myrtaceae, Gramineae), BRAHMS and survey methods. On-going mentoring in plant identification .

Annex 2

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal:</p> <p>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources 			
<p>Purpose</p> <p>The identification of conservation priorities within the cerrado formations of the Chiquitano region of Eastern Bolivia</p>	<p>Acceptance of report by FCBC/government</p> <p>Steps taken to conserve priority areas recognised</p> <p>Progress in meeting CBD commitments by Bolivia</p>	<p>Report from FCBC/ government agencies</p> <p>Press reports</p>	<p>Bolivia continues to work towards meeting its CBD commitments</p>
<p>Outputs</p> <p>1. Report to FCBC and Bolivian government detailing priority cerrados for conservation with map of hotspots, checklist of cerrado species with provisional conservation data, role of mesetas as refugia and assessment of impact of grazing.</p> <p>2. A colour illustrated red data book of the endemic/ endangered plants of the zone.</p> <p>3. Information leaflets and posters on the flora and vegetation of the zone for public education.</p>	<p>Completion of comprehensive report and checklist</p> <p>Existence of map</p> <p>Detailed conservation assessment of species</p> <p>Existence of assessments of mesetas and grazing impact</p> <p>Completion, publication and distribution of book</p> <p>Existence of leaflets and posters</p>	<p>Review of report</p> <p>Reports from Bolivian partners/ government institutions/ international Groups/ British Embassy</p> <p>Reviews of book</p> <p>Comments from IUCN representatives</p> <p>Review of leaflets and posters</p> <p>Reports from schools, visitors and other users</p>	<p>Identification of probable cerrados.</p> <p>Staff available to carry out assessment.</p> <p>Staff with assessment and identification skills.</p> <p>Cooperation offered by local communities</p> <p>Transport available</p> <p>Continued support by MNKM and FCBC.</p> <p>Existence of photographs</p> <p>Collection of information on specific species</p> <p>Availability of</p>

<p>4. At least 4 scientific papers related to the plants/vegetation of the Bolivian cerrados</p> <p>5. Enhanced capacity in botanical survey, conservation assessment, taxonomy</p>	<p>Papers completed and accepted for published</p> <p>Number of collections Made</p> <p>Number identified</p>	<p>Peer reviews of papers</p> <p>Reports by herbaria</p> <p>Examination of data base and specimens</p>	<p>photographs</p> <p>Oxford and local artist available</p> <p>Information available</p> <p>Discovery of new species</p> <p>Collection of data</p> <p>Problems not overly complex</p> <p>Field work completed</p> <p>Data entered</p>
<p>Activities</p> <p>1. Rapid assessment of plant diversity of potentially diverse cerrados.</p> <p>2. Identification of specimens from zone.</p> <p>3. Assembly of bank of photographs, artwork and data.</p> <p>4. Training/workshops in plant identification, esp. grasses, use of BRAHMS, botanical illustration, project proposal design, survey methods, conservation priorities and assessment</p>	<p>Activity Milestones</p> <p>Selection of potential cerrados for study (by 6/07)</p> <p>Training in assessment methods (by 10/07)</p> <p>Completion of initial assessments (by 12/08)</p> <p>Follow-up visits to short-listed cerrados (by 12/09) for more detailed study</p> <p>Common/indicator species identified (by 12/08)</p> <p>Rarer/more complex taxa identified (by 2/10)</p> <p>Basic set of photos/illustrations ready (by 1/09)</p> <p>Gaps in photos/illustrations filled by 1/10</p> <p>Data entered within 30 days of receipt</p> <p>Two workshops, one on survey methods and one on BRAHMS and by 1/08</p> <p>Four additional workshops including illustration, taxonomy/identification, assessment of survey results by 1/09</p> <p>Three additional workshops including taxonomy/identification, BRAHMS and conservation priorities by 1/10</p> <p>At least one UK trained botanist by 3/10 and one through Darwin fellowship programme</p>	<p>Assumptions</p> <p>Staff and transport available.</p> <p>Local community co-operative.</p> <p>Weather conditions adequate</p> <p>Key experts (UK, Brazil & Bolivia) available to identify material</p> <p>Cameras not lost</p> <p>Computers available</p> <p>Skilled illustrators available</p> <p>Availability of experts in key areas</p> <p>Identification of appropriate taxonomy project for Bolivian researcher</p> <p>Staff available for illustration and taxonomy work</p> <p>Cattle ranchers, community</p>	

<p>6. Meetings with cattle ranchers, community representatives and schools to promote conservation and use of posters/pamphlets.</p> <p>7 Symposia, website, and exhibition to publicise results</p> <p>8. Institutional capacity building through purchase of equipment and materials.</p>	<p>Initial meetings to inform local communities of project activities (by 1/08)</p> <p>Meetings/Workshops with cattle ranchers, major communities/schools in project area by (by 5/10)</p> <p>International symposium in Santa Cruz and national one in La Paz (by 5/10)</p> <p>Purchase of vehicle, computers, GPS, cameras (by 9/07)</p> <p>Purchase of herbarium cabinets and equipment (by 9/09)</p>	<p>representatives can be interested</p> <p>Posters and pamphlets completed</p> <p>Results ready to be publicised.</p> <p>MNKM has sufficient space for additional equipment</p>
<p>9. Lobbying of authorities to support conservation</p>	<p>Meetings with mayors, prefecto, indigenous leaders to win moral/legal support for conservation measures/protected areas</p> <p>Press releases</p>	<p>Political stability at end of project</p> <p>Meetings can be arranged</p> <p>Press can be interested</p>

Checklist for submission

	<i>Check</i>
Is the report less than 5MB? <i>If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.</i>	Yes
Is your report more than 5MB? <i>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.</i>	
Have you included means of verification? <i>You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.</i>	Yes
Do you have hard copies of material you want to submit with the report? <i>If so, please make this clear in the covering email and ensure all material is marked with the project number.</i>	Yes
<i>Have you involved your partners in preparation of the report and named the main contributors</i>	Yes
<i>Have you completed the Project Expenditure table fully?</i>	Yes
<i>Do not include claim forms or other communications with this report.</i>	