



Niassa Carnivore Project

Mitigation of negative human impacts on carnivore populations:
African wild dog, lion, leopard, spotted hyaena

- Sponsor's Report -
November 2007



Second male leopard (LECM02) radio-marked in Niassa National Reserve (K. Begg)

Prepared for
Sociedade para a Gestão e Desenvolvimento
da Reserva do Niassa
Moçambique

By
Colleen M. Begg & Keith S. Begg

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1.0 Introduction and Justification

Reporting period:	July – November 2007
Researchers:	Colleen Begg & Keith Begg
Research Assistant:	Euzebio Waiti (Mbamba village)
Duration of project:	July 2007-December 2010

The Niassa National Reserve (NNR) is located in northern Mozambique on the border with Tanzania. One of the largest protected areas in Africa, it encompasses an area of approximately 42 000 km² located within the Eastern Miombo woodland eco-region. NNR supports a large and diverse complement of herbivore and carnivore species, albeit at relatively low densities at present. In addition more than 25 000 people are resident across the reserve in approximately 40 villages.

Large carnivores are amongst the most difficult species to conserve, as they tend to occur at low densities, range widely and conflict directly with human interests. Yet, in a very real sense their presence can be an ecological indicator of the “health” of the ecosystem and their successful conservation in an area can deliver broader biodiversity benefits as umbrella or flagship species. These species are of international conservation concern particularly African wild dogs (Critically Endangered) and lions (Vulnerable). Recently more attention has also been given to leopard, which are listed on Appendix I of CITES which means trade is strictly regulated. In NNR the large carnivores (lion, leopard and spotted hyaena; African wild dogs) also provide critical revenues for communities and management through eco-tourism and sport hunting (lions and leopards). They may also play an important, but largely unappreciated cultural role. However, the costs to the communities living with carnivores may become considerable (injury, loss of life, stock loss etc) particularly if the carnivore populations increase in response to recovering prey populations and improved protection as is expected in the NNR.

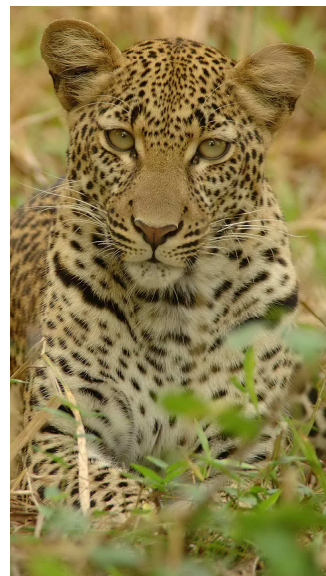
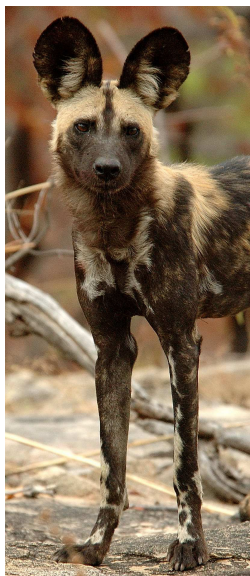
Research between 2003-2006 (Begg & Begg 2004, 2007a, b, c, d) has indicated that the NNR supports a viable population of lions in the region of 800-1000 individuals and more than 450 African wild dogs. Leopard and spotted hyaena are also relatively common but little is known of the specific threats, prey and movement patterns of these two species in NNR. Potential threats to the large carnivores in NNR include retaliatory killing as a result of human-carnivore conflict, snaring, the trophy hunting of underage individuals (leopard and lion) and various disease risks. For example preliminary research has shown that there have been at least 75 lion attacks in NNR in the last 30 years with 11 people killed and 17 injured in the past 6 years alone.

The Niassa Carnivore Project aims to build on the data already collected on lions (Niassa Lion project 2004-2006) and African Wild Dogs (2004-2006) and extend the ecological research and surveying to leopards. It will use target specific, pragmatic research to

develop indicators of the status of the large carnivores in NNR, and monitor and manage the main threats (retaliatory killing, trophy monitoring of underage animals, disease risks). Particular attention will be given to understanding human-carnivore conflict and disease in NNR and finally developing and testing appropriate, pragmatic and sustainable solutions that can be implemented by Niassa communities. This project will take place in close collaboration with SRN, local communities and professional hunters. In addition selected NNR/ SRN staff and community scouts will be trained in all the relevant techniques and detailed survey protocols will be provided to NNR, along with all the required equipment to ensure monitoring is sustainable and ongoing and not researcher driven.

In NNR we have a unique opportunity to secure these populations and develop mitigation strategies before a crisis develops and support for conservation initiatives is eroded. In addition, NNR has the potential to make a significant contribution to the global conservation of all these carnivores due to the large size and remoteness of the protected area.

This report presents initial progress that has been made in 2007 towards achieving the objectives by 2010. The data presented here are preliminary and have not yet been comprehensively analysed.



2.0 Objectives

Our goal is to ensure that by 2010 viable populations of the large carnivore populations (lion, leopard, spotted hyaena, African wild dog) are secured in NNR and their status and threats are effectively monitored by reserve staff.

The broad objectives of the project over the next three years are to:

1. Use targeted research and surveying to further investigate large carnivore status, density and ecological requirements (with particular emphasis on leopard) and develop indicators and survey protocols that can be used for ongoing monitoring by SGDRN.
2. Extend and refine the MOMS community-monitoring program to provide ongoing assessment of human-carnivore conflict and status of special species with 80% coverage of the NNR villages by 2010.
3. Examine the local contexts of large carnivore attacks (humans, livestock) and identify, and test locally derived, practical solutions with the active participation of specific local communities.
4. Continue to assess and minimize the levels of disease risk (canine distemper, rabies, canine parvovirus) to carnivores (particularly African wild dogs) through analysis of blood samples and management of domestic dog population.
5. Continue to assist SRN with the development and implementation of sport hunting guidelines and trophy monitoring systems for lion and leopard to ensure sustainable hunting.
6. Ensure monitoring is sustainable (not researcher driven) and consistent by providing appropriate training, equipment and detailed surveying protocols to SGDRN
7. Disseminate the findings, mitigation strategies and protocols to inform broader national and regional carnivore conservation strategies wherever possible.

3.0. Overview of methods

While monitoring and surveying will include collation of data from the entire reserve, intensive ecological research is focused in a specific study area situated along the Lugenda River in concession block “L5” between the Mbamba village and Msangezi River, as was the case between 2003 and 2006.

Objective 1: Targeted ecological research

- Lion & hyaena call-up survey completed in 2008 to compare with 2005 data (age structure, density distribution) and training of selected personnel. A 10-min tape of sounds known to attract lions (feeding and distress call, hyaena whoops) is played back at full volume at calling stations (each set 10 km apart) along roads throughout NNR.
- Relative density of all carnivores, with particular emphasis on leopard determined through remote camera trapping. For leopard, individuals are identified through spot patterns and their density calculated through capture/ mark/ recapture analysis.
- Additional lions (4-6) and leopards (6-10) radio-marked with a combination of VHF (Telonics) and GPS radio-collars (Vectronics) and followed to determine home range, density, movement patterns and validation of visual aging cues for hunters.
- Standard carnivore measurements, body condition and tooth wear noted from all captured animals.

Objective 2: Community Monitoring System

- In close collaboration with SGDRN (Agostinho Jorge and Mbumba Marufo) the “MOMS” community scout program will be extended through annual training and reporting workshops.
- With respect to this project, MOMS community scouts provide regular information on the opportunistic sightings of carnivores in villages and vital information on incidents of human-carnivore conflict.
- MOMS community scouts may also be used as extension officers to disseminate information and provide local expertise in mitigation strategies once these have been developed.

Objective 3: Identify and implement practical mitigation methods.

- A simple, but more detailed questionnaire will be used to collect information on the specifics of the more recent (2000-2007) carnivore attacks.
- Data on lion movements in Mbamba Village will be collected through following radio-marked lions and by using camera traps. During February – March (main crop harvesting season) detailed information on the movement of lions and their prey species (particularly warthog and bushpig) will be collected in and around the Mbamba village croplands (“mashambas”).
- A list of practical, cost effective mitigation strategies that are considered to have a reasonable chance of success in NNR (and/or are already being employed by Niassa residents with some success) will be compiled. It is likely that mitigation methods will fall into two main categories (not mutually exclusive):

- i) Decreasing attacks by minimizing contact between human and carnivores through changes in behaviour and by the use of improved physical barriers.
- ii) Increasing the tolerance of carnivores by reducing tension e.g. follow up of grievances, provision of effective communication networks, elimination of man-eating lions; participation in decision making processes and improvement of economic benefits e.g. revenue distribution from sport hunting and ecotourism, increased employment, insurance schemes; and improving education (highlighting cultural and conservation importance of carnivores (education)).
- The primary focus of this project will be on development of the Category (i) mitigation strategies with recommendations and guidance provided to SGDRN staff for Category (ii) mitigation strategies. We strongly support the use of protection methods that are already in use by communities, but that can hopefully be further refined to increase effectiveness.
- Once identified, a few techniques will be tested in individual fields of target villages (Mbamba and other villages to be decided possibly Macalange or Negomano) with the active participation of the villagers and communities concerned. One-on-one extension work with individual farmers is considered essential.

Objective 4: Disease, inadvertent and targeted snaring -monitoring and mitigation

- Blood samples will be taken from all immobilized lions and leopards captured in leopard traps for disease analysis (canine distemper, parvovirus, rabies). Techniques and analysis will be determined in conjunction with SRN, Dr Mike Kock (WCS Field Veterinary Programme) and Dr Rosie Woodroffe (wild dog specialist).
- A survey and registry of the number of domestic dogs in NNR will be completed by December 2009 to compare with 2006 results. In collaboration with SGDRN, a decision will be reached about the future of the domestic dog population in NNR with domestic dogs either removed or vaccinated.
- If possible, nutritional surveys will be completed in Mbamba village (following similar techniques used in Tanzania) to assess the importance of bush-meat in the diet. This information will be used to assess the extent of snaring activities and possible solutions.
- Further investigations into the trade in leopard skins from NNR will be made.

Objective 5: Trophy monitoring & hunting guidelines

- Collaboration with individual Professional Hunters (PH's) to develop visual aging cues for leopard and lion will continue.
- All operators are provided with simple datasheets to record critical information on each lion and leopard hunt.
- Trophy monitoring of lion and leopard trophies will be conducted annually in October and November of each year. All skulls will be measured and individual trophies aged according to tooth wear.
- Trophy monitoring results will be reported to PHs and operators through meetings and newsletters each year before the hunting season begins.

- An incisor or premolar will be removed from each trophy for digital dental radiographs (X-rays) of the pulp cavity to provide an additional indication of age that will be tested for correlation with visual aging criteria such as body length and mass (leopards), mane development, nose pigmentation (lions).
- These data will be used to validate visual aging criteria for lions and leopards to assist professional hunters and provide a baseline measure of trophy quality against which future quotas can be assessed.
- For leopard trophies, a 1cm. x 1 cm. piece of skin will be taken for DNA analysis to determine the sex of the animal and for phylogeographic studies (in collaboration with Prof. C. Matthee, Stellenbosch University, RSA).



Fig. 1: Remote camera station along a path in riparian habitat showing two cameras set at each site to record both left and right hand coat patterns and marks



Fig. 2: A “walk through” leopard drop door cage trap set in riparian habitat, which can also be set with additional baits or scent to attract leopard.

4.0 Progress towards achieving Objectives

4.1. Targeted ecological research

Lion

- Two new lionesses from two prides (F-Pride (4 females), M-Pride (6 individuals)) have been collared with VHF collars (Fig. 3).
- A lioness from the “L” pride that had been collared since November 2005 was discovered to have died this year and her collar and skull was recovered. Her death appeared to be of natural causes, as a dead porcupine was found close by. One of her canines was completely broken off, in an old injury, perhaps precipitating her death. It is not yet known what has happened to her two cubs, which would be approximately 15 months old.
- Identification pictures have been taken of all individuals from the F-pride (Fig. 4), however individuals from the M-Pride remain elusive. These identification pictures will be compared with other images taken of lions in the intensive study area between 2004-2006 to develop a history of lions in the area.

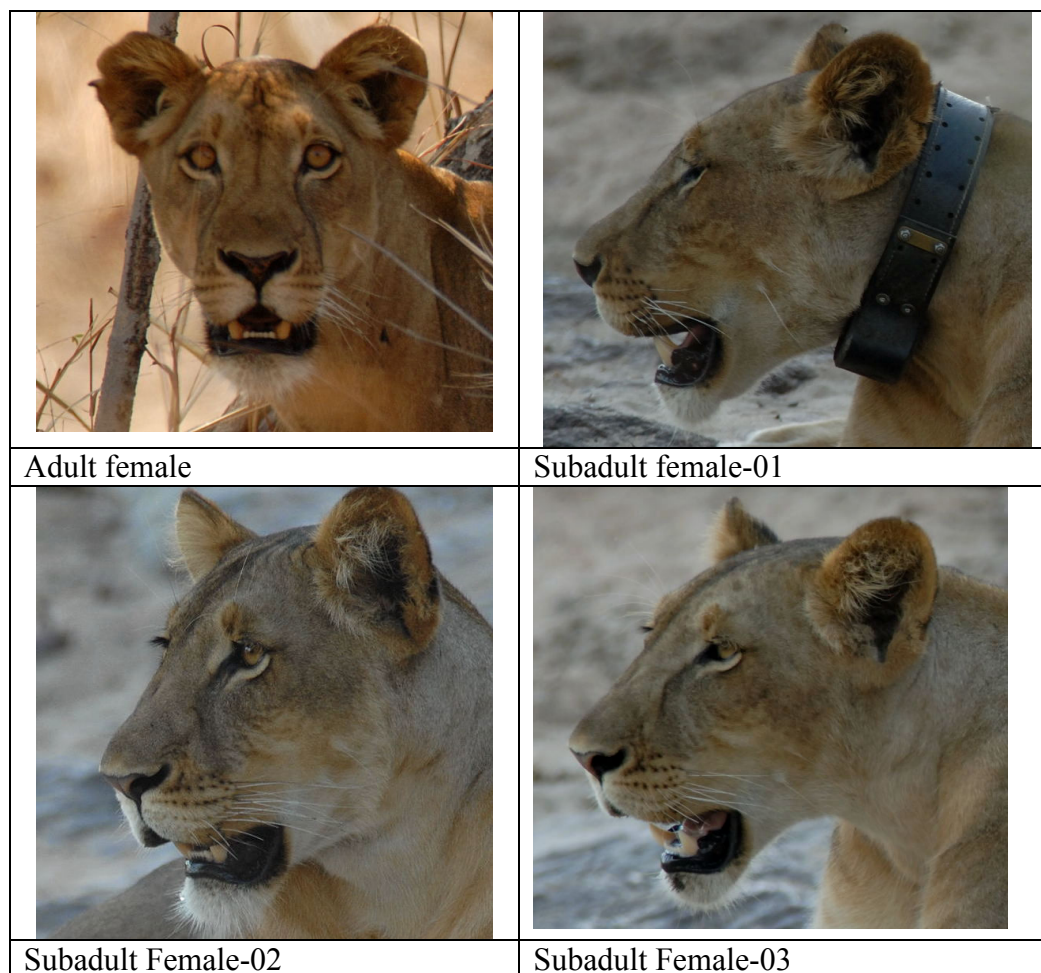


Fig. 3: Identification pictures of F-Pride members comprising one adult female and three subadult females, note the different whisker patterns in the subadults and the distinctive notch out of the ear in the adult female.

- The exact make up of these “prides” is still uncertain as while these females have not been seen together, their home ranges overlap substantially and the same male (“Campo”) has been seen with both groups as well as with another female this year.
- In NNR, small groups of lions (2-4) are commonly seen hunting and resting together but the entire group is seldom seen all together. Research in other areas has suggested that this type of social structure is a feature of low prey density (small prey animals) or human disturbance and needs to be carefully monitored.
- Between October and November 2007, 22 lions were seen in the intensive study area (1000 km²) through call-up and remote camera trapping techniques. This represents a minimum density of 0.02 individuals / km².

Description	Total Number	Adult female	Adult male	Subadults
M-Pride	6	1		5
F-Pride	4	1		3
J-Pride	2	1	1 (Jacket)	
? (maybe J-pride)	6	3		3
? (maybe F-pride female)	2	1	1 (Campo)	
? (camera trap)	1	1		0
? (camera trap)	1	1		0
TOTAL	22	9	2	11

- It is of concern to us that no adult male lions over the age of six have been identified in the study area over the last two years. Both the pride males are less than six years old and are known to visit hunting baits in concessions along the south bank of the Lugenda River. This suggests that the lion density is still low, with little competition for territories. Baiting and hunting pressure on the south bank of the Lugenda may well be forming a “sink” for the source population on the north bank (non hunted area) as has been observed in other areas (Hwange National Park, Zimbabwe). This requires more investigation.

Leopard

- The first two leopards have been caught and collared using drop door cage traps (Fig. 4; Fig 5). Both were young adult males weighing 42kg and 38kg respectively. This is considerably smaller than several of the leopards taken as trophies in 2007 (estimated at 60-70kg). This is the first year that leopard hunts and trophies have been comprehensively monitored and the third year of skull measurements and aging.
- Preliminary data collected on the home ranges of these two leopards suggest they overlap substantially and that these two males make good use of both the riparian and mountain habitats.
- A further 3 incidents has confirmed a trade in leopard skins inside the reserve. A leopard snare (Fig. 6) was discovered in our study area and a snared leopard severely wounded a poacher in one of the hunting concessions. Two leopard skin trophies were also stolen from a hunting concession this season.



Fig 4: The first leopard captured in Niassa (named “Nantusi” by village elders) with Rui Branco (newly qualified Mozambican Vet), Mbamba residents and research assistants.

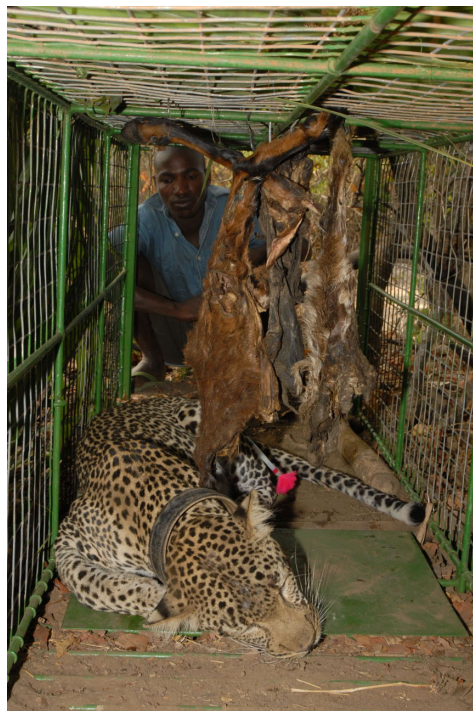


Fig 5: Recapture of “Nantusi” in drop door cage trap.



Fig. 6: Local snare set specifically for leopard in tree, with Hyrax (Dassie) bait hung in palm frond basket. This provides additional confirmation of a trade in leopard skins inside the Niassa Reserve.

Camera trapping

- Remote camera trapping has been initiated in the reserve this year. 30 camera traps at 15 camera stations were set at 1 km intervals for 42 days in riparian habitat. The main goal is to identify individual leopards and quantify leopard density in the area. In addition the relative density of all carnivores and prey species can be assessed and compared to data using other techniques (spotlight counts), in different habitats (riparian, mixed open woodland, Miombo woodland) as well as between hunted and non-hunted areas) and over time.
- To date the camera traps have recorded 28 mammal species, excluding local fishermen. This includes pictures of 12 carnivore species (Fig. 7) ranging in size from the slender mongoose to lion.
- Using camera traps, opportunistic observation and trapping we have so far identified six individual leopards in an intensive study area of 30 km² including both the radio-collared individuals (Fig (8), a large male. The study area will be extended as we learn more about the leopards.
- In addition the camera traps have captured images of at least six individual lions (all known) as well as pictures of 3 females as yet unidentified.
- At one camera station, F-pride lions made a kill close to a camera trap, and took a bite out of one of the cameras!).

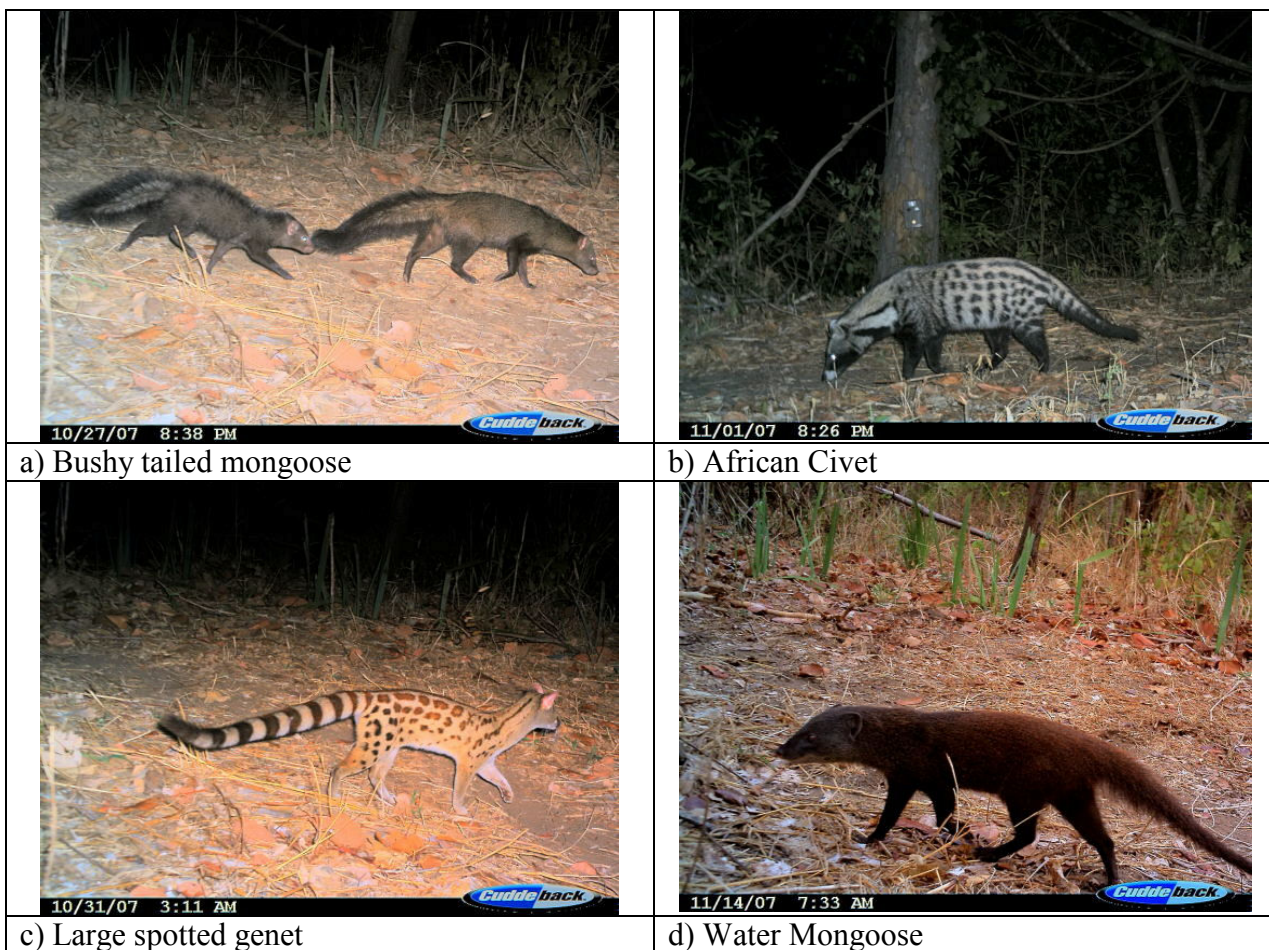


Fig 7: Various small carnivore species recorded by remote camera traps during the first photo exercise.

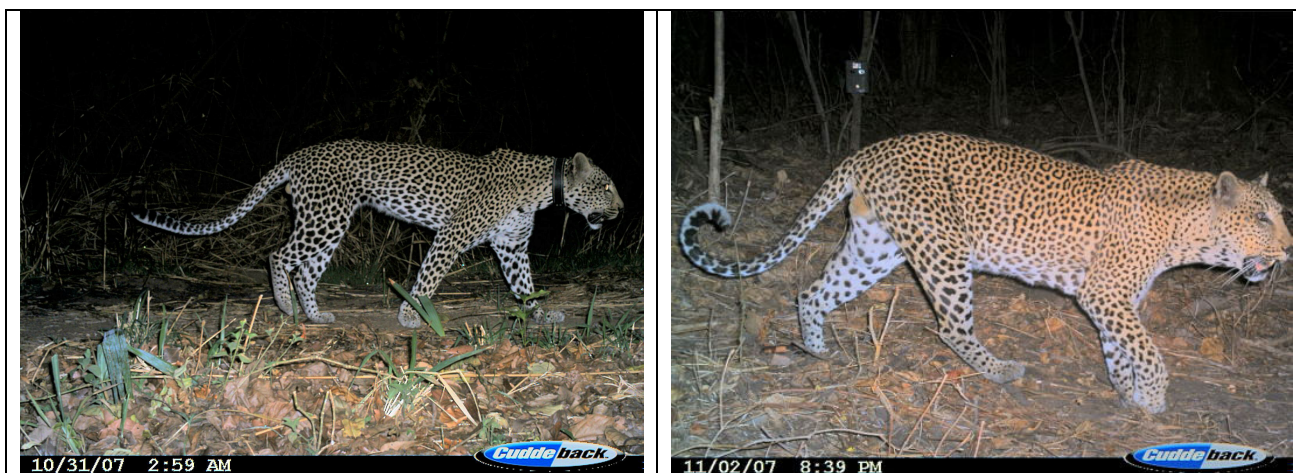


Fig 8: Radio-collared male leopard (“Nantusi”) and a large un-collared male photographed with the use of camera traps in the study area.

African Wild Dog

- In March 2007 a detailed wild dog report was prepared for SGDRN. This report analysed the data collected by the Niassa Wild dog on status and threats over a three-year period (2004-2006) and suggested a way forward.
- Opportunistic sightings of wild dog packs from the research team, professional hunters, ecotourism operators and MOMS community scouts have been collected and will be collated and mapped in December. These include more than 40 sightings from information gathered by community scouts trained and funded by this project.
- At least four packs have been recorded with young pups in the 2007 season, all during September to October.
- Three wild dogs have been killed on the Xixano Road in two separate incidents just outside of the reserve. These are the first records of road deaths of wild dogs and are direct consequences of this road being substantially improved, allowing higher speed traffic. Roads are a significant threat to African wild dogs in other regions and as addressed in previous project reports, this needs to be monitored carefully in NNR.
- Two of the wild dogs killed on the road had their noses and tails removed. It is likely that these were removed for traditional medicine. Again, this is the first record of this type from NNR but is more common in other areas (e.g. the Omay Communal Area, Zimbabwe).
- C. Begg attended the regional Discussion Group on African wild dogs at the Society for Conservation Biology (SCB) conference in Port Elizabeth, South Africa. K. Begg will shortly be attending the Regional Strategy for Wild Dogs and Cheetah in Botswana (3-8 December 2007) to provide detailed information on the Niassa wild dog population.

4.2 Community Monitoring System

- The Niassa Carnivore Project supports the MOMS community scouts program both financially and through mentorship. The goal is to have a community scouts in more than 80% of Niassa villages by 2010. The community scouts currently collect information on sightings of special species (including leopard, lion, African wild dog and Spotted hyaena), human-wildlife conflict and fishing.
- In September, the annual reporting and training MOMS workshop was held in Mbatamila, lead by Mbumba Marufo (SRN Community Officer) and Agostinho Jorge (SRN monitoring and tourism).
- The first year of information collected by the five community scouts were analysed and problems addressed.
- In addition, five additional community scouts from the villages of Mecula, Matondevela, Ntimbo and Mussoma were identified by traditional leaders and trained in MOMS.
- With more than 40 wild dog sightings with details of pack size, location, date and time having been collected by the first 5 community scouts (trained in 2006) it is now clear that the MOMS system already represents an essential part of the long term monitoring system of wild dogs in NNR and this will increase substantially as more and more scouts are trained.

- This year all community scouts were presented with certificates at the end of the workshop and provided with MOMS community scout caps, T-shirts and backpacks.

4.3 Identify and implement practical mitigation methods.

- No conflict with large carnivores were recorded in Niassa villages in 2007.
- A male lion, originally collared in the hunting concession Luwire in 2005, has crossed the Lugenda River and is a regular visitor to Mbamba village croplands presumably in search of prey such as warthogs. He will be fitted with a GPS collar next year and his presence in the mashambas during the wet season will be monitored by research assistant, Euzebio Waiti.
- In addition, during February and March camera traps will be placed in the fields to assess the timing and frequency of visits to the mashambas by all species, particularly bushpig and warthog that are the primary prey of lions.

4.4 Disease and snaring - monitoring and mitigation.

Disease

- Blood and skin samples have been taken from four lion and two leopard and will be analysed for disease markers (canine distemper, canine parvovirus)
- At the SRN 2008 Planning Meeting held in October a decision was reached about the domestic dogs (100-150) in NNR. It was decided:
 - In accordance with the 2005 Community Policy, no domestic dogs will be allowed in NNR and the current dog population will be removed in a way to cause minimal stress to dog owners. No new dogs will be allowed, particularly in areas currently without dogs (65% of NNR villages)
 - In 2008, Mozambican vet, Rui Branco (already associated with the Niassa Wild Dog project; Begg & Begg 2007) will make an inventory / registry of all dogs currently in NNR. In addition all current domestic dogs will be vaccinated against rabies, however the message that no dogs are allowed in NNR will continue to be spread.
 - The possibility of setting a limit around villages where dogs are not allowed and neutering all dogs in NNR and then allowing the current dog population to die out naturally were discussed and will be assessed.

Snaring

- The history of the collared male lion “Jacket” is of particular interest. Jacket was marked in a hunting concession opposite the intensive study area in May 2005. He was subsequently snared (wire snare) in Nkuti village. He managed to remove his collar in the struggle to get out of the snare but survived, although he was in poor condition and subsequently lost most of his mane through stress. He was re-collared in November 2005 and his snare wound treated but he then disappeared and his collar was not heard again after this date. In October 2007, Jacket was photographed by a camera trap with an unidentified female, having now crossed the Lugenda River. He was subsequently recaptured and collared in an old cropland near Mbamba village. His second GPS collar was severely damaged and replaced with a VHF collar. From conversations with Mbamba residents it appears he is regularly seen in the mashambas and will provide interesting data on lion movements around this village.

- To date we have records of five snared lions, two within the intensive study area. In addition in 2007 a lioness was observed in the Luwire photographic concession (opposite the intensive study area) with a snare around her front right paw.
- Data suggests that there may be significant trade in leopard skins from NNR as mentioned earlier in this report.
- Conversations with Niassa residents suggest the current selling price for a leopard skin from NNR is between Mt900 to Mt1500 (\$40). This requires more attention.

4.5 Trophy monitoring & hunting guidelines

- In February 2007 a detailed trophy monitoring report (lion, leopard, buffalo, crocodile and hippo) was prepared for operators and SRN. This report analysed the data collected by the Niassa Lion project on lion trophy quality, and off-take over a three-year period (2004-2006).
- Each year all lion trophies are aged according to tooth wear, nose pigmentation and mane development and quotas are distributed to each concession based on previous years trophy quality using a “Points System” development by the Niassa Carnivore Project in collaboration with SRN (SRN Lion Regulations). In NNR only male lions over the age of six years may be taken as trophies as this minimizes pride disruption through infanticide and has limited effects on population growth.
- The objective is to use monitoring and education to reduce the number of underage lion being shot at trophies in NNR to below 10% by 2010.
- The 2006 trophy monitoring results were presented by K. Begg to the Niassa Hunting Operators in Lichinga in May 2007. Based on 2006 lion trophy quality and the Niassa Points System, two concessionaires received a decrease in lion quota and one Block received an increase.
- For the 2007 season all operators were provided with lion kits as in previous years (datasheets, camera, maps) as well as detailed guidelines on how to age lions in Niassa.
- In addition for 2007, simple leopard questionnaires (position, number of baits, condition, weight and measurements of animal) to be filled in by all hunters on taking a leopard trophy were distributed. All leopard skulls and skins have to be provided for inspection. Any leopard skin without an obvious scrotum attached will be assumed to be a female.
- Assessment of the development of manes, nose darkening and teeth wear in two young radio-collared male lions in the intensive study areas continued. Both lions were re-immobilized to attach new collars in October 2007. They were both marked in May 2005 when they were an estimated 3 years old and are now estimated to be an estimated 5 years old.
- Annual data on gradual nose pigmentation (Fig 9), tooth wear and mane development is used to validate visual aging cues in Niassa that can be used by Professional Hunters to age lions before they are taken as trophies.

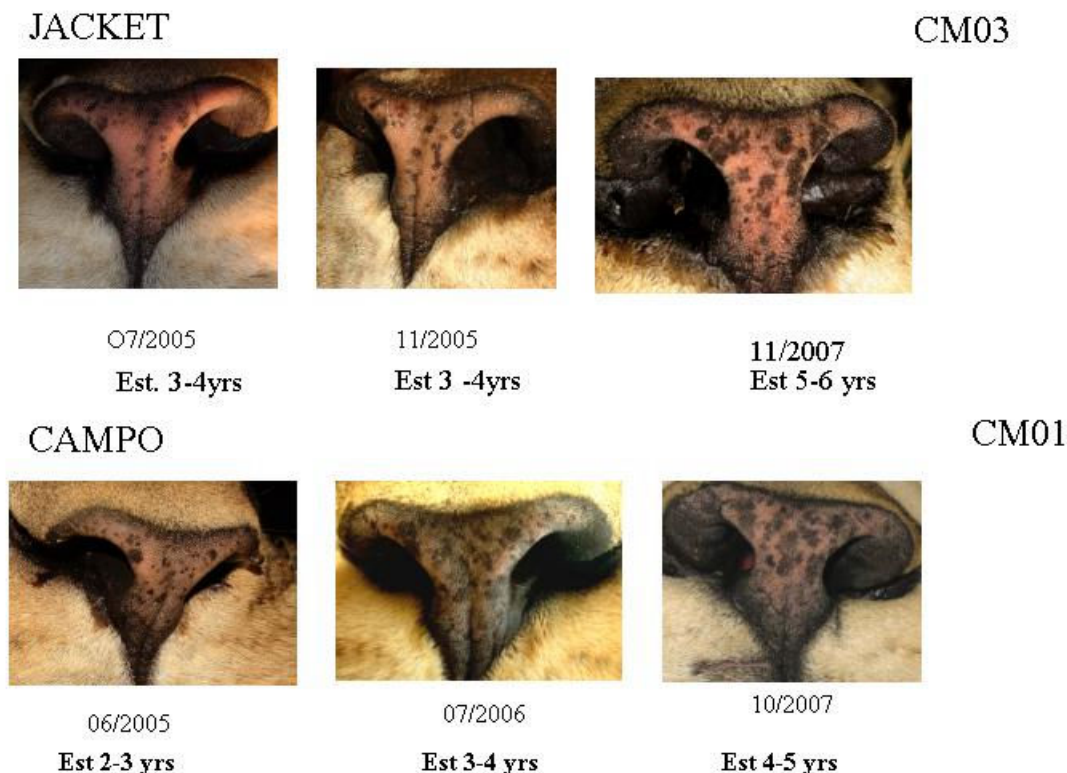


Fig. 9: Noticeable darkening of the noses of two radio-collared young adult lions in NNR over a three year period

- All operators were visited in November 2007 to age and measure leopard and lion trophies. The assessment of trophy age is not yet complete as X-rays of the pulp cavities of premolars still need to be done. A brief report on lion and leopard trophy monitoring results will be prepared and presented to SRN with recommendations for 2008 quotas by the end of December 2007.
- Preliminary results show that in 2007, eight of the fifteen lions on quotas were taken as trophies, and 50% of these lions were less than 6 years in age with one lion possibly younger than four. At least 5 lion hunts were unsuccessful as no suitable lion trophies were seen.
- Leopards are on Appendix 1 of CITES and trade is strictly regulated. Trophy monitoring is therefore essential. In 2007, at two females and several young animals were taken as trophy animals. Data on tooth wear will again be used to provide an indication of age in the leopard trophies and will eventually be correlated with weight, size and other physical characteristics. The aim is to develop visual aging characteristics that PHs can use to improve their assessment of leopard trophies.

5.0. Main goals for 2008

- At least two additional lion and four leopards will be radio-marked with GPS collars.
- A call-up survey of NNR on available roads following the same methods used in 2005 will be conducted both to compare density and age structure of lion population to 2005 estimate and to provide training to SRN/ NNR staff in survey techniques.
- Camera trapping will continue in riparian, open woodland and Miombo woodland as well around Mbamba village in the wet season.
- Five additional community scouts will be identified and trained and the 10 current scouts will attend a report back meeting in Mbatamila.
- Results on trophy monitoring will be presented at the annual operators meeting and results disseminated to Professional Hunters.
- An in-depth questionnaire survey will be initiated to collect detailed information on circumstances surrounding carnivore attacks since 2000.
- Mozambican Agostinho Jorge (SRN Employee- Honours Graduate from Eduardo Mondlane University) will spend three months with the project gaining experience in research and surveying techniques.
- Mozambican Vet, Rui Branco (supported by this project) will provide a registry of domestic dogs in NNR and vaccinate current dog population.

6.0. Niassa Carnivore Reports

- Begg, C.M & Begg, K.S. 2007b. *Niassa Wild Dog Project: Status and Conservation 2004-2006*. Unpublished report prepared for SRN, Maputo
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7.0. Expenditure for 2008

Not yet completed, will be completed at end of December 2007 and provided to FFI and SGDRN.

7.0. Proposed Budget for 2008 (Fair Play Foundation Funding)

Please Note: The Niassa Carnivore Project has several funding streams supporting different specific aspects of the project. The Fair Play Foundation funds are targeted primarily to support the monitoring and mitigation of threats to NNR wild dog population. Running costs and salaries are shared across the funders. The full budget for the Niassa Carnivore Project is available on request.

NIASSA CARNIVORE PROJECT 2008-FAIR PLAY FOUNDATION

Item	TOTAL			Fair Play Foundation	
	Cost/unit US\$	Total units	Total cost	NO. UNITS	US\$
Personnel					
Project leader (Colleen Begg)	1500	10	15000	2	3000
2 x Full time assistants salaries, food, uniforms,	100	24	2400	12	1200
Camp Assistant -radio, guard, general	90	12	1080	12	1080
Community assistants-Mbamba -2	23	24	552	0	0
A. Jorge (SRN: Trophy monitoring, MOMS- 3 mths)	600	3	1800	0	0
M. Murofa (1 month/yr: SRN: MOMS training, co-ordination	600	1	600	0	0
K. Begg (2 months/yr -trophy monitoring / animal immobilizations)	1000	2	2000	1	1000
Community scouts (information and time)	23	135	3105	41	943
SUBTOTAL			26537		7223
Workshops and meetings					
GIS training workshop-SRN staff	560	1	560	1	560
Community scout uniform	20	6	120	6	120
MOMS Community scouts -Training workshop -food & diesel	50	1	200	0.75	150
Conflict mitigation meetings and workshops			1000		0
MOMS Community scouts -Reporting meeting-food& diesel	50	1	200	0.75	150
SUBTOTAL			2080		980
Travel costs					
SRN representative -Maputo-NNR (A. Jorge)	350	1	350		0
NNR Operators Meeting -CT-Maputo +accommodation	900	2	1800		0
SRN meeting -NNR-Maputo	350	1	350		0
Travel International airfares, hotels, visas	1600	1	1640		0
RSA-Niassa Reserve air travel (portion)	500	2	1000	1	500
SUBTOTAL			5140		500
Running Costs / consumables					
Vehicle Fuel (200 lt drums)	239	15	3585	5	1195
generator Fuel- petrol	261	3	783	3	783
Research vehicle insurance & licensing			2727		927
Vehicle maintenance, servicing (2 vehicle)			3000	0	1800
Motorcycle maintenance	17	12	204	0	0
Motorcycle fuel-petrol	261	2	522	1	261
Basic Food supplies	100	12	1200	12	960
Miscellaneous camping & capture supplies			200		200
Emergency Evacuation Policy	550	3	1650	1	550
MOMS Community scouts stationery supplies/ datasheet	500		500	0	200
Trophy monitoring -vials,stationery and datasheets			100	0	0

Batteries			500	0	300
BUSHMAIL- HF email link	1000	1	1000	0	0
Notebooks, stationery, datasheets			200	0	200
Assistants uniforms	30	12	400	12	400
Veterinary drugs and supplies -capture			500	0	0
bank Charges			500	0	500
Annual auditing fees-Ratel Trust			700	0	700
Office supplies / ink / printing			300	0	0
SUBTOTAL			18571		8976
Research Equipment					
Field equipment-binoculars for A. Jorge-laptop, binoculars, camera			2100		0
Field equipment-binoculars for M. Marufo-laptop, binoculars, camera			2100		0
Research vehicle - to revert to SRN at end of project	35000	1	35000		0
Lion GPS collars and shipping charges	4000	4	16000	0	0
Leopard GPS collars & shipping charges	4000	0	0	0	0
Extra memory cards for camera traps	50	30	1500	30	1500
batteries for camera traps	1.5	360	540	360	540
Whip antennae	250	1	250	1	250
2 motorolas	500	2	1000		1000
VHF Receiver	1100	1	1100	0	0
SUBTOTAL			59590		3290
Domestic dog vaccination and monitoring					
Food and camping supplies			700		700
Assistant salary and equipment			600		600
Miscellaneous research supplies			100		100
6 boxes syringes		6	84	6	84
500 rabies vaccines		500	270	500	270
Cotton, antibiotics, antiseptic			100		100
SUBTOTAL			1100		1854
Sample and Trophy Monitoring					
Lion data collection kits	20	16	320		0
X-rays of pulp cavities	10	30	300		0
Carnivore disease Analysis			1500		500
SUBTOTAL			2120		500
Dissemination of results					
Niassa Newsletter	2	50	100	50	100
Local language -pamphlet			0	0	0
Analysis and preparation of reports			400	0	0
SUBTOTAL			500		100
Contingency / Miscellaneous (5%)			3500		2000
TOTAL			119138		25423