



Welcome to the Earthwatch Concept Note.

Earthwatch's project review processes are guided by our mission to engage people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment. The grant application process at Earthwatch begins with the completion of a Concept Note. To be considered for Earthwatch support in 2013, you must submit your Concept Note by **January 27, 2012**.

Concept Notes will be reviewed based on scientific merit, appropriateness of volunteer activities, safety and logistical viability, expected project outcomes and impacts, and Earthwatch's available support for the project. If your Concept Note raises the interest of the Earthwatch review committee, you will then be invited to submit a Proposal. Invitations for Proposal submissions will be communicated in February. For more information see www.earthwatch.org/research.

The Concept Note is broken down in three sections:

- Section 1: Project Design
- Section 2: Need for Volunteer Participation
- Section 3: Scientists

Please send completed form to research@earthwatch.org.

* Indicates Response Required

Background Information

* Scientific project title

Wildlife conservation in the Soutpansberg Mountains, South Africa

* Research site location(s): Be as specific as possible, include the city, town, national park, state, etc.

Lajuma Research Centre, Soutpansberg Mountains, Limpopo Province

* Research site country(ies)

South Africa

* Research site region

Africa

* Research site(s) latitude

23 02.23 S

* Research site(s) longitude

29 26.05 E

Project web address (if applicable)

Section One: Project Design

* Goal

Describe the desired result that this project seeks to achieve and the problem that will be addressed as a result. How is your project innovative or distinct from other work in your field?

Protected areas are a cornerstone of local, regional, and global strategies for the conservation of biodiversity. As human populations continue to rise and human activities increasingly convert and degrade lowland habitats, protected areas in mountainous regions are increasingly important to species conservation. Our project is based at the Lajuma Research Centre within the Soutpansberg Mountain Range, an area recognized nationally as a centre of endemism and biodiversity. The mountains fall within the Vhembe UNESCO Biosphere Reserve and form part of the North-Eastern Escarpment Bio-region, a priority area for conservation research highlighted by the South African National Biodiversity Institute. Our research addresses this need through focusing on three key themes:

- (1) to assess the role of the Soutpansberg mountains in biodiversity conservation and the viability of populations of keystone and flagship species within this mountainous environment;
- (2) to assess the extent of human-wildlife conflict from an interdisciplinary perspective, focusing on both livestock depredation and crop-raiding, and investigating viable mitigation strategies;
- (3) to increase environmental awareness in local communities to respond to the conservation challenges of land reform and land use change.

Each of these themes has central scientific questions allied to strong applied perspectives with community involvement to ensure that management recommendations have the maximum conservation impact.

* Objectives

State and describe the scientific objectives that will contribute to achieving the project goal.

- 1) Evaluating the role of the Soutpansberg Mountains in conserving flagship mammalian species. With growing anthropogenic pressure on land for farming and other commercial activities, mountainous environments are becoming increasingly important as conservation refuges for many mammalian species. Even so, land use changes and government land reforms pose further risks to the conservation value of these regions. We are conducting a long-term monitoring programme of keystone mammalian species within the biodiversity hotspot of the Soutpansberg Mountains.
- 2) To assess the extent of actual and perceived human-leopard conflict and the viability of the Soutpansberg leopard population. Large carnivores can place significant costs on human populations by inflicting damage that threatens local livelihoods through livestock depredation and predation on managed wildlife. Retaliatory killings of carnivores in response to perceived livestock depredation are common, while levels of legal hunting in the Limpopo province are also high. Our project aims to assess actual levels of livestock predation alongside stakeholder perceptions and assess population viability under current hunting pressure.
- 3) To evaluate the nature and extent of human-primate conflict within the Soutpansberg mountains. While predation on domestic livestock is often cited as the most common cause of human-wildlife conflict, crop damage by wild animals is also a significant issue, often causing farmers considerable economic loss and frustration, and undermining local conservation efforts. Primates are often cited as a greater problem than the major predators within the Soutpansberg, and the project aims to understand the ecology of the diurnal primate species, assessing the factors leading to crop-raiding and human-wildlife conflict.

- 4) To evaluate and mitigate the environmental risks from land reform and land use change. One of the most significant tensions arising from South Africa's land reform program has been land use change in rural areas, particularly cultivation on lands that provide safe havens for species of conservation concern. The project is assessing the risk of increased human-wildlife conflict and economic loss based on the distribution of land claims and predicted land resettlement, while evaluating strategies for mitigating the risk, particularly through education.

* Methods and Activities

Please provide an overview of the methodology you plan to use, the sample scheme, and your plans for data analysis.

Baseline monitoring of medium-large mammalian species is conducted through 24 established pairs of digital camera traps spaced at 1-minute intervals in a 4x6 array. This permanent matrix is supplemented by short-term (3-month) camera-trapping surveys to gain additional population density estimates in new areas or to monitor the range use of predator species outside of the core area. Capture-recapture and occupancy modelling techniques are used to determine species densities. Species of conservation priority currently monitored by camera trapping include leopard (*Panthera pardus*), caracal (*Caracal caraca*) and brown hyena (*Hyaena brunnea*), alongside civet (*Civettictis civetta*), large spotted genet (*Genetta tigrina*), pangolin (*Manis temminckii*), aardvark (*Orycteropus afer*), bushbuck (*Tragelaphus sylvaticus*), red duiker (*Cephalophus natalensis*) and giant rat (*Cricetomys gambianus*). Primates are also monitored and, in addition, their distribution and behaviour are assessed through direct observation (see Objective 3).

Although detailed estimates of leopard population density will be obtained from the camera-trapping surveys (Objective 1), additional information on leopard movements and diets are collected through telemetry and GPS collars and through scat analysis to provide detailed information on the potential for human-wildlife conflict and the extent of livestock depredation. Detailed assessments are also made of factors influencing the vulnerability of livestock to predation such as vegetation structure, the use of different husbandry techniques, deterrent practices and the distance to nature reserves. This information is coupled with landowner surveys to determine perceptions of leopards and their conservation and to map perceived patterns of predation. Such surveys also provide information on illegal hunting which, coupled with legal hunting records and details on survival from camera-trapping and telemetry, allow us to assess the viability of the Soutpansberg population under current levels of persecution. These analyses are a critical element of the development of management strategies.

Behavioural observations on habituated troops are conducted for all three primate species (chacma baboons, *Papio ursinus*; vervet monkeys, *Cercopithecus aethiops*; samango monkeys, *Cercopithecus mitis*) to assess behaviour, diet and ranging patterns. These data are supplemented with ranging data from GPS collars and VHF collars. Vegetation transects and plots are assessed monthly to determine food availability. Crop raiding will be measured systematically using exclosure plots and through video analysis of crop raiding events in areas close to our study population. In a broader context, a standard epidemiological model within GIS is being developed that predicts the relative risk of primate crop raiding based on crops grown, their availability within farms and patterns of primate selectivity. Habitat and land use surveys coupled with landowner interviews are used to collect the baseline data for these models.

The standard epidemiological model of human-wildlife conflict (Objective 3) will be developed to reflect land use changes due to land reform based on site inspections and published information on land claims. Strategies for mitigating human wildlife conflict following land reform information will be based on landowner surveys and interviews, and field trials combined with published strategies to develop management recommendations for current and future areas of high risk of conflict. This will be combined with an education program. The Lajuma Research Centre is assisting the Sepolopote Community with the development of an Environmental Education

Unit in the Blouberg Nature Reserve. This relationship includes physical involvement in building and other projects, environmental advice and discussions, assistance with promotional and educational documentation, and help in preparation of funding applications. The Lajuma Research Centre is also responsible for an Eco-schools Node in the Blouberg area.

* Project Outputs

What measurable outputs and outcomes could be expected from the project?

Earthwatch has identified a small number of high-level measures of success to express achievements across the diverse portfolio of projects we support, details are available [here](#).

The primary measurable outputs over the next three years can be divided into four main categories (i) peer-reviewed publications, (ii) management reports, (iii) educational material, and (iv) capacity building.

Peer-reviewed publications: For Objective 1, a series of papers is envisaged given the diversity of species involved, coupled with a more detailed assessment of the Soutpansberg region as a centre of endemism and biodiversity. In the longer term, population trends extending beyond 3 years are also likely to lead to significant publications and recommendations since we will be able to assess the stability and dynamics of these wildlife populations. Objectives 2 and 3 are both anticipated to lead to a series of publications addressing the nature of human-wildlife conflict in the region, with a particular focus on livestock predation and crop-raiding, respectively. The integration of primate and predator data should also lead to a series of high profile publications examining predator-prey interactions. For Objective 4, an output assessing the impact of land reform on human-wildlife conflict and conservation strategies is also anticipated.

Management reports: The findings from Objective 1 would be developed as management recommendations for Nature Conservation (South Africa) and the South African National Biodiversity Institute, as well as for the Vhembe UNESCO Biosphere Reserve. Information on leopard management and conservation from Objective 2 will be disseminated through the Limpopo Leopard Forum and communicated to Nature Conservation (South Africa) in a management report. A similar management report will be developed from the information emerging from Objective 3, and disseminated to local stakeholders through focus groups.

Educational materials: The primary outputs for Objective 4 will be educational material and an increase in environmental awareness in the local communities. Although this is often difficult to evaluate and 'measure', it will be possible to assess the uptake of our educational material within schools, and the success of the Environmental Education Unit in the Blouberg Nature Reserve.

Capacity building: in addition to the educational element, there is considerable potential to increase capacity building in this Earthwatch project through the incorporation of members of Nature Conservation or students from Venda University into project teams.

Section Two: Need for Volunteer Participation

This section provides Earthwatch with an overview of the volunteer experience. Participants assist researchers in the field for set blocks of time in groups called teams. Earthwatch participants can be adults, teens, students, teachers, or corporate employees. Participants are NOT required to have any special skills before signing up to work on a project and will be trained to complete all field tasks upon arrival on site. High school students and college students are becoming an increasingly important type of volunteer, so your ability to work with these volunteers is advantageous.

* Briefly describe your project's need for non-specialist volunteers. Projects should include a range of research tasks that will be conducted by volunteers under your supervision.

Volunteers could be involved in all elements of the camera-trapping research. Photographs are downloaded from camera traps every 2 weeks, and volunteers would be actively involved in this process. Volunteers would then be involved in processing the pictures at the research station, initially sorting the pictures from each camera by species, before making ID assessments for those species where individual recognition is possible. Handbooks to assist with individual recognition are currently available for two species (leopard and brown hyena).

Volunteers would be involved in two key activities for this objective. Firstly, although the intensity of trapping to fit GPS collars will vary across the study it is likely that many groups would be involved in the setting and monitoring traps. Volunteers could also be involved in data retrieval and tracking via VHF receivers for certain collars. Secondly, volunteers would play an important role in scat analysis, both in the collection of material on surveys and in the filtering and preparation of scat samples. Based on reference material at the site, volunteers could also be involved in the analysis of diet composition. The potential also exists for volunteers to be involved in research examining the factors which influence the vulnerability of livestock to predation.

Volunteers may be involved with baseline data collection on the habituated primate groups and would assist with the habituation of new groups using the VHF collars to assist in locating the monkeys. Volunteers could assist in the trapping of primates, particularly baboons, since the GPS collars are replaced on a regular basis. Volunteers would also assist in vegetation transects and monitoring established plots for food availability (identification guides for food species are available). Depending on the time of year, opportunities would also exist to assist with enclosure plot experiments, with volunteers also involved in the habitat and land surveys to collect the data for the human-primate conflict models.

Volunteers would be involved in habitat and land use assessments within the Soutpansberg region to develop the conflict models and may be involved in stakeholder interviews and field trials of risk mitigation strategies. The main tasks for volunteers for this objective, however, would be in assisting with the educational program. Activities could include physical involvement in developing education infrastructure, developing education material, and participating in presentations and educational activities for local schools and community groups. Volunteers with formal training in education or financial matters may be particularly valuable in offering advice to the Environmental Education Unit in the Blouberg Nature Reserve.

* a. State minimum number of volunteers per team (to allow completion of tasks)

6

* b. State maximum number of volunteers per team (so that all team members are sufficiently occupied with useful tasks and so that all volunteers can be safely managed, including in vehicles, accommodations and during research tasks)

16

* c. Provide a date range (months) for the teams:

January to December

* d. Provide the total number of teams you would like to run

10

* Potential team length(s) (select all that apply)

1 day 2-3 days approximately 1 week approximately 2 weeks

* Type of Accommodations

Please indicate the accommodation type(s) available.

Field Station Hotel Hostel
 Camping Bed & Breakfast Other

Section Three: Scientists

Please list all of the scientists or Principal Investigators (PIs) who will be working on this research project and attach a copy of their CV.

Lead PI

* Title

Dr.

* First Name

Russell

* Last Name

Hill

* Institutional affiliation/Employer

Durham University

* Street Address

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* State

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* Country

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* Work telephone

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* Email Address

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Co-PI

Title

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Country

Work telephone

Other telephone

Email Address

Co-PI

Title

First Name

Last Name

Institutional affiliation/Employer

Street Address

Address Line 2

City

State

Postal Code

Country

Work telephone

Other telephone

Email Address

Please attach a CV for the Lead PI and all Co-PIs.