



Niassa Carnivore Project

ANNUAL REPORT



THE YOUNGEST NIASSA CARNIVORE PROJECT SUPPORTER AT THE MBAMBA VILLAGE LION FUN DAYS

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In collaboration with:



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EXECUTIVE SUMMARY

Niassa National Reserve (NNR) located in northern Mozambique is an extensive wilderness and one of the largest, most undeveloped and least known protected areas in Africa (42 000 km²). NNR has been identified as a priority for both lion (IUCN 2006) and African wild dog (IUCN/SSC 2008) conservation in eastern and southern Africa. Unlike many protected areas, NNR also supports a growing population of more than 30 000 people spread across 40 villages. The African lion is listed as vulnerable with an estimated 23 000 to 40 000 lions remaining in Africa (IUCN. 2006) while the African wild dog is considered endangered with less than 8000 individuals remaining (IUCN/SSC 2008). Range wide surveys have identified habitat loss and human-carnivore conflict to be the major cause of widespread declines. Niassa's lion population (800-1000 individuals) is believed to be one of only five lion populations left in Africa that is currently increasing and it represents one third of the national lion population (Chardonnet *et al.* 2008). The importance of this population for global conservation efforts is increased by its transfrontier links to populations in Tanzania through the Selous – Niassa Wildlife Corridor. The Niassa-Selous African wild dog population is the second largest wild dog population remaining in Africa. In addition, Niassa Reserve provides the core and source of largely unprotected lion and African wild dog populations extending from the east coast of Mozambique at Pemba to the western boundary with Malawi at Lake Niassa and extending 100 km southwards (Chardonnet *et al.* 2008). Protecting Niassa is therefore not only vital for lions but also for its significant populations of African wild dog, leopard and spotted hyaena.

The Niassa Carnivore Project (NCP) has been working in NNR since 2003 in collaboration with the management authority (SRN), Niassa communities and tourism operators. The mission of NCP is to secure the large carnivore populations in NNR by promoting coexistence between carnivores and people and mitigating all human induced threats. Major threats identified in NNR are indiscriminate snaring and poisoning, and retaliatory killing due to human –carnivore conflict. Secondary threats include potential disease outbreaks, targeted snaring for skins and the sport hunting of underage individuals (lion and leopard). NCP uses a four pronged approach of targeted pragmatic research and monitoring, community outreach/ education, training of Mozambican conservationists and direct mitigation of threats to achieve its objectives. The first phase (2003-2006) focused on research to understand and identify the major threats and provide baseline data against which future mitigation efforts can be measured. This second phase (2007-2010) is focused on reducing human induced threats to carnivores through community outreach and developing pragmatic, locally based solutions.

In 2009, specific research and conservation activities included continued radio-collaring of lions to assess movement patterns around villages, age structure and visual aging cues and mortality. Disease risk is being assessed through analysis of lion blood samples. A questionnaire survey of the western NNR village

complex was conducted to complete the historical data set of lion attacks. These data provide detailed information on high risk activities, age group and sexes of victims, village responses to attacks, etc. A total of 87 lion attacks have been recorded since 1970, with two people injured and two people killed in 2009. The main victims of lion attacks are adult men between the ages of 16 to 40. Attacks occur in fields and villages, with high risk activities identified as sleeping outside and walking at night either to the toilet or to protect fields from crop pests. A poster is in development to spread information on high risk activities and safe shelters and effective goat corrals. Five villages (the largest) have the highest rate of attacks (Mecula, Mussoma, Negomano village complex, Mbamba, Mavago). Testing of fences ("living" *Commiphora Africana* (African Myrrh) and bamboo) around fields and homes to reduce contact between lion and people is ongoing.

Annual independent monitoring of lion (n = 9) and leopard trophies (n = 23) continued and recommendations for 2010 quotas, and leopard regulations were prepared for SRN. To inform leopard quota setting camera trapping was completed in a sport hunted areas to assess leopard density compared to a non hunted area. A memo on sport hunting of lions in Niassa was prepared for SRN and sport hunting operators to address current concerns and a pamphlet was produced and distributed to sport hunting operators and clients entitled "A Quick Guide to Aging Niassa Lion" to reduce the number of underage lions taken as trophies.

NCP continues to support the development of the SRN Niassa community scout monitoring program (SMOG) through financial support, mentorship and an assessment and development of a three year strategy for SRN for the SMOG program to ensure it reaches its goal of representing 80% of all Niassa villages. Mentorship and training of NCP research assistant and SRN employee, A. Jorge, and field assistants E. Waiti and P. Sandali continued. Environmental education was initiated through three stakeholder meetings with teachers. A Niassa Conservation Story book focused on reducing human- carnivore conflict and an associated workbook is in development and will be distributed in 2010 accompanied by teacher training as a first step towards conservation education. Success of the project will be measured against baseline (2005-2009) data collected on lion population density, frequency of carnivore attacks, and the number of underage lions and leopards taken as trophies.

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1.0 MISSION STATEMENT:

The Niassa Carnivore Project serves to secure and conserve lions and other large carnivores (leopard, spotted hyaena and African wild dog) in Niassa National Reserve, northern Mozambique by promoting coexistence between carnivores and people. We acknowledge the costs to Niassa communities who live with carnivores while recognizing the potential of these carnivores to provide substantial ecological, cultural and economic benefits to Niassa Reserve and Mozambique. This mission is being achieved through direct mitigation of threats particularly human-carnivore conflict, targeted pragmatic research, development of locally based monitoring systems, mentorship and training of local conservationists and community outreach (education and awareness).



PROJECT OVERVIEW

Mitigation of negative human impacts on large carnivore populations:

Niassa National Reserve, Mozambique

| | |
|---------------------------------------|---|
| Reporting period: | January -December 2009 |
| Project period (Phase2): | July 2007 – Dec 2010 |
| Project Leaders: | Colleen Begg & Keith Begg |
| Research Assistant: | Agostinho Jorge (SRN research and monitoring officer) |
| Field Assistants: | Euzebio Waiti (Mbamba village) Alberto Mussoma (Macalange village) Pedro Sandali (Mbamba village) |
| General assistanta (part time) | Ndugu Alberto (Mecula village) Danny-Boi Saude (Mbamba village) |



2009 Niassa Carnivore Project Team:
Ndugu Alberto, Agostinho Jorge, Keith & Finn Begg, Euzebio Waiti, Danni-Boi Saude Alberto Mussoma, Colleen and Ella Begg, Pedro Sandali

2.0 PROJECT OBJECTIVES

1. Use targeted research and surveying to investigate and understand large carnivore status, density and ecological requirements and develop indicators and survey protocols that can be used for ongoing monitoring by SGDRN (Society for the development of Niassa Reserve)
2. Extend and refine the MOMS (Management orientated monitoring system) community-monitoring program to provide ongoing assessment of human-carnivore conflict and status of special species with 80% coverage of the NNR villages and to ensure local communities are engaged in carnivore conservation.
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. Assess and minimize the levels of disease risk (canine distemper, rabies, canine parvovirus) to carnivores (particularly African wild dogs and lions) through analysis of blood samples and management of the domestic dog population.
5. Assist SRN with the development and implementation of sport hunting guidelines and trophy monitoring systems for lion and leopard to ensure sustainable sport hunting.
6. Initiate environmental education and extension work in Niassa communities to build a relationship between wildlife and people based on accurate ecological information and successful mitigation methods.
7. Ensure monitoring is sustainable (not researcher driven) and consistent by providing appropriate training, mentorship, equipment and detailed surveying protocols to SRN (the management authority of NNR)
8. Disseminate the findings, mitigation strategies and protocols to inform broader national and regional carnivore conservation strategies wherever possible.

3.0 MAIN ACHIEVEMENTS (2003-2008)

- Completion of the first biodiversity survey of Niassa carnivores with 24 carnivore species identified (2003).
- Lions and African wild dogs identified as research and conservation priority for NNR (2004), MOU with SRN signed and Niassa Lion and Wild Dog Project proposal (Phase I) finalized and funding obtained. Phase II of Niassa Carnivore project initiated in 2007.
- NNR identified as a priority Lion Conservation Area in Southern and eastern Africa (IUCN Cat Specialist Group 2006) on the basis of data provided by the Niassa Lion Project.
- The transfrontier Selous -Niassa Wild dog population (Niassa National Reserve, Mozambique; Selous Niassa wildlife corridor and Selous Game Reserve Tanzania) is recognized as the second largest wild dog population left in the world . This is based on data from NCP confirming the presence of at least 350 African wild dogs inside NNR.
- Niassa Lion sport hunting regulations developed by the Niassa Lion Project and implemented in collaboration with SRN and Niassa tourism operators (2006). This system includes an innovative points system for assigning quotas based on lion age. Niassa Reserve becomes the only sport hunted area in Africa where a mandatory six year age limit for lion trophies is enforced. CIC Markhor Award is awarded to SRN/ Niassa in part due to lion sport hunting regulation. This system is adapted for use in Botswana on leopard and Zimbabwe on lion quota setting.
- In collaboration with SRN, and funded and mentored by NCP a pilot community based monitoring program is implemented in NNR (SMOG)to monitor human wildlife conflict, status of special species and fishing activities based on Namibian MOMS (Management Orientated Monitoring System) model (2006). To date 13 scouts from 12 villages have been trained.
- Preliminary data from first questionnaire survey of human lion conflict in NNR reveals that there have been at least 75 lion attacks in NNR in the past 30 years, (Begg et al. 2007).
- Production of NNR promotional DVD in Portuguese for Mozambican audience (K. begg), full length wildlife documentary “Badger Quest” with Portuguese edition (K. Begg) , publication of article in Africa Geographic Magazine (June 2007) to increase awareness of NNR and its conservation importance to broader audience.
- NCP assists with the development of the National Lion Conservation Strategy and Action Plan (2009).

4.0 OVERVIEW OF PROJECT PROGRAMS

The Niassa Carnivore Project (NCP) works in close collaboration with SRN, Niassa communities and tourism operators (ecotourism and sport hunting). The aim is to complement SRN's current conservation activities by providing input (data, advice, equipment, funding, training, conservation education materials) specifically focused on large carnivore conservation and to directly mitigate threats. NCP has a four-pronged approach:

1. Targeted pragmatic research and monitoring
2. Direct mitigation of threats particularly human-carnivore conflict
3. Environmental education, awareness and community outreach
4. Mentorship and training

4.1 TARGETED RESEARCH AND MONITORING OF THREATS AND STATUS

Sound scientific research underpins all our activities, as we believe that only with a good local understanding of the issues can effective conservation be achieved. However the aim of NCP is not to conduct in-depth ecological studies of Niassa lions or leopards. Research is specifically targeted at providing information needed to mitigate threats, providing baseline information against which the success of conservation activities can be measured and developing reliable indicators that can be used to sustainably monitor the carnivore populations over time.

Intensive ecological research and testing of mitigation measures is focused in a specific study area situated along the Lugenda River in concession block "L5-South" designated for ecotourism. The study area borders two sport hunting concessions on the south bank of the Lugenda River (L8, L7) with ecotourism concessions to the west (L4-East) and east (L5-north). It includes Mbamba village, a major village inside the protected area which supports approximately 3000 people and encompasses a mosaic of habitats (riparian, Acacia woodland, open wooded grassland, mixed woodland and miombo woodland) as well as an arc of granite inselbergs. The southern boundary of the intensive study area is a 30km stretch of the Lugenda River, which is the most intensively fished area along the 350 km of the Lugenda River contained within NNR. The river provides a critical protein and income source for several communities. The intensive study area therefore represents many of the larger challenges faced by NNR as a whole but it is not sport hunted. Surveying and monitoring of the status and threats to the large carnivore populations in NNR occurs throughout the protected area.



FIG 1. SATELLITE IMAGE OF INTENSIVE STUDY AREA (NORTH OF THE LUGENDA RIVER) IN EASTERN LUGENDA RIVER VALLEY OF NIASSA NATIONAL RESERVE.

OUR RESEARCH ACTIVITIES INCLUDE:

- a. Radio-marking of selected lion and leopard in the intensive study area with a combination of GPS and VHF radio collars to understand movement patterns, density, age structure, mortality, prey with a particular focus on the movements patterns of lion around villagers (why and when do they enter the village fields) and validation of visual aging cues (tooth wear, manes, noses, body condition).
- b. Remote camera trapping to determine the relative densities of different carnivores, density of leopard in hunted and non-hunted areas (to inform sustainable sport hunting quotas and provide a baseline), and movements of animals around village fields.
- c. Track and visual transects to assess prey density and relative densities of large carnivores.
- d. Questionnaire surveys throughout NNR to assess past and present human-carnivore conflict, behaviours that make people vulnerable to attack, mitigation methods already used by communities, cultural value of carnivores and influence of spiritual leaders etc.

Ongoing monitoring of the status of the carnivore populations and their threats is critical to assess the effectiveness of conservation efforts and identify problems and threats before a crisis develops. It is essential that monitoring is simple, sustainable (achievable in terms of funds and manpower) and relevant to the conservation objectives. It needs to be closely linked to mentorship and training of local conservationists to ensure it is not researcher driven but an integral part of the natural resource management system in NNR.

NCPS MONITORING ACTIVITIES INCLUDE:

- a. Development of a Community Monitoring System in collaboration with SRN whereby community monitors are identified by traditional leaders in each village to collect relevant information (sightings of special species, human- wildlife conflict, disease). These community monitors provide an important link between reserve management and communities and are a way for communities to get actively involved in natural resource management.
- b. Lion and spotted hyaena call-up surveys to assess density, age structure and changes in population structure over time (every three years).
- c. Annual monitoring and assessment of all lion and leopard sport hunted trophies to assess off take and trophy quality etc.
- d. Disease analysis from blood samples taken from domestic dogs as well as wild carnivores in collaboration with Mozambican State Veterinary Department

4.2 DIRECT MITIGATION OF THREATS

Research and monitoring between 2005 and 2008 have identified the main threats to large carnivores in NNR. These are listed in Table 1 in order of priority (this is not a static list but changes as mitigation measures are implemented and threats continue to be assessed). Finding pragmatic locally based solutions to decrease these threats is the main focus of the project. Mitigation of threats involves extension work and education (see 5.4), tests of physical barriers (fences, shelter) to reduce contact between people and carnivores, and assisting SRN with the development of sustainable and practical monitoring and regulatory systems (points system for minimizing underage hunting of lions, Problem Animal Control protocols)

4.3 MENTORSHIP AND TRAINING

NCP provides training and mentorship to both NNR staff and local villagers. Our activities include providing SRN staff with direct field training on the project, providing field staff with critical equipment where needed so they can work effectively (GPS, computers, binoculars, cameras), identifying and training local villagers as field assistants (GPS use, driving skills, radio tracking, basic car maintenance, trapping etc) and by sourcing and providing funding for subprojects and training run by SRN (vaccination of domestic dogs, MOMS training workshops etc). In addition, NCP provides SRN with equipment and skills needed to continue with monitoring activities (camera traps, call-up equipment, predator traps).

4.4 EDUCATION, EXTENSION AND AWARENESS

At present environmental education and extension work in Niassa communities is in its infancy. NCP reports information back to specific communities through local village meetings, posters and the community scouts to spread information on mitigation measures and basic ecological information. Environmental education is being initiated and will have two components a) SRN Teachers for Conservation Initiative which will include rehabilitation of the schools, provision of essential teacher materials and developed of a few conservation lessons for the local curriculum component of the national curriculum and b) NCP initiative which will be focused on development of Wildlife Clubs and developing a relationship between children and wildlife through provision of a Conservation storybook and activity book, and wilderness field-trips . Both initiatives are in development and funding is being sought. NCP also disseminates information from the project to a broader Mozambican and international audience through the e-newsletters, web pages, scientific papers, public presentations, film, photography and popular articles.

TABLE 1: RANKED THREATS TO LARGE CARNIVORES IN NIASSA NATIONAL RESERVE – 2009. NOTE THESE ARE ADJUSTED AS MORE DATA IS COLLECTED AND MITIGATION MEASURES ARE PUT IN PLACE

| Threat | Ranking | Comments |
|---------------------------------------|--------------------|---|
| Inadvertent snaring and poisoning | High | Snares set for meat and problem animals (bushpigs) inadvertently catch carnivores |
| Human –Conflict / Retaliatory killing | Medium | Loss of life, injury and stock losses |
| Sport hunting of underage leopards | Medium | Leopard in sport hunting concession in protected area |
| Disease – rabies and canine distemper | Medium | Likely to be spread from 200-300 domestic dogs resident in protected area |
| Targeted snaring for skin trade | Medium | Mainly for leopard, some lion |
| Sport hunting of underage lions | Low | Reduced threat due to SRN Lion regulations – Points System |
| Road casualties | Low but increasing | Particularly wild dog, increasing as roads are upgraded |
| Traditional medicine | Low | All species |

5.0 PROGRESS TOWARDS ACHIEVING OBJECTIVES

Appendix 1 provides a summary review of the progress achieved based on the 2009 objectives. Activities and results achieved for each objective are discussed in more detail below.

5.1. TARGETED RESEARCH AND MONITORING.

A detailed report on results of ecological research will be provided in July 2011 with full analysis of the lion research data collected by NCP between 2005 and 2010. This report simply provides a summary of data collected in 2009 field season.

ECOLOGICAL RESEARCH ON LION TO UNDERSTAND DENSITY, MOVEMENT PATTERNS AROUND VILLAGES AND ACROSS THE LUGENDA RIVER, AGE STRUCTURE, AND VISUAL AGING CUES IN NNR TO INFORM SPORT-HUNTING QUOTAS AND MITIGATION OF HUMAN –CARNIVORE CONFLICT.

- The lions in the intensive study area (1000 km²) have been monitored since 2005 through opportunistic sightings, call up and radio-marking of selected individuals. The focus is on understanding movement patterns and mortality around Mbamba village, movement across the Lugenda River, development of visual aging cues and monitoring of density and age structure over time.
- Since 2005, 12 lions have been radio collared: six females and six males (two males > 6 years old, 1 sub adult male, and 3 males in the 4-6 year old age category).
- Three lions were captured, two collars were replaced (two males both over the age of six years) and one collar was removed (sub adult female in pride of four females). The information stored on board two of these GPS collars provides the first wet season data on lion movements, although both collars stopped working in February / March. Data has still to be properly analysed.



FIG. 2 COLLEEN, AGOSTINHO AND EUZEBIO FIXING A NEW COLLAR ON LICM01 (CAMPO)

Age structure and aging cues

- During re-collaring of two male lions, aging cues were reassessed (teeth wear, mane development, mane development and nose pigmentation). One of these lions, Campo (LICM01) has been collared since 2005 when he was 3-4 years old. He is now 7-8 years old and his nose is clearly darkening with age and his mane is filled in behind the ears. In 2008, he shifted his home range to an area of Miombo woodland around Nkuti and Mbamba villages. His movements will be closely monitored as he is now considered a village lion. The reasons for his shift in home range are unknown; however there is a coalition of two old male lions currently in his old home range (LICM06 & LIM07).
- In 2008/2009 there were at least 22 lions utilising areas of the intensive study area (0.02 km²). Of these six were adult males (four over six), ten adult females, two unknown sex and six sub-adults. Two cubs were seen in November 2009 that might belong to F-pride female but this still needs to be confirmed. However, six of these animals were killed or missing by December 2009. The density in the study area has remained stable for three years despite these levels of illegal off-take but is not increasing despite increases in prey populations.



FIG 3: DARKENING OF CAMPO'S NOSE AT TWO YEARLY INTERVALS. HE IS CURRENTLY A 7-8 YEAR OLD MALE LION AND HIS NOSE IS MORE THAN 50% BLACK.

Mortality

- In the past five years, at least 12 lions have died in the intensive study area (Table2) and 75% of these deaths have been due to snaring / poisoning in Mbamba village. Information from the community suggests that these lions were not targeted but were caught in snares set for bush meat and to kill problem animals, particular warthogs and bushpigs. Four of these animals were radio-collared (see objective
- Lions killed in snares and found dead continue to be reported to NCP by Mbamba residents. While the level of snaring is of concern, it is a positive development that the Mbamba community is reporting these deaths as this information is difficult to collect without community assistance. This highlights the importance of addressing why lions are entering the village and machambas. By reducing the numbers of lions attracted into the villages this will not only reduce potential for lion attacks but will also reduce inadvertent snaring (see 2008 report on lion sightings in village during wet season).
- Three efforts were made to collar three “village” lions with GPS collars in 2009 adding to the three lions (one male and two females) that are already marked. However we were not successful as they were very skittish. In June-July 2010, Panthera’s capture specialist, Dr Guy Balme will be visiting NNR for 3 weeks. Guy will be teaching us how to foot snare safely and accurately. This technique has been successfully used for a variety of elusive felids and will help ensure we can catch the Niassa village lions. The aim is to collar all lions utilising the area around Mbamba and Nkuti village with a combination of VHF and GPS collars fitted with mortality sensors. This will allow us to quickly respond to any dead lion to assess cause of mortality. Additional information on movement patterns around the village will also be collected to increase our understanding of when and why lions are entering the village.

TABLE 2: OVERALL CAUSES OF MORTALITY IN LION STUDY POPULATION, DETAILS ARE PROVIDED IN THE END NOTES BELOW THE TABLE.

| Cause | Male | Female | Sub adult | Unknown |
|---------|------|--------------|-----------|--------------|
| Snaring | 3 | Possibly 1a* | 0 | 3b |
| Natural | 0 | 1c | 1d | 2e |
| Unknown | 0 | 1 | 0 | (uncollared) |
| Total | 3 | 3 | 1 | 5 |

a One collared female is currently missing, she is part of the Mbamba village pride and may have been snared

b Five lions were reported by Mbamba village as snared in 2008-2009, two were collared, and three were uncollared.

c Old female, death may have been caused by porcupine quills

d Sub-adult male died chasing a warthog and getting stuck by shoulders in warthog burrow

e Two dead lions reported by village within 100m of village surrounds, cause of death unknown but likely to be caused by humans.

Prey

- Ungulate transects through the intensive study area were completed in 2009 to monitor prey density for lions and leopards and will be compared with 2004-2006 and 2008 ground counts and used to complement the 2009 aerial census information.
- Data on lion prey continues to be collated. Prey records are obtained from opportunistic sightings from tourism operators, communities as well as from radio-marked individuals. An additional 14 prey records were obtained in 2009. For the first time in 2009, Niassa wildebeest was recorded as prey in the Block L9 in the east of NNR. In other areas wildebeest are a common prey species for lion, however in Niassa that had not previously been recorded perhaps due to low Niassa wildebeest numbers. While the diversity of species taken as prey continues to increase with increasing data, over the past three years the most important prey species has not changed. In Niassa, the most common prey species for lion are bush-pig, warthog, and buffalo.

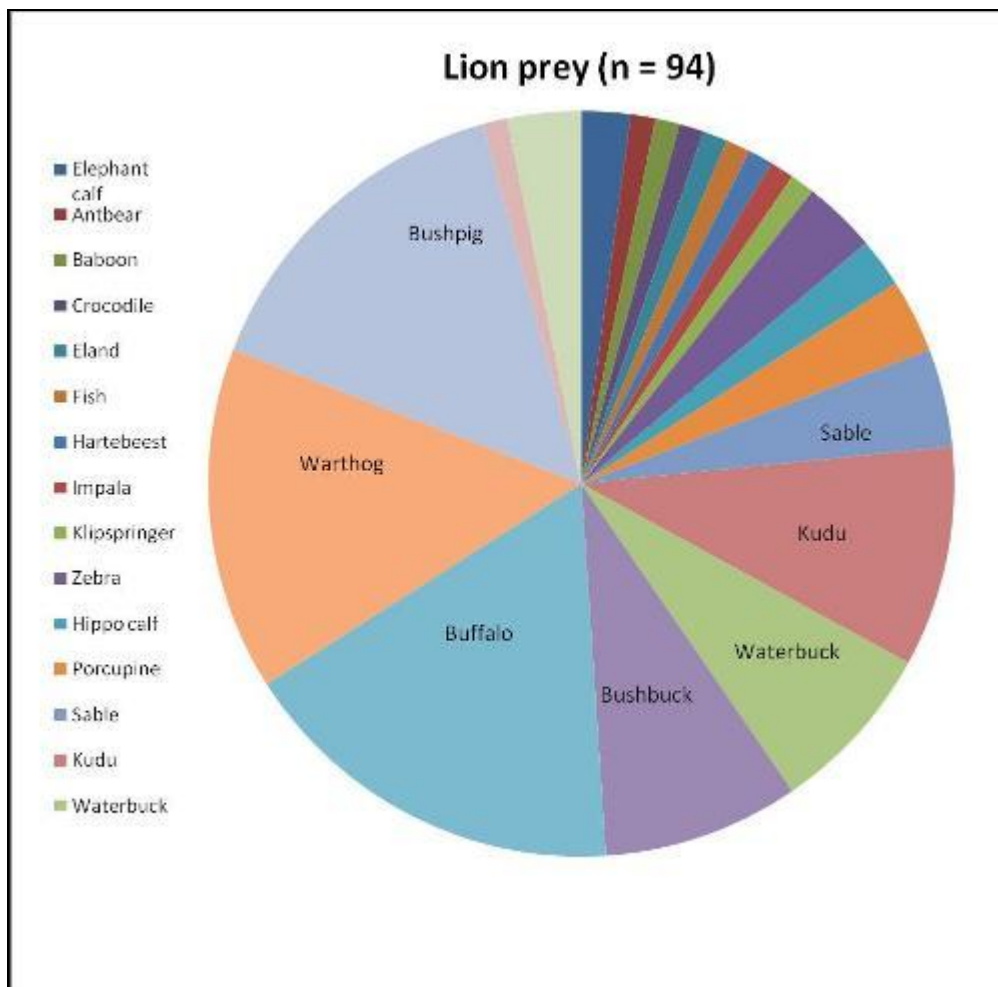


FIG. 4: PREY OF LION DETERMINED FROM OPPORTUNISTIC SIGHTINGS AS WELL AS FROM FOLLOWING RADIO-MARKED INDIVIDUALS.



FIG 5: YOUNG LIONESS WITH KUDU PREY

USE OF TARGETED ECOLOGICAL RESEARCH OF LEOPARD TO UNDERSTAND DENSITY, AGE STRUCTURE, AND VISUAL AGING CUES IN NNR TO INFORM SPORT-HUNTING QUOTAS

- Leopard density is being assessed to ensure sport hunting quotas and off-take is sustainable. No previous information was available on leopard densities in Niassa and little information is available on leopard densities in Miombo woodland. Current concerns about sport hunting of leopards and the effect of shooting leopards under the age of seven years (Packer *et al* 2009) suggest this should be a priority.
- To date nine leopards have been radio-marked in the intensive study area (6 males, 3 females). In 2009, one adult male leopard (Exodo) was collared and the collar on one female was replaced. The females are resident in the study area, but none of the males have remained in the study area for more than one year. The movement of males needs to be investigated further. One male leopard was found dead at a poached elephant carcass in 2009, Cause of death is unknown but he was possibly killed by lions scavenging at the carcass.
- We continued with camera trapping to assess leopard density. This year we set up two camera trapping grids, both consisting of 15 camera stations (two cameras at each site) in approximately 120 km² areas in a hunting concession (L7, L8) and in the intensive study area, mirroring each other. Film camera traps were kindly donated by Panthera. The cameras were in place for 60 days before being removed. Camera traps were checked every 7-10 days to assess battery levels and film by A. Jorge and E. Waiti. Data has not yet been analysed. These data will potentially be analysed in depth by A. Jorge

as part of his Research Masters program through Kwazulu Natal in 2010 with additional sampling in miombo woodland and possibly around villages.

- The camera trapping data from 2008 has finally been fully analysed. An array of 15 camera stations (30 traps) was set in a grid formation in the intensive study area to assess leopard density. Using the program CAPTURE and capture/ mark/ recapture statistics the data show that 17 leopards were present in an effective study area of 115 Km². This represents an overall density of 14.78 leopards / 100km². We have identified 14 individuals from their spot patterns; 6 males and 8 females. This provides the first accurate estimate of density of leopards in NNR the data will be analyzed further in the wet season. All the radio marked leopards were captured by the camera traps providing us with confidence in the technique. The radio marked data also show that leopards are rarely crossing the Lugenda River. Camera trapping data from 2009 and in 2010 in the same area will be used to investigate turnover in the leopard populations over time.
- DNA samples continue to be taken from both captured leopards as well as from leopard trophies for a genetic study being conducted by Prof. Conrad Matthee at Stellenbosch University, South Africa. Initial results suggest significant different within the leopard population in NNR, perhaps due to the east- west differences. These are being investigated further.



FIG 5: LEENA (LECF03), AN ADULT FEMALE LEOPARD WITH HER NEW COLLAR.

MONITOR THE STATUS OF THE AFRICAN WILD DOG POPULATION IN NNR THROUGH OPPORTUNISTIC SIGHTINGS

- NCP is collaborating with the Selous Niassa Wildlife Corridor (SNWC) to survey for large carnivores in SNWC, bordering the north western boundary of NNR on the Ruvuma River (178 km of common boundary). A particular focus of the survey will be the African wild dog. The African wild dog population in NNR, extending to Selous Game Reserve through the Selous Niassa Wildlife Corridor is believed to be the second largest in the world at present. This survey is therefore of critical importance. The first series of questionnaires have been completed and additional surveys will be completed in November. Several wild dog sightings as well as breeding records have been obtained by Krissie Clark, the researcher doing the questionnaire surveys.
- The MOMS/ SMOG community scouts collect ongoing data on wild dog sightings and pack sizes as average pack size and the number of sightings of wild dogs seen each year provide a simply indicator of wild dog status for NNR management. Average pack size of 35 packs in 2006 was seven individuals (Begg & Begg 2007) and this provides the baseline against which the data can be compared. Table 2 shows that the average pack size has remained stable at 7 – 9 individuals per pack over the past four years. The number of sightings has also remained stable with a slight decrease in 2009. Sightings of wild dogs from hunting operators and NNR staff continue to be collected each year and these data will be added to the database but have not yet been analyzed for 2009.

TABLE 2: SUMMARY OF COMMUNITY SCOUT WILD DOG SIGHTINGS INFORMATION BETWEEN 2006 AND 2009. PACK SIZE AND SIGHTINGS NUMBER ARE MONITORED TO PROVIDE A SIMPLE INDICATOR OF WILD DOG STATUS

| Year | Pack size | | | Number records |
|------|-----------|---------|---------|----------------|
| | Mean | Maximum | Minimum | |
| 2006 | 9 | 20 | 2 | 22 |
| 2007 | 8 | 23 | 1 | 43 |
| 2008 | 7 | 30 | 1 | 61 |
| 2009 | 7 | 30 | 1 | 42 |

MONITOR AND COLLATE HUMAN-WILDLIFE CONFLICT RECORDS.**Carnivore attacks**

- Collating of information on carnivore attacks has continued. 2009 attacks are summarized in Table 2. Data is still not being effectively collated by NNR as it is being collected by community agents (which do not yet represent all villages), tourism operators, security officer, community officer and NCP. A PAC reporting datasheet has been developed by NCP in an effort to standardize data collection and ensure full details are collected. It is suggested in the MOMS strategy that these datasheets be given to the MOMS manager to ensure all data are filed and collated by NNR staff in future.

TABLE 3: CARNIVORE ATTACKS ON PEOPLE AND LIVESTOCK IN NNR DURING 2009

| Carnivore | Person-Injured | Person-killed | Chickens | Goats | Domestic dogs | Other |
|-----------|----------------|---------------|-----------|-------|---------------|---------|
| Lion | 2 | 2 | 1 | 0 | 0 | |
| Hyaena | 5 | 0 | 0 | 0 | 0 | |
| Leopard | 0 | | 24 | 2 | 1 | 2 sheep |
| Total | 6 | 2 | 10 events | 2 | 1 | 2 |

- In 2009, two people were killed and two injured by lion inside NNR. In May two fishermen were attacked by a lioness on two separate occasions in the west of NNR Reserve, whilst sitting around the fire at their fishing camp. In August a man was killed by a lion when riding his bicycle in the east of the Reserve, few details are available but this highlight of dangers of people moving through the Reserve alone. A community scout reported a man was injured by a lion in Matondevela.
- Hyaenas injured four people in Milepa and one person at Matondevela. All Milepa attacks were on people sleeping out in the machambas. African wild dogs were not implicated in any attacks on livestock or people.
- No leopard attacks on people were recorded in 2009. Leopards caught chickens in three villages (Lissongile-16 chickens, Matondevela-7 chickens, Ntimbo 1 chicken) and caught two goats, two sheep, and a domestic dog in Hiputi village in the west of NNR.
- A lion was snared and possibly poisoned (a dead vulture was found near the lion carcass) in Lissongile after attacking chickens; the lion was skinned and the skin sold. This was reported by the community scout. A leopard was also reported to be killing chickens in this village.

- The community scout system (SMOG) is essential for monitoring human-carnivore conflict. Expansion of the community scout monitoring system to all villages in NNR should be a priority.
- In June, the final stage of the questionnaire surveys on carnivore attacks were completed in the seven remaining villages in the west of NNR by A. Jorge and E. Waiti. A separate report is available on request detailing this information. Information on 14 additional lion attacks since 1970 were collected. This completes the survey for the entire protected area (40 villages) with a total of 87 lion attacks recorded (fig 3, fig 4, fig 5). These data form the baseline for human-lion conflict against which future activities can be assessed. Detailed analysis will follow and a paper is in preparation.
- The data show that men are the most likely victims (86%), with 46% of the attacks on adult men between the ages of 16 and 40 and 40% of attacks on men older than 40. Few attacks are on youths (n =6 attacks) or children (n=3) and adult women (n = 4). It is likely that men are attacked more often than women as they engage in more risky activities i.e. walking alone at night to protect crops, protect families when lions appear, check snares, sleep outside. When children and youth are attacked they are generally killed rather than injured due to their small size. Extension works needs to focus on the adult men.
- An incident report has been developed for use by Reserve staff, operators and researchers to standardise the information collected in future and ensure data collection is ongoing. It is critical that details of each attack are collected (particularly the activity of the person immediately before the attack) so that we can understand what makes people vulnerable and thereby look for solutions. The challenge now is to make sure this incident sheet is used and the data entered.

Snaring & poisoning

- Indiscriminate snaring of lions is currently the biggest threat to lions in NNR. In 2008, 5 lions were snared in Mbamba village and at least two lions have been snared this year in the same village. On a positive note, the information provided by Mbamba village residents is the first concrete information we have been able to collect on the level of snaring and has confirmed the need to address this issue urgently (See section on mortality 6.1.1).
- Lions were not the targets of these snares they were set for bush meat or to control problem animals. This type of snaring is a complicated issue to address as it relates to problem animals, poverty and the need for meat, issues that are larger than lion conservation on its own. However, lions enter the fields due to high “prey catchability” and by decreasing prey species in villages we can decrease the number of lions inadvertently snared (see section on fences).

- One lion was found dead in Kambako from unknown causes and one lioness was sick. A further two lions were found dead 100m from Mbamba village cause of death unknown. A lion was found skinned near Lissongile village. It was reported to have been catching chickens, a baited snare (bushpig) was used to kill the lion. Poison might also have been used as a dead vulture was seen close to the carcass. W. Ebersohn (SRNSecurity Officer) found another skinned lion in a fishing camp close to Nguli Falls.
- We have received reports of two leopard traps found in the north eastern section of the Reserve. Both appear to have successfully caught a leopard, although one broke out of the snare. We received reports from Lichinga (E. Young, Johan Calitz safaris) of two leopard skins and skulls selling for Mt8000 each (\$275). The price for sale in the NNR is Mt 2000 (\$70).

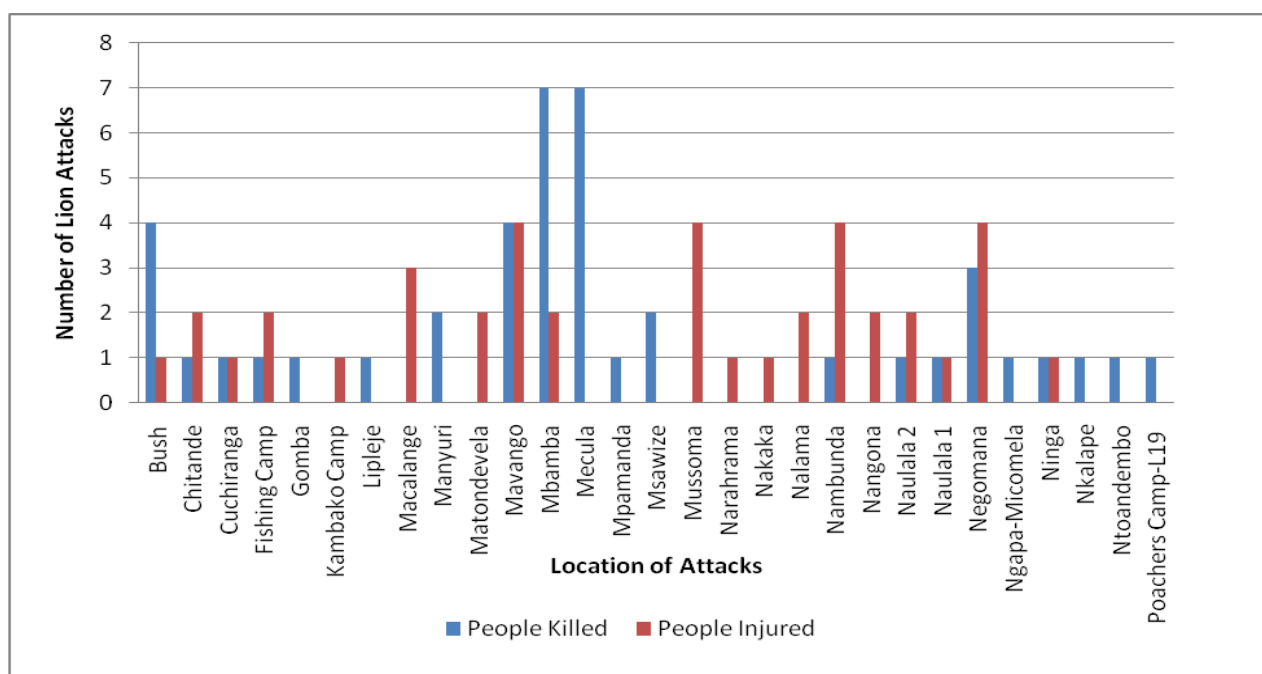


FIG. 6: DISTRIBUTION OF LION ATTACKS ACROSS NIASSA VILLAGES SINCE 1970

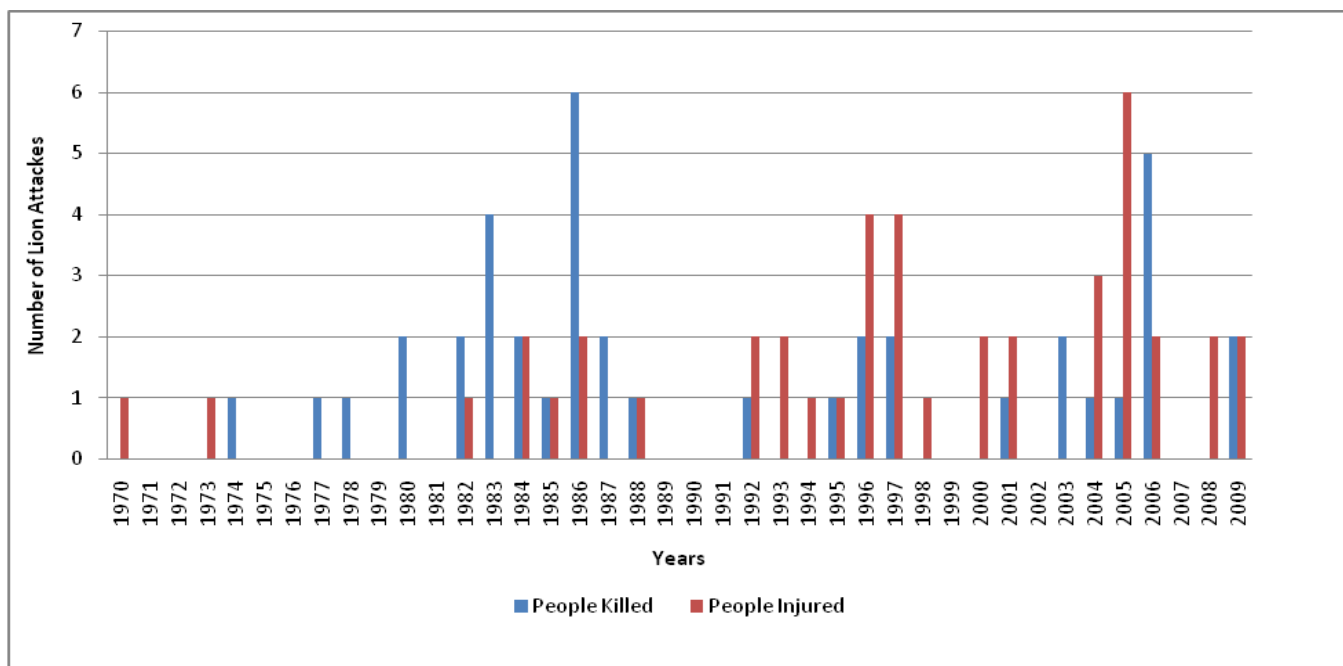
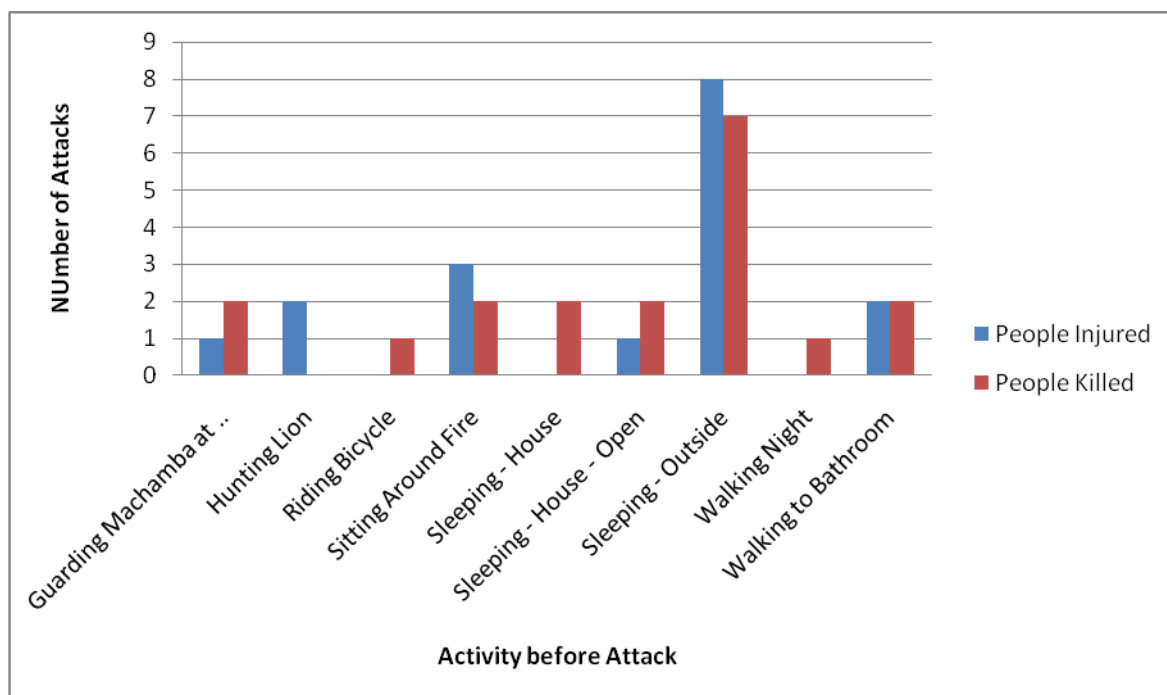


FIG. 7: NUMBER OF LION ATTACKS PER YEAR IN NIASSA NATIONAL RESERVE SINCE 1970



8 .ACTIVITIES OF PEOPLE BEFORE THEY WERE ATTACKED BY LIONS SHOWING THAT SLEEPING OUTSIDE WITH NO PROTECTION OR IN OPEN SHELTERS (NO DOORS OR WALLS) ARE THE HIGHEST RISK ACTIVITIES.

INITIATE TESTING OF PHYSICAL BARRIERS TO REDUCE HUMAN CARNIVORE CONFLICT.

- In December 2008, the first experimental trials of a bamboo fence built to prevent bush pigs and warthogs from entering fields during the critical crop period were initiated. Warthogs and bush pigs are a favoured prey of lions. Lions enter the fields to catch pigs and this brings them into contact

with people. Decreasing the number of warthogs and bush pigs entering the machambas/ fields will therefore not only help the communities control a major crop pest but will also decrease the possibility for human-lion conflict. Bamboo fences are been used by some people both inside the Reserve (Mecula) and outside the reserve to protect against warthog and bushpig damage, however the effectiveness of this technique were unknown.

- The fence was built by four people over a 5 day period (30m x 40m) around a rice mashamba known to experience high levels of warthog and bush pig damage (Fig. 7) in Mbamba village. A neighbouring field with similar problems was used as a control. Pedro visited the two machambas every day from December to April and noted the number of times warthogs entered and the amount of food (rice) eaten).
- Results were encouraging and suggested that further testing of fences was warranted. Over a 5 month period, warthogs entered the field without the fence on 28 occasions compared to only five occasions in the field with the fence (Table 3). Warthogs broke through the fence near the end of the wet season in areas where the fence had started to degrade. Most revealing was that Mzee Iweni, owner of the fenced field was very impressed with his fence and plans to maintain it and use it again in 2009 / 2010 wet season.
- A community meetings lead by Euzebio Waiti and Pedro Sandali was been held in Mbamba village in June to report back on pig fence results and planned activities of NCP in 2009 dry season. . All agreed the fence worked well but community elders felt the labour needed to build the bamboo fence each year and the long distances needed to collect bamboo would prevent most people from building the fence. Termite activity results in bamboo fences needing to be rebuilt every 1-2 years.



FIG. 9: EUZEBIO WAITI REPORTING BACK ON THE PROJECT'S ACTIVITIES TO MBAMBA VILLAGE COMMUNITY.

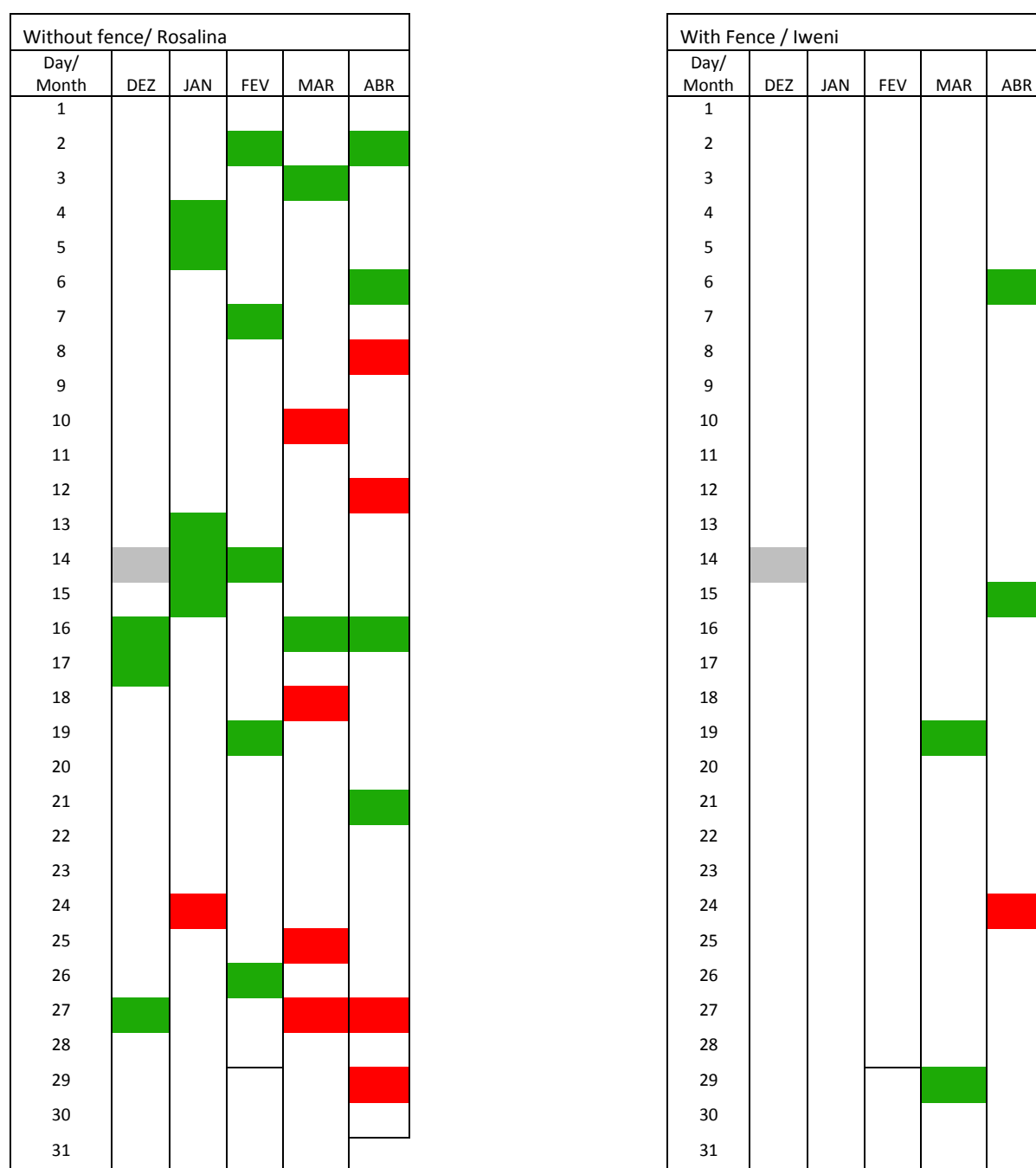


FIG. 8: VISUAL REPRESENTATION OF WARTHOG AND BUSH-PIG DAMAGE TO AN UNFENCED AND BAMBOO FENCED FIELD IN MBAMBA VILLAGE IN 2009, WHERE GREEN SQUARES REPRESENT A PIG ENTERING THE FIELD BUT NOT EATING AND A RED SQUARE REPRESENTS A PIG ENTERING A FIELD AND EATING THE RICE CROP. THE DATA WERE COLLECTED BY RESEARCH ASSISTANT PEDRO SANDALI. THEY ARE PRESENTED IN THIS VISUAL FORMAT TO MAKE THE DATA UNDERSTANDABLE TO VILLAGE COMMUNITY AND WERE REPORTED BACK TO THE COMMUNITY BY PEDRO IN JUNE 2009.

- “Living fences” may provide a more sustainable alternative to bamboo fences We are experimenting with the potential of using “living fences” around machambas to minimize bush-pig and warthog damage and for walls around homestead and corridors to toilets to minimize lion attack. A variety of different local thorny plant species were planted and tested this dry season.

Commiphora africana has the best potential. It coppices easily from small cuttings, cuttings are readily available in Cabo Del Gado province where it is already in use as a fence, and it forms a formidable barrier that will potentially keep out lions as well as bushpigs and warthogs. It is used in Tanzania by the Maasai to keep cattle safe at night. These fences require input initially to plant but thereafter need little maintenance. New fences can be built simply by coppicing from already established fenced, which ensures sustainability. It requires no technical expertise and equipment and local communities are already acquainted with coppicing of manioc.

- A community meeting was held in Mbamba village in November to introduce *Commiphora africana* to the community and discuss how to test it in Mbamba village. The community was supportive and excited by the potential of *C. Africana* as a living fence. One Mbamba resident man had previous experience with *C. Africana* in Tanzania and agreed it had potential. Elders agreed that an initial fence would be planted around Chefe Ngongo's field in the 2009/ 2010 wet season with cuttings provided by NCP. The fence was planted in November 2009 ten days before the first rains arrived by Chefe Ngongo and his family with guidance from NCP. A crossover technique was used to minimize "holes" at the base of the fence. Initial results were encouraging as the fence had already produced shoots by mid December. This fence will be monitored throughout the wet season by E. Waiti. Once it is established further cuttings will be brought in to initiate more widespread tests of fence designs.



FIG. 10: PEDRO AND ELLA CHECK THE STATUS OF THE *COMMIPHORA AFRICANA* CUTTINGS IN CAMP –



FIG. 11: COMMUNITY MEETING IN MBAMBA VILLAGE TO INTRODUCE *C. AFRICANA*, PAO PIKU (PHOTO A. JORGE)



FIG 12. FIRST PLANTING OF *C. AFRICANA* IN MBAMBA VILLAGE IN CHEFE NGONGO'S FIELD WITH ASSISTANCE OF A. JORGE (NCP)

IMPROVE CAPACITY OF NNR TO RESPOND TO HUMAN-CARNIVORE CONFLICT EVENTS BY DEVELOPING PAC GUIDELINES FOR LARGE CARNIVORES

- SRN has developed guidelines for Problem Animal Control in NNR and these were provided to NCP for comment. Related to this document a list of “rules for safe behaviours” for communities will be developed to minimize human-wildlife conflict. A poster or pamphlet will be developed by once these rules have been agreed on for distribution in the communities.
- In May a lioness attacked a fishermen at a fishing camp, a second attack occurred three days later. This attack was reported to SRN and NCP by the sport hunting operator operating in the area and immediate attempts were made by the Professional hunter to find the culprit, an old lioness. The PH requested permission from SRN for the client to hunt this problem lion given that a lion hunt was going on in the area at this time. This was not supported by NCP. NCP takes the position that involving client in problem animal control complicates an already complicated issue particularly since it precludes the use of call up equipment to find the lion and can delay the process. In

addition, by allowing this it provides the opportunity for less than scrupulous sport hunting operators to fabricate problem lion incidents in order to increase their quotas. This has been a problem in other areas. In this case the lioness was not found, however no further attacks occurred and it is hope she died.

EXAMINE THE CULTURAL ROLE OF LIONS AND OTHER CARNIVORES IN NIASA COMMUNITIES.

- The visit by Dr Paulo Israel, anthropologist planned for 2009 to investigate cultural role of carnivores to communities in NNR did not take place due to his other work commitments. Paula Ferro (MSc Anthropology, Paris Univeristy) who has been working on understanding pedestrian routes in NNR will be assisting us in 2010 to investigate the cultural value of lions, and assisting with teacher training and collection of baseline information on perceptions of carnivores to assess environmental education in the future.
- In-depth interviews of two spiritual leaders connected with the Chembamb Spiritual site were documented in Swahili, these are currently being translated into Portuguese.
- Conversations with adults and children in Mbamba village were initiated to explore possible cultural value of large carnivores including any proverbs, myths and legends involving large carnivores (with the assistance of P. Ferro, anthropologist). However at present, communities appear to see little cultural or ecological value to large carnivores with the only economic value being sport hunting and sale of their skins. Many residents would prefer there to be lions in NNR due to the dangers they pose to people and livestock. There is little understanding of ecological issues and when asked to use words to describe lions or leopards, the only words used were words used were related to skins and conflict. Environmental education is critically needed.

SUPPORT AND GUIDE PROGRAM TO REDUCE DISEASE RISK TO CARNIVORES IN NNR

- A three year strategy for reducing the number of domestic dogs inside NNR and reducing disease risk was prepared by Rui Branco based on his work in 2008, partially sponsored by NCP. NCP has commented on this document and discussed this with SRN. No action was taken in 2009 due to lack of capacity in NNR at present. SRN and NCP are looking for the funding and appropriate personnel to put this program in place (\$12000 over three years).
- There is no doubt that the longer we wait to put this program in place the more difficult it will be to control the domestic dog population which has grown exponentially in the last three years. The risk of disease is significant as there have been two rabies outbreaks in areas surrounding the reserve in the past three years.

- Blood samples continue to be taken from collared animals for analysis of disease risk. Samples are being stored at the National Veterinary lab in Maputo awaiting analysis (canine distemper, TB). We are attempting to resolve why there has been such a delay in the analysis. If no analysis is done in the next few months then we will try to get the samples transferred to Onderstepoort in South Africa for analysis. Funding from 2008 and 2009 is still available for this analysis (\$2300).

5.2. COMMUNITY OUTREACH AND EDUCATION

ENGAGE WITH SPORT HUNTERS OPERATING IN NNR TO REDUCE RISK OF UNSUSTAINABLE SPORT HUNTING (HUNTING OF UNDERAGE INDIVIDUALS) AND DEVELOP GUIDELINES FOR THE SPORT HUNTING OF LARGE CARNIVORES IN NNR IN COLLABORATION WITH SRN.

- A pamphlet entitled “A Quick Guide to Niassa Lions” was developed by NCP to assist professional hunters (PHs) and clients in correctly aging Niassa Lions. This was based on five years of data collected by NCP. A presentation was done for Barbara Crown of “the Hunting Report” on NCP activities focused on monitoring of sport hunting activities.
- Questionnaires, details of the information required and the pamphlets were distributed to all operators before the hunting season began in June. Email communication has been maintained with all the concession holders. Full details are required for all leopard and lion hunt even if no trophies are taken.
- NCP continued to provide independent assessment and aging of all lion and leopard trophies for SRN. In 2009, all lion and leopard trophies were assessed, aged and measured. Five lions and 23 leopards were taken as trophies with one lion and one female leopard shot “by mistake”. Details of leopard, lion and wild dog sightings have also been collected wherever possible. Provisional lion quota recommendations have been prepared according to SRN points system. Based on trophy quality all quotas should remain the same for 2010 except for Block L9 which should receive a decrease in quota from three lions to two lions. Full details of trophy monitoring will be provided in the Annual sport hunting report available end of February.
- Guidelines from leopard collaring show that it should be obvious to tell male and female leopards apart, with adult male Niassa leopard weighing an average of 43kg and females 28kg. Professional hunters are advised that if they cannot easily tell whether a leopard is a male or a female, the male is probably a sub adult and too young.
- The Annual SRN Operators meeting was postponed until December 2009. NCP was asked to present the 2008 sport hunting results to all present (SRN, NNR sport hunting operators,

government officials and interested parties). Following the presentation a number of questions and criticisms of NCP and the six year lion age minimum were raised. The SRN lion regulations with a mandatory and monitored six year age minimum were instituted in 2006 in collaboration with NCP. These regulations have been successful at reducing the number of underage lions (under the age of six) taken as trophies and as result lion off take has declined to 3-6 lions / year from a quota of 18 lions. However some operators assert they are unable to make a profit on this level off-take and SRN Tourism Officer suggested the six year age minimum and lion quotas need to be reassessed. These issues are dealt with in detail in a short comprehensive memo prepared by NCP (available on request) and in the 2009 Trophy Monitoring Report for lion and Leopard. Based on scientific data, NCP does not support any increase in the off-take of lions at present as it believes this will be unsustainable given the current lion density and level of illegal off take.

- Provisional leopard guidelines were prepared and presented to all operators. At present it is impossible for professional hunters to accurately age leopards in the field. This is supported by camera trapping data from NCP that shows large differences in condition and appearance of the same adult male in a year period. However, given that leopard are on Appendix I of CITES and there is some concern about high off-takes in other areas (Packer et al 2009), NCP suggests penalties should be incurred if full information including a GPS position, questionnaire, body-length measurement and weight is not provided, trophies are not provided for aging and assessment, if female leopards are killed and if skins are stolen. More details are provided in the 2010 Trophy Monitoring report. A version of the SRN Lion Points System is being utilised to determine leopard quotas in Botswana

DEVELOP MOMS COMMUNITY SCOUT MONITORING PROGRAMS

- The SRN Community Scout Monitoring program (MOMS/ SMOG) has now been running for four years and there is no doubt it is a valuable and effective program, with the community scouts providing an important interface between NNR management and the communities. However, some changes are needed and a plan developed for its further development to make sure it reaches its full potential. At present the SMOG community scout program is fully funded by NCP.
- NCP has developed a three year strategy /plan with a budget for the SMOG program based on feedback from all stakeholders. This is currently with SRN for review. The most important recommendation is the hiring of a fulltime SMOG Manager to coordinate the training and support of community scouts, data and financial management and regular reporting.

- The fourth annual SMOG training workshop for the 13 Community scouts from 12 villages took place in Mbatamila on the 22/23 September, again lead by Agostinho Jorge and Mbumba Marufo. This year no new scouts were trained as the focus was on providing further training to existing scouts to develop their role as extension agents for NNR and discussing problems and solutions. Two bicycles and three soccer balls were presented to scouts that have been collecting excellent information since 2006 (Fig. 3). Data on special species, fishing activities and human-wildlife conflict was analysed and scouts assisted with preparing annual reports. As part of our initiative to train the scouts to not only collect valuable information but also to communicate information from the reserve to communities, Agostinho Jorge presented information on ways for communities to avoid conflict with carnivores – corrals, safe behaviours, shelters, etc. Wim Ebersohn (Security Officer) talked to the scouts about the type of information that was needed for the Reserve scouts to respond to problem animals.



FIG. 13: FOUR COMMUNITY SCOUTS RECEIVE BICYCLES AND FOOTBALLS FOR EXCELLENT WORK ACHIEVED IN THE PAST YEAR

(PHOTO A. JORGE).



FIG. 14. FOURTH ANNUAL SMOG WORKSHOP – THE COMMUNITY SCOUT TEAM (PHOTO A. JORGE)

INITIATE ENVIRONMENTAL EDUCATION AND AWARENESS IN NNR

- Niassa Reserve teachers are a vital resource for conservation management. Through the teachers the most educated people in each village, important information on ecology, resolving human wildlife conflict and the meaning of living in a protected area can be communicated to children in an age appropriate way. By teaching the children, the information will filter through to the adults. Many adults in Mbamba village have never been away from their village and have no concept of their place geographically. There is currently no environmental education or ecology being taught in the schools aside from some ecological information provided in the Government school books in grades 5 and above. Most children do not appear to know they live in a protected area and what this actually means. There is also little understanding of the importance of animals in the cycles of ecology beyond being a source of meat and skins. Animals are generally seen as problems or food.
- In June, a meeting was held with Mbamba school teachers at their request in Nkuli camp. NCP was asked to be a Friend of the Mbamba School. It was agreed that the teachers would provide us with a list of materials needed for the community to upgrade and fix the two old school rooms. In addition, teachers were asked to provide the children with information on ways to protect themselves from carnivores and to report any carnivores snared in the village. The school supports 328 children in seven grades.
- Based on the list provided, NCP has rehabilitated one of the old school rooms. Doors and shutters still need to be made. This was a collaborative effort with rehabilitation initiated and guided by Mbamba teachers, materials paid for by NCP, labour done by Mbamba community members and NCP, payment of workers provided by Director of Education, and desks provided by NNR/ SRN made from timber confiscated from illegal logging activities inside NNR. The Director of the Mecula District provided funds to pay the painters and workers and SRN / NNR provided 30 school desks made from confiscated timber in NNR. Work on the second schoolroom will continue in 2010.
- Initial funding was obtained for development of a Conservation Storybook for all Niassa Reserve Schools. Additional funds have been sourced for a workbook and cloth ABC conservation wall-chart that will also be completed in 2010 and will be closely linked to the storybook. The storybook is currently in development. It is a locally relevant story about a young girl that has a strong conservation message with a focus on large carnivores and protecting yourself from attack. The pictures will all be locally relevant. This book will help with literacy and numeracy and will be

complementary to the national syllabus. It will be accompanied by an activity book for each child with a number of games and exercises all with an ecological/ conservation theme.

- Afra Kingdon, a well known artist, children's book author (recent book is "Green meets White"), and naturalist was contacted to prepare the materials. Afra has spent two weeks with NCP in the field to ensure the details in the story and illustrations are locally appropriate. As part of her visit, two mornings of conservation activities were planned in Mbamba village. The aim of these Lion Fun Days was to make conservation fun, motivate the school children and assess their abilities to do different activities to make sure the activity books are set at the correct level. The materials are currently being developed, translated into Portuguese and ready for distribution in June 2010. If funding can be obtained, distribution will be accompanied by teacher packs including waterproof containers to store books and teacher training to ensure resources can be used effectively by the more than 45 schools inside the protected area.
- Two meetings were held with all Mecula district teachers as well as the Directors of Education in Mecula to discuss the development of the materials and to allow the teachers to contribute ideas for the conservation storybook and activity book. Feedback from the community and Teachers has been overwhelmingly positive and the activities were productive in informing the development of the conservation educational materials.

Mecula Wildlife Club.

- Two teachers from Mecula Secondary School initiated the first wildlife Club in Niassa Reserve – the Mecula Wildlife Club and asked Nkuli to be patrons. The Club currently has 28 teenage members.
- The leopard was chosen by the member as an emblem and objectives have been drawn up. The first meeting of the Mecula Wildlife Club took place in December 2009. Children were collected by NCP and SRN community Officer and transported to the Reserve Headquarters at Mbatamila for a tour of what the Reserve does. A wildlife DVD on leopards was chosen and a meal was provided. Wildlife club members drew pictures of leopards for each month and a calendar has been produced with the help of NCP to raise money for the club.



FIG. 15: MBAMBA CONSERVATION FUN DAYS – 2 & 3 NOVEMBER 2009: AGOSTINHO SHOWS CHILDREN WHERE THEY LIVE IN THE WORLD AND THERE PLACE IN NIASSA NATIONAL RESERVE



FIG 16: REHABILITATION OF OLD MBAMBA VILLAGE SCHOOL ROOM



FIG 17. MEMBERS OF THE NEWLY FORMED MECULA WILDLIFE CLUB

5.3. CAPACITY BUILDING

MENTOR AND TRAINING OF LOCAL MOZAMBIKAN CONSERVATIONISTS

- Agostinho Jorge has spent 6 months with us in the field this year obtaining experience in all facets of the project from research technique, through to community outreach, logistics and entertaining of donors. His help has been invaluable particularly with camera trapping and questionnaire surveys in Mavago..
- Agostinho has applied and been accepted to do a Research Masters at the University of Kwazulu Natal, South Africa. His field project will be completed as part of NCP and NCP is committed to continuing to provide him with support wherever possible. Agostinho will continue to assist NCP with environmental education and the “living fences” program in 2010 where time allows.
- NCP Research assistants, Euzebio Waiti and Pedro Sandali , both Mbamba residents have been developing their skills presenting results to their community and interacting with the school children. Euzebio commented that two years ago he never would have imagined the work he would be doing, the standing he know has in the community. Both Euzebio and Pedro help to guide educational activities and NCPs interactions in Niassa communities.
- Euzebio is now fully trained in camera trapping, radio tracking, captures and basic data entry as well as 4x4 driving. In 2010, P. Sandali was taught basic data entry into excel and access databases. He has also just obtained his driver’s license (January 2010).

- Through NCP, Funding has been obtained from the WCN Solar Project (Stephen Gold) for a \$90 000 professional solar systems for Mbatamila, the Reserve Head quarters. This will provide a reliable
- power source for the offices, including the VSat Email systems and computers, charging of batteries for communication systems as well as lights and solar showers for the scout camp. It will hopefully cut the diesel bill in half and will ensure that no further expensive equipment is damaged by power surges. The system is currently being packed for shipping and it should be in place in 2010. This is the largest project sponsored by the WCN solar program. NCP will also receive one rack of solar panels to help run our camp. This solar system will make a significant contribution to conservation in NNR.

5.4 DISSEMINATE FINDINGS AND PROMOTE AWARENESS OF PROJECT

DISSEMINATE THE FINDINGS, MITIGATION STRATEGIES AND PROTOCOLS TO INFORM BROADER NATIONAL AND REGIONAL CARNIVORE CONSERVATION STRATEGIES WHEREVER POSSIBLE.

National Lion Conservation Strategy and Action Plan

- On the 16th & 17th July a workshop was held in Maputo, Mozambique by MITUR (Ministry of Tourism) to develop a National Lion Conservation Strategy and Action plan. Colleen and Agostinho were invited to contribute. Colleen presented an overview of the lion population status and conservation activities in NNR. The NCP also provided funding for the printing of the final survey report on which the meeting was based. NCP contributed to this report. This report (based on two surveys completed in 2007 and 2008) suggests that there are at least 2700 lions in Mozambique concentrated in three important lion conservation units, all with trans-frontier links. More than 30% of the Mozambican lion population is believed to be protected within Niassa National Reserve (800-1000 lions). This highlights the need for conservation work in this area to secure this population.
- The Action Plan was to be completed by MITUR in October (not yet received for editing) with an aim to receive endorsement from the National Government by next year. This is only the first (though critical) step, the challenge is to translate this ambitious plan into reality with limited resources.
- An email newsletter has been initiated with the first edition sent out in May 2009, second edition in September. This allowa us to keep all our sponsors, partners and supporters up to date with our progress.

- NCP has been contributed to the MAPA (Mapping Africa Protected Areas) project which is producing a layer for Google Earth that shows protected area boundaries and details of conservation projects. NCP has details on the NCP project mission and objectives, sponsors and activities on this layer, this layer will be going live on Google Earth in the next few months but can be seen. <http://earth.google.com/outreach/africa1.html>
- NCP has decided not to develop its own website yet, as the funds needed for this can be better spent on other priorities given that the project is well represented on sponsors website, particularly the website of the Predator Conservation Trust (www.predatorconservation.com/niassa)
- C. Begg has been invited to become a member of the IUCN Cat Specialist Group and IUCN Canid Specialist Group. She is already a member of the African Lion Working Group and these affiliations help to ensure contact is maintained with other research programs so we don't "reinvent the wheel" as there are a large number of excellent conservation projects following similar lines.
- NCP was invited as a return guest speaker to WCN Expo in San Francisco, USA in October; Keith attended the three days of workshop and two days of donor events and spoke to an audience of more than 500 people at the WCN Expo Event about Niassa and lion conservation.
- After a yearlong application process, NCP has been accepted as a partner of the Wildlife Conservation Network (WCN), and will join 12 other partners working on conservation projects in developing countries around the world (www.wildnet.org). WCN will not only assist NCP with securing funding but provides support and technical advice on a number of other levels (development of business plans, promoting the project, technical advice and contacts etc).
- In 2010 NCP is organising and funding an informal meeting in Dar es Salaam, for people working on human- carnivore conflict in the region particularly man-eating to allow us to share ideas, test possible solutions in other areas, and prevent us from "reinventing the wheel". While several reports are currently available that focus on human-carnivore conflict and discuss broad mitigation measures e.g. insurance schemes, livestock protection, there is little information on the specifics of reducing human-lion conflict on the ground e.g. how to build a fence, livestock boma, corral etc that works.

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2009 Year Review (based on 2009 NCP Workplan)

Of the 39 activities identified in the 2009 workplan, 90% of the activities have either been completed (62%) or are in progress due for completion in next 6 months (28%). Four activities (10%) are still planned but no progress has been achieved and two activities have been discarded (see comments). Three of the four activities still planned have been delayed by circumstances out of NCPs control (two postponed by SRN and one was postponed by the anthropologist).

| Objective | Activity | Complete | In progress | Still planned | Discarded | Comments |
|---|---|----------|-------------|---------------|-----------|---|
| Investigate specifics of human-carnivore conflict | Complete in depth questionnaire in Mavago-Msawaize village complex | | | | | Conducted by A. Jorge and E. Waiti with separate report prepared. |
| Initiate testing of actions to reduce human-lion conflict | Test effectiveness of bamboo fences Report back to community on results | | | | | Report back in May by Euzebio Waiti |
| Assist with development of PAC guidelines | Produce draft guidelines, Identify spiritual leaders | | | | | Protocol developed by SRN on human wildlife conflict including PAC guidelines. NCP provided comments. In process of being finalized by SRN. Two spiritual leaders interviewed about most important sacred site in Niassa – Chemambo – completed 2010 |
| Examine cultural role of lions and other carnivores | Organize a visit by anthropologist P. Israel to investigate cultural significant of lion and leopards | | | | | Visit delayed by P. Israel |

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| Targeted research of lion and leopard to understand movement patterns, age structure and visual aging cues | Monitor movements of individual radio-marked lion and replace collars | | | Ongoing, collars replaced on two lions, difficulties in catching village lions, two collared lions snared. Mass capture of village lions planned for June/July 2010 using foot snaring-guided by G. Balme of Panthera |
| | Monitor study area population | | | Ongoing |
| | Continue to radio mark leopards to investigate density and movement patterns | | | Ongoing |
| | Camera trap to compare density of leopard in hunted and non hunted area | | | Camera trapping completed data analysis due to be completed by A. Jorge as part of his Masters program-2010. |
| Engage with sport hunters to minimize unsustainable sport hunting | Develop and produce lion aging pamphlet | | | Complete -Distributed to all sport hunting operators and clients |
| | Develop draft guidelines for leopard hunting for discussion | | | Draft guidelines presented at December operators meeting |
| | Organise meeting for PHS in Mbatamila | | | Rescheduled by SRN for 2010 |
| | Report back at operators meeting | | | Points raised – Memo prepared |
| Continue to develop MOMS program | Identify 2009 training needs and support annual training workshop | | | |
| | Analyse 2009 MOMS data - special species sightings, human-lion conflict | | | |
| | Develop MOMS three year strategy | | | |
| | MOMS strategy accepted by SRN | | | Currently being reviewed by SRN, meeting suggested for March 2010 |

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| | Provide funding and guidance for further practical training of community officer | | | Done by SRN, no longer necessary |
| Guide program to reduce disease risk | Fund annual rabies vaccination | | | Funding obtained, but SRN decided to not to vaccinate in 2009. |
| | Provide comments on draft domestic dog strategy produced by R. Branco | | | |
| | Collaborate with National Veterinary Department to provide and analyse blood and parasite samples | | | Samples are stored at the National Veterinary lab in Maputo, agreement was made for analysis but Dr Neves then left the country. Contact has been reinitiated, analysis completed before end March 2010 |
| Initiate environmental education and awareness in NNR | Train and assist NCP field assistant to provide two report backs to Mbamba village community | | | |
| | Survey schools – how many schools, appropriate age group and current status and needs | | | Number of schools is known, appropriate age group has been identified (9-11yr old), three teacher meetings were held, however a survey is still needed of schools and current needs. SRN has hired a teacher for 2010 and this will be one of the goals. NCP is collaborating with SRN on Teachers for conservation initiative |
| | Develop and fund road signs that promote awareness of flagship Niassa carnivores | | | Design is being finalised, March 2010 |
| | Produce a poster on effective protection methods | | | Poster completed March 2010, distributed 2010 |

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| | Initiate development of Niassa conservation storybook | | | Funding obtained, contact and MOU signed with Afra Kingdon to write book, three week intensive visit in Niassa and storybook, work book are currently being written. To be completed July 2010 |
| Continue with e mentoring and training of local Mozambicans | <p>Drivers license for E. Waiti</p> <p>Develop TOR and provide 6 months of training for A, Jorge</p> <p>Assist A, Jorge with applying and finding funding for Masters degree</p> | | | A. Jorge has been accepted in Research Masters program at Kwazulu Natal, South Africa |
| Secure more reliable funding stream and future of NCP | <p>Develop NCP e-newsletter</p> <p>Develop NCP website</p> <p>Investigate options of setting up Mozambican foundation</p> <p>Complete funding proposals and secure funding for 2009</p> | | | <p>Development of website discarded for the present as not considered a priority, information provided on funders websites</p> <p>Contact with Mozambican, South Africa and USA lawyers established lawyer to investigate options. Due completion Dec 2010</p> <p>Full funding secured and partnership status with WCN awarded</p> |
| Increase awareness of NCP work | Endorsement with Ministry of tourism | | | Initial verbal endorsement obtained but election in October, new ministers n place. Will pursue 2010 |

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| Collaboration on Phase II of National Lion Survey and development of National lion action plan | | | | On review board for Conservation Action Plan which was meant to be reviewed in October however no action yet. |
| Collaboration with Selous Niassa wildlife corridor | | | | Collaborating on carnivore survey in SNWC, results due in June 2010 |
| Write and submit paper on lion trophy monitoring system | | | | Still in progress, due to be submitted April 2010 |
| Short conservation paper on status of wild dogs | | | | Due Dec 2009, not achieved but still planned |
| Disseminate annual report-2008 | | | | |