



Tropical Andean Butterfly Diversity Project

Proyecto Diversidad de las Mariposas Andinas
Tropicales



Darwin Initiative Annual Report 2

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Darwin Project Information

Project Ref Number	475 or 14-047
Project Title	Tropical Andean Butterfly Diversity Project
Country(ies)	Venezuela, Colombia, Ecuador, Perú, Bolivia, USA, UK.
UK Contract Holder Institution	University College London (UCL)
UK Partner Institution(s)	Natural History Museum (NHM).
Host country Partner Institution(s)	Venezuela: Museo del Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay (MIZA); Instituto de Investigaciones Científicas de Venezuela IVIC. Colombia: Instituto de Ciencias Naturales, Universidad Nacional de Colombia (ICN); Universidad de los Andes, Bogotá. Ecuador: Museo Ecuatoriano de Ciencias Naturales, Quito (MECN). Perú: Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima (MUSM). Bolivia: Museo de Historia Natural Noel Kempff Mercado, Santa Cruz (MHNNKM); Museo Alcides D'Orbigny Cochabamba (MAO) y Colección Boliviana de Fauna de La Paz (CBF). USA: Florida Museum of Natural History, University of Florida, Gainesville (FLMNH). Andes Region: Conservation International (CI).
Darwin Grant Value	£ 149,187
Start/End dates of Project	August 2005 - Dec 2008
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 Apr 2006 to 31 Mar 2007 Annual report number 2
Project Leader Name	Professor Jim Mallet
Project website	www.mariposasandinas.org (Spanish) www.andeanbutterflies.org (English)
Author(s), date	J. Mallet (JM), K. Willmott (KW), B. Huertas (BH), G. Lamas (GL), 24 April 2007.

1. Project Background

The Convention on Biological Diversity (CBD) requires signatory countries to identify and conserve globally important components of their biodiversity. Meeting this obligation requires knowledge of the diversity, distribution and ecology of species. While such knowledge might be available for some vertebrate groups, data are almost non-existent for insects, which make up 70% of terrestrial species, are often highly endemic and are vital to ecosystem health. Among insect groups, butterflies are regarded as one of the best potential indicator groups for biodiversity conservation because of the extent of existing knowledge, relative ease of survey and value in communicating ideas about conservation to the public. However, despite a recent renaissance in research on Andean butterflies, the world's richest and most poorly known fauna, Andean countries still lack an adequate knowledge of their national butterfly faunas.

Institutions and governments throughout the Andean region have highlighted the urgent need for basic systematic and biological data, and a number of small-scale efforts to compile such information exist (e.g. by C); project at MIZA, Venezuela). However, such efforts are hindered because taxonomic expertise and the world's richest sources of collections information still reside mainly in UK (the NHM has c. 20% of world specimens) and the USA.

The Tropical Andean Butterfly Diversity Project aims to address the biodiversity challenge posed by tropical Andean butterflies. This challenge consists of increasing the number of trained workers on the region's butterflies, making distribution data and photographs of specimens widely available, assessing the true diversity of species and subspecies, resolving the systematics and classification at many levels, obtaining baseline data on biology and distribution, and applying such data to begin to conserve threatened elements of the fauna.

The project is a collaborative initiative involving the UK, USA and the five tropical Andean countries: Peru, Colombia, Bolivia, Venezuela and Ecuador. The project involves work at museums and institutions in the UK, USA and South America, and at field stations in Andean countries (described further below).

2. Project Partnerships

During development of the project we were in contact with Andean country institutions by e-mail, telephone and many personal meetings. The Inaugural Meeting in April 2006 in Gainesville brought all project coordinators together for the first time to discuss project activities and goals. Some of the Andean coordinators and other invited specialists brought with them doubts and misgivings that had not been expressed before, allowing us to resolve many issues successfully and develop a new level of trust and understanding. Since then, we have been working closely with all project members in the year's principal activities, the organisation of student courses and databasing of Andean country collections. Visits by UK and USA project members to Andean countries to conduct student courses strengthened these partnerships and established many new partnerships with museums and researchers in each country. These have enabled the project to be publicised more widely and encouraged many to join our international network of some 150 students, researchers and others interested in studying tropical Andean butterflies.

Partner institutions contributed enormously with the organisation of the courses in each Andean country. Such assistance included identification of the course location, reservations of field stations, hotels and transport, loan of equipment, recruitment of volunteers to assist with running the courses, and provision of facilities. A number of local companies, people and institutions contributed through generous discounts in accommodation, food and transport.

The project also received important contributions from two Brazilian Lepidoptera experts, Dr André Freitas (Universidade Estadual de Campinas) and Dr Jorge Bizarro (Mariposario "Reserva Ambiental Serelepe"), who assisted with lectures and practicals during the week-long course in Bolivia. The Bolivian coordinator, José Luis Aramayo, secured additional funds from WWF Bolivia to cover the costs of their flights from Brazil, and those of two students from Amazonia. Perhaps most importantly, numerous institutions have contributed researchers, curators and lecturers who have spent significant

periods managing the project and attending student courses, without reimbursement from the grant. The FLMNH (USA) and MUSM (Peru) allowed Dr Keith Willmott and Dr Gerardo Lamas, respectively, substantial time to prepare lectures and practicals, assist with the organisation of courses and other project activities, attend the courses to help with training, and spend time in partner institutions to assist with curation. Other significant contributions of time of staff and curators towards organisation of courses and databasing were received from the MHNNKM and the CBF (Bolivia) (3 researchers), the Museo Ecuatoriano de Ciencias Naturales (1 researcher), the MIZA and IVIC (Venezuela) (3 researchers), and the ICN, CENICAFE and Universidad de los Andes, Bogotá (ULA; Colombia) (4 researchers). The MIZA and the ICN also allowed us to use their scientific research stations for the student courses for a substantial discount. The major institution for science in Venezuela, IVIC, provided the time of its subdirector Dr Angel Vilorio, also contributing with transport of lecturers within Venezuela. Two owners of major private collections, Jean François LeCrom (Colombia) and Padre Francisco Piñas (Ecuador) have contributed by allowing us to database their personal collections, while the former also gave lectures at the course in Colombia at his own time and expense.

The project has also established collaborations that will result in the exchange of data with the Butterflies of Colombia project (Luis Miguel Constantino), Butterflies of Guatemala and Belize project (Lic. José Salinas ECOSUR, Mexico), and the Butterflies of Paraguay project (Dr Fernley Simmons). A number of researchers have pledged to make distributional data from their personal research available for the project database.

Additional funding was obtained from AndinoNET to help develop the courses in Colombia and Venezuela (US\$2,000). WWF in Bolivia contributed with \$1,600 to assist the student course there, providing travel scholarships for students, course advertising and travel funds to bring in the two Brazilian experts. Conservation International committed \$25,000 towards paying salaries of assistants to database specimens in the five Andean countries.

The contributions of the project towards the institutional capacity of our partners are described elsewhere in this report.

3. Project progress

3.1 Progress in carrying out project activities

Enhanced institution staff capacity for butterfly research

The first project planning meeting was held in Gainesville from 23-30 April 2006 (as planned – unless otherwise discussed, activities do not differ significantly in manner and time from the original proposal). A total of 16 project members from the UK, USA and the five tropical Andean countries participated. University of Florida contributed \$10,000 (reported in the previous year's report), permitting additional experts to be brought in from each country. The meeting lasted for one week and began with presentation of lectures for the planned student courses, to obtain feedback from South American project members. The meeting ended with three days of discussion of project goals and logistics, particularly relating to the organisation of student courses and databasing of collections in South American countries. Dr José Vicente Rodríguez, from CI, attended to discuss how to increase the conservation value of the project.

UK and USA Project members have spent additional time with South American project members during field courses, visits to institutions to curate collections, and through e-mail and phone exchanges. Wherever possible and appropriate, curation has been conducted alongside curators and volunteers to teach identification skills.

Student training

Four student courses were conducted between September and December 2006 in Venezuela, Colombia, Bolivia and Ecuador, lasting 6 days each (see Annex 3 for course programmes). The courses took place in some cases later than anticipated due to constraints imposed by availability of key project members and seasons and field sites. The Ecuador course was a combined course for that country and Peru, due to a lack of suitable field stations in Peru and teaching commitments of key project members. Each course was attended and taught by three of the four main project

members (KW, JM, BH and GL), as well as country coordinators, invited national and international experts, and representatives from Conservation International.

The courses have been popular, with 26 students attending in Venezuela, 28 in Colombia, 25 in Bolivia and 25 in Ecuador-Peru (original target 30 students per country). The relatively low numbers on the Ecuador-Peru course (approximately half the students came from each country) primarily reflect the paucity of institutions with lepidopterist expertise in both countries. The courses were developed and aimed for the Andean region, but, because of project publicity, we received and considered applications from students and assistance from students and lecturers of 12 different nationalities. Participants on the courses included: 3 international PhD students (Spain, Mexico and USA), 4 national PhD students (Colombia and Venezuela), 9 MSc students, 49 undergraduate students and 38 graduates including owners of important private collections and workers in educational butterfly exhibits, NGOs, and butterfly farms.

All students and country coordinators received a CD-ROM with c.28 lectures, c.600 PDF articles, 2 free statistical analysis programs, and information on grant opportunities and protocols for storage of specimens. Lead institutions and other butterfly researchers in each country received a total of 50 butterfly collecting nets and net-poles, 15,000 pins for butterfly specimens, forceps and other small items of equipment required for butterfly collection and research projects. A draft version of the manual "Field Survey Techniques for Neotropical Butterflies" has been completed in Spanish (40 pp.) and will shortly be available via the project website.

Following the student training courses, we have since advertised a competition for small research grants for South American students, and received 36 applications from 6 countries. We will be selecting 2-5 projects per country to receive funding and subsequent support during their field work and data analysis. In addition, TABDP members and other experts contacted through our network constantly assist and advise South American students in their research. One Venezuelan student is currently working at the FLMNH with KW learning techniques for butterfly curation, while three other students are interested in applying to the University of Florida to pursue graduate studies with KW.

An open-access mailing list for the Tropical Andean Butterfly Diversity Project (<http://www.mailinglists.ucl.ac.uk/mailman/listinfo/tabdp>) has been set up at UCL and currently has 110 subscribers worldwide, and this has established a network of people interested in studying Andean butterflies. To date c. 500 messages have been exchanged with enquiries for information and assistance, and advertisements for more than 50 job and research grant opportunities. A related list with a number of overlapping members is our more specialised research list specifically on Heliconius and Ithomiinae butterflies: (<http://www.mailinglists.ucl.ac.uk/mailman/listinfo/heliconius>).

Curated collections

Curation continued in the NHM, UK (Melitaeini and Pieridae), FLMNH, USA (Ithomiinae, Papilionidae, Pieridae) and Andean country collections. Gerardo Lamas and/or Keith Willmott, and other TABDP project members visited the following Andean country collections to assist with curation: MIZA Venezuela, Mauro Costa collection (MC) Venezuela, Instituto de Investigaciones Científicas (IVIC) Venezuela, ICN Colombia, JFL Colombia, MECN Ecuador, FP Ecuador, MHNNKM Bolivia and Yuvinka Gareca collection (YG) Bolivia. Two manuals, on use of the TABDP database (21 pages) and digital photography of butterfly specimens (15 pages), have been produced, published on line (http://www.mariposasandinas.org/supporting_files/manual_fotos_TABDP.pdf; http://www.mariposasandinas.org/supporting_files/manual_basededatos_TABDP.pdf) and distributed in Spanish.

Database and digital images

Each country received one Nikon Coolpix 8700 digital camera and two high-powered laptop computers with the project database (MS Access) to aid in databasing Andean country collections. A contribution of \$25,000 was received from Conservation International to database additional collections in each country and 11 South American students are now employed part time to help with databasing and photographing specimens to be incorporated in the project's database and website.

Training in database use was provided during the courses. Databasing continued in the NHM, London, with more than 18,600 records (Papilionidae, Melitaeini; next group, Pieridae); the FLMNH, Florida, with 5933 records (Ithomiinae, Papilionidae, literature records); the MIZA, Venezuela, with

1000 records; the ICN-UN (Pieridae) and Jean François LeCrom Collection (JFL) (Papilionidae and Pieridae), Colombia, with 1876 records; the MECN and Francisco Piñas Collection (FP) collection, Ecuador, with 18,900 records (all families, and Papilionidae/Pieridae, respectively). No data were available for Bolivia and Peru. More than 46,000 additional specimen records for Ithomiinae and *Adelpha* (Nymphalidae) are also available to the project from KW and GL's research databases.

The project now has approximately 10,000 digital photographs of type and other specimens of Papilionidae, Pieridae, Nymphalidae (Ithomiinae, Melitaeini and *Adelpha*). Images are being distributed with copies of the database and will be available online at the project website. Obtaining permission from museum curators at the NHM and USNM to make type images available online has been a significant achievement of this project; currently neither collection has any such information available on their institutional websites for any Lepidoptera.

The website database interface has been designed and may be viewed at its test site: <http://turbot.laculine.com/~chris/butterflies/php/>. It is currently being installed onto the FLMNH servers and should be available for public access by mid-May. We have included more functionality than originally planned. In particular, integration of photographs with distribution data (described below) has necessitated much additional work. The database interface will not only offer the ability to generate taxonomic lists, output distribution data and allow searches for taxonomic information for a specific name (as in many other similar projects), but will also offer two unique features. Firstly, users can output photographs of taxa, instead of locality records, thus making the database a dynamic, online field guide that shows only those images relevant to any particular field study. Secondly, the database allows a species summary search, showing broad distribution data and photographs of all subspecies for any given species, thus assisting greatly in identification of subspecies taxa.

Other outputs

Project team members participated in the foundation of ACOLEP (Colombian Lepidopterists' Association) in Bogotá.

A number of volunteers are working with TABDP project members in London (3), USA (2), Bolivia (2), and Ecuador (2). They have been trained to help with project activities such as databasing, photography and curation.

3.2 Progress towards Project Outputs

Enhanced institution staff capacity for butterfly research

Project members have contributed to and gained an enormous range of taxonomic and biological knowledge and experience. It has been our goal for all to understand basic aspects of butterfly systematics, biology and conservation, and practical aspects such as databasing protocols and photography techniques. Project activities (workshop and student training courses) have contributed substantially towards this goal, but, most importantly, these activities have been mutual learning experiences through which project members (especially those from UK and USA) have benefited from interaction with all other project members, rather than training being unidirectional from UK to Andean countries.

Provision of resources such as database, digital photographs, field equipment and assistance in curating collections have all enhanced the capacity for butterfly research in our partner institutions.

Student training

We have made major progress towards our goals, as measured by original proposed indicators. Overall, we expect to train fewer students than initially envisaged. However, we initially expected that the majority of students would be undergraduates with little prior interest or experience in butterfly research, and therefore fewer would continue with this field in the future, necessitating the training of many individuals. Instead, we were extremely encouraged by the high levels of interest and enthusiasm of many undergraduate to graduate students on the courses, as reflected in the number of applications we subsequently received for research grants. Through further discussion with project coordinators we believe it is more important to continue to encourage the most promising students through support from research grants and advice from project members, and to hold more advanced courses in 2007 for such students, rather than to repeat the same introductory courses as in 2006.

Indeed, student feedback from the courses suggested a need for both more advanced lectures as well as more time devoted to field work and practicals.

Curated collections

We expect to surpass our initial goal of 5 major, well-curated national collections. While visits to such collections have been important for demonstrating identification methods, we believe it will be much more effective eventually to assist with curation via photographs of type specimens and assistance via e-mail, and will be committing significant time to this in 2007. In addition we believe that the website and online photograph archive will be important tools in assisting with “virtual curation”, so we will be concentrating in particular in developing these resources.

Database and digital images

The project currently has c. 92,000 specimen records available for analysis in various databases, having made substantial progress towards our initial goal of 150,000 specimens. No reports or information have been received to date from two Andean countries to assess progress there. Databasing has concentrated on Papilionidae, Pieridae, and three subfamilies of Nymphalidae (Nymphalinae: Melitaeini, Ithomiinae and Limenitidinae). Remaining Pieridae and Nymphalidae (Satyrinae) will be the next groups. In addition, we are preparing a list of species in all families that are potentially threatened due to restricted ranges for databasing priority, since distribution information will be needed to assess IUCN threat status. We will also make special efforts to obtain data for many of these rare species from other collections outside those in which we are currently working. Some 10,000 digital photographs (reaching our initial target) have been taken or obtained through collaboration, including many type specimens, in the groups mentioned above. We will continue to expand this image archive.

3.3 Standard Output Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	TOTAL
4A	Undergraduate students trained (Colombia, Ecuador, Peru, Venezuela, Bolivia, Chile, Argentina)		49		
4B	Training weeks provided (each course involved 6 days x 12 hrs per day, total 72 hrs per course, equivalent to 2 training weeks)		8		
4C	Postgraduate students trained (Venezuela, Colombia, Mexico, USA, Spain)		16		
6A	Non-student professional and amateur lepidopterists; includes course attendants (39) and country coordinators and owners of private collections (11) (Venezuela, Colombia, Ecuador, Peru, Bolivia)		49		
6B	Workshop in Gainesville,		6		

	April 2006, time spent in curating collections (1 week per country, 1 week workshop)				
7	Number of different kinds of training materials produced for use by host country	1 (10 Powerpoint lectures)	4 (2 manuals, 1 poster, 1 CD containing scientific articles and computer software, 18 Powerpoint lectures)		
8	Number of weeks spent by UK project staff on project work in host country		6		
10	Field manuals		1 (Field techniques for surveying neotropical butterflies)		
11A	Number of papers published in peer reviewed journals (acknowledging DI or increasing knowledge of Andean butterfly diversity)		5 (listed in Table 2), 7 (listed in Annex 3)		
11B	Number of papers submitted to peer reviewed journals (acknowledging DI or increasing knowledge of Andean butterfly diversity)		1		
12A	Computer databases established and handed over to host country	3 (Taxonomic database, locality database, specimen database)			
15A	Number of national press releases in host country(ies)		3		
15D	Number of local press releases in UK	2	1		
16A	Number of newsletters to be produced		1 (news page on project website)		

16B	Estimated circulation of newsletter in host countries		150 (readership of website)		
16C	Estimated circulation of newsletter in UK		30 (readership of website)		
17A	Number of dissemination networks established		6 (1 website mailing list; 5 contact lists of students and researchers attending courses in each of 5 Andean countries)		
20	Estimated value of physical assets handed over to host countries		£4,655 (laptop computers and printers [£2163]; digital cameras [£1605]; field equipment [£887])		
23	Value of resources raised from other sources for project work	£18,231 (FLMNH contribution for workshop [£5882]; contributed travel expenses [£2500]; overheads [£3666]; salary time project members [£6183])	£55,424 AndinoNET [£1110], WWF Bolivia [£890], Conservation International [£13,890]; overheads [£14,663]; salary time [£24,731]; BioQuip discount [£140]; + numerous unquantified contributions [see Project Partnerships])		

Table 2 Publications. Additional publications are listed in Annex 3. Following criticisms in the review of our previous annual report, publications listed here are only those that were produced over the last year either specifically as a result of this project, or that acknowledge Darwin support. Additional publications are listed in Annex 3.

Type	Detail	Publishers	Available from	Cost £
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(* indicates copy in Annex 3)	(title, author, year)	(name, city)	(eg contact address, website)	(if applicable)
Journal * article	Natural hybridization in heliconiine butterflies: the species boundary as a continuum. Mallet, J., Beltrán, M., Neukirchen, W., & Linares, M. 2007.	BMC Evolutionary Biology 7: 28.	http://www.ucl.ac.uk/taxome/jim/jim_pubs.html	
Journal * article	Hybrid speciation. Mallet, J. 2007.	Nature 446: 279-283.	http://www.nature.com/nature	
Manual	Técnicas de campo para el estudio de mariposas Neotropicales. Willmott, K.R., Huertas, B. 2006.	TABDP (in translation)	http://www.mariposasandinas.org/resources_sp.html	
Manual *	Manual para la toma de fotografías digitales del proyecto TABD. Huertas, B., Willmott, K.R. 2006.	TABDP	http://www.mariposasandinas.org/supporting_files/manual_fotos_TABDP.pdf	
Manual *	Manual para el manejo de las bases de datos el proyecto TABD. Willmott, K.R., Huertas, B. 2006.	TABDP	http://www.mariposasandinas.org/supporting_files/manual_basededatos_TABDP.pdf	
Scientific meeting abstract	Registro fotográfico de las mariposas del Instituto de Ciencias Naturales de la Universidad Nacional de Colombia. Pulido, H., Andrade, G. 2006.	II Congreso Colombiano de Zoología, Colombia, memorias.	mgandradec@gmail.com	

3.4 Progress towards the project purpose and outcomes

The project has made significant progress towards two of its three main outcomes. A large number of students, curators and other lepidopterists have participated in training activities, significantly improving the knowledge and skills of South American researchers. The compilation of information on butterfly diversity, distribution and abundance is progressing well in UK, slowly in USA and variably in Andean countries. We are, however, on target to reach our initial goal of 150,000 specimens databased, and most collections are now reasonably curated for at least the focal groups. Our main purpose-level assumption, that “partner institutions and taxonomists remain committed to research and conservation work on tropical Andean butterflies”, has remained valid, although resignation from the Museo and replacement of project coordinators in the lead institution in Ecuador have caused some difficulties this year. We hope that this situation will be resolved in 2007 and that the new Director and Curator will be sympathetic towards the goals of our project.

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

Not applicable at this stage.

4. Monitoring, evaluation and lessons

Our project has three main aspects: training, data gathering and data analysis. The first two have been applicable over the last year.

Tangible outputs

Progress on compiling information on distribution of tropical Andean butterflies has been evaluated via the number of records in the project database, the number of species represented and number of distinct localities represented. The number of butterfly images and species with images permits assessment of progress towards a complete taxonomic digital archive for the region, discriminating between type and non type specimens. Ultimately, whether the database contributes towards an increased knowledge of Andean butterflies may only be judged in the long-term from the number of publications that use its information.

Written reports

All national coordinators have been requested to provide an annual written report to us on their activities and progress in the project. In addition, Conservation International requires a 6-monthly report to assess progress in databasing. To date, we have only received reports from Colombia, Ecuador and Bolivia, addressing only to some extent the questions posed in the guidelines that we sent out. The inconsistency of replies and evident lack of time that national coordinators have to prepare such reports, especially since they are not directly funded by the project, makes their use in assessing project impact limited in anything other than assessing numbers of specimens databased.

National coordinators all agree that the courses have been effective in motivating, training and involving students in butterfly research. They also all agree that more funds are necessary to adequately database Andean country collections. We will be seeking other sources for such funds over the next year.

Evidence that outputs contribute to project purpose

Ultimately, the best evidence that our project outputs contribute to the project purpose will only accumulate during the last project year and subsequent years. Such evidence would include publications using data compiled by the project which advance understanding of tropical Andean butterflies, publications by students and staff involved in the project on tropical Andean butterflies as evidence of training value of project, implementation of conservation action by Conservation International (allocation of resources, training, etc) and other organisations based on recommendations published by the project and project data.

Useful feedback from students about the courses have been positive and have led to some changes in emphasis in future courses, as detailed in 3.2 above.

Lessons

Annual reports sought from project coordinators should involve a bare minimum of information. Evaluating the impact in terms of training is likely to be possible only over a time-span longer than the project itself.

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

Dissemination

The review noted that the project's dissemination strategy was behind schedule. This problem has now been resolved. The project website came online in May 2006, in both English and Spanish, and is the primary means for disseminating information and results from the project. Other means of dissemination are discussed elsewhere in this report.

Strategy for butterfly research and conservation

The review suggested that a draft Strategy should be submitted with this report. However, since at the end of Year 2 (i.e., now) the project has been in operation only for 15 of its 36 months, we argue that it would still be very premature to produce such a draft at this stage.

Partnerships and involvement of researchers from host countries

We believe the evidence that the project is fully involving numerous host institutions and individuals is amply presented in this report.

Training courses

The review suggested that training courses be developed in consultation with potential beneficiaries. The training courses were subjected to a practice run during the workshop in Gainesville, during which time we received substantial feedback from Andean country coordinators and two recently graduated South American students who remain part of the project team. The courses were modified to take account of these suggestions. The review also suggested that the courses involve practicals as well as lectures; in fact, we already planned for the courses to involve three afternoons of practicals and three days of field work. Students attending courses in 2006 were presented with a questionnaire to evaluate the course content and management; their comments and suggestions will be incorporated into the design of the 2007 courses.

Logical framework

The review suggested that we should consider revision of the logical framework to provide a more effective tool for management, monitoring and evaluation. We contend that this project is unusual in that we are attempting to establish just that: a logical foundation for *long-term* data-gathering, research and conservation of Andean butterflies. Indeed, we commend the Darwin Initiative for their vision in funding such a project, which is to found an organization which will, we hope, achieve its most important goals over a sustained period, many of them long after the end of our current 3-year project. Under such conditions, the short-term identifiable purpose indicators that the reviewers seem to desire are difficult to define; perhaps reviewers could make more detailed suggestions if they feel we have misunderstood their arguments. Ultimately the success of the project, which will also achieve the purpose which was initially accepted as valid by the Darwin Initiative when evaluating our proposal, will be judged from multiple publications and actions over a much longer time-scale than the project itself. With this in mind, we remain convinced that the existing indicators and means of verification that we presented in the original proposal, and on which basis funding was awarded, are the most appropriate and precise to evaluate the success of this project over the 3-year timespan of current Darwin Initiative funding.

6. Other comments on progress not covered elsewhere

The main risk that we see the project facing is the difficulty of compiling data together from the multiple institutions that are currently databasing specimens. Not only are there logistical concerns, but also those of trust, that data will be shared with others or used for personal gain. We hope to promote trust among our collaborating institutions through being the first to make our own data from the NHM, FLMNH and other museums available online for all to access.

7. Sustainability

The project evidently has a high profile within the host country butterfly research community, as evidenced by the encouraging number of applications that we received for the student courses. Bolivia, Colombia and Venezuela all received 50-75% more applicants than could be accepted for the courses. We have also received requests for information and offers of collaboration from many individuals, including a number of countries outside the tropical Andean region (as discussed elsewhere in this report).

Project coordinators have produced posters advertising the courses and the project in general, while the website has obviously been instrumental in bringing the project to the attention of a wide audience. The project website has been online since May 2006 (hosted free by FLMNH) and is available in both English and Spanish www.andeanbutterflies.org and www.mariposasandinas.org. The website contains background information about the project, student courses, training and grant opportunities, and links to related websites.

The website has a news page reporting on project activities, and details of the project has also appeared in articles in two local newspapers from Venezuela and Bolivia and WWFolio Bolivia, WWF Bolivia's January 2007 newsletter (see Annex 3). The project was introduced by José Clavijo (Venezuela coordinator) during the meeting of CABI Bioscience in England in February 2006, during

the annual meeting of ABBIF in Campinas, Brazil and together with Gonzalo Andrade (Colombian coordinator) at the AndinoNET meeting in Curitiba, Brazil in March 2006. To continue promotion of the project in the scientific community, we will present a poster about the project during the II Conference on Neotropical Lepidoptera in Panama (April 29- May 03 2007) and during the 5th International Conference on Biology of Butterflies in Rome, Italy (2nd -10th July 2007).

The project's exit strategy remains the same as described in our original project proposal, namely to provide national institutions and conservation organisations with the enhanced and necessary knowledge, resources, contacts and future strategy to advance butterfly research in the region beyond the project's conclusion. This year we have made substantial progress towards training students and institutional staff, development of permanent resources for butterfly biodiversity research (curated collections, database, digital image archive), and a network of butterfly researchers, as described in this report. The strategy for future butterfly research in the region will be published during the last project year.

8. Dissemination

The project website is our primary means of disseminating information and resources resulting from the project. The website contains links to publications by project members (c.100 free to download), country profile pages that provide information about current projects in each Andean country, and links to download manuals and other project publications.

The online database will of course be the main point of access to the specimen locality data being digitised by the project, as well as digital images of type and other specimens. The online database is already in a beta version, and is described further elsewhere in this report (Section 3.1 above).

A substantial amount of information on tropical Andean butterfly research and the results of the project to date has been disseminated during the student courses and on CD-ROM to participating students, as described elsewhere in this report.

All of the UK and USA project members, and most of the South American coordinators, have been committed to research on tropical Andean butterflies for their entire professional careers. There is thus no doubt that we will continue to gather and disseminate information on tropical Andean butterfly diversity beyond the lifespan of the project. Indeed, our main hope is that this project will provide a foundation for project members and students to apply for funding to greatly expand future research on Andean butterflies. The FLMNH has agreed to host the project's website and provide server space for data and images for the foreseeable future, thus providing us with a permanent platform for dissemination of information.

9. Project Expenditure

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 ECTF and the Darwin Secretariat to publish the content of this section

Since the project's establishment in August 2005, the Tropical Andean Butterfly Diversity Project has rapidly advanced in the achievement of its main objectives. Training courses in butterfly systematics, biology and conservation were successfully conducted in 2006 in four Andean countries: Venezuela, Colombia, Bolivia and Ecuador. More than 100 undergraduate and graduate students and other professional and amateur lepidopterists, from 12 countries, participated in these courses. An international team of researchers, museum curators and volunteers has been established, and are capturing museum specimen locality data for Andean butterfly species, to create a regional database that will be accessible online. Almost 36,000 records have been captured by the project to date in two of the world's major collections, the Natural History Museum and the Florida Museum of Natural History, and principal collections in the five Andean countries. Combined with other databases, the project now has c. 92,000 specimen records available for analysis. A network of more than 200 researchers on Lepidoptera has been successfully established for the Andean region. The TABD Project is also supporting field work through small project grants for students and is developing institutional capacity through training and provision of tools for biodiversity research.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2006/07

Project summary	Measurable Indicators	Progress and Achievements April 2006-Mar 2007	Actions required/planned for next period
<p><i>Goal:</i></p> <p><i>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-</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of benefits arising out of the utilisation of genetic resources</i></p>			
<p>Purpose</p> <p>To establish a regional research programme and conservation priorities for tropical Andean butterflies, through improved knowledge of their diversity, distribution and abundance.</p>	<p>Enhanced institutional capacity for butterfly research and conservation</p> <p>Synthesised knowledge of butterfly diversity, distribution and abundance</p> <p>Current and future priorities for research and conservation identified.</p>	<p>Significant progress has been made in training, with all training courses completed successfully. Databasing is progressing well in UK, slowly in USA and variably in Andean countries. We are, however, on target to reach our initial goal of 150,000 specimens databased. Most collections are now reasonably curated for the focal groups.</p>	<p>Organisation and completion of next set of training courses. Focus on priority species (restricted range) for databasing. Recruitment of assistance in databasing FLMNH. Seeking additional funds for databasing in Andean countries from CI and other sources. Organisation of conference and workshop for mid-2008. Preliminary analyses of priority areas for conservation and research.</p>
<p>Outputs</p>			
<p>1. Enhanced institution staff capacity for butterfly research.</p>	<p>10 staff from 5 partner institutions trained in identification, curation, databasing and grant proposal writing.</p>	<p>Our project coordinators and other partner institution staff have an enormous range of taxonomic and biological knowledge and experience. Our goal has been for all to understand basic aspects of butterfly systematics, biology and conservation, and practical aspects such as databasing protocols and photography techniques. Project activities have contributed substantially towards this goal, but, most importantly, these activities have been mutual learning experiences through which project</p>	

		members (including those from UK and USA) have benefited from interaction with all other project members, rather than training being unidirectional from UK to Andean countries. All project partners have been assisting with databasing and have received our project database, together with photographs, for use in their collections.
Activity 1.1. Project planning and training workshop		The project planning workshop took place in Gainesville, April 2006, and presented lectures on many aspects of butterfly biology and systematics to 12 Andean country project members, 1 representative from CI, 2 UK project members and 1 USA project member. Specimen databasing and running of student courses was discussed.
Activity 1.2. Work with Andean country project members in Andean countries		Keith Willmott and Gerardo Lamas spent at least 3-5 days (often much more) in each country working at major collections to identify and curate collections, during the process helping project partners to learn new techniques for identification of difficult groups. Both will visit these and additional collections during country visits in 2007.
Activity 1.3. Student courses		One-week student courses were conducted in 4 Andean countries, at which project coordinators were present. In addition to learning skills for running such courses, participants also benefited from assisting with practicals and field work. A further round of student courses is planned for late 2007.
Activity 1.4. Data analysis workshop, final year		Planned for mid-2008, the conference on Andean butterflies will also be accompanied by a workshop for project coordinators to analyse data gathered in the project towards producing the regional strategy.
2. Students trained in butterfly systematics, field survey methods and data analysis.	Field survey manual; 1 student-training workshop of 1 week per country per year (25 students per course, total 250 students). 40 students receive further training and support for dissertation research.	We have made substantial progress towards our goals, as measured by original proposed indicators. We expect to train fewer students than initially envisaged, but at a higher level. Students and researchers of many ages, levels and backgrounds attended the courses, making it unlikely in some countries that the same introductory course would draw similar numbers of new students. Instead, in those countries, we plan a more advanced course for fewer, more promising students to provide continuity and further encouragement and support in their career development.

Activity 2.1. Training courses	Four 1-week training courses were conducted, in Venezuela, Colombia, Ecuador and Bolivia, with a total of 104 participants attending. These included 49 undergraduate students, 9 MSc students, 3 international PhD students, 4 Andean PhD students, and 39 other professional and amateur lepidopterists. Similar or more advanced courses (depending on the country) are planned for 2007.
Activity 2.2. Production of training materials	The project has produced two manuals for museum research: one for use of the Darwin Butterfly Database and one for photography of butterfly specimens. A draft of the manual of field techniques for surveying butterflies has been completed and is now being translated into Spanish. We expect to have this available on the project website by the end of May. A total of 28 Powerpoint presentations were produced for the student courses and distributed to students on a CD at the end of the course. In addition, these CD's contained a table of grant opportunities, a list of contacts of other course participants, protocols for field work, two computer programmes for data analysis (available free from the Internet), and c. 600 scientific articles (PDF) on butterfly systematics and biology, and related topics.
Activity 2.3 Website and Lepidoptera specialist network	Our website (May 2006) is available in English and Spanish, with background information on the project, research projects underway in each country, student courses and links to publications. It offers a mailing list to which 110 students and researchers have so far subscribed, with 500 messages exchanged concerning requests for information, help with identification, job and grant opportunities, and the website's periodic photo identification competition. We also plan to create a directory of taxonomic experts that have agreed to respond to specific identification questions.
Activity 2.4 Small grant competition for student research	We announced a competition for small grants (\$300-700) to assist with student research projects. We received applications from 36 groups of students, the great majority of whom attended the training courses, from Colombia (21), Ecuador (2), Peru (5), Bolivia (6), Chile (1) and Guatemala (1). We will be selecting 2-5 applications from each country for funding (c. 40 students), and each group will receive additional support and advice during their projects. A similar competition will be announced next year

		following the next courses.
3. Curated national collections.	National collections (minimum of 5, 1 per country) curated and identified.	We expect to surpass our initial goal of 5 major, well-curated national collections. While visits to such collections have been important for demonstrating identification methods, we believe it will be much more effective eventually to assist with curation via photographs of type specimens and assistance via e-mail, and will be committing significant time to this in 2007.
Activity 3.1. Curation of lead institution collections		Project members spent at least 3-5 days at the MIZA (Venezuela), MECN (Ecuador) and MHNNKM (Bolivia) curating particular problematic groups of butterflies and teaching such skills to curators and assistants. GL works full-time at the MUSM (Peru) and maintains this as the best curated collection in the Andean region. While similar visits are planned for 2007, we hope to move towards “virtual curation”, where curators send us digital photographs of difficult groups as they work on the collections and we assist in identification via e-mail; the project supplied digital cameras to country coordinators at the meeting in Gainesville in April 2006. We will continue to expand the photograph archive distributed with the database, assisting in many identification problems.
Activity 3.2. Curation of other important collections		We have been assisting in the curation of four additional important collections. JM has identified the Heliconiinae and KW has been identified Ithomiinae in the collection of Jean LeCrom (Colombia), via e-mailed images. KW also spent 2 days working in the collection of Padre Francisco Piñas (Ecuador), 2 days at the collection of Yuvinka Gareca (Bolivia – to be deposited in the MHNNKM) and the database and photographs were distributed to curators at the MAO (Bolivia).
4. Darwin Andean Butterfly Database.	Taxonomic and photographic database established; NHM, MCLB and partner collections databased (3500 species, 150,000 specimens).	The project currently has c. 92,000 specimen records available for analysis in various databases; no reports or information have been received to date from three Andean countries to assess progress there. Databasing has concentrated on Papilionidae, Pieridae, and three subfamilies of Nymphalidae (Nymphalinae: Melitaeini, Ithomiinae and Limenitidinae). Remaining Pieridae and Nymphalidae (Satyrinae) will be

		the next groups. In addition, we are preparing a list of species in all families that are potentially threatened due to restricted ranges for databasing priority, since distribution information will be needed to assess IUCN threat status. Some 10,000 digital photographs have been taken or obtained through collaboration, including many type specimens, in the groups mentioned above. We will continue to expand this image archive.
Activity 4.1. Locality database		The locality database now contains c. 7100 records, with c. 4400 georeferenced to date. Georeferencing the remainder is an ongoing task.
Activity 4.2. Databasing of specimens at NHM (London)		Papilionidae and Nymphalidae (Melitaeini) have so far been databased (c. 18,600 specimens).
Activity 4.3. Databasing of specimens at FLMNH (Gainesville)		The following numbers of specimens have so far been databased: Heliconiinae: 2799; Ithomiinae: 717; Ecuadorian butterflies: 667.
Activity 4.4. Databasing of Andean country collections		The following numbers of specimens have so far been databased: Venezuela: no data available; Colombia: ICN: 847; JFL: 1029; Ecuador: MECN: 5900; PP: 13,000; Peru: MUSM: no report received to date; Bolivia: MHNNKM: no report received to date.
Activity 4.5. Literature and other records		1300 records, c. 1750 specimens from numerous collections; c. 46,000 specimens of Ithomiinae and Limenitidinae (<i>Adelpha</i>) from the personal research databases of Keith Willmott and Gerardo Lamas.
Activity 4.6. Online database		Development of the online database interface has been the responsibility of KW and a web programmer. This interface has been delayed due to KW being in South America for the last 4 months of 2006, assisting in student courses and other fieldwork, and due to incorporation of numerous modifications to the interface as suggested by other project members. We expect the interface to be operational by mid-May 2007, at which point it will have the following features: "species summary search", a summary of distribution data and type photographs of all subspecies for any given species; "taxonomic list search", capable of reproducing any part of the entire neotropical butterfly checklist complete with higher taxa, synonyms, authors, original genus of description and type locality; "specimen and image search", which will return data or images from the

		database according to geographic and taxonomic criteria; and a “species name search”, allowing searches for any species or subspecies name and providing taxonomic and type specimen information and images. A test version may be viewed at: http://turbot.laculine.com/~chris/butterflies/php/
5. Taxonomic revisions.	10 taxonomic papers submitted to peer-reviewed journals.	Project members have produced a variety of taxonomic publications this year, though none that have relied heavily on data from this project. As more specimens become databased over the next year we expect this to change. In addition, several project members have been unable to work on taxonomy due to time spent on the student courses and databasing.
Activity 5.1. Work on taxonomic revisions and other scientific articles promoting research on tropical Andean butterflies		Project members are working on a variety of taxonomic revisions, especially in the Ithomiinae and Satyrinae, the most poorly studied of our focal groups.
6. Regional research and conservation strategy, with 50 Key Butterfly Areas identified.	Workshop (Yr 3) in Gainesville; data analysis complete; publication detailing regional research and conservation strategies.	No results to report to date.
Activity 6.1. Training in assessing IUCN threat categories		BH and KW are intending to take a 1-day course in assessing IUCN categories in summer 2007. These skills will be passed on to country coordinators during the workshop in 2008.
Activity 6.2. Workshop in yr 3		The workshop is now planned to occur concurrently with the Andean butterfly conference in summer 2008. It will involve all project members in data analysis and finalisation of the scope of the research and conservation strategy.
Activity 6.3. Data analysis		Data will be analysed to identify research and conservation priorities, the Key Butterfly Areas and to assign IUCN threat status to species, throughout 2008. We are also working with Owen Lewis (Oxford University) to assist with assessing threat status for the neotropical species of the 1500 world butterfly species that will be included in the new IUCN Global Invertebrate Red List.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p><i>Goal:</i> <i>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 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</i></p>			
<p><i>Purpose</i></p>			
<p>To establish a regional research programme and conservation priorities for tropical Andean butterflies, through improved knowledge of their diversity, distribution and abundance.</p>	<p>Enhanced institutional capacity for butterfly research and conservation.</p> <p>Synthesised knowledge of butterfly diversity, distribution and abundance.</p> <p>Current and future priorities for research and conservation identified.</p>	<p>Institutions capable of securing funding and conducting research into butterfly diversity and conservation.</p> <p>Distribution and taxonomic data from collections and literature compiled into a single database.</p> <p>Published "Regional Strategy for Butterfly Research and Conservation in the Tropical Andes".</p>	<p>Partner institutions and taxonomists remain committed to research and conservation work on tropical Andean butterflies.</p>
<p><i>Outputs</i></p>			
<p>Enhanced institution staff capacity for butterfly research.</p> <p>Students trained in butterfly systematics, field survey methods and data analysis.</p>	<p>10 staff from 5 partner institutions trained in identification, curation, databasing and grant proposal writing.</p> <p>Field survey manual; 2 student training workshops of 1 week per country (30 students per course, total 300 students). 40 students receive further training and support for dissertation research.</p>	<p>Annual report by national co-ordinators.</p> <p>Annual student supervisor reports and national co-ordinator reports.</p>	<p>Andean institutions continue to employ staff who pass on knowledge.</p> <p>At least some students use knowledge gained to take higher degrees and become next generation of butterfly researchers.</p>

Curated national collections.	National collections (minimum of 5, 1 per country) curated and identified.	Six-monthly reports by national coordinators; data in database.	Institutions maintain collections.
Darwin Andean Butterfly Database.	Taxonomic and photographic database established; NHM, MCLB and partner collections databased (3500 species, 150,000 specimens).	Six-monthly reports by national coordinators; database online and CD, also sent to DI.	Data quality sufficient for achieving conservation and research goals; database maintained in future.
Taxonomic revisions.	10 taxonomic papers submitted to peer-reviewed journals.	Pre-prints/reprints at project website.	-
Regional research and conservation strategy, with 50 Key Butterfly Areas identified.	Workshop (Yr 3) in Gainesville; data analysis complete; publication detailing regional research and conservation strategies.	Published strategy in hard copy and CD, sent to DI, and available on project website.	Strategy is followed by major research institutions and conservation organisations within the region.
Activities	Activity Milestones (Summary of Project Implementation Timetable)		
Institution staff training and student workshops.	Project planning workshop to establish methods, goals and develop training programme (Yr 1, Apr 06). 1 st student training courses completed (Yr 1, Aug 06). 2 nd student training courses completed (Yr 2, Aug 07). Staff training in identification, curation and databasing complete (Yr 2, Aug 07).		
Databasing, development of digital products.	Database structure complete. WORLDMAP software developed. Website established. Digital photograph collection established (30% complete) (Yr 1, Mar 06). Online database with Ithomiinae, Limenitidinae (Yr 1, Dec 2006). Photography complete (Yr 2, Jul 07). Database complete (Yr 3, Feb 08) and online (Dec 08).		
Curation of collections.	MCLB complete (Yr 1, Jun 06). Preliminary curation of Andes collections complete (Yr 1, Jul 06). NHM complete for focal groups (Yr 2, Jul 07). Andes countries curation complete (Yr 2, Jul 07).		
Taxonomic revisions.	5 papers submitted to peer-reviewed journals (Yr 2, Jul 07). 5 papers submitted (Yr 3, Nov 08).		
Data analysis and development of long-term research and conservation strategy.	Analysis of results (Yr 3, Apr 08). Strategy planning workshop with project members, taxonomists and conservation organisations (Yr 3, May 08). 50 Key Butterfly Areas identified (Yr 3, May 08). 2 papers submitted on Andean butterfly diversity and conservation. "Regional Strategy for Butterfly Research and Conservation in the Tropical Andes" published (Yr 3, Dec 08).		

Annex 3 onwards – supplementary material (optional)

Other publications by project members that contribute significantly to knowledge of Andean butterfly diversity and classification, the main goal of this project, but that have not resulted from data collected by the project and/or been produced solely in the last reporting year.

Type *	Detail	Publishers	Available from	Cost £
(eg journals, manual, CDs)	(title, author, year)	(name, city)	(eg contact address, website)	(if applicable)
Book chapter	Lista Preliminar de Mariposas Diurnas de Bolivia. En Gareca, Y., Reichle, S. (eds): <i>Mariposas Diurnas de Bolivia: Lista Preliminar de Mariposas Diurnas de Bolivia y algunas especies de mariposas diurnas típicas y llamativas de Bolivia</i> . Gareca, Y., Forno, E., Pyrcz, T., Willmott, K., Reichle, S. 2006.	PROMETA Bolivia.	yuvinkagar@yahoo.com	£10
Journal article	A review of the genus <i>Manerebia</i> Staudinger (Lepidoptera: Nymphalidae: Satyrinae) in the northern Andes. Pyrcz, T.W., Willmott, K.R., Hall, J.P.W., Vilorio, A. 2006.	Journal of Research on the Lepidoptera 39: 37-79.	http://www.flmnh.ufl.edu/butterflies/neotropica/pubs.html	
Journal article	Higher-level phylogeny of the Ithomiinae (Lepidoptera: Nymphalidae): classification, patterns of larval hostplant colonisation and diversification. Willmott, K.R., Freitas, A.V.L. 2006.	Cladistics, 22: 297-368	http://www.flmnh.ufl.edu/butterflies/neotropica/pubs.html	
Journal article	A phylogenetic reassessment of <i>Hyalenna</i> Forbes and <i>Dircenna</i> Doubleday, with a revision of <i>Hyalenna</i> (Lepidoptera: Nymphalidae: Ithomiinae). Willmott, K.R., Lamas, G. 2006.	Systematic Entomology 31(3): 419-468.	http://www.flmnh.ufl.edu/butterflies/neotropica/pubs.html	
Journal article	Phylogenetic relationships among the Ithomiini (Lepidoptera: Nymphalidae) inferred from one mitochondrial and two nuclear gene regions. Brower, A.V.Z., Freitas, A.V.L., Lee, M.-M., Silva Brandao, K.L., Whinnett, A., Willmott, K.R. 2006.	Systematic Entomology 31: 288-301.	http://www.flmnh.ufl.edu/butterflies/neotropica/pubs.html	
Journal article	Five new Peruvian subspecies of <i>Morpho</i> (Lepidoptera: Nymphalidae, Morphinae). Blandin, P., Lamas, G. 2007.	Rev. peru. Entomol. 45: 65-70.	http://www.mariposasaninas.org/pubs_sp.html	
Journal article	Invalidation of six neotypes among neotropical butterflies (Lepidoptera: Hesperidae, Pieridae, Lycaenidae and Nymphalidae).	Rev. peru. Entomol. 45:	http://www.mariposasaninas.org/pubs_sp.html	

	2007. Lamas, G.	115-119.	dinas.org/pubs_sp.html	
Journal article	The identities of <i>Neonympha nerita</i> Capronnier, 1881 and <i>Neonympha thobiei</i> Capronnier, 1881 (Lepidoptera: Nymphalide, Satyrinae). 2007. Lamas, G.	Rev. peru. Entomol. 45: 121-123.	http://www.mariposasan.dinas.org/pubs_sp.html	

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ectf-ed.org.uk putting the project number in the Subject line.	No
Is your report more than 5MB? If so, please advise Darwin-Projects@ectf-ed.org.uk that the report will be send by post on CD, putting the project number in the Subject line.	N/A
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.	No
Have you completed the Project Expenditure table?	Yes
Do not include claim forms or communications for Defra with this report.	No