

A National Plan for Carnivore Conservation in Tanzania

FIRST ANNUAL PROGRESS REPORT



Institute of Zoology, Zoological Society of London

In collaboration with

Tanzania Wildlife Research Institute

funded by

The Darwin Initiative for the Survival of Species



Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project title	A national plan for carnivore conservation in Tanzania
Country(ies)	Tanzania
Contractor	Institute of Zoology, Zoological Society of London
Project Reference No.	11-007
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Reporting period	Nov 2002 – Mar 2003 (the first five 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 2001 it ranked 17th lowest in its GNI and 2nd lowest in its Purchasing Power Parity. Tanzania has a population of around 34 million in an area of nearly one million square kilometres and a per capita income of less than \$300 per year. Nevertheless, Tanzania has positive growth and is developing at an annual growth rate of around 5% 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 is recognised to be a hotspot for African carnivore biodiversity (Mills et al. 2000). Not only does the country contain a high species richness, holding a total of 35 species of carnivores recorded, among the highest carnivore biodiversities in Africa, but it also contains significant populations of 6 threatened carnivores, cheetah, wild dog, lion, striped hyaena, spotted hyaena and spotted-necked otter. In particular Tanzania is home to a third of the world's estimated 5700 wild dogs, and includes the largest single population in the Selous Game Reserve, which is estimated to hold an 1000 individual dogs, over one sixth of the worlds population. Tanzania also holds the fourth largest population of cheetahs in the world, including one of the largest single protected populations of 250 individual cheetah in the Serengeti National Park and surrounding protected areas.

Of all the taxa, carnivores pose the most significant conservation problems. Wherever carnivores occur, there are varying degrees of conflict with people. With large carnivores the causes of conflict are obvious, in terms of physical danger for people and livestock, however conflict often occurs even with smaller carnivores. For example, in the UK most carnivore species have been persecuted at some stage in their history, and many still face antagonism today. Badgers have been gassed, foxes and otters hunted, and wolves and bears eliminated. Even the smallest carnivores such as weasels and stoats have been trapped and poisoned by game keepers.

This history of persecution of carnivores by people means that countries like Tanzania, that still support large and healthy carnivore populations, are unusual, and are therefore critical to the conservation of these species. However, Tanzania has a growing and developing population placing increasing demands on its resources, and the future of its carnivore populations cannot be guaranteed. Therefore if it is to be able to conserve its carnivore populations for the future, it needs to be able to monitor and manage them effectively in the face of increasing threats. The purpose of this project is to help build Tanzania's capacity to monitor the carnivores within its borders and to formulate an action plan for their long term conservation.

3. Project Objectives

This project aims to help Tanzania increase its capacity to monitor carnivores through the establishment of a Carnivore Conservation Centre at the headquarters of the Tanzania Wildlife Research Institute (TAWIRI) in Arusha. The centre will collect data from a wide range of sources and manage this information in a national database on carnivore distribution. It will have a special focus on two species of large and easily individually identifiable carnivores that are particularly threatened: cheetahs and wild dogs. The centre will have four key national functions, all of which will assist Tanzania in meeting its obligations under the Convention on Biodiversity: 1) to establish and monitor the current distribution of all carnivore species; 2) to monitor individually recognised cheetahs and wild dogs; 3) to train Tanzanian wildlife professionals in carnivore monitoring techniques; and 4) to increase national awareness of carnivore conservation issues. The ultimate objective is to build an action plan for carnivore conservation in Tanzania to prioritise conservation action to conserve threatened carnivores and hence safeguard carnivore biodiversity across the country.

The start of the project, originally April 2002, was late due to a delay in the start of the contract, which was not finalised until August. Immediately the contract was finalised, TAWIRI had a change of board, and the project had to be presented again to the new board for approval before we were able to go ahead. Therefore our original workplan and logframe were delayed by 7 months. Where possible we have tried to bring objectives forward, as will become apparent below.

Allowing for this change in timing, our main objectives for the reporting period are as follows:

1. Interview, identify and employ a project manager for the project (December 2002)
2. Establish and equip temporary offices at TAWIRI (by January 2003)
3. Develop a software program to computerise the matching of cheetahs and train project leader and project manager in computer matching software (by January 2003)
4. Complete plans for office construction (January 2003)
5. Finalise print and begin distribution of cheetah, wild dog and carnivore leaflets and posters (February 2003).
6. From February 2003 onwards publish a monthly newsletter to inform participants about the project.
7. Promote media interest throughout.

The delay in the start of the project changed our prioritisation of objectives slightly, in particular, budgetary constraints made it imperative that we made our primary expenditure, the building construction, a priority, and hence this activity was promoted, and is in fact, ahead of schedule, with the consequence that some other activities are behind schedule. However broadly speaking, the project objectives are being met, and we are on track. The original logical framework for this project is in Appendix 1.

4. Progress

4.1 Interview, identify and employ project manager for the centre

The employment of a project manager was an urgent priority of the project. Without a project manager in place, it was impossible to initiate the other objectives of the project. However, as mentioned above, a change in the board of TAWIRI caused a delay in appointing this post. The post was finally agreed in September, an advertisement went out in October, and interviews were made in November. Because of the high rank of the post, it was important that the interviewing and selection process were clear and transparent, and so an interview board was selected, made up of key players from within TAWIRI and from outside, and chaired by a representative from the ministry of education. The interview process was funded by TAWIRI, which was an important demonstration of their support for the project. We received a number of good applications for the post, but only one candidate with a PhD. In the event the best candidate, Maurus Msuha, did not have a PhD, but did have a masters degree from the University of East Anglia, United Kingdom. Maurus was clearly the best applicant and

was appointed by the unanimous decision of the board. Maurus's previous working experience was with the Wildlife Conservation Society of Tanzania, a Tanzanian conservation NGO, with whom he spent 8 years, devising action plans for bird conservation within the country, and co-ordinating waterbird counts on wetlands. Between 1995-96 he worked with the RSPB on another Darwin Initiative funded project aimed at identifying important bird areas in Tanzania. Maurus started as project manager on the carnivore project in mid December.

4.2 Establish and equip temporary offices

The location of the temporary office was identified by the project leader and the project partner in November 2002. The office was in use as a board room, but in December was temporarily partitioned into two smaller offices, one for the project manager, the other for the project leader and visiting scientists, together with a small lobby area that could be used by a project administrator. A driver for the project was employed at the end of December, and the project was loaned a landrover from the Serengeti Cheetah Project until it was able to purchase its own vehicle, a second hand Toyota pickup, in January 2003. A laptop for use by the project leader was purchased in November 2002 and a desktop computer for use by the project manager was purchased in the beginning of 2003. A scanner and a printer were also acquired for the office. All computers were wired into the ethernet network at TAWIRI in January, allowing fast and efficient email and internet access, and also, through the provision of an extra line, providing a much needed facility for visiting carnivore scientists in Arusha.



Fig. 1 Maurus working in his temporary office at the Carnivore Centre at TAWIRI

4.3 Cheetah matching software

The development of the cheetah matching software was commissioned in August, immediately after confirmation of the contract with Darwin. The software was developed by Lex Hiby of Conservation Research Ltd., and is extremely sophisticated. Its' development was planned to enable us to fulfil one of the objectives of the project: to establish a national program of monitoring individual cheetahs. Without automating the matching process, it was unlikely we would be able to process photographs of cheetahs received sufficiently quickly to make a national monitoring program feasible.

Superficially, matching cheetahs may seem to be relatively straightforward, and indeed, it is not particularly difficult to construct software to match photographs of cheetahs, provided they are all taken at a 90 degree angle and the cheetahs photographed are all in exactly the same position. However in reality, this is seldom the case, cheetahs may be angled with their heads away from the camera or their tails away, they may be relatively low down in the grass, or relatively high up on a termite mound, and so the photo angle and orientation of the cheetah can vary quite dramatically. In order to account for this, Lex had to build a model of the movement of a cheetahs pelt in different positions. ZSL allowed him access to the captive cheetahs at Whipsnade to help him get the video footage he needed to build this model. Now, when the user matches a new photo, s/he merely has to pin down a few fixed points on the cheetah e.g. the shoulder and the haunch, and the computer twists and manoeuvres its model cheetah to bring the cheetah to a perfect 90 degree angle, from which it can then search for a match.

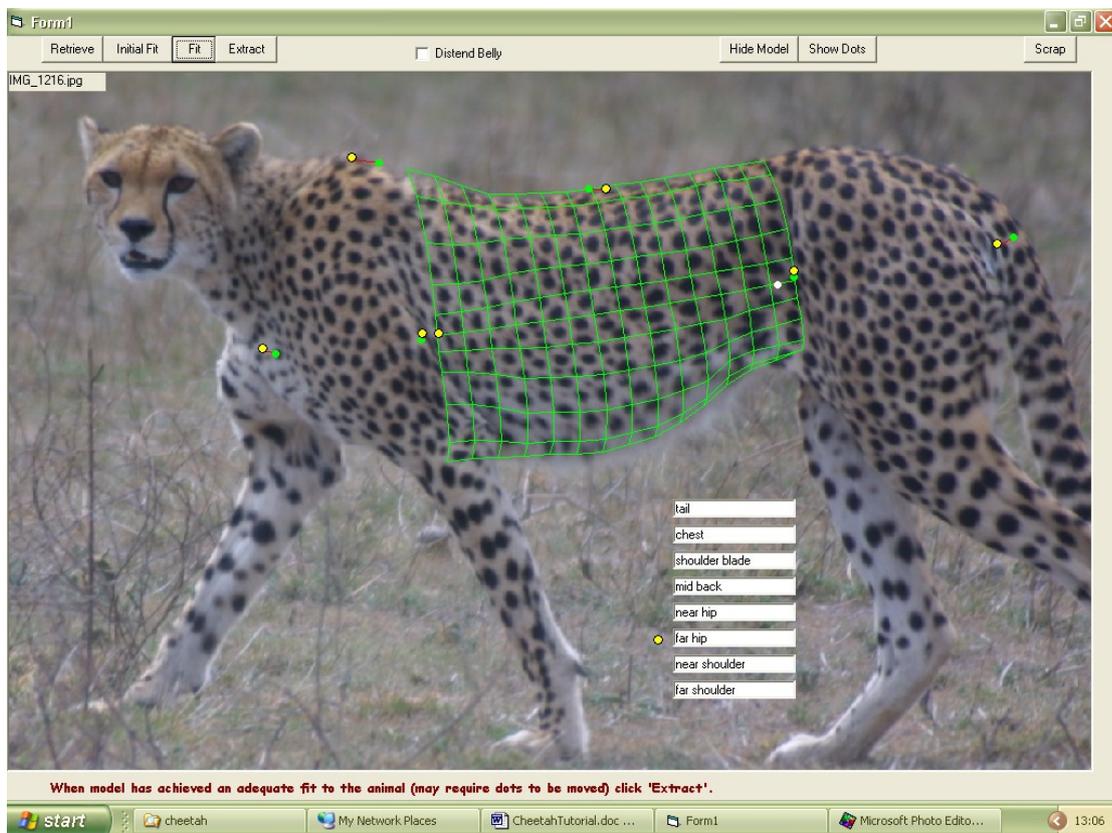


Fig. 2. The cheetah matching program, illustrating the fitting of the 3D model to the cheetahs chest prior to matching.

The software is very easy to use, and Lex, with his colleague Phil Lovell, from the University of St. Andrews, came out to the centre in February to install it on the project's computers. Lex and Phil also designed a database for the project that can be used with the matching software. Both the project leader and the project manager have been trained in its use.

4.4 Office construction

The design of the office building, and the appointment of an architect and contractors have taken up the largest component of the project's activities over the first five months.

As our temporary offices are small, we need to complete this building before we are able to take on additional staff. After a number of consultations, and through agreement with TAWIRI, the project appointed Mr Kasihawaki, from ARCHIconult Ltd., as the architect and consultant, and Sam Construction Ltd., as the contractors. Final plans were drawn up and the bill of materials agreed and building commenced on 22nd February. The building is planned to have a reception, five offices and one meeting room, together with a small store room and a tea making area (fig 3). It's overall dimensions are 10m by 22m. The building will have a broad welcoming verandah that we will use to portray a mural that will be chosen to represent the aims of the centre.

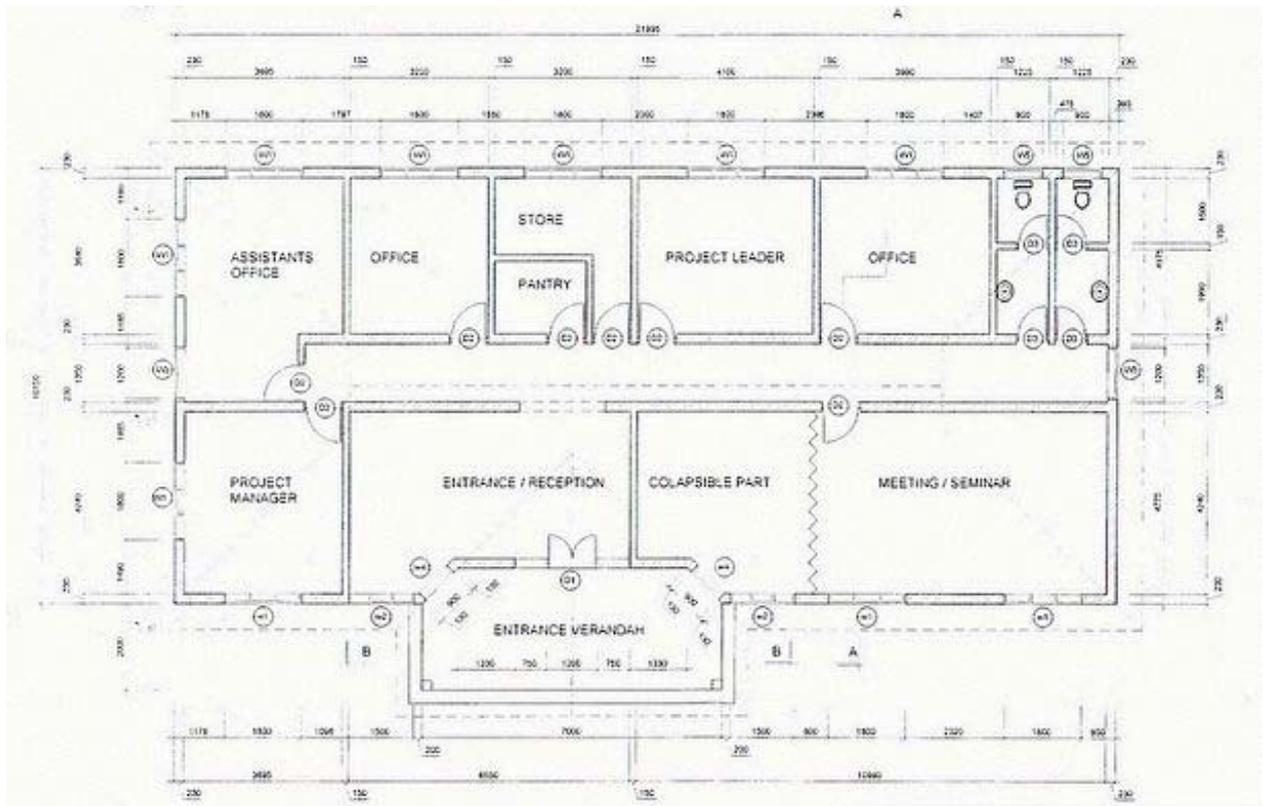


Fig. 3 Office Plans

The planned completion date is the end of May. At the time of writing building is ahead of schedule. In our original timeplan we had planned to complete the centre in February, 10 months into the project. However, due to our endeavours to bring this component of the project forward, our completion date is now planned 6 months into the project.



Fig. 4 The building: laying foundations and at the beginning of April 2003

4.5 Leaflet printing and distribution

The cheetah and wild dog leaflets, were finalised in February, and printing began in March. Both leaflets follow a similar format, and include a section about the centre and its objectives, a section on behaviour and ecology, a section on conservation, and a section on individual recognition. Both leaflets also include a section on 'cheetah friendly' or 'wild dog friendly' observation practices in an attempt to minimise disturbance and harassment of these species by tourists. Finally the leaflets include a cutaway section for any tourists who want to send in photographs to fill in and send in to the project. This section prompts the tourists for information on the animals they saw, as well as some information on their safari company so that we can identify those companies who are most supportive of the scheme.

WILD DOG CONSERVATION



Wild dogs used to be widespread across Africa, and were found in all habitats except rainforest and desert. However most of the wild dogs surviving today are found in protected areas in sub-Saharan Africa more than a 100 individuals.

Tanzania is a critical country for wild dogs, holding the largest population of wild dogs including the largest single population Reserve. However, despite protection, the population continues to decline due to conflict with people.

SOME INFORMATION ABOUT WILD DOGS

Wild dogs have a social system and live in packs. They are the sole species in the Lycanidae family.

ECOLOGY AND BEHAVIOUR

Wild dogs are most often found in open grassland to thick bush. They live in packs of 2-12 dogs, a combination of adults and pups. With pups, packs can cover home ranges usually range between 100-200 km². They are invariably found at low density, and are always found at low density.

competition from larger carnivores such as lions and spotted hyenas.

REPRODUCTION

Like wolves, usually only the dominant or alpha male and female in a pack reproduces. The dominant female is usually the alpha female. She gives birth in a den after a 3-month pregnancy, with timing that varies among ecosystems, depending on patterns of prey availability. The pups are kept at the den for the first 3 months of their life, while the pack regularly leaves the den to hunt. The alpha female generally stays with the pups to guard them, sometimes with another member of the pack and the other members of the pack leave the den twice a day to hunt. When they return to the den the pups and their mother solicit food, and all members of the pack regurgitate food for them. Wild dogs pack leave the den once they are 3 months and travel with the pack, joining them at kills. They are usually allowed to eat first at a kill while the rest of the pack waits until they have finished eating before feeding themselves.

spotted hyenas where the density of these predators is high. They very rarely scavenge, possibly because of the danger of meeting other larger carnivores at kills.

WILD DOG FRIENDLY WATCHING

We hope you are lucky enough to see wild dogs during your stay in Tanzania. If you do, then please help them by making use of wild dog friendly watching practices. The national parks and game reserves in Tanzania are a sanctuary for the wild dog, where they should be free of persecution at all times.

Wild dogs are fascinating to watch. Because they are very social, individuals communicate with other members of the pack constantly, through sound, smell and body language. However, whilst you are watching them, please ensure you keep your impact on them to a minimum through a few simple rules:

1. Never drive directly at wild dogs. Approach slowly at an angle or in a zig-zag fashion.
2. Pause frequently as you approach and observe through

THE CHEETAH WATCH CAMPAIGN



Tanzania is home to the Serengeti Cheetah Project, a 27 year study of known individual cheetahs that has told us much of what we know about wild cheetahs.

ECOLOGY AND BEHAVIOUR

Cheetahs do well in a wide variety of habitats, ranging from mountains and desert through to open grassland and bush. Cheetahs have a social system, which is unlike any other cat species. Cheetah females are tolerant of other females, and do not maintain territories, whilst cheetah males are social, forming groups of 2 or 3, usually brothers, which stay together for the rest of their life. Males in groups are more likely than single males to take and retain a territory, which they will then defend against male intruders. In the Serengeti, male territories average 50km², whilst females and males without territories move over 300km² every year.

REPRODUCTION

Cheetahs give birth to their first litter at two years after a 3-month pregnancy. The cubs are kept in a lair for the first 2 months of their life, when their mother leaves them to hunt every morning, and returns at dusk. Cheetah cub mortality is high - out of 20 cheetah cubs born, only one will survive to independence. Cubs die mostly because they are killed by lions or hyenas: their mother cannot defend them against these much larger predators. Cubs may also die from exposure or fire, or from abandonment if their mother is unable to find food. If they survive, cheetah cubs will stay with their mother until they are 18 months old, after which they will roam with their littermates for another 6 months.

HUNTING

Cheetahs are predominantly active by day. They hunt by a stealthy stalk followed by a fast chase. Because of their unparalleled speed and acceleration cheetahs can hunt successfully even if they start a chase at a much greater distance than bulkier and heavier large cats, such as lions and leopards. They take a wide variety of prey, depending on habitat and geographic location, but they prefer prey of 15-30kg: the size of an adult Thomson's gazelle or impala.

HOW YOU CAN HELP

Please help us to monitor cheetahs in Tanzania by sending us your photographs and filling in the form below for each group of cheetahs seen.

Your Name: _____

Your Address: _____

When were you on safari? _____

How many cheetahs did you see in the group? _____

What was the sex of the cheetahs you saw? _____

If there were cubs with the cheetahs you saw how big were they (please tick box)?

Less than half size

Half size

Three-quarter size

Full-grown

What was the name of your safari company? _____

Where did you see the cheetahs (please give a rough location)? _____

If you would like us to post information about your sighting on the web please could you sign below:

Signature: _____

(This is an easy way for us to inform you about the cheetahs you have seen)

Please send your form and photographs to:

The Tanzania Carnivore Conservation Centre, TAWIRI, Box 661, Arusha, Tanzania

Or you can email us at carnivores@habari.co.tz

Fig. 5 The Wild Dog Watch and Cheetah Watch leaflets

Tanzania National Parks (TANAPA) have agreed to help us with the distribution of the leaflets, and have offered to distribute them to the gates of all the relevant national parks where they can be collected by tourists as they enter the park. Similar links will be built with Wildlife Division to ensure their distribution through the game reserves. A number of lodges and safari companies are also participating in the scheme. We hope to use our first workshop, planned for the end of April, to encourage interest within the wildlife governmental and private sectors and expand our distribution network. WCS have agreed to host a web site for both the wild dog and the cheetah watch campaigns. We will use these web sites to post information about individual animals seen by tourists – this is much cheaper and easier than using normal post. Giving information back to tourists provides us with a means to encourage further participation in the scheme. Participants are asked to sign a statement in the leaflet to allow us to post information in this way, the wording of this statement was agreed by lawyers within WCS.

The remaining leaflet contains the carnivore distribution check sheets. This leaflet is targeted at resident experts, such as scientists, ecologists, safari guides, camp managers, hunters, and lay experts, requesting information on carnivore presence at a half degree scale, similar to the information gathered by the widely established Bird Atlas Project. Because of the limited distribution of this leaflet, it has a simpler construction than the other leaflets, and apart from a brief section describing the purpose of the centre, is principally made up of boxes for participants to complete. All leaflets are attached to the end of this report.

Posters have not yet been made to promote the centre, as these were deemed to be of a lower priority than a number of our other objectives that we have brought forward.

4.6 Newsletter

Newsletter production has been delayed because of concentration on priorities 1-5. We anticipate to print the first newsletter in June.

4.7 Media

Media input has been low key as yet, as we are waiting for the centre to be finished before large scale promotion of the centre and it's activities. However we have produced a news page on ZSL's web site, and a small article on the priorities of the centre has been included in TAWIRI's newsletter. Media interest in the project is high, and so we anticipate that once we have held the workshop and opened the new centre, media output should increase.

4.8 Other activities

Research

One aim of the centre, besides long term monitoring of carnivore biodiversity, is an aim to deliver quality research that not only meets the standards of international peer-reviewed journals but also makes a significant contribution to the development of effective conservation management of biodiversity. High quality research requires specialist collaborators who can help develop data analysis techniques specific to the centre's requirements. Over the first few months of this project, we have been identifying potential collaborators, in addition to those already on the project team, to

help us develop specialised techniques and to assist in the training of Tanzanian scientists to use these techniques. To date we have identified:

- Professor Ray Hilborn, University of Washington, and Dr Andrew Cooper, University of Boston. Experts in mark-recapture analysis, necessary for the analysis and interpretation of cheetah and wild dog data. Ray and Andy have agreed to help us analyse the cheetah and wild dog data using mark-recapture analysis, and to train the centre's scientists in these techniques.
- Lara Foley, Wildlife Conservation Society, expert in GIS techniques, and resident in Tanzania. Lara has agreed to help us establish our carnivore distribution database and help us use GIS to analyse the data produced. Lara's involvement with the project is particularly fortuitous as she is resident within Tanzania, and hence can be closely involved with training project personnel as well as assisting with GIS analysis.

We intend to take an international and collaborative approach to our science, building long term links with individuals that are supportive of the capacity building objectives of the centre, and who are able to assist with training objectives as well as helping to process and analyse data.

Significant difficulties and modifications of planned progress

To date we have had no significant difficulties in our planned progress, aside from the initial delay. However we have changed the priorities of a few of our objectives. In particular, it was felt that it was desirable to bring the initial workshop forward. The project relies to a large extent on the enthusiasm and the participation of a wide variety of people with lay or professional interest in the wildlife sector. Therefore, the project team felt that it was preferable to hold a workshop as early as feasible in order to encourage widespread participation. The planned date for the initial workshop is 29th April, and it will serve to inform representatives from the safari and hunting sectors about the objectives of the project as well as encouraging interest from key stakeholders within the governmental wildlife sector.

We have made one other small change to our planned activities for the following year, in that rather than conduct a short training course for the entire year of undergraduates, we are planning to take on a smaller number of students but for a longer period of training during their final year projects. We made this change because by selecting a small number of students through an application process we would be able focus training on students who were particularly interested in carnivore biodiversity. The longer period of training enables us to ensure that we can equip and train students to conduct their own field projects, thus making it more likely that they will have the skills necessary to undertake their own biodiversity assessments once they have graduated.

Timetable (workplan) for the next reporting period

Apr 2003	14A	First workshop, largely internal with a few external experts, to discuss and quantify progress to date, establish and prioritise data deficient areas for field work, and assess monitoring techniques available.
Jun 2003	5	Compile shortlist and interview two additional Tanzanian nationals for the post of project assistant.
Jun 2003	21	Complete construction of the Tanzania Carnivore Conservation Centre. Move existing facilities into the new office facilities. Purchase additional computer equipment.
Jun 2003	20	
Jun 2003	20	
Aug 2003	18A, 19A	Opening ceremony for the Carnivore Conservation Centre. Tanzanian research assistants to undertake a two month training period in the use of matching software, database management and statistical analysis from Marcella Kelly.
Sep 2003	6A, 6B	
Sep 2003	7	Complete a Tanzania carnivore identification guide for distribution to individuals participating closely with the scheme. Identify a minimum of one, but preferably two Tanzanian masters students to begin research for a two year dissertation at the centre.
Oct 2003	2	Demonstrate monitoring techniques and the potential of the facility to interested individuals from Kenya Wildlife Service (KWS). KWS have already expressed interest in the idea of the centre as a model for Kenya.
Dec 2003	6A, 6B	The centre will provide training for 2-4 final year projects undertaken by degree students at the universities of Dar and Sokoine.
Dec 2003	4A, 4B	First year of databases completed: 1. Individually identified wild dogs 2. Individually identified cheetahs 3. Preliminary carnivore distribution maps
Mar 2004	12A, 12B	One month training program in GIS provided by WCS for all staff at centre.
Mar 2004	6A, 6B	Print and continue distribution of leaflets and posters to request information on carnivores from tourists and interested resident experts (e.g. researchers, safari operators, lodge managers etc.). Monthly A4 newsletter to inform participants of the progress of the project and to encourage future participation distributed to: 1. Tourists and local staff associated with tourism development (5000 copies per month). 2. Local resident experts targeted for contributions of distributional data (500 copies per month).
Throughout	7	Wherever sufficient time allows then media interest will be actively encouraged through press releases and the ZSL press office. Particular efforts will be made to encourage broadcasts within country, however this is likely to be primarily radio as TV has limited coverage in Tanzania.
	16A, 16B	
	17A, 18A, 18B, 19A, 19B, 19C, 19D	

5. Partnerships

A number of collaborations and partnerships have been encouraged:

Collaboration with existing projects in Tanzania

WCS Tanzania Program: Both the project leader 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. In particular, Lara Foley, a member of WCS Tanzania field staff, is currently working with the Tarangire Elephant Project, has agreed to provide GIS assistance to the project.

Tanzania National Parks: The project relies on the support of TANAPA for its success. Since its inception TANAPA have been extremely supportive of the project and have assisted in the distribution of leaflets. TANAPA will also play a key role in our coming workshop, as the Chief Ecologist has agreed to be the guest of Honour and the Chief Veterinarian has agreed to give a talk on the significance of disease in carnivore conservation.

The Serengeti Carnivore Disease Project: This is a new project established this year between the Serengeti Lion Project, the CVTM at the University of Edinburgh and the TANAPA Veterinary department. All members of the project have been supportive of this project, and, given the potential for collaborative data collection, we hope to be working closely with this project. The project leader and project manager are in regular communication with TANAPA.

Tanzania Wildlife Research Institute (TAWIRI): The project is intimately involved with TAWIRI through its central aim of building the capacity of TAWIRI to monitor carnivore biodiversity. The project is based 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. The staff at the centre are under contract to TAWIRI and the contractors for the building have been appointed according to TAWIRI protocols.

Tanzania Bird Atlas Project: This project has objectives similar to one of our key objectives, and hence we have been in regular communication with this project from the beginning. The Tanzania Bird Atlas Project has been of great assistance in establishing our protocol for the carnivore atlas project, a key component of our activities and both the project leader and the project manager are in regular contact.

Other: there are a number of smaller projects operating in Tanzania which work predominantly or partly with carnivores. This project seeks to ensure that everyone involved with carnivore 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 and the Tarangire Lion Project. We have also established links with research projects who are not carnivore based, but may be interested in participating in the project. These include the Serengeti Biodiversity Project, the Southern Highlands Project, the Tarangire Elephant 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 leader have ensured that FZS are informed of the project activities, and FZS have promised assistance to the project wherever possible.

WCS International: WCS international have been very supportive of this project from its inception and have provided logistical assistance, including establishing web sites for the Cheetah Watch and Wild Dog Watch campaigns. The project liases with WCS's Africa and Global Carnivore Programs. WCS are currently considering an application for a small top up grant for the coming year.

6. Impact and Sustainability

The project has only been in place for a few months, and therefore it's impacts to date have been small, nonetheless the project has made some achievements in terms of impact and sustainability:

- Direct impact on TAWIRI has been substantial, since the centre, currently being built, is visible to all staff and has had an important positive impact on staff morale.
- An application has been made for a small top up grant for the coming year from WCS International. If successful, and to date the application has been approved by the Africa program, such support is potentially key to the long term sustainability of the project.

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
21	2	Temporary office established
21	1	Tenders and plans selected for new office building
?	1	Cheetah matching software and database written and installed on project computers
5	1	Project manager appointed after an open and transparent interview process.
20	2	Initial computer facilities, including ethernet link to internet, established in temporary offices
6A, 6B	2	Project leader and project manager trained in use of cheetah matching software.
21	1	Office building approaching completion
7	Thousands	Leaflets for Cheetah Watch and Wild dog Watch Campaigns printed and distributed.

7	1	Checksheets for carnivore distribution database completed.
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Reasons are given in section 4 whenever outputs differ from that planned.

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	Cheetah Watch Campaign Leaflet	Arusha Printing Press, Arusha	Carnivores@habari.co.tz www.wcs.org/cheetahs	free
Leaflet	Wild Dog Watch Campaign Leaflet	Arusha Printing Press, Arusha	Carnivores@habari.co.tz www.wcs.org/wilddogs	free
Leaflet	Carnivore Atlas Project Leaflet	Arusha Printing Press, Arusha	Carnivores@habari.co.tz	free

Dissemination activities

In the early phase of the project we have been concentrating on buildings and setting up the project. We have printed 10,000 leaflets for the Wild dog Watch and the Cheetah Watch campaigns and begun preliminary distribution, however we expect to establish a wider distribution network after the first project workshop on April 29th 2003.

9. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	Expenditure
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10. Monitoring, Evaluation and Lessons

One of the main activities of the project over this reporting period has been to build the new office facilities for the carnivore centre. This office block is clearly visible as a testament to the work of the project. The leaflets produced by the project are also widely available in Tanzania. The remainder of the project's activities are relatively new, and so evaluation at this stage is premature. 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 2004. In addition we will ask participants to evaluate our workshop to be held on April 29th 2003.

11. Author(s) / Date

Dr Sarah Durant	June 2003
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Appendix 1

Logical framework.

<i>Project summary</i>	<i>Measurable indicators</i>	<i>Means of verification</i>	<i>Important assumptions</i>
<p><i>Goal</i></p> <p>To assist countries rich in biodiversity but poor in resources with the conservation of biological diversity</p>	<p><i>Capacity to monitor and conserve biodiversity increased.</i></p>	<p>Capacity of TAWIRI increased through buildings, staff, training and equipment.</p>	
<p><i>Purpose</i></p> <p>To establish a national Carnivore Conservation Centre that will conduct long term monitoring of carnivores and train wildlife professionals in carnivore monitoring techniques.</p> <p>The production of a Carnivore Conservation Action Plan for Tanzania, that will assess the degrees of threat for each species where sufficient information exists, and prioritise further research on data deficient species and areas.</p>	<p>Centre established and fully operational at TAWIRI headquarters in Arusha by Feb 2003.</p> <p>Three year database on carnivore distribution and status generated by March 2005.</p> <p>Increased expertise in carnivore monitoring skills within the Tanzanian wildlife professional community</p> <p>Carnivore Conservation Action Plan supported and endorsed by governmental wildlife agencies in Tanzania.</p> <p>Implementation of recommended priorities for conservation.</p> <p>Further research in data deficient areas activated.</p>	<p>Feedback about the centre and monitoring plan from visiting experts.</p> <p>Final report and scientific papers summarise data.</p> <p>1-2 masters degrees awarded in carnivore research and a higher awareness of carnivore issues among wildlife professionals</p> <p>Signed endorsement of the plan by all governmental wildlife agencies in Tanzania.</p> <p>Incorporation of recommended priorities into wildlife policy.</p> <p>Initiation of new research projects in Tanzania focussing on data deficient areas and species identified by plan.</p>	<p>Governmental will exists.</p> <p>Funding can be found for projects.</p>

<i>Outputs</i>			
1. Carnivore Conservation Centre established at TAWIRI headquarters in Arusha, Tanzania.	Buildings erected with six offices and one small meeting room.	1. Presence of building and centre confirmed by visiting experts.	Permission to build granted ¹ .
2. Capacity for carnivore monitoring within Tanzania established.	Office equipped with appropriate facilities and suitable staff selected.	2. Presence of equipment and staff confirmed by visiting experts.	There are sufficient qualified Tanzanian nationals to run the centre.
3. Assessment of distributional range of all species of carnivore in Tanzania.	Maps of distributional ranges of large carnivores and GIS analysis produced by end of project.	3. Maps and analyses published in Carnivore Conservation Action Plan and scientific papers.	Sufficient resident experts identified in country to provide distributional information ²
4. Assessment of status of cheetah and wild dog in Tanzania	Estimates of cheetah and wild dog distribution, population size and demographic parameters by end of project.	4. Estimates published in Carnivore Conservation Action Plan and scientific papers.	Sufficient visitors to national parks to ensure enough photographs submitted ³ .
5. Carnivore Conservation Action plan for Tanzania.	Plan published in March 2005 and endorsed by government. Peer review and acceptance of these papers by March 2005.	5. Reviews and feedback from scientists and conservationists and letters of endorsement by government.	
6. Submission of a minimum of four scientific papers in international journals.	A minimum of three wildlife professionals trained and experienced in using these techniques and a minimum of ten students and wildlife professionals exposed to short courses in carnivore monitoring by end of project.	6. Papers on file at TAWIRI and IoZ.	
7. A core of wildlife professionals trained in carnivore monitoring techniques.		7. Training reports on file at TAWIRI and IoZ.	There are enough qualified candidates for the posts and short courses.

Notes on assumptions:

¹ *Permission already given by the Director General at TAWIRI.*

² *Sufficient individuals have been identified by the bird Atlas project to ensure a wide national coverage of bird distributions*

³ *A minimum of a 0.2% response rate was found to be necessary for monitoring of the entire cheetah population in the southern Serengeti, response rates necessary for complete monitoring elsewhere will depend on visitor numbers. However there is a higher proportion of respondents in more exclusive (i.e. more remote) camps and lodges than in larger and cheaper facilities. Mark-recapture analyses can be conducted on less intensively photographed populations.*

<i>Activities</i>			
1.1 Establish collaborative links with appropriate institutions within and outside Tanzania.	1.1 Written MoUs between IoZ and TAWIRI, TANAPA, NCAA, Wildlife Division and University of Dar es Salaam June 2002.	1.1 MoU on file at TAWIRI and IoZ.	
1.2 Plan construction of buildings.	1.2 Call for tender published and plans requested by June 2002.	1.2 Architectural plans produced and on file at TAWIRI.	
1.3 Construct buildings	1.3 £30 000 building costs, building completed Dec 2002.	1.3 Presence of buildings verifiable by visitors to centre.	
2.1 Develop computer matching software in order to individually identify cheetahs from photographs.	2.1 Additional £3600 for software development, to be completed May 2002.	2.1 Matching software written and installed on centre equipment	
2.2 Supply office with computing equipment and software.	2.2 Total of £14 000 for computing equipment, to be completed Apr 2003.	2.2 Centre equipped with four desktop computers, two laptops, one scanner, one laser printer, and one photographic printer.	
2.3 Provide training for staff in use of matching software.	2.3 Two courses in use of software: 2002 - total cost of £1900; 2003 - total cost of £1650, completed Apr 2003.	2.3 Staff proficient in use of matching software.	
2.4 Provide training for staff in carnivore monitoring techniques and data analysis.	2.4 Training provided by project leader, Daniela de Luca and Sultana Bashir and Marcella Kelly, completed Jun 2003.	2.4 Staff proficient in monitoring techniques and data analysis.	
2.5 Provide training in GIS and database management.	2.5 Training time donated in Dec 2003 by WCS GIS unit, airfare at £950.	2.5 Staff proficient in use of GIS and database management.	
3.1 Network of interested participants for the carnivore survey identified from the wildlife and tourism sector as well as interested laypeople.	3.1 Network already established for birds through the Atlas project, will be adapted and extended for carnivores by Jul 2002.	3.1 Network established and list of participants kept on file at TAWIRI.	Sufficient number of participants identified to ensure sufficient information.
3.2 Leaflets distributed to participants and email network established.	3.2 £1200 used to fund printing costs of leaflets, printing ongoing from Jul 2002.	3.2 Copies of leaflets kept on file at TAWIRI and IoZ.	
3.3 Carnivore identification guide produced and distributed for participants of scheme.	3.3 £800 for design, printing and distribution of guide in March 2003.	3.3 Copies of guidebook on file at TAWIRI.	
3.4 Records entered on database, and letters responded to.	3.4 Records entered at centre by project staff. £1500 for correspondence, ongoing from Jul 2002.	3.4 Database with records of all carnivore data established at TAWIRI.	
3.5 Range maps produced.	3.5 Maps constructed and printed at centre, using GIS and centre equipment.	3.5 Copies of range maps kept on file at TAWIRI and published in interim and final reports.	
3.6 Data analysed using GIS and important environmental variables impacting range identified	3.6 Analysis conducted by project staff at centre on project equipment.	3.6 Results of analyses published in final report and scientific papers.	TWCN to provide information from satellite data and large herbivore counts.
4.1 Design, production and distribution of leaflets and posters to solicit photos of cheetah and wild dogs from visitors all across Tanzania.	4.1 Total of £13100 used to fund design, printing costs, and postage for distribution of leaflets and posters from Jul 2002.	4.1 Leaflets and posters evident at main gates to National Parks and through targeted lodges, tented camps and safari operators.	

<i>Activities</i>			
4.2 Photographs of cheetah and wild dogs matched, records entered on database, and letters responded to.	4.2 Matching and responses carried out from Jul 2002 by centre staff using centre equipment and software. £2850 for correspondence.	4.2 Computer database of individually identified cheetahs and wild dogs established, copies of letters kept on file.	
4.3 Design, writing and printing monthly newsletter to sustain interest.	4.3 Total of £8160 spent on printing costs ongoing from Jul 2002.	4.3 Newsletter distributed to appropriate individuals, companies, institutions, main gates to National Parks and to targeted lodges, tented camps and mobile camp operators.	
4.4 Data collated and analysed to produce estimates of population size, distribution and demographic parameters of cheetahs and wild dogs.	4.4 Analysis conducted by centre staff and completed March 2005.	4.4 Results published in Carnivore Conservation Action Plan and scientific papers.	Sufficient photographs received.
5.1 Two workshops organised to disseminate information collected and identify data deficient areas and priorities for carnivore conservation.	5.1 £5000 for first workshop in Sep 2003. £10000 for final workshop in Jan 2005, which will include all stakeholders, and reach a consensus on conservation and research priorities.	5.1 Proceedings of workshop produced and distributed.	Consensus can be reached
5.2 Draft plan written and circulated to a wide variety of experts for feedback.	5.2 £200 for distribution of draft plan in Jan 2005.	5.2 Feedback and informal reviews from relevant experts.	
5.3 Meetings organised with all the governmental institutions in the wildlife sector.	5.3 Total of £2220 for two annual trips to Dar es Salaam for project leader and manager to visit Wildlife Division and University of Dar es Salaam. All other collaborating institutions are based in Arusha. Meetings will be frequent throughout project.	5.3 Minutes from meetings produced and filed at TAWIRI.	
5.4 Plan finalised and endorsed by all governmental institutions in the wildlife.	1.4 Writing and editing done by project leader and manager at centre. Drafts circulated for comments on email. Plan finalised in Mar 2005.	5.4 Plan printed and distributed and endorsement filed at TAWIRI.	Sufficient political will exists to permit endorsement of final plan.
6.1 Four papers drafted based on data analyses from outputs 3 and 4 and distributed to co-authors and key colleagues for comments.	6.1 Writing and editing done at centre by project team. Drafts circulated for peer review before submission for publication by Mar 2005.	6.1 Feedback from colleagues.	
6.2 Papers revised according to comments and submitted to journals.	6.2 Revisions done at centre by project team by Mar 2005.	6.2 Publication of papers.	Papers are suitable for publication.
7.1 Selection of suitable personnel for employment at centre.	7.1 Shortlist drawn up with advice from TAWIRI and TBA, and £300 for interview costs. All staff selected by Feb 2003.	7.1 Personnel enter employment under TAWIRI.	There are enough qualified candidates in the host country to fill these posts.
7.2 <i>Training of permanent staff at centre.</i>	7.2 See 2.3 to 2.5.	7.2 Training reports and annual appraisals.	
7.3 Training of one to two students for masters degrees.	7.4 Candidates selected in Jun 2002 with advice from TBA. £4800 to fund living allowance	7.3 Awarded degree by University.	Students are able to complete course.
7.4 <i>Two 3 week training courses for undergraduate students from Universities of Dar es Salaam and Sokoine.</i>	7.5 Total of £4000 total cost of tuition, field trips and travel for courses in Aug 2003 and Aug 2004	7.4 Training reports.	Sufficient interest from undergraduates.