Darwin Initiative Annual Report

A NATIONAL PLAN FOR MAMMAL CONSERVATION IN TANZANIA
SECOND ANNUAL PROGRESS REPORT
April 1st 2006 – March 31st 2007

Zoological Society of London

In collaboration with

Tanzania Wildlife Research Institute

funded by

The Darwin Initiative for the Survival of Species

Darwin Project Information

Project Ref Number	162/14/055
Project Title	A national plan for mammal conservation in Tanzania
Country(ies)	Tanzania
UK Contract Holder Institution	Institute of Zoology, Zoological Society of London
UK Partner Institution(s)	Zoological Society of London
Host country Partner Institution(s)	Tanzania Wildlife Research Institute (TAWIRI)
Darwin Grant Value	£ 214,051
Start/End dates of Project	Oct 2005 – Dec 2008
Reporting period	1 April 2006 – 31 March 2007, Annual Report No. 2
Project Leaders Name	Dr Sarah Durant, Dr Charles Foley
Project website	*www.tanzaniamammals.org*
Author(s), date	Dr Charles Foley, Dr Sarah Durant, Mr Alex Lobora, Dr Simon Mduma, April 2007

Abbreviations and Acronyms

CIMU	Conservation Information Monitoring Unit at TAWIRI
CVTM	Centre for Tropical Veterinary Medicine
DFID	Department For International Development
FZS	Frankfurt Zoological Society
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GNI	Gross national income
QDGS	Quarter Degree Grid Square
MS	Microsoft
TANAPA	Tanzania National Parks
TAWIRI	Tanzania Wildlife Research Institute
TCC	Tanzania Carnivore Centre
TCP	Tanzania Carnivore Programme
TMAP	Tanzania Mammal Atlas Project
US	United States
WCS	Wildlife Conservation Society

1. Project Background

Tanzania is a country rich in biological resources, the importance of which is well recognised nationally. The conservation of Tanzania's wildlife resources were made a national priority soon after independence under the new president Nyerere's Arusha declaration, by which protection for extensive wilderness areas in Tanzania was assured. Since this time Tanzania has continued to show a commitment to conservation, and the maintenance and protection of its wilderness areas are seen as an important component of the path to development, because of the increasing economic importance of tourism to these areas.

Despite its biological riches, Tanzania remains one of the poorest countries in the world. In 2005 it ranked 17th lowest in its GNI and 4th lowest in its Purchasing Power Parity. Tanzania has a population of around 38 million in an area of nearly one million square kilometres and a per capita income of less than $400 per year. Nevertheless, Tanzania has positive growth and over the last few years has been developing at a steady annual growth rate of around 6-7% per year, due in part to the commitment of its government and its political stability. Tourism, particularly wildlife tourism, is a key factor driving this growth. However, despite the importance of tourism, and hence wildlife resources, for the economy, conservation is, by necessity, low on the list of the country's priorities. Far more pressing needs, such as basic education and health, inevitably take precedence. Because of this, Tanzania's rapidly developing wildlife sector depends on external assistance for support. In particular, as a signatory to the biodiversity convention, Tanzania relies on support from other countries to fulfil its obligations to the convention.

Tanzania has an extraordinarily rich mammal fauna. The country ranks 5th in Africa in overall mammal biodiversity, and the Serengeti ecosystem alone boasts the highest diversity of ungulates in the world and the greatest density in Africa. The country's conservation record is exceptional; 15% of the country has been set aside expressly for the purpose of conserving biodiversity, and almost 25% is granted some level of protective status. The abundance of wildlife resources has spawned a large, rapidly expanding wildlife-related tourism industry, revolving around photographic safaris and sport hunting. Tourism is the country's second largest earner of foreign exchange and contributor to GDP, with an estimated value of $500 million per annum. Yet despite the importance Tanzania attaches to wildlife conservation, there is no formal national framework for mammal conservation in the country. Furthermore information on the distribution and status of many mammal species, essential for developing such a framework, is limited since Tanzania lacks capacity for monitoring its biodiversity.

2. Project Partnerships

Host Country Partner:

<u>Tanzania Wildlife Research Institute (TAWIRI):</u> TAWIRI is the main host country partner for this project, and the project is operated directly under TAWIRI. The project is closely involved with TAWIRI through its central aim of developing the capacity of TAWIRI to monitor mammal biodiversity. The project is based at the Carnivore Centre, which is at the headquarters of TAWIRI in Arusha, and the project partner is the Director General of TAWIRI, Dr Simon Mduma. All members of TAWIRI have been extremely supportive of the project. Four of the project staff who were appointed under the TCP were appointed as permanent TAWIRI employees at the beginning of 2005, whilst the other two are on TAWIRI short term contracts. TMAP operates as an effective sub-unit of TAWIRI; it reports activities to TAWIRI, exchanges information with the other sub-units, and TMAP employees all play an active role in TAWIRI operation and function. Machoke Mwita, the CIMU Database manager, and Rangvald Larsen, a CIMU consultant, are integrally involved with the development and supervision of the TMAP Database.

Other collaborations with projects in Tanzania:

<u>WCS Tanzania Program:</u> Project leaders and the project manager are in regular contact with representatives of the WCS program in Tanzania, who have been extremely supportive of the project, and have been involved at all levels of the project's activities. Lara Foley, a staff member of WCS Tanzania, continues to provide considerable GIS assistance to the project. Other WCS staff have continued to send in data sightings from areas around the country, notably the south.

<u>Tanzania National Parks:</u> The project relies on the support of TANAPA for its success. TANAPA have been extremely supportive of the project in many ways. It has provided free entry permits to all parks

and has assisted with logistical support in the parks, including allowing the team to set up their camps at ranger posts. The Chief Ecologist of TANAPA has forwarded the TMAP website to all park ecologists and requested their support with data submission.

Tanzania Department of Forestry and Beekeeping: Many of the camera trap surveys are carried out in forest reserves or forested areas around the country. These fall under the jurisdiction of the Forest and Beekeeping Department (isn't it Division? Check with Alex) , which has been extremely supportive by providing permits for project personnel to visit all forests in the country and local forestry officials have provided assistance and logistical support on site during surveys.

The Serengeti Carnivore Disease Project: This is a project established between the Serengeti Lion Project, the CVTM at the University of Edinburgh and the TANAPA Veterinary department. Close links were already established with this project through TCP and have continued with TMAP. Members of this project conduct regular night transects in the Serengeti and have shared relevant data with TMAP.

Tanzania Carnivore Program (TCP): This program was established in 2002 by a similar Darwin Initiative grant. This year TCP has acquired a full time GIS consultant, Dr Margaret Waweru who is based at the Centre where she is co-ordinating a range-wide conservation planning initiative for cheetah and wild dogs. Sarah Durant, the PI of TCP, together with WCS, has raised funds for a vehicle and salaries for a second camera trap survey team that will augment the data collected by the TMAP team.

Tanzania Cheetah Conservation Program: This program evolved from the Serengeti Cheetah Project, and is directed by Sarah Durant. The program therefore has a long history of strong partnership with TCP and TMAP. It has supported TCP and TMAP by the loan of a project vehicle over the entire reporting period, and providing a driver for the project. The project manager to TCP, Maurus Msuha, is now doing his PhD with this program, and both he and another PhD student, Amy Dickman, are conducting research relevant to the objectives of TMAP, conducting surveys within two priority areas, the Maasai Steppe and Ruaha region.

Tanzania Bird Atlas Project: This project has many objectives and methods similar to ours, and thus we have been in regular communication with this project from the beginning. Both projects have extensive field components, and we have sought to assist each other by collecting relevant data to the other project during field surveys.

Tarangire Elephant Project: This is a WCS project that has been operating in Tarangire for 14 years. One of the project leaders (Charles Foley) is co-PI on TMAP and TEP has provided logistical support and the time and expertise of Lara Foley in developing the database and GIS assistance.

Progetto Oikos: This project is run by an Italian NGO and is conducting a monitoring program in and around Mt Meru and Arusha National Park. TMAP has loaned the project some camera traps, and their personnel are some of our most prolific data contributors.

Grumeti Reserves: This is a private company that manages a large tourism and hunting block on the western border of the Serengeti. They have a full time ecologist and a monitoring team who regularly send us sightings.

Field Museum of Chicago: Through their Mammal Collection Manager, Bill Stanley, the museum has helped train the TMAP survey team in sample collection and preservation, has shared survey logistics, and has provided invaluable advice on survey sites.

Others: There are a number of smaller projects operating in Tanzania which work predominantly or partly with mammals. This project seeks to ensure that everyone involved with mammal research or conservation is kept informed of the project's activities and has access to the project's facilities and library resources. To this purpose, we have established links with all such projects in Tanzania. These include the Serengeti Lion Project, the Serengeti Hyaena Project, the Serengeti Jackal Project, the Tarangire Lion Project, the Serengeti Biodiversity Project, the Southern Highlands Conservation Project, the Katavi Research Project, the Gombe Research Project and the Mahale Mountains Research Project. Within the private sector Nomad, Sokwe and Dorobo Safari companies and Ndutu lodge have provided important regular information about mammal distribution.

Other collaborations with projects internationally:

Frankfurt Zoological Society (FZS): FZS operates a number of conservation programs within Tanzania and is a key player in Tanzania conservation. The project manager and the project leaders have ensured that FZS are informed of the project activities, and FZS have promised assistance to the project wherever possible. FZS have assisted with the importation and clearance of the TMAP project vehicle and the new TCP vehicle.

WCS International: WCS International (based in New York) have been very supportive of this project from its inception. WCS has provided substantial funding to host a workshop to develop the elephant management plan, which will be the first action plan tackled by TMAP.

Global 400 Wildlife Picture Index: This is a new initiative at ZSL and WCS that aims to develop tools for monitoring based on camera trapping to address the CBD 2010 targets. TMAP and TCP have obvious interest in helping to ensure that monitoring outputs are able to feed into policy and practice at international as well as national scales. The wildlife picture index aims to do this through standardised camera trapping protocols at key international sites. TMAP is working with this initiative in the mutual interest of addressing wider international aims.

3. Project progress

3.1 Progress in carrying out project activities

3.1.1 Sub-unit of TAWIRI developed to monitor large mammals in data deficient areas using standardised methods

ACTIVITIES

Camera Trap Surveys and Field Interviews

During the first year of the project we hired and provided further training to a three person team to carry out camera trap surveys (2 people had already received training through TCP but the third person was entirely new to the technique) and structured interviews to gather data on mammal distribution across the country. Carrying out these surveys has formed much of the core of our work this year. Survey sites for the year are selected during quarterly team meetings based on geographical gaps in the database and areas thought to be of high mammalian biodiversity interest. The team visits an area for a minimum of 6 weeks. In each site a camera trap grid is set up with cameras positioned at least 1km apart. In some sites (notably Arusha National Park) we were interested in establishing leopard densities, as well as overall biodiversity, and here the team set up two cameras at each station allowing both sides of an animal to be photographed, facilitating the process of individual identification. In all other sites only one camera was set up per station, with a minimum of 40 cameras set up per site, and conducted over a set period to meet an overall aim of a minimum of 1,000 total camera trap days. Once the cameras are in place, the team conducts interviews with local villagers (particularly targeting local residents who spend a lot of time in the forest or survey area) using a standardised interview template. During this process the interviewees indicate which mammals they have seen using our photo-identification guide.

At the end of the field survey the team returns to the Carnivore Centre to carry out the data analysis. This involves developing the film, scanning every negative, identifying all species in the pictures, tagging every picture with the species, date, time and location, and then entering all of these data into an Excel worksheet (see data protocols submitted in FY1 annual report). Following verification, the data are then entered into the TMAP database and added to maps published on the website at the end of the every month.

Arusha National Park survey

This survey was carried out between March and May of 2006. The survey doubled as a training survey and was led by Dr. Marcella Kelly from Virginia Tech University, who provided training on survey development and implementation. A grid system was set up to cover the forested areas of the west and centre of the park, with 20 cameras set up in pairs at 2km intervals for a total of 1073 trap nights. The survey recorded 1496 individuals of 26 species of mammal providing a trap success (#trapped/#trap nights) of 0.054. Arusha National Park has been protected since 1977 and this extended period of protection is reflected in the high densities of wildlife in the forest areas. Suni, Harvey's duiker and Bushbuck were all particularly abundant throughout the park. Only one new species – the White-tailed mongoose, a common savannah species - was added to the park list. However the survey did reveal a surprisingly high number of Bushy-tailed mongoose (Bdeogale crassicaudatus) – 47 trapped, with a trap success of 0.04. This species was only recently added to the park list and was generally thought to be rare throughout its range in East Africa. This species is almost exclusively nocturnal, and this, combined with its cryptic nature and the difficulty of distinguishing it from the Marsh mongoose, has undoubtedly contributed to previous under-reporting. TMAP has now found this species in Arusha NP, Ngorongoro

Conservation Area, and Mahale NP. The leopard data is in the final stages of analysis using 'CAPTURE', a computer software package that uses mark recapture statistics to obtain density estimates.

Serengeti National Park survey

The Serengeti National Park has benefited from numerous aerial surveys over the past decades and there is good information on the density and distribution of large ungulates. However there is surprisingly little information on the smaller and nocturnal mammal species, particularly within the forested areas inside and on the edge of the park. After consulting with other ecologists with long experience working in the park, we selected three areas in which to concentrate survey effort: the Bologonja forest in the far northeast, forested areas in the Loliondo Game Controlled Area outside the park to the east, and the riverine forest along the western corridor of the park. The first two forested areas form part of the northern highland forests, while the western corridor has vegetation species more representative of the Congolese forest block. The first cameras were put up in late May 2006 and taken down in July 2006, for a total of 1219 camera trap nights. The majority of species photographed were relatively common savannah mammals. A total of 784 individuals of 29 species were recorded with an average trap success of 0.022. The extent of the forests in all three areas has diminished greatly in recently years as a result of uncontrolled burning within the park, and these habitats are likely to disappear without concerted action from the park management.

Minziro Forest Reserve survey

The Minziro Forest Reserve is in the far northwest of Tanzania on the border with Uganda. It is one of the few forests in Tanzania that is part of the Congolese biome, and is also unusual in being a seasonally flooded forest, with large areas of the forest being inundated annually by overflow from the Kagera River. The area has been well surveyed in the past by ornithologists, but there were no documented lists of mammals, including even the larger mammals; It is therefore an exciting undocumented area and we expected to observe some mammals more typically associated with the Ugandan forests. The survey was carried out in the dry season from August to September 2006. 67 camera traps were set for a total of 1503 trap nights. The highlight of the survey was the observation of two species of pangolin within the same area: the Giant and the Tree pangolin. The Giant pangolin was recorded for the first time in Tanzania in our survey of Mahale National Park in 2005, so this is a large range extension for the country. There is one reported record of Tree Pangolin in Tanzania (on the western shore of Lake Victoria)[1], and if this is confirmed, our sighting would represent the second record of this species for the country. A total of two Tree Pangolins were captured on film and a skeleton of a third was shown to us by a local villager. Several people interviewed mentioned seeing the species regularly, suggesting that it might be quite common in the area, although there is potential for confusion with the giant pangolin. We found numbers of mammals in the forest to be very low, which is an indication of unchecked poaching by villagers. Only 102 pictures were taken of 14 mammal species with a trap success of 0.005, a trap success that is less than 25% of most other surveys. Several snares were found in the forest and high snaring levels were confirmed by many villagers during interviews.

North Tanga survey

This is an area where very little mammalian survey work has been done, and consequently little is known about the local mammalian biodiversity. The vegetation is a combination of coastal rag, small forest patches, and dry savannah. We were particularly interested to discover whether any of the rare coastal species found in southeast Kenya, such as Ader's duiker, Golden-rumped elephant shrew and Sokoke dog mongoose, extended into northern Tanzania. The team found very little undisturbed habitat close to the coast suitable for a survey, so they moved 30km inland to a hunting block dominated by coastal savannah bushland east of the Mkomazi Game Reserve. The survey took place between November and December 2006 and a total of 42 stations were placed in a 1km grid system resulting in 67 exposed films. The results of this survey are still being compiled and thus far a total of 354 mammal pictures have been processed representing 29 species. We believe we might have another new species for Tanzania within these records but are awaiting confirmation from external experts. We will inform the Darwin Initiative when the results are back.

[1] Kingdon, J. 1977. East African mammals: An altas of evolution in Africa volume IIIA carnivores. London, Academic Press

Zoraninga Forest Reserve survey

This is one of the largest remaining tracts of forest on the Tanzanian coast and considered to be of high importance for biodiversity. The forest was recently annexed to the new Saadani National Park, and all hunting and logging activities have been stopped. The team started work on March 22nd 2007 and expect to complete the survey by May 8th. To date none of the films have been developed or analysed.

Developing and identifying data contributor network

The project now has a network of 206 individuals and organisations that have received project material and submitted data in the past. The majority of data contributors are from northern Tanzania, but we are gradually expanding this to regions of low coverage such as the south and west of the country, mostly through direct contact with people known to be working in those areas. Traditionally we have sent prospective participants printed data collection forms with detailed instructions on how to fill them out. However encouraging people to send in the data forms has typically proven difficult, particularly with the high number of mammal species now being surveyed. In order to facilitate data gathering, project staff are visiting potential participants and conducting direct interviews with them, with particular emphasis on people in the safari business who spend a lot of time in the field. The Arusha-based staff allocate time in their work schedules every month to visit safari companies and gather data from drivers and staff.

Website development

As more people in Tanzania acquire internet access, we are now increasingly turning to the internet for data collection. Development of a professional website has been a key priority for TMAP. We have created an interactive site that allows users to submit data online, thus providing an easy mechanism for data submission that bypasses the time consuming process of filling out and mailing paper forms, which we believe was a substantial impediment for many potential data contributors to TMAP, particularly as there are a large number of species to be covered.

After an extensive development process, the website (www.tanzaniamammals.org) was created with the following features:

a) A species information page which lists all of the project target mammals found in Tanzania. For each species we provide (or are in the process of providing) a short species description highlighting key identification points, a brief description of the species ecology and social structure, and a list of similar species that could possibly cause confusion during identification together with links to their respective pages. Where possible, each species also has a picture and, if we have received geo-referenced sightings of it, the latest distribution map updated monthly from our database (see Figure 1).

Figure 1. Screen-grab of the webpage for Bohor reedbuck from www.tanzaniamammals.org
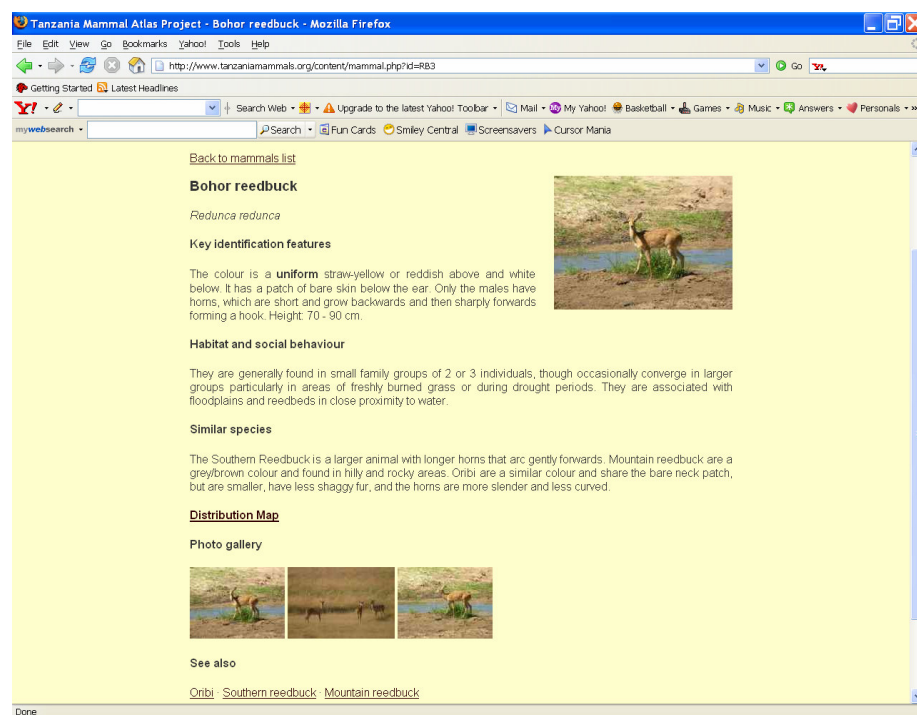
b) b) A news page that displays updates from the field and .pdf copies of past newsletters.

c) Two data submission pages. As with the paper forms there are two versions to enable contributors to submit information in one of two different formats.

  i. The first allows users to fill in simple sighting information for each grid square. Users identify their grid square location from a digital map and then check a box next to each species seen in that grid (see Figure 2).

Figure 2. Screen-grab of the online Sighting Information form. Users can directly send mammal sighting data with a grid square reference which can be obtained from a map on the Project website.

  ii. The second form requests more detailed information for each species such as a GPS reference, number of individuals seen, habitat type, etc..

  When the user submits the data, the data form is sent to two different email addresses (the database manager and a backup). The data undergo a verification process before being entered into the database.

d) A page detailing all books and papers in our library collection with a search function that allows the list to be searched by author, key words, mammal species, etc.

e) A page with background information on the aims of the project and brief descriptions of the Darwin Initiative and project partners and collaborators.

The site was constructed using a combination of coding languages including PHP and MySQL in a way that allows us to readily alter and maintain the site ourselves after a small amount of training. The web designer will come to Arusha in June to hold a short training session with all project participants to enable the project team to maintain the website use.

Many participants have now started sending in data via the new website, though printed forms remain an option for all contributors, particularly those with no or limited web access.

Newsletter production

The team has produced two editions of the TMAP newsletter detailing information on the project activities. 1000 copies of each newsletter were printed for dissemination to interested parties, and PDF files are available for free download on the project website (www.tanzaniamammals.org). See Annex 3 for copies.

Training

In order to extend our camera trap survey coverage, we have continued to train and loan equipment to other research teams working in different areas. Over the current reporting period, two traps are on

long term loan to researchers in the Usambara Mountains, and four traps were loaned to researchers monitoring wildlife on the western slopes of Mt. Meru.

A project volunteer, Mr. Chagula Mwita, a recent graduate of Sokoine University of Agriculture with a BSc. in Wildlife Management, joined the project team at the end of October. He has received training in all aspects of camera trap survey methodology, including data entry and analysis.

3.1.2 Centralised database of mammal distribution and status that integrates historical records, and in formation from CIMU, TCC and proposed project.

ACTIVITIES

The TMAP database has expanded significantly during the past year and now has over 12,000 records covering 87 of our target species.

Database development

The original database inherited from TCP had a simple straightforward design in Access, which although appropriate for a smaller number of relatively rarely seen carnivore species, was not suitable for our purposes for two key reasons. Firstly, it was not compatible with existing databases in TAWIRI; these databases contain a large amount of information on many species of large mammals which fell under the TMAP remit. Secondly, Access has limited capacity in terms of data management, and hence would be less able to cope with the substantial increase in data under TMAP. Therefore in order to improve the system and make it compatible with other distribution databases in TAWIRI, we redesigned the database in MYSQL, taking the opportunity to increase its ease of use. This work was carried out by a database expert from the University of Norway, Rangvald Larsen, who has been a consultant to the TAWIRI CIMU. Our database manager (Edwin Konzo) was involved in all stages of the work and has been given thorough training in how to use the new database system. The key features of the new database are as follows:

   a) A new menu system.
   b) A move towards standardising our data geographic referencing to the Quarter Degree Grid Square (QDGC) system, which allows for easier integration with other wildlife atlas databases.
   c) An automated map production system which means maps no longer need to be produced on a species by species basis – an important development given that the number of species in the database has tripled.
   d) Development of a new data requisition system that allows users to extract data for any combination of species and/or observer (see Figure 3).
   e) A new map template (see Figure 4)
   f) Development of an internal website on the TMAP server to allow any team member to access the database and extract the latest information.

We also initiated a rigorous and automated back up protocol to ensure that we would not lose all of our work in case of a catastrophe such as the building catching fire. On a daily level, a snapshot of the database is stored on the server at noon, and then compressed and sent to Rangvald Larsen by email in Norway. At a weekly level a back-up is made at 12.30 pm on every Thursday and sent by email to the database manager, project manager and both project PI's.

Figure 3. The intra-net database interface, showing an example of the reporting and statistics page – eg. the top 10 species with the most records in the database.
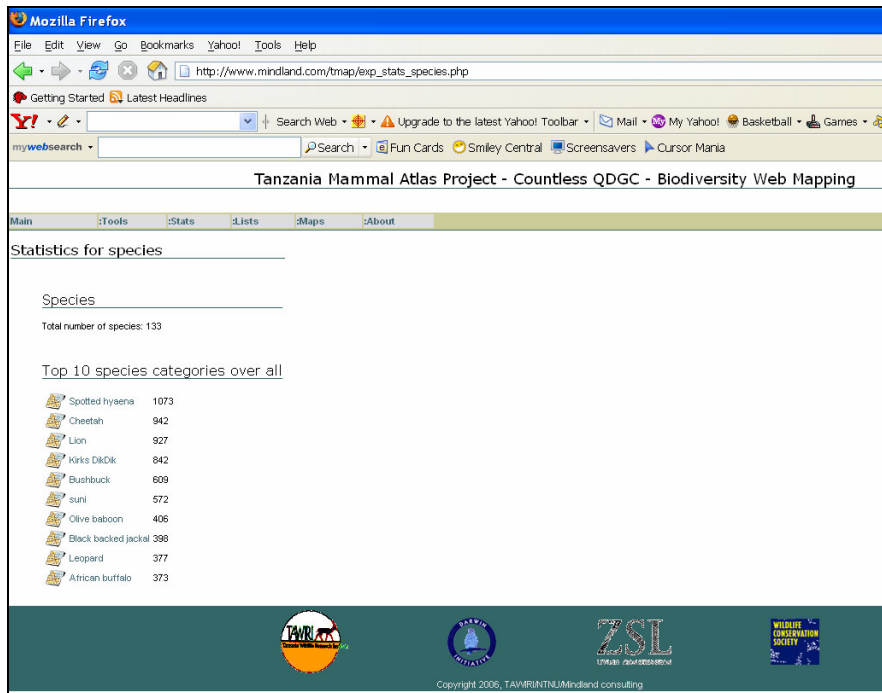
Figure 4. The intra-net database interface, showing an example of the mapping page – eg. location of all records in the database (11,927 at the time) by grid square. The background layer is a relief map of Tanzania.
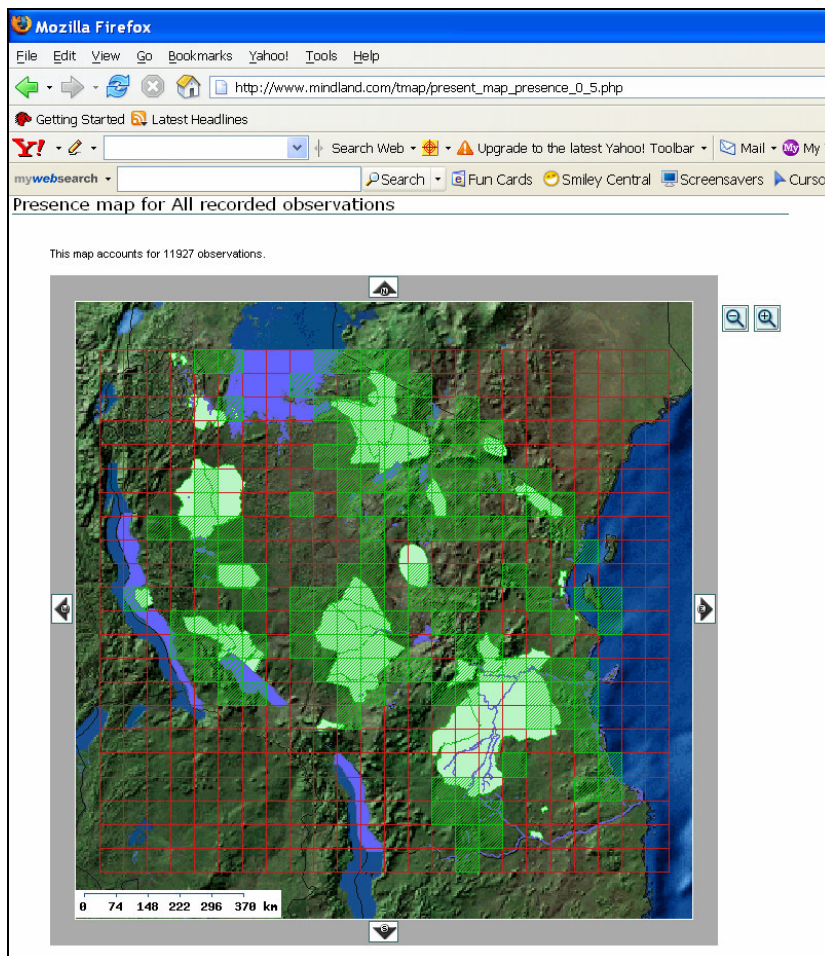
**Data extraction from databases and published and unpublished papers.**

The TCP database was easily transferred into the new TMAP database format, and the changes detailed above, allowed the TMAP database to be fully compatible with the CIMU database to enable direct data transfer between the two systems. The CIMU database contains over 20 years of data from aerial censuses conducted around the country. TMAP, TCP and CIMU have an agreement on the modalities of data sharing between the two systems; all data within the TCP and TMAP sites are available to CIMU while CIMU provides all point data (species, location and number of individuals) to be transferred to the TMAP database. The TMAP database manager has been collaborating with Machoke Mwita from CIMU to extract data from previous aerial surveys, starting with the Selous Game Reserve and the Rungwa-Ruaha ecosystem. This will gradually be extended to include all National Parks and Game Reserves where counts have been conducted and will greatly augment the TMAP database for protected areas.

The project has continued to collect an extensive library of papers related to mammals in Tanzania, and has located some important unpublished documents detailing historical mammal distribution in the country. Information from these is gradually being extracted and the data entered into the main database.

GIS training and analysis

This training was originally scheduled to occur during the first year of the project. However, upon investigation, there was no standard training program available that had direct, practical relevance to the work of the GIS and Database officer. Most existing courses would either cover a lot of material that Edwin already knew or spent substantial amounts of time covering material that Edwin would not need. We therefore arranged a tailor-made training program through a consultant GIS expert, with substantial experience in training and in biodiversity monitoring. The training program was developed in consultation with project staff and lasted two weeks. The objectives were two-fold: 1) to provide structured, practical training on relevant GIS topics, and 2) to develop a 'Human Footprint' map of Tanzania. GIS topics included a review of map projections; an introduction to the ArcView software Spatial Analyst extension; connecting ArcView to the project database for live updating of species distribution maps and streamlining their production; and developing habitat suitability models. Additionally, a new map template for both printed and web-based maps was created for a more aesthetic and consistent cartographic style (Figure 5).

Figure 5. The new distribution map template, showing the example of Spotted Hyaena distribution in Tanzania.
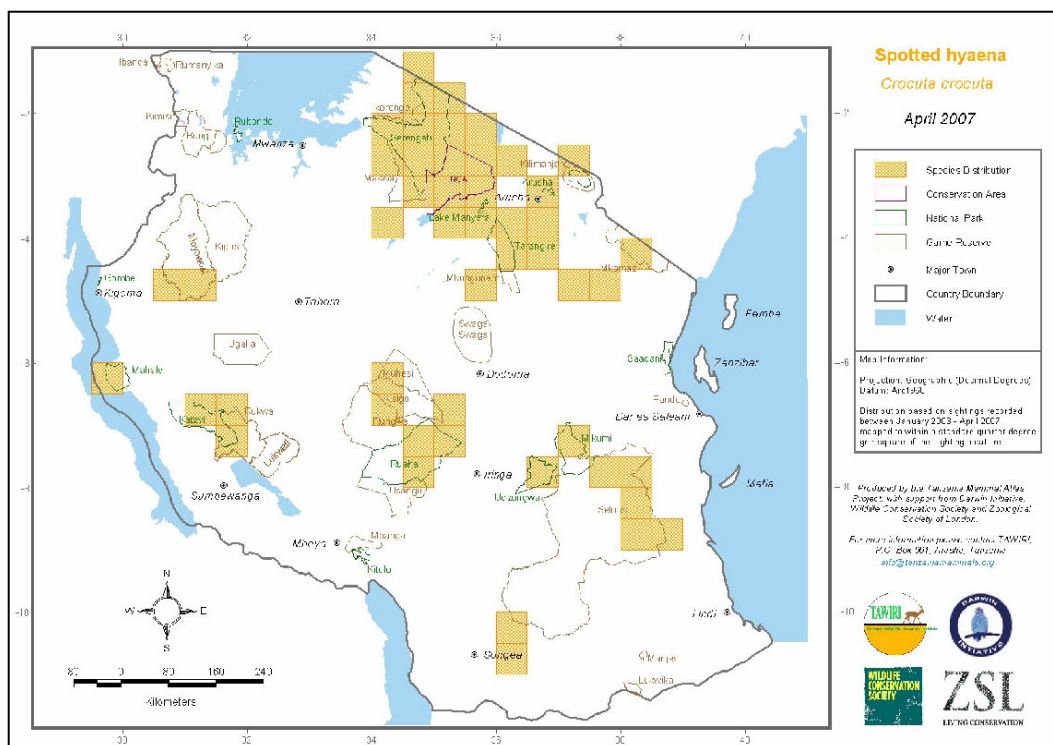
The second component of the training was the development of a high resolution Tanzanian 'Human Footprint', based on the Wildlife Conservation Society's Global Human Footprint (www.wcs.org/humanfootprint). The 'Footprint' provides a general indication of human activity and hence represents an important component of conservation threat across the country. The footprint will provide an important map of human activity that can be related to observed mammal distribution patterns. Spatial analysis can then be used to identify species specific thresholds of human activity and hence to make predictions about future species distribution under observed and predicted anthropogenic change. A draft footprint map was created using the ArcView 'distance function' on national spatial databases covering road networks, railways, village centres, human population density, protected areas, and land cover (Figure 6). This will be an important reference tool in the development of the Conservation Action Plans as it will highlight which parts of the country are likely to host major populations of mammals and which areas are threatened. The project is a work-in-progress and will be updated and improved as better data sets become available.

3.1.3   Conservation Action Plan for Tanzania's mammals developed to identify conservation priorities for each species and establish areas of data deficiency.

ACTIVITIES

Workshops to develop conservation action plans for the large mammals of Tanzania will start in the third year of the project and will make use of the databases and surveys described above.

3.2   *Progress towards Project Outputs*

The project is well on target with two of its stated outputs, namely establishing a sub-unit of TAWIRI to monitor large mammals, and compiling a database of mammal distribution in Tanzania. TMAP has a fully functional office with six well trained staff including a project manager, a GIS and database technician and a field coordinator. It also has a three-person field survey team that have been conducting camera trap surveys across the country. We have a sophisticated database with over 12,000 records and a historical database is being developed with close to 6000 records. The database still has a northern Tanzanian bias, reflecting the location of the project headquarters, though we are increasingly expanding our list of contributors and our number of records from other areas of the country, particularly the south. There are also a number of mammal species that we have little or no information for (particularly the prosimians and some of the smaller ungulates). We aim to address this through targeted interviews of known specialists, including researchers and professional hunters, and by selecting field survey sites to areas of known or potential distribution.

One problem we have faced is that we had not properly anticipated the time it takes to process survey data once it has been collected in the field. Field surveys themselves take 6-8 weeks. After that the team has to scan in and code every picture, enter the information into the computer, and then write a project report. This process is extremely time consuming and means that the team can only realistically carry out five surveys a year, rather than the eight originally envisaged. Hosting a volunteer has helped reduce the workload for the survey team, although, because it is difficult to find and retain volunteer staff, this is not a long-term solution. In order to address this problem we have made a concerted effort to raise further funds to enable us to employ and equip a second field survey team under the auspices of TCP, but who will contribute data to both TCP and TMAP. Funds have been raised for a second project vehicle through the Howard G. Buffett Foundation, whilst funds for the salaries and surveys for the project team are almost in place through ZSL, WCS and St Louis Zoo. We are confident that this survey team will be able to start work by the second half of 2007. This team will make use of a field officer who is currently assisting Maurus Msuha in camera trap surveys, as part of Maurus's PhD, and hence has been provided with relevant training and field experience. The team will also be able to use Maurus's camera traps. We aim to launch this survey team in September after Maurus has finished his field work. Once the second survey team is in place we will be able to meet our end of project target of surveying 15 sites across the country.

A further constraint has been finding the necessary staff time to extract data from historical sources (both published and unpublished) and enter this into a database. The process is both time consuming and tedious, and the team will need assistance from outside sources if this is to be completed in time. We are currently searching for committed volunteers to take on this task.

Figure 6. Draft 'Human Footprint' map of Tanzania showing areas of low human influence (brown) to high human influence (blue).
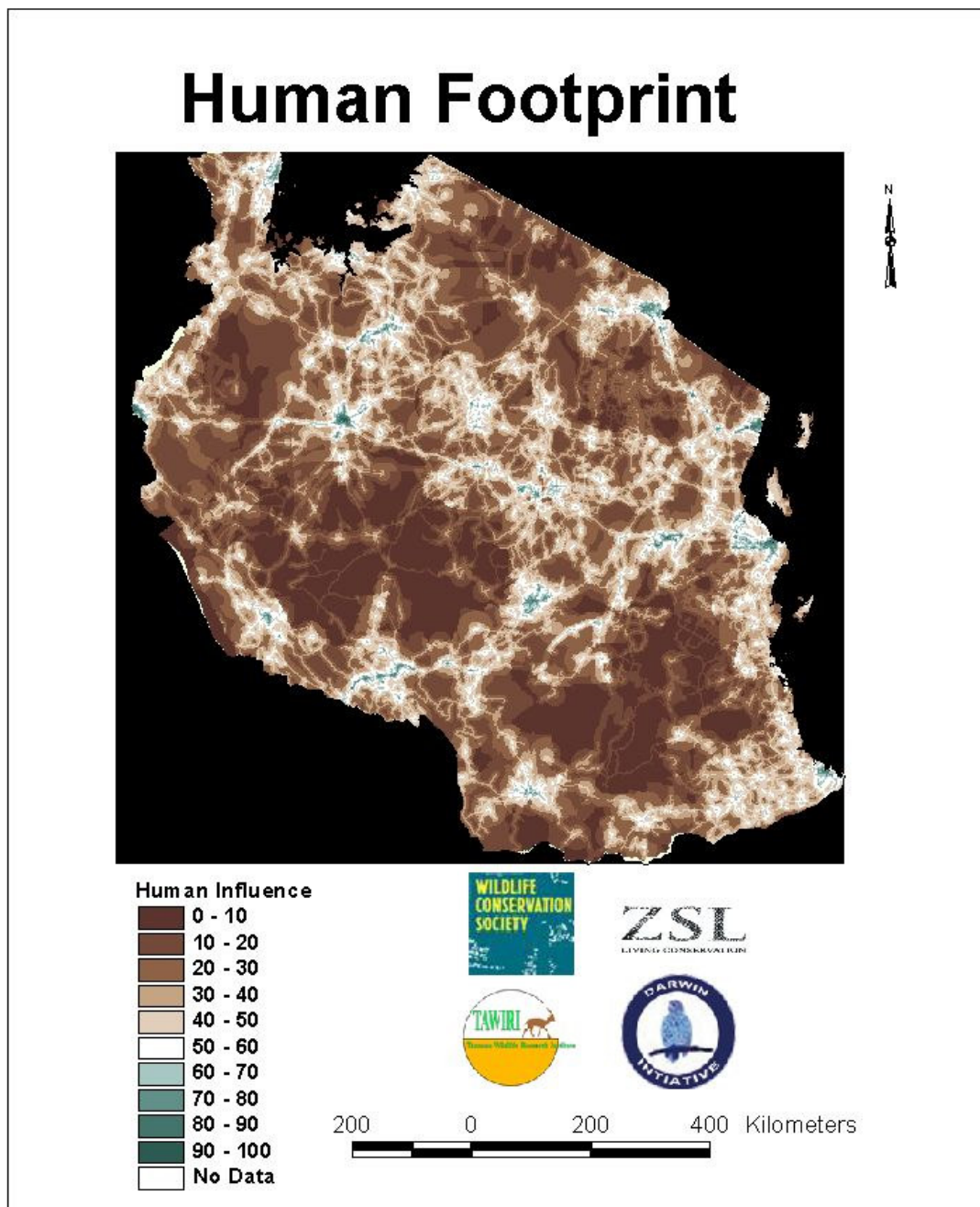
3.3   Standard Output Measures

Table 1   Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	TOTAL
5	Project staff receives continuous supervision and varied training in all aspects of project operations, and specialised training based on their job responsibility.	6 (on-going)	6 (on-going)		6 individuals
6a/b	Project manager trained in Advanced GIS and modelling (2 weeks)	1/ 2 weeks	0		1 for 2 weeks
	Project team members trained in camera trapping monitoring techniques and data analysis (6 weeks)	3/ 6 weeks	0		3 for 6 weeks
	GIS analyst receives training in remote sensing and advanced GIS techniques (2 weeks)	0	1/ 2 weeks		1 for 2 weeks
	GIS analyst receives training in database design and maintenance	*0*	1/ 4 weeks		1 for 4 weeks
7	Camera trapping protocol manual, checksheets for mammal distribution database.	2	0		2
8	Dr Charles Foley Dr Sarah Durant	30 12	30 12		60 24
9	Mammal Conservation Action Plans (divided by mammal groupings or species of special importance, eg. elephants. Goal is 5 plans by 2008)	0	0		0
10	Mammal identification guide to use during field survey interviews	1	0		1
11a/b	2 papers to be published in peer-reviewed journals describing the results of the mammal atlas and the mammal action plan.	0	0		0
12a	National mammal distribution database established	1	0		1
12b	National carnivore database and TAWIRI CIMU database	2 on-going	2 on-going		2 total
14a	Workshop hosted with national wildlife authorities, government agencies, and internal/external experts to draft the Mammal Action Plans. Scheduled for 2008.	0	0		
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	3	6		9 total
15a	Parliamentary and newspaper announcement about the finding of Giant pangolin in Tanzania	0	1		1
16a	Semi-annual newsletter	0	2		2
16b	Circulation in Tanzania: printed copies (also available free online)	0	1000 each issue		2000
17a	Data contributor network	1 on-going	1 on-going		1 total
17b	Tanzania Carnivore Contributors, Tanzania GIS users group, Tanzania Bird	4 on-going	4 on-going		4 total

	Atlas, camera trap users group				
19a	Radio marketing will take place following the release of the Action Plan to disseminate the key findings (2008).	0	0		0
20	Computer equipment, field survey, camping equipment, camera equipment, new 4x4 LandRover	£37,872	£3,700		£41,572
21	TAWIRI Mammal Survey Team	1	0		1
23	Other funding (£value)	£8,000	£10,000		£18,000

Table 2   Publications

Type *	Detail	Publishers	Available from	Cost £al
Newsletters	Mammals Newsbites. October 2006 and April 2007	Tanzania Mammal Atlas Project	www.tanzaniamammals.org	FREE

3.4   Progress towards the project purpose and outcomes

A key output of TMAP will be the production of a series of medium to large mammal conservation action plans, which will be consolidated into one action plan for the large mammals of Tanzania. We anticipate that we will have sufficient data to develop these plans by early next year. Following the successful example of the TCP, a series of workshops will be held for sub-units of mammals to formulate action plans. Each workshop will summarise the current knowledge for each species, assess the relevant threats to their conservation, explore tools for monitoring and conservation, and lay out a set of priorities for research and conservation. Workshops will be organised around taxa groups in order to ensure that the size and scope of each workshop is manageable. These workshops will be highly participatory to ensure a common ownership of the resultant action plan by all participants, and will be attended by representatives of all of the government wildlife agencies as well as experts in the relevant areas.

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

The project was devised to ensure that its activities met an ultimate purpose of devising monitoring and conservation strategies to ensure the conservation or all medium to large mammals in Tanzania. These strategies, if implemented, should directly meet the DI project final goal a) to achieve the conservation of biodiversity. It should also partly meet the DI project final goal b) to achieve the sustainable use of the components of biodiversity, as Tanzania derives significant financial benefits from tourist trophy hunting and its rural people derive local benefits in the form of access to protein, albeit often through illegal offtake, and increasingly from land lease deals with tourism operators. It is largely on target to meet its purpose. However a bigger issue is how to best ensure the implementation of conservation strategies which is the route to delivering clear impacts on DI goals a) and b). In Tanzania, conservation implementation is largely in the hands of the government sector, and hence requires their support and endorsement. The process devised by TCP, and duplicated in TMAP, is effective in terms of attaining an endorsed national action plan that can be used to guide conservation effort, however implementation depends on follow through on this plan, and this does not necessarily automatically happen once the plan is finalised. One means of increasing the likelihood of implementation, and hence impact, is to create a post project position with the responsibility of following up on the plan and checking on progress towards implementation. Indeed, this formed the basis of an unsuccessful funding application to the Darwin Initiative after the TCP. The TCP has recently obtained funding through WCS for the appointment of a representative who has the responsibility to follow up on implementation of the carnivore plan in the second half of 2007. We will therefore be in a better position next year to comment on how best to ensure that the action plan devised by TMAP is likely to result in sustained conservation benefits. However, we are optimistic that this approach will work, due to the engagement, interest and active support of key stakeholders during the formulation of the plan, and due to a governmental environment that is currently extremely supportive to devising and delivering against strategic frameworks, general management plans and action plans.

4. Monitoring, evaluation and lessons

The project is monitored and evaluated in the same manner as the TCP, as this strategy proved to be extremely effective in implementing this program. The activities of the project are monitored against quarterly workplans drawn up at quarterly meetings attended by the entire project team. These workplans are based on the logical framework in the original proposal. Each project staff member writes a monthly workplan based on the needs detailed at our quarterly meetings, and this workplan is submitted to the project manager and project leaders who use it to determine progress. The project manager collates the information and submits monthly reports to the project leaders and ZSL which are also used to monitor progress against the workplans. In this way the team remains fully aware of project goals and targets and can adjust workplans and timetables to ensure that the project outputs are met. We are particularly fortunate to be able to compare our progress (thus far very satisfactory) against the baseline provided by TCP, which successfully achieved a similar overall aim of national conservation action plans for all carnivore species.

Lessons learned are covered above, the key of which is that progress against survey targets is lower than anticipated due to the large amounts of data to be processed and entered after each survey. We are taking measures to address this by raising funds for a second survey team.

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

Our review is included in Annex 4 and our response is below (additional comments in italics):
We thank the reviewer for taking the time to produce such an in depth assessment of our project. Below we address the specific points raised:
- Project MOU: The signing of this was delayed due to a changeover in director, however it is now signed by both ZSL and TAWIRI (signed in November 2006).
- TAWIRI subunit: we felt we did explain how our survey unit functions as a subunit within TAWIRI in our submitted report, however clearly more explanation is needed – we will address this in our next report. *We hope we have achieved this here.*
- The historical database: This is an important point and one which we are addressing. We have amalgamated a more or less complete historical record of the scientific and grey literature on mammal distribution across the country, and we are entering this data into our database. This data entry is fitted around our other activities, with the overall aim of ensuring that all this data is entered by the time we enter the action planning process.
- The web site: The web site is designed and will go live the week starting 26th February 2007, and an email about the new site will be sent out to all contributors and stakeholders. There will be a link on the Institute of Zoology web site.
- Report delay: We will endeavour to ensure our next report is submitted on time. Previous causes of the delay were to do with finalising the accounts table, the Darwin secretariat has subsequently told us that the accounts table does not have to represent final closed accounts for that year. This will allow us to submit our reports in a more timely manner.
- Additional materials: The Tanzania Mammal Atlas Checksheet and the camera trapping protocol were both submitted with the report. Perhaps these were not forwarded to the reviewer. The mammal guide was not included because it was very large and too big to send by email.
- Time spent on site: Sarah Durant spend around 4-6 months per year in Tanzania, whilst Charles Foley is resident in Tanzania and so there is a substantial amount of project supervision.
- Mammals database: The database is largely sighting information and hence has the same format as most atlas databases of this type. It is not a particularly complex database and can be exported into different data formats. Addressing the needs of our local partner, TAWIRI, has been our first consideration in the design of the database, however project leaders have discussed with the relevant IUCN specialist groups about the format of the database. The database is the same format as the carnivore database and the cheetah database has been exported readily into the IUCN Cat SG database.
- Mikumi's Animal Behaviour Research Unit (ABRU): The project has been keen to establish links with all projects across Tanzania. We have certainly approached ABRU previously, and we will do so again.
- Project expenditure: The underspend was a carry over as we anticipate running for a full 3 years if we are to be able to achieve our objectives.
- Logical framework: In our monitoring and evaluation we mention 'The activities of the project are monitored against quarterly workplans drawn up at quarterly meetings attended by the entire

project team. These workplans are based on the logical framework in the original proposal.' We should have added that progress is also evaluated against the original logical framework.

- Delivery of training in GIS and remote sensing: Upon investigation there were no courses that addressed our needs, and we have instead worked with a local GIS expert to create a tailor made course. Because of the commitments of this expert we have had to delay this course but it will go ahead in April 2007.

6. Other comments on progress not covered elsewhere

Delayed Start

The start of the project was originally delayed by five months (from May 2005 to October 2005) due to unavoidable delays caused by a change in personnel at the Director General position in TAWIRI. Once the new Director General was officially appointed, the project and the MOU contract was officially endorsed by the TAWIRI board and the MOU was subsequently signed by the Director General (see Annex 5). The delay did not cause major disruption to our work program, except for minor delays to our survey work.

7. Sustainability

TMAP has benefited greatly from the activities and partner support generated by the TCP, a former Darwin Initiative project. TCP has finalized conservation action plans for all of the Carnivore species, which were very well received by our respective partner wildlife authorities in-county. The goals of TMAP are therefore well known to these institutions and we have benefited from their full support and cooperation.

TAWIRI, our main partner organisation, has shown its commitment to the project by having made four of the TMAP project staff permanent TAWIRI employees. TANAPA has also been extremely pleased with the results of the project to date, particularly the fact that TMAP is playing a pivotal role in developing comprehensive mammal species lists for all the National Parks, something that has thus far been sorely lacking. TANAPA is becoming increasingly involved with TMAP and has now requested all its park ecologists to use and contribute to the project database.

Several high level delegations have visited the Centre. These include the Permanent Secretary of the Ministry of Natural Resources and Tourism, Mr. Salehe Pamba who visited TMAP in November to familiarize himself with the Centres activities, and thirty five members of the national assembly comprising the Land, environment and Natural Resources Parliamentary committee who visited the Mammal Atlas Project in January to familiarize themselves with the our work. The results of our camera trap surveys have attracted a lot of attention and the finding of the Giant Pangolin was announced in parliament by the then Minister of Minister of Natural Resources and Tourism Hon. Antony Diallo last June. These visits and the publicity from the surveys have helped raise the profile of TMAP nationally.

It is envisaged that the survey program will become a core long-term activity of TAWIRI. We anticipate it functioning in a similar manner to CIMU, obtaining core costs from biodiversity surveys commissioned by wildlife management authorities.

On an international level, TMAP has been involved with an initiative developed by ZSL and WCS to devise a protocol for using camera trap techniques as a component of monitoring for the 2010 CBD biodiversity targets – the Wildlife Picture Index.TMAP expects to play a key role in this initiative, and aims to develop long term biodiversity monitoring sites within the country. To this aim the project leaders have submitted a pre-proposal to the JRS fund, and will be submitting a more scientific proposal to the Natural Environmental Research Council in 2007. Such funding will provide support for core scientific and survey staff to enable maintenance and hopefully an expansion of project activities.

8. Dissemination

The team has produced two copies of the TMAP newsletter detailing information on the project activities. 1000 copies of each newsletter were printed for dissemination to interested parties. These include all data contributors to TMAP as well as partner organisations and potential donor organisations. PDF copies of the newsletters are available for download on the project website. Information on interesting survey findings has been presented to our partner organisations as well as

the local media resulting in a mention being given in parliament of the Giant pangolin finding and an article in the Daily News newspaper on the 27th of November 2006.

9.   Project Expenditure

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

This project has conducted five in depth surveys for medium to large mammals, including 4 in areas never before surveyed systematically for these species, and 3 in areas which were largely or completely unknown. Our survey in Minziro Forest Reserve showed clear evidence of a population of tree pangolin, a species only once before documented in Tanzania, and not known to be currently resident in the country, as well as a second population of giant pangolin, which is known to occur at only one other site in Tanzania, as previously discovered by the project's survey last year in Mahale. This information will be used to help aid the conservation of an already much degraded reserve. The year also saw the launch of the project web site, which allows people to submit information about mammals they have seen in Tanzania on line, and provides distribution maps of all medium to large mammals in the country. This web site will help to engage the public and private sectors, and hence encourage further contributions of information to the project. Finally, the project is working with a new initiative, the Wildlife Picture Index at ZSL and WCS which will extend its impact into the international arena. This initiative aims to use camera trap survey techniques as a tool for monitoring biodiversity at an international level to measure progress towards CBD 2010 targets.

I agree for ECTF and the Darwin Secretariat to publish the content of this section (*please leave this line in to indicate your agreement to use any material you provide here*)
In this section you have the chance to let us know about outstanding achievements of your project over the year that you consider worth highlighting to ECTF and the Darwin Secretariat. This could relate to achievements already mentioned in this report, on which you would like to expand further, or achievements that were in addition to the ones planned and deserve particular attention eg in terms of best practice. We may use material from this section for various promotion and dissemination purposes, including e.g. publication in the Defra Annual Report, Darwin promotion material, or on the Darwin website. As we will not always be able to ask projects on an individual basis for their consent to publish the content of this section, please note the above agreement clause.

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

Project summary	Measurable Indicators	Progress and Achievements April 2006 - March 2007	Actions required/planned for next period
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve* *The conservation of biological diversity,* *The sustainable use of its components, and* *The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*		The project has made good progress in data collection that will form the basis of a national conservation action plan for all medium to large mammals in Tanzania. This plan will set out priorities for conservation of each species, which, if implemented will enable their conservation.	*(do not fill not applicable)*
Purpose To develop a national monitoring system of large mammals that addresses current geographic and taxonomic data gaps, in order to produce a detailed distributional atlas and conservation action plan for large mammals in Tanzania.	Mammal monitoring system, which addresses current data deficiencies, in place by 2008. Distribution atlas of large mammals developed by 2008. Increased skills in mammal monitoring for TAWIRI staff through creation of a new monitoring unit. Conservation action plan published by 2008.	A functioning monitoring system has been established which targets geographic and taxonomic data gaps. We have a fully trained camera trap survey team, a large list of data contributors, and a sophisticated database with over 12,000 entries of large mammal distribution. There are still taxonomic and regional data deficiencies that we plan to address through targeted surveys and interviews with a second survey team.	1) Train a second survey team 2) Conduct 9 camera trap surveys across the country 3) Initiate species action plan workshops 4) Start drafting the first chapters of the Tanzanian medium to large mammal conservation action plan 5) Increase and maintain the national database on medium to large mammals. 6) Maintain and update project web site and produce two newsletters to provide feedback and encourage data contributors to supply more information.
Output 1 Sub-unit of TAWIRI developed to monitor large mammals in data deficient areas using standardised	3 new staff trained as implementers and existing TAWIRI staff trained as trainers in mammal monitoring by early 2006. Further data contributors identified and	Three project staff have been trained in camera trap survey techniques including data collection and analysis. Database officer trained in database management, data entry and data analysis, and GIS use. 206 data contributors currently identified and submitting data. There are still data deficiencies in the south and west of the country and we are actively recruiting	

methods.	submitting sufficient mammal sightings regularly to ensure wide coverage of the country.	contributors in these areas.
		6 camera trap surveys completed to date. A second team being added will help reach target of 15 by next year.
	Mammal distribution data acquired for at least 15 target areas using remote camera traps	Survey protocol manual completed during last reporting period.
	Manual of survey protocols produced.	
Activity 1.1 Camera Trap Surveys and Field Interviews		Five surveys completed this year, in addition to the single survey of last year. With the introduction of the new TCC survey team, we fully expect to meet our overall goal of 15 camera trapping surveys by the end of the project.
Activity 1.2 Developing and identifying data contributor network		The network of data contributors is well established and we hope with the creation of online data submission via our website that more data will be submitted. We will continue to encourage data contributions through our website, visits and presentations and request specific data from organisations or individuals who have data of interest or who have contributed in the past.
Activity 1.3 Website development		Website is online at www.tanzaniamammals.org. The website will be maintained by project staff with distribution maps updated monthly or news articles updates as necessary.
Activity 1.3 Newsletter production		Two editions of the bi-annual "Mammal Newsbites" have been produced (October 2006 and March 2007). Two more editions will be produced in October 2007 and March 2008.
Activity 1.4 Training		In addition to the database and GIS training outlined in activity 2.1 and 2.3, representatives of several research organisations and students have been trained in the camera trapping protocol to extend national coverage.
Output 2 Centralised database of mammal distribution and status that integrates historical records, and in formation from CIMU, TCC and proposed project.	Centralised database of mammal distribution on file at TAWIRI. Library of historical data established and both hard and electronic filed copies at TAWIRI. Distribution atlas for targeted mammal species	A mammal distribution database that is fully compatible with CIMU and TCP has been developed with 12,000 entries and distributions maps of 87 target species. A library of papers related to mammal distribution – both digital and hard copy – has been started and we continue to add to it.
Activity 2.1. Database development		New, fully revamped database developed with the assistance of a database expert. Data entry will continue in the coming year in the lead up to drafting the Conservation Action Plans.

Activity 2.2. Data extraction from databases and published and unpublished papers		Integration with TAWIRI CIMU database fully functional and data being gradually transferred between departments. More CIMU aerial survey data will be integrated into the TMAP database in the coming year.
		Published and unpublished references continue to be collected when sourced. This will be ongoing through the year.
		Identification and appointment of a volunteer to extract data from literature to ensure that this important activity is kept on track.
Activity 2.3. GIS analysis and training		A 2-week, one-on-one training in Advanced GIS in April 2007. Map production and GIS analysis will continue next year, with a focus on using the newly developed Tanzanian Human Footprint in the drafting of the Conservation Action Plans.
Output 3 Conservation Action Plan for Tanzania's mammals developed to identify conservation priorities for each species and establish areas of data deficiency.	Action Plan supported and endorsed by governmental wildlife agencies and NGOs in Tanzania.	This activity will start in the coming year in the form of the initiation of the first of a series of workshops which will be held to draft conservation action plans for specific taxa groups. The draft conservation action plan will be completed at the end of the project.
Activity 4.1. Host a series of workshops to develop Conservation Action Plans for key species and groups of species (ie. Elephant, rhino, antelopes, primates)		This activity will occur in the coming year and be reported in the next reporting period.
Activity 4.2. Compile the individual species-specific Conservation Action Plans into a National Action Plan for Mammals of Tanzania, with the support and endorsement from relevant government wildlife agencies.		This activity will occur in the coming year and be reported in the next reporting period.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve* • *the conservation of biological diversity,* • *the sustainable use of its components, and* • *the fair and equitable sharing of benefits arising out of the utilisation of genetic resources*			
Purpose			
To develop a national monitoring system of large mammals that addresses current geographic and taxonomic data gaps, in order to produce a detailed distributional atlas and conservation action plan for large mammals in Tanzania.	Mammal monitoring system, which addresses current data deficiencies, in place by 2008. Distribution atlas of large mammals developed by 2008. Increased skills in mammal monitoring for TAWIRI staff through creation of a new monitoring unit. Conservation action plan published by 2008.	Reports summarising database and a manual covering monitoring protocols. Distribution maps published and disseminated through the web TAWIRI team conducting surveys independently as part of their annual workplan. Conservation Action Plan published by target date.	TAWIRI remains supportive and committed to the project. Key stakeholders endorse Conservation Action Plan.
Outputs			
Sub-unit of TAWIRI developed to monitor large mammals in data deficient areas using standardised methods.	3 new staff and existing TAWIRI staff trained as trainers in mammal monitoring by early 2006. Data contributors identified and submitting sufficient mammal sightings regularly to ensure wide coverage of the country. Mammal distribution data acquired for at least 15 target areas using remote camera traps Manual of survey protocols produced.	Training report submitted and attendees have proven aptitude in survey methods.* Contributor contact list and correspondence on file at TAWIRI HQ. Interview forms and reports from each survey filed and submitted to project library. Copies of survey manual available at TAWIRI HQ.	Network of data contributors keen and willing to send in data. Data can be collected from all parts of the country. Key stakeholders support data collection activities.

Centralised database of mammal distribution and status that integrates historical records, and in formation from CIMU, TCC and proposed project.	Centralised database of mammal distribution on file at TAWIRI. Library of historical data established and both hard and electronic filed copies at TAWIRI. Distribution atlas for targeted mammal species	Database accessible to authorised personnel at HQ. Library available for viewing by authorised personnel. Copies to be sent on CD to Darwin and key stakeholders. Atlas distributed to all stakeholders in hardcopy or electronic form and published on the web.	Data contributors prepared to supply data
Conservation Action Plan for Tanzania's mammals developed to identify conservation priorities for each species and establish areas of data deficiency.	Action Plan supported and endorsed by governmental wildlife agencies and NGOs in Tanzania.	Action Plan published and distributed to all stakeholders. Letters of endorsement by government and relevant authorities. Copies to be sent to Darwin Initiative.	Sufficient data exists to produce meaningful plan. Sufficient buy in from all stakeholders to ensure endorsement of plan.