A National Plan for Mammal Conservation in Tanzania

FIRST ANNUAL PROGRESS REPORT

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Zoological Society of London

In collaboration with

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funded by

The Darwin Initiative for the Survival of Species

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
ITC	International Institute for Geoinformation Science and Earth Observation
TANAPA	Tanzania National Parks
TAWIRI	Tanzania Wildlife Research Institute
TCC	Tanzania Carnivore Centre
TCP	Tanzania Carnivore Programme
TDI	Turbo Direct Injection
TMAP	Tanzania Mammal Atlas Project
US	United States
VAT	Value Added Tax
WCS	Wildlife Conservation Society

Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project title	A national plan for mammal conservation in Tanzania
Country (ies)	Tanzania
Contractor	Institute of Zoology, Zoological Society of London
Project Reference No.	162/14/055
Grant Value	£ 214,051
Start/Finishing dates	Oct 2005 – Dec 2008
Reporting period	Oct 2005 – Mar 2006 (the first six months)

2. Project Background

Tanzania is a country rich in biological resources, the importance of which is well recognised within the country. 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 conservation of its wilderness areas are increasingly seen as a component of the path to development, because of their increasing economic importance due to tourism to these areas. For several years, tourism has ranked as second to agriculture as the most important contributor to the GDP.

Despite its biological riches, Tanzania remains one of the poorest countries in the world. In 2005 the country's GNI ranked 19th lowest through the atlas method and 5th lowest by Purchasing Power Parity (World Bank World Development Indices). Tanzania has a population of around 35 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 is developing at an annual growth rate of around 6.8% 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, 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.

3. Project Objectives

This project aims to help Tanzania meet its obligations under the Biodiversity Convention by developing a national conservation action plan for its mammal species. In order to do this it will strengthen national institutions and increase capacity to monitor and conserve mammal biodiversity by a) developing capacity to monitor mammal distribution and status in areas where little information is available; b) establishing protocols to monitor small and cryptic species, c) collating all existing information to develop a centralised database of distribution, status and, where possible, abundance, for all mammals (excluding rodents, bats, insectivores, and marine mammals). These steps will generate sufficient data to establish an action plan that will be used as a framework to guide future conservation management and policy. The project thus helps Tanzania fulfil its obligations under articles, 7, 8, 10, 11, 12, 13 and 16 of the Biodiversity Convention.

The start of the project, originally scheduled for May 2005, was delayed for five months because of administrative delays in getting the MOU contract signed and obtaining board approval for the project. The delays were primarily caused by an unforeseen change in the senior management of TAWIRI, with the previous Director General, Dr. Charles Mlingwa leaving the post to run for parliamentary elections, prior to signing the MOU contract. An interim Acting Director General, Dr Simon Mduma, was appointed to head the department until a permanent replacement is selected later this year. The MOU is still awaiting endorsement by the TAWIRI management and the board of directors, though in a meeting with the new administration in October 2005 it was agreed that the project should proceed, and that the remaining administrative issues would be tackled at a later date. The project has been able to build on the existing good relationships established by the Tanzania Carnivore Program (TCP) with all the major wildlife authorities in Tanzania, which have provided it with strong national support from its inception. Hence we do not foresee this delay in formal endorsement of the project as presenting a significant problem. Despite the delays we have been able to implement many of our first year objectives, and the project is not far behind its original timetable.

Our main aims for the reporting period were as follows:

i. Interview and employ new project staff (Nov-2005)
ii. Purchase new equipment both for the office and for field work.
iii. Establish a Mammal Atlas Database
iv. Initiate field surveys
v. Train staff in GIS use, database management, and camera trapping survey techniques
vi. Develop a digital library of papers relevant to mammal distribution in Tanzania
vii. Media
viii. Other activities

4. Progress

4.1 Interview and employ staff for the Project

In a meeting with TAWIRI management it was decided that, where appropriate, staff of the successful Darwin Initiative supported TCP would be hired to fill positions in TMAP. This was a logical step since TCP staff had received extensive training during the course of the project, much of which would be pertinent to TMAP, and because they had already shown themselves to be highly motivated and capable individuals. In the light of this, Mr Alex Lobora, the former TCP GIS and Database Analyst, was promoted to fill position of project manager, a post which he had previously filled very capably for short periods in an acting capacity. Mr. Lobora has a Masters of Science Degree in Natural Resources Management with the Application of GIS and Remote Sensing from the International Institute for Geoinformation Science and Earth Observation (ITC) in the Netherlands. Chediel Kazaeli, who has a Wildlife Diploma from Mweka Institute of Wildlife Management and who was initially working with TCP on a contract basis to carry out camera trapping surveys, was hired to work as an assistant field officer. Flora Gerson Kipuyo and Zawadi Mbwambo were both also retained from TCP to act as project secretary and driver respectively. Maurus Msuha, the previous project manager to the TCP, is currently undertaking a PhD program in conservation biology at ZSL and UCL in London.

Two posts, namely that of Field Coordinator and GIS and Database specialist could not be filled internally, and candidates were sought through advertisements placed in two local newspapers, in adherence to employment regulations at Tanzanian Government institutions. Over a hundred applications were received for the two posts, of which ten were shortlisted, five for each position. Interviews took place in November 2006 before an eight person panel comprised of senior TAWIRI staff, the TMAP project PI's and two external GIS experts. Two candidates, Edwin Konzo and Mwemezi Rwiza were unanimously selected to fill the posts of Database and Communication's officer and Field Coordinator respectively. Edwin has a BA degree in education from the University of Dar es Salaam and has extensive GIS knowledge gained through his work with a DFID funded project in Mbeya Region. Mwemezi obtained a BSc. in Wildlife Management from Sokoine University, after which he worked as a field officer for 2 years with the Serengeti Disease project. The two new staff joined the project in January 2006, and the project has also employed a gardener to look after the centre grounds, bringing the total number of staff to seven. Finally, the project benefits from the presence of an additional driver employed through the Tanzania Cheetah Conservation Programme, Jumanne Ramadhani. This is particularly useful as Zawadi is becoming increasingly active as a field assistant and hence is often away from the office. Jumanne assists with project logistics for TMAP.

Fig. 1 Project staff working at their offices at the Carnivore Centre at TAWIRI. From upper left: Alexander Lobora, Mwemezi Rwiza, Flora Kipuyo, Edwin Konzo, Chediel Kazaeli, Zawadi Mbwambo and Ishmael the project gardener

4.2 Equipment purchase

The new project is housed at the Carnivore Centre offices at TAWIRI that were built by the Tanzania Carnivore Programme, and has made use of much of the equipment purchased for that original project. New purchases include two new computers for project staff, namely a desktop for the Field Coordinator and laptop for the Project Manager, and a high quality scanner for scanning in camera trap pictures. All computers are wired into an independent ethernet network at the Carnivore Centre, allowing fast and efficient email and internet access, and also providing a much needed facility for visiting scientists in Arusha. During January through March there were extensive, nationwide power cuts caused by a prolonged drought that affected the country's hydro-electric power output. This forced us to purchase a small petrol generator, which has the capacity to run all the lights and computers in the office, and allowed project activities to continue unhindered.

A Landrover TDI station wagon has been purchased and is being shipped with a consignment ordered through Frankfurt Zoological Society, who are very kindly arranging a waiver of the import duty and VAT on the vehicle. The vehicle was budgeted in the original Tanzania Mammal Atlas Project grant, however the budget did not include import duty, hence the agreement with FZS and the resultant delay in acquiring the vehicle. The project is currently using TCP's Toyota pickup, originally purchased second hand in January 2003, and which was recently repaired following major engine problems. It was also loaned two project landrovers from the Tanzania Cheetah Conservation Program over the reporting period which have been a considerable help with field surveys. We are now seeking to purchase larger rims and tyres for the pickup to make it more bush worthy, which means that it can also serve as a back-up field vehicle for occasions when the new Landrover is not available. A large amount of camping equipment was needed for the field survey work most of which has now been purchased. This includes large rucksacks, tents, sleeping gear, cooking gear, torches, waterproof clothing, footwear and binoculars.

Fig. 2 The Carnivore Centre office at TAWIRI in Aruhsa, where the project is based.

Fig. 3 Some of the new field equipment at the Carnivore Centre, packed and ready for a camera trapping survey.

4.3 Establishing a Mammal Atlas Database

Database development

An important aim of TMAP is to develop a Database that will be compatible with the main Database at CIMU, the TAWIRI department responsible for monitoring the populations of large ungulates in the National Parks and Game Reserves, so as to allow easy data transfer between the two departments. The old TCP template was built in Access; and has been expanded as a stop-gap measure to accommodate all the new species of mammals, but will soon be converted to a server driven Database using MYSQL programming language. A server to host the Database was donated to TMAP by Rangvald Larsen from the University of Norway and a team of experts formed to design a new integrated Database. The team is composed of Ragnvald Larsen, a Database expert from the University of Norway, Lara Foley of Tarangire Elephant Project (TEP), a GIS expert who also helped design the original TCP Database, Machoke Mwita, the CIMU Database manager and Edwin Konzo and Alexander Lobora from TMAP. Once the new Database has been completed it will host all the new sighting records from TMAP, while all of the data from TCP, past camera trapping surveys, and from reports and publications, will be uploaded into the new system.

Contributor information sheets

Information packets introducing the new project and contributor collection protocols have been developed over the reporting period and will be used by our contributors to send in data on mammal sightings across the country. Two templates have been produced: one aimed at collecting purely presence/absence data, provides a complete species list and requests information on whether the species has been seen in a particular grid square over the course of a year, while the other is a more comprehensive data sheet requesting GPS location data, numbers of individuals and habitat type (Appendix II). Digital copies have been sent out to all of our online contributors, and 1000 hard copies have been printed and are ready for circulation.

Mammal identification guide

We are currently finalising production of a mammal identification guide that will be used during our interviews with local villagers, and distributed to data contributors. Proper identification of mammal species is a real problem for many of our current and potential contributors, who often have little access to accurate field guides, and this consequently affects the reliability of their sightings. Many of the National Park staff, for instance, are unable to distinguish common species of antelope for lack of an identification manual. The new guide includes pictures and descriptions of each mammal species collected from project collaborators and from the web, and scaled against an average human male for large species, or a human hand for smaller species (see Fig 4). Once printed, the guide will be used by project personnel during interviews with local people to assess the presence of mammal species in their area, and copies will be made available to project collaborators such as TANAPA and other data contributors to help improve the natural history skills of their personnel.

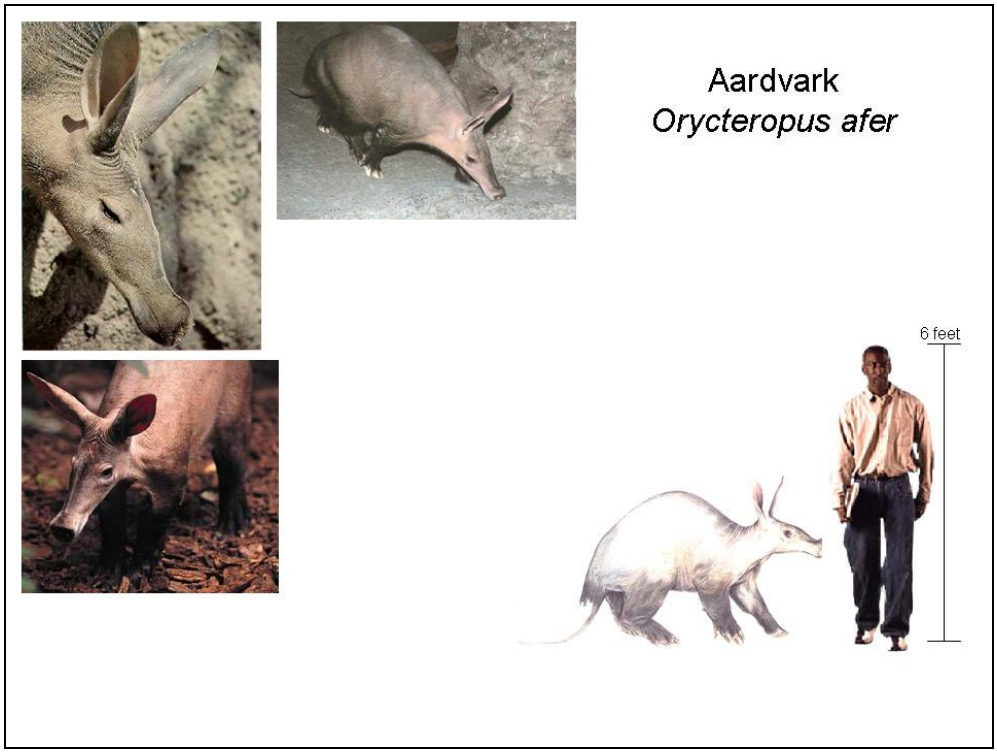

Fig 4 Mammal identification sheet for Aardvark

Field questionnaires

We expect to augment data collected from camera traps by interviewing local villagers and hunters about the mammal diversity in their area. A pilot field questionnaire has been drawn up by the TMAP team, with a focus on obtaining information on mammal distribution and abundance, the threats to wildlife and any local uses for different species. The pilot questionnaire has been sent to Professor Katherine Homewood from the University of London, for advice and comment on the questionnaire design, and will then be printed for use on our imminent survey in Minziro Forest in August.

4.4 Surveys

Camera trapping surveys combined with interviews of local people in the survey area will provide our main source of data for the project. Thus far, two camera trapping surveys have been conducted, one in Mahale Mountains National Park in the far west of the country from October to December 2005, and another in Arusha National Park in the north, which was completed in May 2006. The gap in surveys in January-February was due to the arrival of new project staff who needed training prior to field work. Our surveys benefited from the good relationship with the wildlife authorities established during TCP. TANAPA and the Forestry and Beekeeping Division granted the project team permits for most of the major national parks and all of the forest reserves for 2006. Such comprehensive permits are rarely granted and are a testament to the strong partnerships, originally established during the TCP.

The Mahale survey was conducted in partnership with a team from WCS, led by David Moyer, that was carrying out a broad biodiversity survey of the park. This enabled the two teams to share logistical support and reduce overhead costs, which were significant as Mahale National Park is one of Tanzania's remotest parks, lying on the eastern shores of Lake

Tanganyika. The park was particularly interesting to us because it is a Congolese forest remnant and many parts of the park had been poorly surveyed. The logistics of working in these isolated areas is considerable and Chediel Kazaeli and Zawadi Mbwambo took three days to get to the site using a combination of vehicles, trains and boats. The team spent two months in the park, where they used a random trapping protocol to survey three different habitat types; thick forest, a mixed forest-grassland site, and a montane site dominated by bamboo. A total of 659 mammal sightings representing 24 mammal species were recorded during the study. Many interesting species were recorded including Bushy tailed porcupine (Atherurus africanus), a Congolese forest species seldom recorded in Tanzania, Cape clawless otter (Aonyx capensis), a new species for the park, and Aardvark (Oryxteropus afer). However the most exciting finding was of Giant pangolin (Smutsia gigantea), the first confirmed record of this species for Tanzania (Fig. 5). We had seven records of this species and the high trapping frequency suggests that they are relatively common in the area, suggesting that Mahale may prove to be one of their conservation strongholds in Africa.

Fig. 5 First authenticated record of Giant Pangolin in Tanzania

The Arusha National Park survey served as a hands-on training session as well as a biodiversity survey for our new staff. The survey was initiated in March 2006 with training provided by Dr Marcella Kelly from Virginia Tech University. TANAPA provided park rangers to facilitate the survey and who also received training in the technique. A total of 40 cameras were set up in pairs on a grid system that will allow us to determine densities of spotted cats in the park. The results of this survey are now being analysed.

Four more surveys are planned for 2006, that will be covered in the current reporting period, including one in the northern Serengeti, Minziro forest in the north west of the country, the Tanga coastal area, and Ruaha National Park. Because of the logistical difficulties involved in accessing and surveying different parts of the country, we are experimenting with training local researchers and park ecologists in camera trapping techniques and providing them with equipment which they can then use at their field sites. This way we hope to extend our area of coverage while at the same time training and enthusing local wildlife managers and researchers in useful field techniques. Many groups have expressed interest in using traps, however we are limited by the number of traps that we have available. To date traps have been loaned to researchers working in Amani forest in the Usambara mountains, and a team monitoring a wild dog denning site in the Serengeti ecosystem; more collaborative partnerships are being considered, and we are exploring funding options for more camera traps.

Fig.6 Camera trapping survey team at Arusha National Park which started in Mid March 2006

4.5 Develop a digital library of papers relevant to mammal distribution in Tanzania

A main aim of TMAP is to establish a library, both digital and hardcopy, of papers relating to mammal status, distribution and abundance in Tanzania that will be easily accessible to students and scientists stationed at TAWIRI. Linus Munishi, a recent graduate from Sokoine University with a Bsc in Wildlife Management, was contracted to carry out this work. He gathered data using a variety of methods, including visits to libraries at various institutions in East Africa, accessing websites and contacting scientists and conservation practitioners directly. During a four month period he visited the TAWIRI and TANAPA libraries in Arusha, the College of African Wildlife Mangement at Mweka, the Public library at the University of Dar es Salaam, the Department of Zoology at the University of Dar es Salaam, libraries at the head offices of GTZ and WWF in Dar es Salaam and at Nature Kenya and the National Museum of Kenya. At each location he carefully sorted through the available material and then photocopied all relevant information, or, when this was not possible, he noted the reference so the document could be obtained from other sources.

During this exercise Linus collected a total of 350 documents including published papers, unpublished manuscripts, internal project reports and Phd and Msc thesis, among which were some extremely valuable references from the grey literature showing distributions of mammals in Tanzania from the 1960's. Of these documents 62 were already in digital format and the remaining 288 were photocopied. A Tanzania Mammal Archive has now been developed with a reference list of all available literature, and each document has been coded to facilitate retrieval. A specially designed library cabinet has been installed in the reception area to house hard copies of all the documents (and documents on carnivores previously collected by TCP), which visiting students and scientists will be able to sign out to read on the premises. The photocopied documents are currently in the process of being scanned (118 have been completed to date), so that ultimately all documents will be available digitally.

Data extraction

We carefully sifted through all archived documents and extracted information on mammal distribution, density and status, for inclusion in a 'historical' dataset. We also recorded details of the original methods of data collection, the source of the information and the year of publication. In cases where the exact grid square could not be determined, the general location was recorded – for instance 'Tarangire National Park' or 'Pangani district'. This new

dataset has a total of 6011 sighting records for 123 mammal species stretching back to the 1950's, and provides an extremely valuable historical account of species distribution that will be used for comparison purposes with the new database. The data is currently held in excel but will ultimately be merged with the TCP and CIMU databases.

4.6 Training

GIS and data modelling

Alex Lobora was awarded a place on an advanced training course in GIS for Wildlife Management hosted by WCS in New York from the 17th to the 28th of October, 2005. The course taught participants how to use ArcGIS, which is rapidly becoming the software of choice among GIS practitioners, and provided training in raster analysis. Alex was also shown how to use and apply a modelling software called GARP (Genetic Algorithm for Rule Set Production), which is unique in that it allows users to model the distribution of species using only presence data (most other models also require absence data which is very difficult to obtain). Alex used GARP to predict the distribution of cheetahs and wild dogs in sub Saharan Africa using information on suitable habitat analysis from the Tanzania dataset, and found an good fit with actual distribution, particularly for the cheetah data. Much of the information collected for the TMAP database will only provide presence data, so this technique will prove particularly useful when we come to analyse species distribution range in Tanzania. On his way back from New York Alex stopped off for a week in London where he visited ZSL, meeting with ZSL personnel and exploring possible future collaborations and initiatives between ZSL and TAWIRI.

Camera trapping methodology and data analysis

In February 2005 TMAP welcomed Dr. Marcella Kelly from the University of Virginia Tech who spent four weeks training TMAP field personnel in camera trapping techniques. Marcella has used camera traps extensively for her research on jaguars in Central America and had previously spent 6 weeks training TCP team members in camera trap protocols. The aim of her visit was to provide refresher and new training for TMAP personnel to a) develop and implement a camera trapping survey in the field, b) properly catalogue camera trap photographs in a database, c) analyse data to obtain density figures, and d) produce a camera trapping protocol document detailing all aspects of the method. Approximately half of the time was spent with the field personnel on database issues, learning how to properly extract data from photographs (both from a random sample and a grid system), and to categorise and enter data into a database. Project staff then learned how to use Capture-Recapture software to determine densities of individually recognisable species, using data of leopard captures collected during a TCP survey of Tarangire National Park, and produced the first ever estimate of leopard densities using the method in a savanna ecosystem. The final week was spent setting up camera traps on a grid system in Arusha National Park and refining field survey techniques. At the conclusion of the trip a field manual outlining and explaining camera trap survey techniques and protocols was produced for use by TMAP staff (see appendix III).

4.5 Media

At this stage of the project we have not yet had any major interactions with the local media. We have however been approached to submit articles on TMAP to local conservation

magazines including Miombo, the magazine of the Wildlife Conservation Society of Tanzania, and will be submitting an article to them in the near future.

4.6 Other activities

Contribution of external advisors to the project team over the reporting period

Marcella Kelly, Virginia Tech, USA
Provided training to project staff in camera trap surveys, including survey methodology, survey design and implementation, and data analysis. Participated in the field survey of Arusha National Park, and produced a manual detailing all aspects of camera trapping protocol for TMAP staff.

David Moyer, WCS Iringa office, Tanzania
Assistance with survey logistics in Mahale National Park, where the two teams shared camps and porters.

Lara Foley, Tarangire Elephant Project, WCS, Tanzania
Assistance with candidate interviews and project planning and implementation. Appointed to the steering committee to spearhead the establishment of a new TMAP Database. Works closely with the database manager providing specific guidance and training in GIS.

Rangvald Larsen, University of Norway, Norway

Assistance with candidate interviews. Appointed as member of the steering committee to spearhead the establishment of a new TMAP Database. Provided TMAP with Database server.

4.7 Significant difficulties and modifications of planned progress

We have described above how administrative problems led to a six month delay in the start of the project. Since then activities have proceeded much as originally anticipated. However there was one major change which had to be introduced due to a lack of further funding for the TCP. The lack of funding meant that salaries that were to be covered by TCP needed to be covered by TMAP, so that our trained staff were not lost to other projects during the interval. The finances to cover these unforseen costs became available after we decided to cancel the inception workshop that was to be held with relevant partners to introduce TMAP and encourage participation in data collection. This step was taken following consultation with several of our key partners who suggested that most relevant groups were already familiar with the work of TCP and, given that the format for TMAP was very similar, participants could more practically be updated through email and newsletters. We instead announced the launch of the new project to participants at the three TCP Carnivore Action Plan workshops and at the TAWIRI Annual Workshop held in Arusha in early December, which was attended by over 150 researchers from around the country. We have also sent an introductory letter describing the aims of TMAP to all people on our contact list, and are confident that the new project will garner as much support as TCP.

There has been a substantial delay in purchasing the new project vehicle, a Tdi Landrover. The vehicle, which is coming from the UK, is one of a batch of vehicles imported by the Frankfurt Zoological Society, and we had to wait until the order for all the vehicles was ready. The purchase and importation process is always lengthy and we are now expecting the vehicle to be released in July. This means that we have had to either depend on vehicles loaned from

other projects or the unreliable TCP Toyota Hilux for several of our field surveys, which has caused some difficulties as the low ground clearance and inappropriate tyres makes off-road driving difficult. We hope to improve its off-road capacity by adding larger tyres, but until the new vehicle is cleared our field activities will continue to be somewhat restricted.

The delay in the start of the project led to us underspending our budget by £7000 this financial year. The Darwin Initiative has been notified of this issue and provisions made to carry over the sum to future years and to extend the end date of the project into 2009 to compensate for the time lost.

Timetable (workplan) for the next reporting period

Timetable	Activities
Jun 06	First quarterly newsletter produced; subsequent publications will be an ongoing activity.
Jun 06	Third field survey in Northern Serengeti
Jul 06	Print mammal identification guide booklet
Jul 06	Initiate advanced training in website design and management and desktop publishing
Jul 06	Develop and publish project website (Updating the site will be an ongoing activity).
Aug 06	Finalise development of new CIMU database with steering group
Aug 06	Fourth field survey in Minziro forest
Sep 06	Data entry – this will be an ongoing activity
Oct 06	Annual meeting to review progress and select sites for coming year.
Oct 06	Advanced GIS and Remote Sensing training (3 weeks)
Nov 05	Fifth field survey in northern Tanga coast
Jan 07	Sixth field survey in Ruaha National Park
Mar 07	Ongoing field surveys – sites to be decided

5. Partnerships

A number of collaborations and partnerships have been encouraged:

Collaboration with existing projects in Tanzania

WCS Tanzania Program: Project leaders and the project manager are in regular contact with the representative for WCS Tanzania, who have been extremely supportive of the project, and have been involved at all levels of the project's activities. Lara Foley, a member of WCS Tanzania field staff, is providing considerable GIS assistance to the project. David Moyer, the WCS pilot, has collaborated on logistics and support with the project during the survey of Mahale National Park, while Dr Tim Davenport and Dr Daniela de Luca have sent in excellent summary data from their field sites in southern Tanzania.

Tanzania National Parks: The project relies on the support of TANAPA for its success. TANAPA have been extremely supportive of the new project and have promised to assist in the distribution of checksheets to its Ecologists and park rangers. TANAPA has also been

extremely helpful by giving the project free entry permits to all National parks to undertake camera trapping surveys. TMAP will seek to assist TANAPA by developing a large mammal monitoring protocol for inclusion in the TANAPA Ecology Department handbook, and by producing an identification manual of large mammals that can be used by rangers as a reference guide.

Tanzania Department of Forestry and Beekeeping: Many of the camera trap surveys will be carried out in forest reserves or forested areas around the country. These fall under the jurisdiction of the Forest and Beekeeping Department, which has been extremely supportive by providing a permit for project personnel to visit all forests in the country and the assistance of all local forestry officials.

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 nightly transects in the Serengeti and have offered to share relevant data with TMAP.

Tanzania Wildlife Research Institute (TAWIRI): TAWIRI is the main partner for this project, and the project falls directly under TAWIRI. The project is intimately 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. All members of TAWIRI have been extremely supportive of the project. Three of the project staff who were appointed under the TCP were appointed as permanent TAWIRI employees at the beginning of 2005, whilst the other three are on TAWIRI short term contracts. Machoke Mwita the CIMU Database manager and Rangvald Larsen a CIMU consultant will be integrally involved with the development and supervision of the TMAP Database.

Tanzania Carnivore Program (TCP): This program was established in 2002 by a similar Darwin initiative grant. Whilst it has had problems in securing long term funding, and its staff have been transferred to TMAP, TMAP is still acquiring data relevant to the program, and TCP has secured a limited amount of funding to ensure that it can continue to operate as a separate entity, including a grant of £10,000 from ZSL linked to their lions of the Serengeti exhibit established at Whipsnade, $10,000 from WCS from July 2006, and $5,000 for wild dog work, also from WCS.

Tanzania Cheetah Conservation Program: This program evolved from the Serengeti Cheetah Project, and is headed by one of the PIs on TMAP (Sarah Durant). The program hence 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. They are both providing important data to TMAP.

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

Tarangire Elephant Project: This is a WCS project that has been operating in Tarangire for 13 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.

Other: 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 mammals research or conservation is kept informed of the project's activities and has access to the project's facilities. 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 Project, the Katavi Research Project, the Gombe Research Project and the Mahale Mountains Research Project.

Collaboration with existing 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 are currently helping with the importation and clearance of the project vehicle

WCS International: WCS international have been very supportive of this project from its inception. In January 2006, WCS invited the project manager to a priority setting workshop for lions held in South Africa which produced a Conservation Strategy for the lion in Eastern and Southern Africa.

6. Impact and Sustainability

Whilst it has only been in place for a few months, this project in itself is testament to the impact of a previous Darwin Project, the TCP, and has drawn on and extended the impacts of this successful project. The specific impacts of this project are indicated in Table 1. Key among these was finding and hiring project staff, providing the continuation and expansion of the vibrant office atmosphere that was evident during TCP. The field surveys have also been very successful, with a new species added to the Tanzania mammal list in our very first outing. This finding has helped advertise our work and highlighted the potential of TMAP to our partner organisations.

It is envisaged that the survey program developed under TCP and further expanded under TMAP will become a core long term activity of TAWIRI. In this respect it could function similar to CIMU, obtaining core costs from biodiversity surveys commissioned by wildlife management authorities. On an international level, there has been an increasing interest in the use of camera trap techniques as a tool for monitoring for the 2010 CBD biodiversity targets.

TAWIRI has already expressed its commitment to TCP and this project by covering the core salaries of the three permanent staff, as well as Maurus Msuha, when he finishes his PhD. However, in the medium term, TAWIRI are unlikely to be able to fully support the expertise and personnel developed through TCP and TMAP, and will depend on some external support. Small amounts of such support have already been achieved, through a grant from WCS summing $15,000 and through a one off payment by ZSL of £10,000. Proposals for larger donations from ZSL and St. Louis Zoo are being developed, as both organisations have expressed an interest in the project and are keen to find more long term support for the program. Lasting legacies of short term projects can only be realised if they can evolve into long term initiatives, when they are able to benefit fully from the mutual trust and respect

developed between individuals and institutions. This project provides one mechanism by which this can be achieved.

7. Post Project Follow up activities

NA

8. Outputs, Outcomes and Dissemination

Table 1. Project Outputs (According to Standard Output Measures)

PROJECT OUTPUTS		
Code No	***Quantity***	***Description***
5	10	Applicants short listed and interviewed for two posts of Field officer and Database and Communications officer
5	7	A project manager, a field officer, database officer, field assistant, secretary and a driver employed by the project
6A, 6B	3	Project staff trained in camera tracking field operation and data analysis.
6A, 6B	1	Project manager trained in advanced GIS and modelling software
7	1	Camera trapping protocol manual developed
7	1000	Checksheets for mammal distribution database printed and distributed.
20	3	A desktop computer, a laptop computer and a slide scanner purchased
20	97	Fieldwork equipment purchased

Table 2: Publications

Type * (e.g. journals, manual, CDs)	***Detail (title, author, year)***	***Publishers (name, city)***	***Available from (e.g. contact address, website)***	***Cost £***
Leaflet	Mammal Atlas checklist	Arusha Printing Press, Arusha	Carnivores@habari.co.tz	free

8.2 Dissemination activities

At this early stage in the project we have concentrated on producing and disseminating the mammal atlas checksheets, which have been distributed to all our on-line contributors by email, and 1000 copies have been printed to distribute by hand.

9. Project Expenditure

10. 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. The project manager submits monthly reports to the project leaders and ZSL in order to monitor progress against the workplans. Because the project manager has previous experience on TCP, the incorporation of this monitoring and evaluation strategy into this project was straightforward. Over the coming year the project will be monitored and evaluated by the main beneficiary, TAWIRI, who will be asked to write a report by March 2007.

11. Author(s) / Date

Dr. Charles Foley	May 2006
Dr. Sarah Durant	May 2006
Mr. Alexander Lobora	May 2006
Dr. Simon Mduma	May 2006

Appendix 1

Logical framework

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.

Logframe continued on next page…

	Measurable Indicators	*Means of verification*	*Important Assumptions*
Outputs			
Data collection system of mammals developed and implemented for data deficient areas Conservation Action Plan for Tanzania's mammals developed to identify conservation priorities for each species and establish areas of data deficiency.	3 new staff and existing TAWIRI staff trained as trainers in mammal monitoring by 2006. Data contributors identified and submitting sufficient mammal sightings annually to ensure wide coverage of the country. Mammal distribution data acquired for 15 target areas using remote camera traps Manual of survey protocols produced. Action Plan supported and endorsed by governmental wildlife agencies and NGOs in Tanzania.	National database of mammal records on file at TAWIRI HQ. 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 manual in use on surveys and at TAWIRI HQ Action Plan published and distributed to all stakeholders. Letters of endorsement by government and relevant authorities. Copies to be sent to Darwin Initiative.	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. Sufficient data exists to produce meaningful plan. Sufficient buy in from all stakeholders to ensure endorsement of plan.