

Research programme: Fence Interface Research and Monitoring (FIRM)

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Mission Statement of FIRM:

To increase the operational monitoring of wildlife/fence impacts, rural community appraisal and management capacity to allow the authorities to mitigate fencing problems associated with wildlife movements between protected areas and communal lands surrounding the Kruger National Park (KNP) and the Greater Limpopo Transfrontier Park (GLTP).

Principal Conservationists: Dr. John Hanks; Mr. Ken Ferguson; Dr. Richard Fergusson

Executive Director: Dr. John Hanks

Background and description of the programme

Fence Interface Research and Monitoring (FIRM) is a comprehensive operational/enabling initiative that seeks to holistically mitigate fence-induced wildlife problems within the Greater Limpopo Transfrontier Park. The intensive study fence site lies on the Kruger National Park (KNP) western boundary. The project has already identified patterns of fence permeability created by our target species - elephant, lion, hyena and buffalo. Adjacent to this long fence are some of South Africa's highest human density and poorest communities (within Limpopo Province). Our collective interaction with the Kruger study site fence stakeholders (SANParks, NDA, Hlangalani Community Forum and Limpopo Province) has led us to propose a series of inter-connected projects that will examine issues on 'both sides of the fence' relating to protected area conservation (including disease and dangerous animal control) and community distrust of fences. Local people are thought to regard the fence as both a symbol of exclusion as well as an actual physical barrier.

Fences represent a pervasive and increasing facet of protected landscapes in southern Africa. Attempts to remove fences and allow the free movement of wildlife between transfrontier parks have been beset by problems relating to the necessity of fences as a primary mechanism for blocking wildlife-livestock disease transmission and human-wildlife conflict. Defining the patterns and processes of wild animal movement across this interface and quantifying the responses of the authorities and communities, is vital for the long-term mutual protection of both parks and people. Fence policy, within the GLTP, is currently inconsistent – and can only be improved by the harmonisation of fence strategies based on the quantitative results of fence monitoring systems and a comprehensive study of the attitudes of fence stakeholders. Hitherto, the lack of research and coordination on the impacts of park and veterinary fences on biodiversity and people was the identification point for this project.

Fences are the indirect cause of biodiversity gradients that span the interface between local communities and protected areas. Increases in human population numbers have created (external to the KNP western boundary) buffers of land that range in width by between 2- 4 km, through which wildlife can seek out resources (easy domestic prey or nutritious vegetation snacks) and then retreat to the sanctuary of the park. This constant DAC attrition (and loss of livestock through disease outbreaks) foments distrust within local communities towards the park and leads to an escalation of snaring and poaching both within the buffer zone and in the park. This loss of trust could lead to land and compensation claims, or conversely a move by local people for inclusion of their communal land (under contract) within the protected area. In both case the role of, and attitudes towards, fences is critical for biodiversity expansion or contraction.

Shifting entrenched attitudes towards fences requires an analysis of the areas (geographical and attitudinal) of conflict and consensus with regard to the policy development and planning for fences at the TFCA and Local levels. Divergence between the stakeholders over the reasons for fence placement (proposed and current) has led to confusion on fence policy. Communities are affected by this lack of direction in fence policy. Our programme aims to quantify the patterns, processes and human responses to wildlife fence movement and, in mitigation, to trial novel fence monitoring and deterrence systems (and potentially land-use systems e.g. land inclusion). This data can be used to create, for the first time in Africa, a transfrontier fence management plan, that will seek consensus, as far as this is practicable between the parties and the stakeholders. Park, people and biodiversity securities are inseparably linked (by the fence).

Projects for 2008 were:

Project 1:

'Training of KNP fence workers in a novel fence monitoring system'. Funded by WWF-SA.

Project 2:

'Developing GIS mediated databases on fence permeability in the KNP'. Funded by United States Fisheries and Wildlife Service.

Projects planned for 2009 are:

Project 3:

'The Other Side of the Fence': *Project manager, Mr. Wayne Twine (SUNRAE Programme; University of Witwatersrand)* will supervise a local student to investigate the experiences and attitudes of local people to park fences, problem animals, and their control in selected communities on the western boundary of the Kruger National Park. A multi-level approach will be used due to the heterogeneity and complex nature of rural communities. We will investigate how village-level factors such as remoteness,

household-level factors such as size and socio-economic status, and individual-level factors such as education, age and gender, shape people's attitudes to fences and problem animals (e.g. percentage of households that 'boma' livestock at night and quantify opinions on controversial land/park inclusion schemes), and the current and potential impact that these have on local people's livelihoods. Individual interviews will be conducted in six communities adjacent to the western boundary of the Kruger National Park. These will be selected to represent different village contexts. Within each village, a total of 60 individual interviews will be conducted using a structured questionnaire. Respondents will be randomly selected but will be stratified to achieve equal representation across gender and age classes. The questionnaire will be used to collect information on the household (size, socio-economic status, livelihood strategies), and the individual (age, gender, education, position in the household), in relation to the perceived impacts of problem animals and porous fences. A focus group will also be conducted with the leadership of each village to collect information on their experiences, attitudes, and responses to issues relating to fences and problem animals. Educational materials such as a DVD on DAC and how to limit its impacts will be made available via the SANParks outreach bus.

Project 4:

'Estimation of the Prevalence of Zoonotic Pathogens in Wildlife in Relation to Fence

Permeability'. *Project Manager, Ms. Nada Abu Samra (University of Pretoria) and Dr. Abidou Samie (Department of Microbiology, University of Venda.)* The project will address the issue of the influence of fence permeability in the transmission of zoonotic diseases, between the wildlife and domestic animal compartments, at different scales of fence permeability. *Cryptosporidium* and *Escherichia coli* (*E. coli*) O157 have been selected as the zoonoses to be studied at this interface. We will focus on two different study areas that lie adjacent to the western fence of KNP. Fence permeability, as a causal factor in disease spread, will be investigated and recommendations, for mitigation purposes, made to the fence managers. Our results will be extended, to the communities, via primary health care pamphlets/DVD (in Shangaan and vaVenda available from the SANParks outreach bus) that will recommend how to lessen the risk of human/livestock contamination from zoonotic diseases.

Project 5:

'Profiling Fence Breaking Elephants and GPS/GSM tracking of habitual elephant fence breakers':

Project Manager, Dr. Andre Ganswindt (University of Pretoria). The extent to which fences, as artificial elements of their environment, influence the movement and behaviour of elephants (individual and population levels) deserves investigation in relation to habitual fence damaging behaviour. By linking faecal DNA genotype, sex, and glucocorticoid metabolite concentration (as an indicator of physiological stress by comparing adrenocortical function in African elephants located at varying distances on both sides of the fence) to collected dung samples, with the overall aim of the study being to demographic/stress profile habitual elephant fence breakers. By using non-invasive techniques to monitor gonadal and adrenal endocrine function in egressing African elephants based on faecal steroid

analysis and the recently established faecal DNA techniques, we aim to supply information on the individuality, movement and seasonality of elephant fence damage that will aid in fence management.

Project 6:

‘Developing Fence Management Models and Plans’: *Project Manager, Mr. Ken Ferguson.* SANParks has requested that FIRM audit various fence management options. Small scale, local community fence maintenance contracts have recently terminated on the KNP western fence and although these trials were not closely monitored, the scheme has been viewed as a favourable alternative to the state control of fence maintenance. We propose a feasibility study that will create a cost-benefit analysis model for current fence costs, efficiency of maintenance and fence types (state controlled) compared with the putative community fence ‘ownership’ scheme. In association with our partners, a fence management plan and policy briefings of our findings, will be published. Project 6 also represents an end of project synthesis emanating from the cross disciplinary synergies between ecological and social aspects of the FIRM programme.

Project 7:

‘Chilli Deterrents for Park Fences’: Defending park fences against elephant damage requires new thinking and ‘smart’ fencing. Electric fences are largely unworkable due to component theft. FIRM has developed experimental protocols to identify effective secondary fence deterrents. Our primary tool will be the use of chilli products applied to/near the existing fence. Mr. Malvern Kardoza of EPDT will conduct these trials. The products may also have application for stemming the movement of lions, which have been identified by the local community as ‘enemy number one’. Mitigating dangerous animal fence movement by non-lethal means remains a priority for FIRM.

Project 8:

‘Transferring FIRM fence monitoring methods to Gonarezhou National Park (Zimbabwe) and Limpopo National Park (Mozambique)’ Co-funding pending from CIRAD-Zimbabwe and SADC-FMD EU Project.

Project 9:

‘Export of fence barrier tape/symbol monitoring system’ to all major SADC fences/ and ‘training for trainers’ workshop to be funded by SADC FMD Project.