

Darwin Initiative

Final Report

1. Darwin Project Information

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Country	Bolivia
UK Contractor	Department of Environmental & Evolutionary Biology, University of Glasgow
Partner Organisation (s)	Armonia, Noel Kempff Mercado Museum of Natural History, Los Volcanes Research Station, Fundación Amigos de la Naturaleza and others
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2. Project Background/Rationale

Bolivia is one of the world's mega-diversity countries holding a large percentage of the planet's biodiversity, including 14% of the world's bird species in 0.75% of the earth's land surface. The country is similarly rich in other taxa and is therefore of critical importance for the conservation of the earth's biological diversity. Bolivia's importance is magnified because it also holds large numbers of endemic taxa. As one of the signatories of the 1992 Convention on Biodiversity (CBD) Bolivia is obligated to identify, monitor and conserve this national biodiversity (Articles 1, 7a & 7b). In contrast to its richness in biodiversity, Bolivia is economically one of the poorest countries in South America but despite this has developed an important protected areas system that contributes to fulfilling the country's CBD obligations. Since Bolivia ratified the CBD in 1994 a preliminary set of conservation priorities focusing on infrastructure requirements have been drawn up. However, resources for conserving biological diversity effectively are scarce and are best targeted on the most important areas, many of which are located out with the existing protected area network. The Darwin Initiative Bolivian Key Biodiversity Areas Project (Bolivian KBA Project) was set-up so that expertise from Glasgow University, Oxford University and other international institutions could help Bolivian organisations and scientists to initiate and develop a national network of priority

sites that, if conserved, would protect Bolivia's globally important biodiversity (Articles 1 & 7c & 7d). This process helps fulfil one of Bolivia's key obligations, as a contracting party to the Convention, by developing the first site-specific national strategy for the in-situ conservation of biodiversity (Articles 6a & 8).

The Bolivian KBA project is based out of Glasgow University in Scotland and funded by the United Kingdom government's Darwin Initiative Scheme for biodiversity conservation and Glasgow University with additional support from the BP Conservation Programme and Conservation International. The concept of identifying site-specific priorities that hold species crucial to conserving the world's biodiversity is based on the BirdLife International Important Bird Areas (IBAs) programme. Working with the conservation NGOs BirdLife International and Conservation International, the project developed this idea and applied it to biodiversity on a wider scale to produce the concept of Key Biodiversity Areas (KBAs). The Key Biodiversity Areas approach employs similar globally applicable threshold based criteria, as used to identify IBAs, but expanded to include other faunal groups. In the future it is hoped that the Key Biodiversity Areas concept will be extended to floral taxa as well.

Key Biodiversity Areas are defined as sites key to the conservation of faunal biodiversity because: 1) they hold a significant numbers of a globally threatened species on a regular basis. Or 2) they hold a significant proportion of the global population of one or more species with a restricted range, i.e. those species endemic to a particular relatively small area. For example, for birds the species characteristic of an Endemic Bird Area. Or 3) they hold a significant proportion of the global population of a congregatory species on a regular basis. Or 4) they hold a significant proportion of species whose distributions are restricted to a biome. Since similar globally applicable criteria can be used across different taxonomic groups, an area identified as key for conservation for one taxonomic group, such as an Important Bird Area, automatically qualifies for Key Biodiversity Area status. When these criteria are applied on a national scale in a country such as Bolivia the result is a set of national site-specific priorities for biodiversity conservation that help the country to progress towards implementing the Convention on Biodiversity. The purpose of the Darwin Initiative Bolivian Key Biodiversity Areas project was thus to gather high quality scientific biodiversity distribution data for use by national conservation organisations, institutions and the government in identifying important sites for conservation. This in conjunction with existing data would enable the designation of a network of Key Biodiversity Areas that could facilitate conservation of virtually all Bolivia's globally important biodiversity. The project also links to the Convention on Biodiversity's current ecosystem theme of Forest Biological Diversity because a high percentage of Bolivia is forested so that a high proportion of the sites designated conservation priorities will be forest sites. Once identified these sites can be monitored by Bolivian biologists with skills based on the training provided during the project (Article 12) and the capacity building part of the project increases the capability within Bolivia to develop active conservation projects that focus on the identified priorities.

3. Project Summary

In order to work towards the goal of an identified national network of sites receiving active conservation and biodiversity monitoring the project had four principle objectives: 1) To collect good quality scientific data on the abundance, distribution and ecological requirements of birds, large and medium sized mammals, amphibians, reptiles and specific insect groups (especially butterflies and dung beetles) at a wide variety of potentially important conservation sites. 2) To assess the current conservation threats to each potential Key Biodiversity Area. 3) To train young Bolivian biologists in the field skills necessary to survey and monitor biodiversity and the organisational skills to run the KBA programme. 4) To assist in institutional capacity building in Bolivia, especially the development of the skills needed to seek funding and implement conservation projects in Bolivia.

The project successfully completed all the objectives above and considerably exceed the original planned outputs. The measurable indicators, outputs and activities outlined in the original Logistical Framework (see appendix) were also successfully carried out. With the exception that the DGB (the Bolivian government's biodiversity department, the Direccion General de la Biodiversidad) took over the role originally planned for a Bolivian National KBA committee. This was an undreamed of improvement on project plans as it provided the project direct access to, and the ability to influence, the conservation arm of the national government rather than having to work through intermediaries. This improvement resulted from the contacts made during the national Key Biodiversity Areas/ Important Bird Areas Workshop we organised at the start of the project. It lead to much more rapid take up of project recommendations that had originally been expected. The result was that within the first year of the project the 21 Key Biodiversity Areas identified during the national workshop were designated national conservation priorities because of the globally threatened and restricted range species that they hold. By the end of the project this had risen to 44 sites listed by the DGB, following project recommendations, as national conservation priority sites. Along the road to achieving the Bolivian KBA project's major goal project personnel carried out biological inventories and conservation assessments of 62 potentially important sites (an additional output of 2), provided 169 person/weeks of training (an additional output of 77 person/weeks) and assisted the project's main national partner Armonia to grow from employing 4 to 37 people working on 16 conservation projects. The project also raised £320,637 in conservation funding on top of the Darwin Initiative funding (£140,000 of which was additional output) and this money is now being used to carry out active conservation work in many of the Key Biodiversity Areas identified during the project.

The project work helped implementation, in Bolivia, of the Convention on Biological Diversity by carryout work described under Articles 1, 6, 7, 8 and 12 and linked to the conventions Forest Biological Diversity ecosystem theme (see appendix 1).

4. Scientific, Training, and Technical Assessment

a) Research Work

Understanding how the project sought to identify key conservation sites is important to understanding the project's work and outputs so the first part of this assessment provides an outline of how the KBA process works and which criteria were applied during the project. Initially the ideas behind the KBA process and how they might be applied in Bolivia were developed during discussions in 2002 and 2003 with BirdLife International staff, principally Leon Bennun and Lincoln Fishpool.

KBA Process and Criteria

The full description of the KBA process was formally published in 2004 by BirdLife International staff and others and what follows under this heading is a summary of this published work (Eken et al. 2004) along with comments on how the published criteria were used in Bolivia.

The Key Biodiversity Areas process is based on a set of global criteria that can be applied across different taxonomic groups to systematically identify the key sites for species that are best conserved using site based conservation strategies. The KBA process applies two main considerations to identify key conservation areas, vulnerability and irreplaceability. First, sites are key for biodiversity conservation if they hold species that face the threat of global extinction in the short to medium term. The global list of all species known or suspected, based on scientific data, to be threatened with extinction is maintained by the IUCN and published as the IUCN Red List. Second, sites are key for biodiversity conservation if they are irreplaceable because they hold species that are endemic to a particular area or region and therefore exist nowhere else in the world. Although many KBA sites will be rich in biodiversity, species richness is not in itself used as a criterion for identifying key conservation sites. This is because high species richness normally depends on a site having many common and widespread species. This means that site based conservation is not a priority for these species as their wide distribution signifies that they face no immediate threat of extinction.

As mentioned earlier there are four specific criteria for identifying Key Biodiversity Areas anywhere in the world and each of these criteria have specific threshold levels. These thresholds are aimed at avoiding commission errors (where sites are mistakenly identified as important but do not in fact hold viable populations of global conservation significance) and avoiding omission areas (where sites that do support viable populations of global conservation significance are excluded). Due to the limited nature of the distribution data available on many species in Bolivia the project's philosophy was to focus on avoiding commission errors. Given the lack of data in the country, omission errors will be inevitable for many years to come in Bolivia. However, as long as sites are not mistakenly identified as important the KBA process will remain valid and sites initially omitted for a lack of data can be added as more information is gathered. The published criteria and thresholds for KBA identification, which we applied in this project, are as follows.

Criterion based on vulnerability

Criterion 1: Globally threatened species. Sites in which a globally threatened species regularly occurs in significant numbers. Threshold: the presence of any highly threatened species (classed as Endangered or Critically Endangered on the IUCN Red List) or the presence, observed or inferred from current data, of 10 pairs or 30 individuals of any threatened species with Vulnerable status.

Criteria based on irreplaceability

Criterion 2: Restricted-range species. Sites that hold a significant proportion of the global population of one or more restricted-range species on a regular basis. Threshold: the presence, observed or inferred from current data, of 5% or more of the global population of a restricted-range species. For birds and mammals a restricted-range species is defined as one with a range of less than 50,000 km². For other taxonomic groups the definition of a restricted range species has not yet been rigidly defined so for these taxa the project focused on species whose distribution was restricted to two or less of Bolivia's nine political departments and found in two or less ecosystems.

Criterion 3: Congregatory species. Sites that hold a significant proportion of the global population of a congregatory species on a regular basis. Threshold: the presence, observed or inferred from current data, of 1% or more of the global population of a congregatory species. A congregatory species is one where individuals of the species gather together at, or pass through, a site in large numbers during one or more periods of their life cycle. Such species include those that gather together a significant proportion of their global population in breeding colonies, at roosting, foraging sites etc. This is especially applicable to migratory species that pass through a few bottleneck sites in vast numbers.

Criterion 4: Biome-restricted assemblages. Sites that hold a significant proportion of a group of species whose distributions are restricted to a biome or a subdivision of it. The practical application of this criterion is often difficult because there is as yet insufficient data available to identify the key biome assemblages in many taxonomic groups. However, as biome restricted species are well defined for one taxonomic groups, birds, we were able during the project to identify bird KBAs for Bolivia using this criteria.

Initiating the KBA Process in Bolivia

As in much of the world, birds are the best studied taxonomic group in Bolivia so the KBA project started its work the country, in July 2003, by applying the KBA criteria to existing bird distribution data. The rationale being that existing bird distribution data would allow early identification of key conservation sites that would also be important for many other taxonomic groups, and therefore allow an early start on their conservation. As a result, in August 2003, Bennett Hennessy director of conservation NGO Armonia (the national BirdLife partner and our first major Bolivian counterpart organisation) began working for the project as Bolivian Important Bird Area Coordinator with the goal of identifying the KBAs crucial for bird conservation.

This work was initiated by organising the Bolivian Important Bird Areas (IBA) workshop in 2003, funded by CI-Bolivia. Forty-six participants from conservation and governmental organisations throughout Bolivia gathered at the workshop in Cochabamba to bring their expertise and knowledge to the task of identifying the first Key Biodiversity Areas for the country. Ornithologists throughout the country from many different organisations supplied data on the distribution of the 28 threatened and 68 restricted-range bird species found in Bolivia. After being collated by Armonia staff and presented

to the IBA Workshop by the project members this provided the scientific data to which the KBA criteria were applied. As a result the specialists at the workshop, including government representatives from the Dirección General de Biodiversidad (DGB), Servicio Nacional de Áreas Protegidas (SERNAP) and individual Bolivian national parks, were able to designate Bolivia's first 21 Key Biodiversity Areas. An additional 23 potential KBAs, thought likely to represent biodiversity conservation priorities but that then had insufficient data to meet the criteria, were also identified.

This successful start to the project was quickly built on in January 2004, when as a result of their participation in the workshop, the DGB (the Bolivian governments biodiversity department) took on the role originally planned for a Bolivian National KBA committee. As a result within 6 months of the start of the project, 21 KBAs were officially adopted as national conservation priorities by the DGB, on behalf of the Bolivian government. To have the KBAs and the KBA process adopted as government priorities so quickly when the original goal had been to try and achieve this at the end of the project was the most exciting success of the first year.

This work was followed up by a series of biodiversity inventory technique training workshops in 2003/04 and the establishment of a scientific partnership with the Noel Kempff Mercado Natural History Museum both of which are described in more detail later in this report. These paved the way for start of the main fieldwork research phase of the project. This began in April 2004 with the objective of carrying out a systematic programme of biological inventories and conservation assessments at 60 sites in 30 areas across Bolivia to supplement the data used in the initial workshop.

KBA Project Rapid Assessment Inventory Methodology

The inventory programme was carried out using rapid assessment surveys focusing on six taxonomic groups, birds, large and medium sized mammals, amphibians, reptiles, dung beetles and butterflies. These taxonomic groups were selected for their ability to act as indicators of wider biodiversity distribution patterns. Their selection was based on 1) these groups being among the most studied taxonomic groups so that sufficient knowledge was available for Bolivia to identify at least to the level of morpho-species the majority of potential taxa, 2) they are amenable to rapid assessment because current knowledge and methodologies can allow a reasonable cross-section of species to be identified or collected in the field in a short period of time, 3) there was expertise, British, Bolivian or international, available to help with their identification in the time frame of the project. Other taxonomic groups, such as small mammals, were not considered to be appropriate indicator groups because discussion with specialists suggested there were no practical methods available that would allow a reasonable percentage of the community of species to be inventoried and identified within the time scale of a rapid assessment survey. No floral surveys were carried out, in part because the amount of material, level of expertise and time needed for a good inventory of even a single group makes the rapid assessment task impractical under many circumstances. More importantly in the context of the KBA process there were not clearly defined criteria for identifying most of the key conservation species so the data would not have been usable. It is hoped that in the future the KBA process will be developed to include a floral component.

To allow results to be easily comparable between sites, each site inventory was conducted for a single major habitat type over an area with an approximate maximum diameter of 4 km. Normally two to three sites were inventoried in each general area

visited so that data collection was for a cross-section of the habitat types in the area. In ecosystems, such as the lowland grasslands and woodlands of the Llanos de Moxos in Beni, where there is a matrix of major habitat types, data was collected concurrently from the different habitats but the results were compiled separately to maintain comparability with single habitat sites. Within each site, each microhabitat was sampled in relation to its abundance in the area. Each rapid assessment site survey was conducted for a period of four to eleven full days of fieldwork, excluded the time entering and exiting the area, which in some cases took up to six days each way. Data was also separately recorded during the travel period. The length of survey time in an area was determined by the overall species richness of the area with the objective being to sample a similar percentage of the community at each site so that survey effort and the chance of encountering the rarer species was comparable between sites. For example, in a low diversity habitat such as *Polylepis* forest in the High Andes of La Paz it was possible to identify 70% of the bird species community in as little as 4 days. While in some of the lowland forest habitats twice or three times as much time was required to identify 70% of the bird species. This method of ensuring survey effort was comparable across sites was tested prior to commencement of the main fieldwork and is a much more robust than trying to survey a site in a fixed number of days or fieldwork hours (Herzog et al. 1999). At each site as well as dates and survey effort, habitat type was identified, location was recorded using GPS and altitude with a barometric altimeter. Details of the specific inventory methods used for each taxonomic group are described in the site reports, a sample of which has been supplied with the annual reports and will be presented in full in the project's technical report due at the end of 2006.

At each site a conservation assessment of habitat quality and human disturbance to the ecosystem was carried out. Eight criteria were used to judge the level of threat to the natural ecosystem in the area of the study site. These criteria were number of people living in the area, presence and quality of different types of access routes to area, amount of logging, amount of pollution, amount of hunting, amount of livestock, amount of cultivation and the overall habitat integrity (judged as a combination of fragmentation and alteration in and around the study site). Each of the eight criteria were judged on a five point scale, full details of which are covered in the upcoming technical report.

Selection of Inventory Sites

Study site selection was conducted through a process of consultations with a number of Bolivian governmental departments, non-governmental organisations and individual specialists. We liaised principally with the Bolivian protected area network (Servicio Nacional de Areas Protejidas - SERNAP), Armonía (Bolivian BirdLife International partner), the natural history museum of Santa Cruz, (Museo de Historia Natural Noel Kempff Mercado - MHNNKM), Protección de Medio Ambiente Tarija (PROMETA), Fundación Amigos de la Naturaleza (FAN) and experts on particular animal groups in Bolivia including Bennett Hennessey (birds), Dr. Sebastian Herzog (birds), Dr. Steffen Reichle (amphibians), Dirk Embert (reptiles) and Dr. Rob Wallace (mammals) amongst others.

The aim of the study site selection process was to choose sites that potentially held populations of species of conservation concern (threatened, endemic or restricted range species) but lacked sufficient or current data to identify if they fulfilled KBA criteria. Sites from ecoregions or habitats that had received few biological investigations in the

past were specially targeted and we aimed to avoid visiting previously well surveyed sites in well documented areas such as the Noel Kempff Mercado National Park in Santa Cruz. We aimed to select study sites with as broad a complete geographical and ecoregional spread. The sites visited are therefore broadly representative of Bolivia's biodiversity as a whole, however road closures due to landslides, bridges being swept away and political disturbances meant the survey teams never managed to work in one major ecosystem, the Andean dry valleys. An Armonia team, including several former members of the KBA project teams, now plans to carry out inventories in this ecosystem in 2006 so there will eventually be data from this ecosystem to which the KBA criteria can be applied.

Survey team staff & organisation.

The KBA survey teams were made up of 2 full time project biologists from the UK (Ross MacLeod & Aidan Maccormick) and 7 from Bolivia (Arturo Munoz, Lucindo Gonzales, Rodrigo Soria, Victor Garcia Soles, Caroli Hamel, Yuvika Gareca and Eberth Rocha). They were supported in the field by visits from 3 other UK experts and 5 experts from Bolivia plus the invaluable work of more than 30 Bolivian and UK field assistants. The core inventory team was normally made up of 6 people, 3 full time biologists (1 ornithologist, 1 herpetologist and 1 entomologist) and 3 field assistants. At times the project teams were joined by outside experts to collect additional data, especially on mammals. When a specialist was not present mammal observational and camera trap data was collected by all the team members.

Biodiversity Inventory Results

The project biodiversity inventory work started with 2 training inventories in October 2004 and March 2005 in which the practical aspects of the methodologies were finalized and the first members of the survey teams trained. The main field work phase of the project then ran from April 2004 to December 2005. During these periods biodiversity inventories were carried out at a total of 62 sites throughout Bolivia.

The inventory work collected new distributional information on 2,315 species of vertebrates and invertebrates including 922 bird species, 169 amphibians, 143 reptiles, 85 mammals, 156 dung beetles and 842 butterflies. The numbers for insects are morpho-species and it is obvious from discussions with experts around the world that a considerable number of these morpho-species represent taxa new to science. Expert opinion also suggests the project has found 5 new amphibian, 3 new reptile and 1 new bird species. Work is ongoing on these species and more specimens/behavioural information plus visits to museums abroad will be needed to confirm these results.

Applying the global KBA criteria to the vertebrate data indicated that 44 of the survey sites held species of conservation concern (species on the IUCN Red List, Bolivian endemics or other species with restricted range). Combining data for sites that were in the same general area and excluding sites where vulnerable or restricted range species were not present in sufficient numbers to pass the KBA thresholds, identified 21 KBAs from the fieldwork. Many of these confirmed sites that had been identified as potential KBAs during the IBA workshop at the start of the project. Together both sources of data identified a network 54 KBAs in Bolivia that will if conserved protect a large part of Bolivia's globally important biodiversity. Of these, 44 KBAs have so far been accepted as national conservation priorities by the DGB on behalf of the Bolivian government. The project's data has also been used to describe 45 of these Bolivian KBAs as international

conservation priorities (published by BirdLife International in the book “Areas Importantes para la Conservacion de Aves en Los Andes Tropicales”). The remaining KBAs that have not yet officially been designated will be proposed to the DGB in the project’s full technical report which is due in December 2006. This report will also cover the details (for which there is not space here) of all the KBA inventory work describing detailed methodologies used for each taxonomic group and the site conservation assessments and including site descriptions and a database of the species found at each site. After being approved by our host country partners this report will be available nationally and internationally via the project website and distributed to interested parties in Bolivia and beyond (including a copy sent to the Darwin Initiative).

The other aspect of the KBA inventory work that remains ongoing is the identification of the insect specimens by experts around the world. It will probably take another two years before all the insect specimens are identified but eventually it should be possible to develop and apply the KBA criteria to the insect data as well and to see if insect diversity patterns can identify important conservation sites not identified using data from vertebrates.

References

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b) Training and Capacity Building

The project’s training programme involved 3 components, national training workshops in Bolivia organised with international experts, one-to-one training for the project’s national biologists and Armonia staff from the project’s UK personnel, and advanced overseas training in Britain and the US for 3 of the project’s key Bolivian team members.

There were 6 national training workshops organised on biological survey methods and conservation fund raising techniques for 146 young biologists/conservationists. These workshops were organised with the help of Armonia, Los Volcanes Research Station, Noel Kempf Mercado Natural History Museum, PCMB (Bolivian bat conservation NGO) and Lomas de Arena Regional Park and part funded by Conservation International. The courses were advertised nationally and the participants selected based on their letter of application and CV, applications were assessed against objective criteria chosen to reflect interest, ability, theoretical knowledge and previous fieldwork experience. The details of the workshops were as follows

Ornithological Inventory Field Training Workshop: Nine Bolivian biologists were trained in ornithological inventory methods, including visual identification, audio identification, dawn chorus sound recording, individual species sound recording and scientific survey & inventory methods suitable for rapid assessment of tropical forest bird communities. Principal instructors were Dr. Sebastian Herzog (University of Göttingen,

Germany), Dr Ross MacLeod & Aidan Maccormick.

Herpetology Inventory Field Training Workshop: Ten Bolivian biologists were trained in inventory techniques for amphibians and reptiles. Training included visual identification of Bolivia's 300+ herp species using identification keys, sound recording of frogs for audio identification, safe handling and capture of snakes, trapping methods and scientific survey & inventory methods suitable for rapid assessment of tropical amphibian and reptile communities. Principal instructors were Dr. Steffen Reichle and Dirk Embert (both Zoologisches Forschungs Institut und Museum Alexander Koenig, Bonn, Germany).

Entomology Inventory Field Training Workshop: Eleven Bolivian biologists were trained in inventory techniques for tropical insects and arthropods. Training included the use of light traps, flight interceptor traps, bait traps, hand searching, sweep netting and a host of other specialist methodologies. Collecting, mounting and identification of specimens were covered, as was the importance of standardised scientific methodologies that allow comparisons of inventories from different sites. Principal instructor Darren Mann (Hope Entomology Collection, Oxford University Museum) with translation by Sebastian Herzog. During his month long stay in Bolivia Darren Mann also completed three entomology training inventories in the Amazonian forests of Pando Department, the savannahs in Beni Department and the dry forests in Santa Cruz Department. These provided more specialist field training in the collection of butterflies and dung beetles and their identification for three future project biologists.

Bat Inventory Field Training Workshop: Ten Bolivian biologists were trained in bat survey methods, including capture with mist nets, visual identification in the hand, specimen preparation, audio identification using bat detectors and the use of the Anabat and Peterson computer systems to record echolocation patterns which can be used to identify many species. Principal instructors were Dr. Luis Aguirre (PCMB), Lizette Siles & Arturo Muñoz (both KBA project biologists).

Hoverfly (Syrphidae) Inventory Field Training Workshop: Six Bolivian biologists were trained during this entomology workshop that focused on larval collection and identification of hoverflies (Syrphidae) as this group acts as a useful indicator of patterns of species richness and endemism. Principal instructors were Dr. Graham Rotheray (National Museums of Scotland) and Geoff Hancock (Glasgow University Zoology Museum).

Additional biodiversity inventory training was carried out during fieldwork for 28 Bolivian and 3 Peruvian biologists. This training covered systematic survey techniques for all the taxonomic groups the project worked on and was carried out both by the British staff and latterly by the full time Bolivian project biologists who had been trained at the start of the project. Field training amounted to a total of 70 person/weeks.

As outlined in the annual reports the project decided to somewhat alter the funding application and scientific report writing training components of the project. The project had initially planned two phases of funding application and scientific report writing workshops. However we decided it would be more beneficial to students and provide greater impact for conservation if we carried one-to-one training with individuals working on actual funding applications and scientific papers/reports. Following the reviewer's suggestions this was complemented by a formal workshop on funding applications and scientific report writing towards the end of the project in August 2005. Over the course of the project Ross MacLeod and Aidan Maccormick gave one-to-one supervision to 14 students and this output replaced the first set of scientific

reporting and funding application workshops outlined in the original application. Training and supervision of students and biologists seeking conservation funds resulted in the successful grant applications prepared by the students that generated £23,911 for conservation projects in Bolivia, which we feel provides good justification for the partial change in strategy.

Conservation Funding and Scientific Report Writing Workshop: Originally this workshop was planned for 16 participants but due to the enormous number of good applications from throughout the country the workshop was expanded more than 3 fold with 55 people attending, providing an additional output of 39 extra people trained. Instructors included specialists from Britain, Germany and Canada and from 6 Bolivian conservation NGOs and scientific organisations.

Overall the project more than doubled its training output in comparison to that envisaged in the original application. The biological training component of the project has had a substantial impact with the first 4 biological inventory workshops in the first year of the project leading to new employment in conservation of more than 50% of the participants.

The project organised advanced overseas training for 3 of the project's full time host country biologists. Bolivian herpetologist Arturo Muñoz received training in species identification, museum collections management and describing new species from Dr Michael Harvey at Florida State University and the Smithsonian Institute in Washington, 15 July to 15 August 2003. Bolivian entomologist Caroli Hamel received training in dung beetle taxonomy and identification and entomological collections management at the Hope Entomological Collections, Oxford University Museum of Natural History for 8 weeks in June & July 2004. In June 2004 Bolivian ornithologist Rodrigo Soria traveled to Britain for 3 weeks biodiversity inventory and project management training from the BP Conservation Programme. After this training each biologist returned to work on the project inventories and helped train the rest of the project's field workers and others in Bolivia.

As part of its capacity building work the project employed Armonia director Bennett Hennessey as the coordinator of the Bolivian Important Bird Area (IBA) programme during the first year of the project. The aim of this post was that, as well as building up Bolivian ownership of the IBA/KBA process, Bennett would use the post and resources/support provided by the project to build Armonia's capacity to conserve the Key Biodiversity Areas identified during the project. A key objective of this work was to make both this post and the Armonia conservation projects financially self sustaining so that conservation work in the KBAs would continue and develop financed long term by Armonia after the DI funding finished. This objective was successfully achieved and in terms of sustaining the project's legacy long term the greatest impact of the training/capacity building work to date is the increased capacity of our principal host country partner, Armonía. Since the start of the project Armonia's capacity to work towards successful biodiversity conservation within Bolivia's KBAs has increased substantially. Armonia now runs 15 conservation projects in Bolivia and 1 in Peru, conserving 11 threatened bird species and working in 14 KBAs. Since the start of the KBA project Armonia has grown from employing 4 people in 2003 to 37 after the end of the project. Synergy between the project's capacity building work and the project's training programmes is demonstrated by the fact that 12 of Armonia's new employees come from those trained by the project.

Another key success of the capacity building work with Armonia was the development of the Threatened Birds of Bolivia project. This collaboration between project personnel and Armonia's ornithological staff was part of the KBA project's exit strategy designed

to implement active conservation measures in KBAs identified during the project. In June 2004 the Threatened Birds of Bolivia project gained a top international conservation award of \$75,000 from the prestigious BP Conservation Programme. This represented a significant additional output from the original KBA application and ensures that, after completion of the Darwin Initiative funding, conservation work continues to be implemented in many of the key conservation sites identified. Institutional capacity building with Armonia, has also seen the development of a successful group of key personnel with the proven ability to run conservation projects and to obtain funding from international sources.

5. Project Impacts

The project purpose was to gather high quality scientific data with which to identify a Key Biodiversity Areas network in Bolivia, and thereby establish national site-specific priorities for biodiversity conservation. In tandem, to expand the capacity of Armonia to act on these priorities and to provide the training and field experience necessary for the KBA programme to be run by Bolivian personnel. The Bolivian KBA project has completely achieved this purpose as demonstrated by the 62 biodiversity inventories and conservation assessments of potentially important sites that were successfully completed (2 more than planned). Of these more than 50% were led and conducted solely by the Bolivian team members trained at the start of the project. The project work led to the designation by the Bolivian government's Directorate of Biodiversity of 44 KBAs/IBAs as national conservation priorities. The project also provided 169 person/weeks of training (an additional output of 77 person/weeks) and assisted the project's main national partner Armonia to grow from employing 4 to 37 people working on 16 conservation projects in 14 of the KBAs designated during the project. The project also raised £320,637 in conservation funding on top of the Darwin Initiative funding (£140,000 of which was additional output) and this money is now being used to carry out active conservation work in many of the Key Biodiversity Areas identified during the project.

The impact of the project's training programmes is demonstrated by the fact that 12 of Armonia's new employees come from those trained by the project and 50% of those trained in the workshops at the start of the project went on to get jobs in conservation. One illustrative case study is that of biologist Rodrigo Soria who, after attending a training workshop, worked with the KBA project first as an ornithologist and then survey team leader. With continuing support from the project he then developed and successfully applied for international funding for a new conservation project for the threatened Southern Helmeted Curassow. After initiating the project, which worked in 3 KBAs, and managing it for Armonia Rodrigo was chosen to do a PhD in Germany analysing Armonia's bird distribution data base. In 3 years Rodrigo has therefore developed from a bright but inexperienced student to one of the most capable and well trained national ornithologists in Bolivia (there are currently no Bolivian ornithologists with a doctorate in the country) capable of developing and running his own conservation programs. The dedication that Rodrigo and many of the other similar young biologist trained by the project have brought to developing their conservation skills and abilities is their own and not something the project is responsible for. What the project has been able to do is to provide avenues for its expression, through training and the opportunity to develop

practical experience in leading conservation projects, that wouldn't have otherwise existed. Rodrigo's case is perhaps exceptional for its rapidity and the fact that he has gained the chance to study at doctorate level (the only doctorate level education available in Bolivia is in theology). However it is otherwise not particularly unusual. All 7 of the projects full time Bolivian biologists continue to work in conservation and 6 are now managing their own conservation or scientific projects.

Perhaps one of the most pleasing side benefits of the project work has been the network of contacts and cooperation between institutions that built up during the project. The project coordinated its work with 27 Bolivian and international conservation institutions and many of these connections continue to flourish. For example Glasgow University is now developing conservation and capacity building projects that will involve 14 of these groups working together, a result that was barely imaginable 3 years ago. Another benefit from the project has been the raising of the profile of the Darwin Initiative Scheme and it appears that Bolivian conservation organisations are now actively seeking out UK partners who may be able to use Darwin Initiative funding to help them develop their conservation abilities and programs. As evidence of this we know of 4 planned applications to the Darwin Initiative for 2006 that will include conservation or capacity building work in Bolivia.

6. Project Outputs

Project outputs are as listed in appendix II and in general they far exceed those originally planned. The differences against those originally planned are 76 additional students trained for an additional 92 person/weeks in biodiversity field survey and conservation funding techniques. One extra Bolivian biologist received advanced biodiversity and conservation training overseas, total overseas training was 1 person/week less than planned due to logistical reasons. 13 additional weeks were spent in country by UK project personnel. 8 additional reference collections were made for host country partners institutions. One additional conference was organised and attended by 35 representatives of government departments and conservation NGOs. Five additional conferences were attended and presentations made on the project work by Bolivian project members. £6,200 in additional assets, in the form of field equipment, were handed over to host country organisations. £140,000 extra was raised in additional resources for conservation work in the KBAs identified during the project. A national Bird Conservation centre was constructed in Santa Cruz as a permanent research and conservation facility which is now being run by one of our project partners and is open to all interested in conservation.

7. Project Expenditure

There were no major differences (>10%) between budget and expenditure, which were as follows.

<i>Item</i>	<i>Budget</i>	<i>Expenditure</i>
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8. Project Operation and Partnerships

Extensive collaboration with host country organisations was a very positive feature of project work and was expanded enormously compared to the original application. Originally partnerships were planned with 3 Bolivian organisations but during the project we were actually able to establish successful collaborations with 27 Bolivian organisations. The goodwill and support generated by these partnerships was an essential aid to the project achieving its objectives. A very strong working relationship was forged with our main host country partner, Armonia, and the project has formed strong links and partnerships with a large number of other host country and international conservation NGO's, scientific institutions, governmental departments, private landowners, indigenous community land partnerships, private foundations, 'people' based NGO's, conservation programmes and protected areas. Below is a description of our host country partners participation in the KBA project.

Principal Host Country Partner: Armonia (BirdLife partner in Bolivia)

Armonia was our principal host country project partner with whom we developed an excellent working partnership that has been absolutely crucial to the successful completion of the project's objectives. The UK principals coordinated weekly, and often daily, with the directorate and administration of Armonia to ensure a solid project-host partnership. Armonia provided essential logistics support concerning fieldwork site access as well as advice on local and national political developments that might affect the successful completion of planned fieldwork and training. In addition Armonia supplied invaluable advice to the UK principals regarding the subtle idiosyncrasies of working practices within Bolivia.

The administration of Armonia guaranteed that the activities of the project were in accordance with all local and national legislation regarding scientific and conservation work at our planned study sites, and additionally ensured that employment procedures and imbursement of Bolivian biologists contracted by the project followed national employment regulations, income tax deductions as well as non-legislative working conditions and practices. Bolivian project members wrote their fieldwork reports using

the project's computers housed at the offices of Armonia and have full access to the organisation's regionally important reference library. Finally the offices of Armonia were used by the project to conduct meetings and have also provided the location and materials for three of the biodiversity inventory workshops. All this lifted an enormous administrative burden from the project organisers and biologists and was instrumental in allowing the project to achieve its very ambitious fieldwork inventory programme. However, beneficial as this support was, Armonia's most important contribution to the project was via its directors' and staff biologists who helped plan and implement the project and develop the whole KBA/IBA concept so that it could be applied on a national scale in one of the world's most biodiverse countries. Additionally Armonia director Bennett Hennessey, in his role as the project's IBA coordinator, established the successful collaboration between the KBA project, Armonia and the DGB (Bolivian Department of State for Biodiversity). Which was instrumental in getting the project's conservation recommendations accepted by the national government.

Principal Scientific Counterpart: Museo de Historia Natural Noel Kempf Mercado (NKM)

To legally conduct biological fieldwork within Bolivia all conservation projects require a national scientific institutional counterpart, who then applies to the Bolivian Department of State for Biodiversity for permits for the project to conduct work. The project had originally planned to work with Colección Boliviana de Fauna (CBF) as our scientific counterpart but an internal power struggle for the directorship of CBF resulted in a change of director. The new director then informed the project that the previously signed agreement with CBF would no longer be honoured and a new agreement would have to be drawn up that would contain a number of unusual conditions. The proposed conditions involved the new director controlling the project's resources and could not therefore be met by the project. At this point we approached the only other scientific institution then able to provide institutional counterpart status, NHM. Following this difficult period we were able to forge a working relationship with NKM staff and were able to employ two full time research biologists from the museum to work on the project. Additionally a large amount of background and logistical information has been supplied by the museum. The institution has been active in providing further biologists for fieldwork and apart from the two full time biologists the project has employed and/or trained 13 field assistants from the museum. In August 2004, two entomology specialists from Glasgow University travelled to Bolivia to provide training to museum personnel and students in using hoverflies (Syrphidae) as biological indicators and this group was later included in some of the project's biodiversity inventory fieldwork. The project has also deposited a significant volume of specimens collected during fieldwork at the museum so we are currently investigating funding sources with the museum to help develop collection management and the use of the collection as a teaching and identification resource.

Other Scientific Partner Institutions

A number of specimens have also been deposited at the Natural History Museum Alcide D'Orbigny in the city of Cochabamba and this institution also provided several of the biologists employed by the project. The KBA project also worked with the Los Volcanes Biological Research Station. This research facility provided facilities for two of the biodiversity inventory workshops, making available accommodation, teaching space and materials for the training of 20 young Bolivian biologists while the research station's director, Sebastian Herzog was the principal instructor during the Ornithological

Inventory Techniques Workshop and acted as the translator for the Entomology Inventory Techniques Workshop. The collaboration between the research station and the project was instrumental in the success of the training workshops as it provides almost the only such facility within Bolivia to conduct field based biological training within montane forests, a habitat in which the project conducted much of its fieldwork.

Other Conservation NGO Partnerships

The project met with all the major national and international conservation NGOs working within Bolivia. Apart from our principal counterpart Armonia, the project collaborated in planning or carrying out biological site inventories with the following organisations, The Nature Conservancy, Fundación Amigos de la Naturelza, Wildlife Conservation Society-Bolivia, Fundación para la Conservación del Bosque Chiquitano, Asociación Hombre y Naturaleza Bolivia and Prometa.

Our original application stated that Conservation International-Bolivia (CI-Bolivia) would be a major partner of the project. The project signed a formal agreement with CI-Bolivia and considerable funding and support was promised before the start of the project. However, although some funding for the training workshops, fieldwork and the IBA programme was eventually received much of the promised collaboration never materialised and no explanation was ever provided by Conservation International for this behaviour. A major planned collaboration between the KBA project and CI-Bolivia was to be the development by staff at CI-Bolivia of a database cataloguing the known distribution of Bolivian biodiversity from museum specimens and existing data. This information was to have been used to assist in the selection of new biodiversity inventory sites for the project fieldwork. Unfortunately this project never happened. However another project partner, Fundación Amigos de la Naturelza, completed a similar data base and provided access to the results of this project instead. These were used to identify potential endemic zones and select fieldwork sites as was originally planned so eventually CI's behaviour did not impact to heavily on the project's work.

Collaboration with the other NGOs mainly involved discussion concerning the provision of the project's data to national databases, location of study sites, cooperative work in the field, avoiding duplication of effort and resources, provision of scientific reports and dialogue regarding the development of future projects that made up the project's exit strategy. The Nature Conservancy and Fundación para la Conservación del Bosque Chiquitano also provided facilities and personnel for the biological inventory workshops. In its second year the project forged a strong collaboration with Protección del Medio Ambiente Tarija (PROMETA), a conservation NGO based in southern Bolivia. PROMETA provided invaluable support during 11 site inventories located in the departments of Tarija and Santa Cruz. The project received a substantial amount of technical support and local knowledge from this NGO, which facilitated successful fieldwork. We also developed an additional conservation project with PROMETA and Armonía working on the most threatened bird species in southern Bolivia, the Rufous-throated Dipper (*Cinclus schulzi*). The aim of the project is to assess distribution, habitat requirements, population size and develop a monitoring technique. Conservation funds were raised and fieldwork initiated by three Bolivian biologists in early 2005.

Partnerships with Governmental Departments

To guarantee that the project left a lasting legacy within Bolivia, links were established with DGB (the Bolivian Department of State for Biodiversity) the governmental department responsible for Bolivia's natural environment. This has led to 44 KBAs being designated as national conservation priorities and the DGB has presented these at national conservation workshops and meetings on biodiversity conservation strategy. Currently therefore the situation is excellent and exceeds the expectations of the original project plan. However, there has been worrying news that the new Bolivian government, that was formed in January 2006 may seek to reorganise the DGB and this could potentially weaken the current commitment to the KBA process. Since the list of identified KBAs sites is also maintained by Armonia, has been published internationally by BirdLife International and has been well publicised in national workshops and conferences it will still function without active government support but it would be much better if the current level of support is not diluted.

A large number of the project inventory sites are within the national protected areas network administered by the Servicio Nacional de Áreas Protegidas (SERNAP). The project has therefore collaborating with SERNAP and provided them with project's results so that these can be added to their national protected areas biodiversity database, which will be used to formulate management plans. In return SERNAP has helping the project with maps and data regarding the individual protected areas. As well as collaborated directly with SERNAP, the project worked directly with the administration of the following protected areas; Carrasco, Altimachi, Madidi, Amboró, Sama, Tariquia, Isiboro-Securé, Kaa-Iya, San Matias, Otuquis, Manuripi and Iteñez. Direct consultation with park directors ensured that the project received accurate logistical data and was aware of any potential health and safety hazards. Additionally park directors often requested surveys from certain locations from within the protected area or information on species of conservation concern, which the survey teams then collected and provided. Within several of Bolivia's protected areas there is conflict between the park authorities and communities either bordering or within the protected area. The result of this is that park directors are sometimes unwilling to give permission (to biologists) to enter these areas and communities at odds with park authorities are unwilling to receive what they see as park-sanctioned biologists working near their communities. This can lead to a case of stalemate resulting in a lack of biodiversity knowledge. On several occasions the project successfully resolved these problems by meeting with communities and protected area authorities separately.

Private Landowners, Indigenous community land partnerships, Private Foundations and non-environmental NGOs.

The project continually worked in partnership with private landowners, indigenous community land partnerships, and non-environmental NGOs and successfully negotiated access to conduct fieldwork in many areas. We received substantial assistance in the form of transport, guides and accommodation from several landowners and communities and the positive profile of the project within Bolivia lead several private landowners and indigenous community land partnerships to proactively request us to conduct biological surveys of the land they control. A Bolivian private foundation, Fundación Simón I. Patiño, also provided the location for the fieldwork section of the biological inventory workshop for herpetology. A number of the above organisations and individuals have also provided invaluable logistical support.

Other International Partners & DI Projects

The main international collaborations not already mentioned were with the Hope Entomological Collections, Oxford University Museum of Natural History, the Department of Biology, Florida International University and the BP Conservation Program who provided advanced, international level, biological and conservation management training for 3 of the project's Bolivian biologists. The Hope Entomological collection also provided considerable help in identifying specimens.

Following a series of protests and road blockades against Bolivia's presidents, which were centred on Cochabamba and La Paz, plans to work in the dry valleys of this region were changed. Instead we selected other high priority sites in areas where road blockades are less likely to disrupt work. As a result the initial contacts with the Oxford University DI project to coordinate sites inventories in the dry valleys of Cochabamba were never developed. However, funding has already been raised for biologists from Armonia to carry out KBA assessments in this area later in 2006.

The Future

The main national project partner, Armonia, continues to be committed to the KBA process and now runs conservation projects in 14 of the Key Biodiversity Areas identified during the project. With 20 permanent staff and 15+ contract biologists working at different times of the year this work looks set to continue for the foreseeable future. The scale of this commitment to ongoing conservation in the KBAs far exceeds the expectations of the original project plan. Active conservation is also undertaken in a further 13 of the KBA sites mostly by the SERNAP (the government national parks organisation) and often in collaboration with other project partners especially NKMMHN, FAN & PROMETA. There does however remain plenty of scope for developing conservation work further in these areas and there are still many key areas where work needs to be initiated.

9. Monitoring and Evaluation, Lesson learning

Monitoring and evaluation of the project was conducted in partnership with a number of host country counterpart organisations. The project organisers had monthly meetings separately with Armonía, the director of Los Volcanes Research Station and staff of the Noel Kempf Mercado Natural History Museum to evaluate project progress against goals. The meetings allowed the project to present activity and progress reports, written and verbal, in order to receive feedback regarding our obligations, contractual agreements and the continued quality of project outputs. After the first year of the inventory work a full written report on the sites visited was provided in Spanish to 5 national and international organisations; Armonia, Noel Kempf Mercado Natural History Museum, DGB, SERNAP and Conservation International. The original application stated that a national Key Biodiversity Areas committee would monitor and evaluate the project progress. However at the IBA workshop at the start of the project the participants showed little enthusiasm for the idea of such a committee. Instead the DGB took on the role of evaluating and monitoring the projects conservation recommendations. As the DGB was able to designate recommended KBA sites as national governmental conservation priorities this greatly increased the project's impact and we found this as a major

improvement on our original plans.

Project progress was monitored and evaluated against the Logical Frame Work of Planned Activities presented in the appendix and against the outputs listed in the original application. For training the key indicators monitored were number of people trained and number of person weeks of training given. Recording the numbers of students that obtained employment in conservation afterwards and what percentage of trainees made successful funding applications or had scientific articles accepted allowed the potential impact of the training to be quantified. More subjectively the project organisers were able to monitor how well trained students could implement their new knowledge when they worked on the project's inventory teams or with our project partners. Following up on the reviewer's comments on the first year of training the final phase of workshop training was monitored by post training questionnaires and follow-up contacts were sought with the first year's participants to ask about employment status post training. For capacity building work the key indicators monitored were the number of new people being employed to work on KBA or other conservation work and by the amount of funds raised for conservation work. For the biological inventory work the key indicators monitored were the number of sites inventoried and the number of sites accepted by the DGB as national conservation priorities.

All planned outputs were produced, a few had slight variations on the original plan and many far exceeded those planned and this helped in achieving the project's goal of gathering high quality scientific data with which to identify a Key Biodiversity Areas network in Bolivia, and thereby establishing national site-specific priorities for biodiversity conservation. In tandem, Armonia's capacity to act on these priorities was greatly enhanced and the training and field experience necessary for the KBA programme to be run by Bolivian personnel was provided. The following are some of the projects key indicators of the achievement of its purpose; 62 biodiversity site inventories in potential KBAs completed (>50% led and conducted solely by Bolivians), Bolivian government (DGB) adopted role planned for KBA committee, 44 KBAs adopted by government as conservation priorities. Recruitment of 37 suitably trained Armonia staff for KBA work. 46 Bolivian biologists attended biodiversity survey techniques workshops and 23 participants obtained employment in conservation biology afterwards. Completion of 4 weeks of herpetological training in USA, 3 weeks of biodiversity inventory and project management training in UK and 8 weeks of entomology training in UK by three of the project's Bolivian biologists. 69 national biologists trained in fundraising and scientific writing techniques. £320,637 in conservation funding raised in addition to funding from the Darwin Initiative. Fuller details of the project's measurable achievements are detailed in the Logistical Framework of Completed Activities and list of outputs in the appendix.

One key lesson learned about monitoring and evaluating the project, that may well be useful to other DI projects, was that written monitoring and evaluation by host country nationals rarely helped identify possible problems or improvements. Written comment whether on anonymous questionnaires or in any other form was very rarely negative. A much more productive way to identify improvements or problems was informal face to face chats that included a leading question such as, how could we do this better or why didn't that work? Person to person participants seemed much more likely to come up with suggestions than if asked to write down responses to similar questions. Indeed generally

face to face meetings were always more productive in getting things done in Bolivia than any form of written communication.

10. Actions taken in response to annual report reviews (if applicable)

The annual reviews were generally very favourable and no major changes to the project were suggested by the reviews. Two minor changes in response to review comments were to institute a system of confidential questionnaires to gauge the quality of the training workshops and the decision to revisit some inventory areas to gather a wider spread of information that covered more than one season or site.

11. Darwin Identity

The Darwin Initiative logo and name were used throughout the project. This included during exchanges with the 27 Bolivian organisations we established links with, at 7 national and international conferences, during training workshops for 146 biologists/conservationists and during the national Important Bird Area Workshop organised for 35 delegates representing conservation groups and governmental organisations from all over Bolivia. The Darwin Initiative name (and where appropriate logo) were also used in all project reports and publications. As a result the Darwin Initiative is widely known among conservation and scientific organisations as a major source of British funding and support for biodiversity conservation. The Bolivian KBA project itself is widely recognised as unique source of biological and conservation data that is accessible to all and we continue to have requests from individual biologists, land owners, indigenous groups, conservation groups and IUCN specialist groups for help, advice and data.

12. Leverage

The KBA project used the support of the Darwin Initiative as a lever to raise £320,637 in conservation funding on top of the funding (£135,719) received directly from the Darwin Initiative. This represented 236% increase in funding, £140,000 of which was additional to the plan in the original application. This money is now being used to carry out active conservation work in many of the Key Biodiversity Areas identified during the project. To ensure that funding could continue after the project we provided training in conservation fund raising for 69 Bolivian biologists and conservationists. Over the course of the project one to one training was given to 14 biologists who worked either directly for the project or for Armonia. This was a modification on the original application where this type of training was planned to be in the form of workshops, the results were very successful with greater than 50% of those trained making funding applications that successfully raised money for their own conservation projects. This training was particularly beneficial to Armonia who now have 4 members of staff who have successfully applied for international funding. In the March 2006 alone, they raised \$85,000 for 5 conservation projects in the KBAs and this is all additional to the money mentioned above raised during the project. To spread the benefits of this training more widely among our partners, the final training event of the project in August 2005 was on conservation fund raising techniques and this attracted 55 participants so over the course of this year we hope to hear about success from this source as well.

13. Sustainability and Legacy

The project's three most enduring legacies are likely to be

- 1) The initial network of 44 Key Biodiversity Areas that has so far been published and accepted by both the national and international conservation community as global conservation priorities. (e.g. the Bolivian section of the Important Bird Area of the Tropical Andes book recently published by BirdLife and partners, is based on work of the KBA project and lists the identified KBA sites as international conservation priorities.)
- 2) The growth of our conservation partner from a small almost unknown Bolivian NGO employing 4 people in to a medium sized and nationally influential NGO employing 37 people on 16 conservation projects helping conserve the KBAs identified during the project.
- 3) The developments in skills and experience of the more than 40 biologists who worked with the project's inventory teams and the 100 plus biologists and conservationists who received training at the project's workshops.

Glasgow University is still working with the major project partners in Bolivia on ongoing conservation projects, including for example sending out a staff and student team to work under Armonia's direction to help conservation in one of the KBAs. The project partners are developing their own inter-organisation initiatives, such as an initiative by Armonia and our scientific partner the NKM Natural History Museum to host an international conference of the Scarabidae. Additional funding has been raised for these projects plus for ongoing work in the KBAs in which Armonia has conservation projects.

14. Value for money

Our main project outputs were training 146 conservation biologists in field survey and fund raising techniques, helping our main NGO partner grow 800% in size so that it now has ongoing funding that allows it to employ 37 trained personnel on conservation projects and carrying out 62 biological inventories. Any of these might be considered good value for the initial project investment so taken together and adding in all the additional outputs achieved which far exceeded the original application we rate this application excellent value for money. As an example of excellent value for money, biological inventories of the type we carried out focusing on many taxa normally cost £15,000 to £20,000 a site because of the salary, travel and organisation costs of getting an international team to the country and then into the remote inventory sites. By basing the international team in country and providing comprehensive training and experience for the Bolivian team members prior to the inventories the project was able to reduce these costs to somewhat less than £5000 a site. The project represents particularly good value for the initial Darwin Initiative input of £135,000 which we were able to use as leverage to raise an additional £320,000 for the project aims and the conservation work that flowed out of them.

Logistical Framework Showing Completed Activities

<i>Project summary</i>	<i>Measurable indicators</i>	<i>Means of verification</i>	<i>Important assumptions</i>
<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 the benefits arising out of the utilisation of genetic resources 			
<p>Purpose</p> <p>To gather high quality scientific data with which to identify a Key Biodiversity Areas network in Bolivia, and thereby establish national site-specific priorities for biodiversity conservation. In tandem, to expand the capacity of Armonia to act on these priorities and to provide the training and field experience necessary for the KBA programme to be run by Bolivian personnel.</p>	<ul style="list-style-type: none"> - 62 biodiversity inventories completed, >50% led and conducted solely by Bolivians. - Bolivian government (DGB) adopted role planned for KBA committee. - 44 KBA/IBAs so far designated as national & international conservation priority sites by DGB. - 37 staff employed by Armonia to work on conservation in KBA sites. 	<ul style="list-style-type: none"> -Final project report. -DGB maps of Areas Important for Birds, Amphibians & Fauna. - 44 of the Bolivian KBAs recommended so far by the KBA project have been published in the book & CD “Important Bird Areas of the Tropical Andes” by Birdlife International. - Armonia employment records & annual Boletín Informativo. 	<p>Armonia remain very committed to the KBA/IBA program and now run 15 conservation projects connected with the KBA network identified during the project. CI-Bolivia showed a very low level of commitment to the KBA concept throughout the project and that seems unlikely to change, fortunately this did not greatly damage the project.</p>
<p>Outputs</p> <p>30 young Bolivian biologists trained and experienced in biodiversity surveys.</p> <p>2 young Bolivians trained & capable of instructing others (entomology & herpetology).</p> <p>Biological inventories of 60 sites completed.</p> <p>Bolivian KBA book published and distributed in electronic form.</p> <p>Armonia able to coordinate future KBA work.</p>	<ul style="list-style-type: none"> - 101 Bolivian biologists completed workshops. Out of the 46 trained in the initial 2 years >50% obtained employment in conservation biology within the program period. - 3 Bolivian biologists trained in UK & USA and now training others - 62 potential KBA sites inventoried. - Publication of IBA/KBA book, CD and website listing bird KBAs. - Recruitment of 37 suitably trained staff. 	<ul style="list-style-type: none"> Course attendance records. Annual & final project reports. Report of training staff from Florida State & Oxford Universities. Annual project report. Individual project site reports in Spanish and annual project report. Published book, CD and website. Armonia employment records and final project report. 	<p>During first two years greater than 50% of participants applied training to project surveys and then moved on to conservation jobs within Bolivia.</p> <p>Trained Bolivian entomologist, ornithologist & herpetologist continue to work in biology and train future students in Bolivia.</p> <p>Sufficient potential KBA sites were logistically accessible to survey teams.</p> <p>Armonia remains committed to KBA/IBA programme.</p>

<p>Activities</p> <p>Training Workshops IBA/KBA Workshop & meetings Entomology & herpetology Training Biological Inventories Write site reports, compile results into scientific papers and prepare KBA book Institutional capacity support given to Armonia</p>	<p>Activity Milestones (Summary of Project Implementation Timetable)</p> <p>6 Training workshops (2 of the planned workshops were amalgamated into larger workshops) plus one to one training carried out, giving 154 person/weeks, which far exceeded planned output. KBA Workshop involving government (DGB) representatives, Sept 03. Final meeting with DGB (replacing KBA Committee) representing Bolivian government, July 05. Field training with Oxford & Glasgow staff July-Sept 03, Aug & Dec 04 & Jan 05. Entomology & ornithological training in UK June & July 04, herpetology museum training in USA July 03. 62 Biological inventories, compilation of site reports and preparation of scientific papers May 2003-Dec 2005. IBA/KBA booklet published April 2004. Presentation of results, reports & recommendations to DGB has so far resulted in 44 KBAs being designated. Worked with Armonia to identify specific priorities, then provided training and assistance in international grant applications, £320,633 raised for conservation in KBAs, May 03-Dec 05.</p>
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Logistical Framework Showing Planned Activities

<i>Project summary</i>	<i>Measurable indicators</i>	<i>Means of verification</i>	<i>Important assumptions</i>
<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 			
<p>Purpose</p> <p>To gather high quality scientific data with which to identify an Important Biodiversity Sites network in Bolivia, and thereby establish national site-specific priorities for biodiversity conservation. In tandem, to expand the capacity of Armonia to act on these priorities and to provide the training and field experience necessary for the IBS programme to be run by Bolivian personnel.</p>	<p>Number of biodiversity inventories completed.</p> <p>Bolivian National IBS Committee set up</p> <p>Number of IBS designated by Bolivian IBS committee.</p> <p>Independent Bolivian survey teams completing site inventories in 2nd/3rd years.</p> <p>Number of IBS staff employed by Armonia.</p>	<p>Individual project site reports and annual project report presented to IBS Committee, sponsors and collaborators.</p> <p>Electronic book of Bolivian Important Biodiversity Sites published on web and CD on completion of project. Copy sent to Darwin Initiative.</p> <p>Individual site reports</p> <p>Annual and final project reports.</p>	<p>Continued commitment of Armonia and CI-Bolivia to IBS programme.</p>
<p>Outputs</p> <p>30 young Bolivian biologists trained and experienced in biodiversity surveys.</p> <p>2 young Bolivians trained & capable of instructing others (entomology & herpetology).</p> <p>Biological inventories of 60 sites completed.</p> <p>Bolivian Important Biodiversity Sites book published and distributed in electronic form.</p> <p>Armonia able to coordinate future IBS work.</p>	<p>No. of Bolivian biologists completing training workshops .</p> <p>No. of Bolivian biologists applying techniques to project and external field work.</p> <p>Completion of training in Oxford & USA.</p> <p>No. of potential IBS sites investigated.</p> <p>Publication and distribution of book</p> <p>Recruitment of suitably trained Armonia staff dedicated to IBS work.</p>	<p>Course attendance records maintained by Los Volcanes Field Station. Annual project report.</p> <p>Report of training staff from Oxford University. Annual project report.</p> <p>Individual project site reports on Bolivian IBA web site and annual project report.</p> <p>Published CD and website.</p> <p>Armonia employment records and final project report.</p>	<p>A good percentage of participants will apply training to project surveys and then move on to conservation jobs within Bolivia.</p> <p>Trained Bolivian entomologist & herpetologist will continue to work in biology and train future students in Bolivia.</p> <p>Potential IBS sites are logistically accessible to survey teams.</p> <p>Continued commitment of Armonia to IBS programme.</p>
<p>Activities</p> <p>Training Workshops</p> <p>IBS Workshops</p> <p>Entomology & herpetology Training</p> <p>Biological Inventories</p> <p>Write site reports, compile results into scientific papers and prepare IBS book</p> <p>Institutional capacity support given to Armonia</p>	<p>Activity Milestones (Summary of Project Implementation Timetable)</p> <p>8 Training workshops carried out between Aug 2003 and March 2005.</p> <p>2 IBS Workshops involving national IBS Committee, Sept 2003 and May 2005.</p> <p>Field training with Oxford & Glasgow staff July-Sept 2003 & 2004, entomology museum training at Oxford University Jan & Feb 2004, herpetology museum training Jan 2004 & Jan 2005.</p> <p>Biological inventories, compilation of site reports and preparation of scientific papers May 2003-April 2005. IBS book prepared Jan-April 2005. Presentation of results, reports & recommendations to IBS Committee resulting in IBS designation, May 2005.</p> <p>Work with Armonia to identify specific priorities, then to provide training in international grant application process, followed by practical application to identified priorities, May 2003-April 2004.</p>		

Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	10	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	50	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation		Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity		Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	40%	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness		Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.

14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	100%	Check % = total 100

15. Appendix II Outputs

Please quantify and briefly describe all project outputs using the coding and format of the Darwin Initiative Standard Output Measures.

Code	Total to date (reduce box)	Detail (←expand box)
Training Outputs		
1a	Number of people to submit PhD thesis	
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	70 students received training during 6 workshops on biological inventory techniques, conservation fundraising and scientific writing and during more advanced one to one training in field etc (additional output 35 students)
4b	Number of training weeks provided to undergraduate students	75 person/weeks (additional output 48 person/weeks)
4c	Number of postgraduate students receiving training (not 1-3 above)	76 students received training during 6 workshops on biological inventory techniques, conservation fundraising and scientific writing and during more advanced one to one training in field etc (additional output 41 students)
4d	Number of training weeks for postgraduate students	79 person/weeks (additional output 46 person weeks)
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (i.e not categories 1-5 above)	3 Bolivian biologists received advanced entomological, herpetological, ornithological and conservation management training abroad in Britain & the USA (additional output 1 person)
6b	Number of training weeks not leading to formal qualification	15 person/weeks (1 week less than planned)
7	Number of types of training materials produced for use by host country(s)	2, Bird Survey Techniques book translated into Spanish and a Herpetology Survey Methods book written in Spanish
Research Outputs		
8	Number of weeks spent by UK project staff on project work in host country(s)	146 weeks (additional output 13 weeks)
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	

Code	Total to date (reduce box)	Detail (←expand box)
10	Number of formal documents produced to assist work related to species identification, classification and recording.	
11a	Number of papers submitted for publication in peer reviewed journals	6 submitted to international peer review journals, 3 papers published and rest currently being reviewed
11b	Number of papers published or accepted for publication elsewhere	
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	
13a	Number of species reference collections established and handed over to host country(s)	8, the project made sizeable new collections of amphibians, reptiles, butterflies and dung beetles for the Noel Kempff Mercado and D'orbigny Natural History Museums in Santa Cruz & Cochabamba respectively (all are additional output)
13b	Number of species reference collections enhanced and handed over to host country(s)	

Dissemination Outputs		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	1, Bolivian Important Bird Area Workshop organised in Cochabamba, 35 delegates representing conservation groups and governmental organisations from all over Bolivia. (Additional output)
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	7, Presentations at 2 national and 5 international conferences. October 2003, VII Neotropical Ornithological Congress, Chile. February 2004, VI Bolivian Ornithology & Bird Conservation Conference. March 2004, BirdLife World Conservation Conference & Global Partnership Meeting, South Africa. Oct 04, Scarab Research Network Meeting & VI Reunion de Latin Americana Scarabaeoidologia, both Costa Rica. Dec 2005, Scottish Tropical Biology Conference. Mar 06 Bolivian Ecology Conference.

15a	Number of national press releases or publicity articles in host country(s)	7, Work with the press has focused on raising conservation awareness for key conservation species present in the KBAs. This has resulted in 7 articles in nationally read newspapers
15b	Number of local press releases or publicity articles in host country(s)	
15c	Number of national press releases or publicity articles in UK	
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	
19b	Number of national radio interviews/features in the UK	
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the UK	
Physical Outputs		
20	Estimated value (£s) of physical assets handed over to host country(s)	£12,600 of computers, sound recording equipment, binoculars, camera traps and other biodiversity monitoring field equipment. (additional output £6,200)
21	Number of permanent educational/training/research facilities or organisation established	Construction of a national Bird Conservation Centre in Santa Cruz, the centre provides administrative, technical & expert support to bird conservation projects throughout the country and running costs are met by Armonia. (Additional output).
22	Number of permanent field plots established	
23	Value of additional resources raised for project	£320,633 (Additional output £140,000)

16. Appendix III: Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
<i>Journal paper</i>	<i>A New Species Of Tomodon (Serpentes: Colubridae) From High Elevations In The Bolivian Andes.</i> Harvey and Muñoz, Herpetologica, 60 (3), 2004, 364–372	<i>The Herpetologist s' League, Inc.</i>	http://www.bioone.org	-
<i>Journal paper</i>	Description of Bothrops jonathani Harvey (Serpentes: Viperidae) From Southern Bolivia. Harvey and Muñoz, Herpetologica, In press.	<i>The Herpetologist s' League, Inc.</i>	http://www.bioone.org	-
Journal paper	First sound recordings, new behavioural and distributional records and a review of the status of the globally threatened Scimitar-winged Piha Lipaugus uropygialis Bryce, R. et al. Cotinga, In Press.	Neotropical Bird Club	http://www.neotropicalbirdclub.org/	-
booklet	Important Bird Area Program for the Conservation of Birds and their Habitats in Bolivia, Bennett Hennessey & Rodrigo Soria, 2004, 16 pages. (Spanish)	Armonía	Asociación Armonía, Lomas de Arena 400, Santa Cruz de la Sierra, Casilla Postal 3566. Bolivia. Armonia@scbbs-bo.com	Free
website	Web pages introducing and explaining the Important Bird Area Program in Bolivia; including the process of IBA designation and details of all the IBAs. Rodrigo Soria. 2004 (Spanish)	Armonía	www.armonia-aicas.org.bo	Free
book	Important Bird Areas of the Tropical Andes (the Bolivia section of this book is based on the work of the KBA project)	BirdLife International	Book stores	

Appendix IV: Darwin Contacts

Project Title	Bolivian Key Biodiversity Areas Project
Ref. No.	162/12/013
UK Leader Details	
Name	Ross Macleod
Role within Darwin Project	Project leader, trainer & ornithologist
Address	Graham Kerr Building, Department of Environmental & Evolutionary Biology, University of Glasgow, G12 8QQ.
Phone	
Fax	
Email	
Other UK Contact (if relevant)	
Name	Aidan Maccormick
Role within Darwin Project	Project coordinator, trainer & ornithologist
Address	School of Biology, Bute Building University of St. Andrews St. Andrews, Fife KY16 9TS
Phone	
Fax	
Email	
Partner 1	
Name	A. Bennett Hennessey
Organisation	Armonia
Role within Darwin Project	IBA Coordinator and director of Armonia's conservation work in KBAs
Address	Lomas de Arena 400 Casilla 3566 Santa Cruz de la Sierra Bolivia
Fax	
Email	
Partner 2 (if relevant)	
Name	
Organisation	
Role within Darwin Project	
Address	
Fax	
Email	