Monitoring, understanding and managing the impact of large scale mammal re-introductions in Majete Wildlife Reserve, Malawi

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To All of You Wonderful 2016 field season volunteers....

Thank you, thank you thank you...what a wonderful field season we had! We certainly could not have achieved all we did without your help. Not only did you all contribute financially...your willing hands, enthusiasm, humour and smiles also kept the research team in high spirits throughout the fielding season. We managed to collect a huge amount of very valuable data this past season, not to mention the total number of dung samples that research staff now have to process in the laboratory at Stellenbosch University!

2016 was full of wonderful happenings in Majete Wildlife Reserve:

There was yet another addition to the lion pride, Elizabeth gave birth to her first cub in July 2016 - this is the 1st of the 3rd generation of Majete’s lions. One of adult male lions and the female (Shire) were collared with brand new satellite collars and the other adult male was collared with a new VHF collar.

Majete has finally become a “bread basket” for wildlife and in 2016, 550 antelope (waterbuck, kudu, sable, eland and zebra) were translocated from Majete to Liwonde National Park and Nkhotakota Wildlife Reserve. This is a dream come true for Majete. The rehabilitation and management of both Liwonde and Nkhotakota were taken over by African Parks towards the end of 2015.

Dr Jason Ransom, an equine specialist who is affiliated with the University of Colorado and the Northern Cascades National Park, visited Majete to assist with the zebra ecology study. It was fantastic having such an expert to assist.

Excitement ruled towards the end of July 2016 when a very healthy young male black rhino was re-introduced to Majete to add to the current gene pool. Of all people, Prince Harry assisted with the re-introduction effort.

And over and above everything else that happened in 2016, three masters students successfully graduated in 2016.

The endless hours you spent assisting us with waterhole sessions to identify, count and sex animals, changing camera trap cards and sorting through what has now amounted to 10 000’s of camera trap photographs, walking and driving transects in order to count animals, participating in school visits, helping repair vehicles, dish washing....to mention but a few of the happenings.....is so much appreciated.

Thank you for providing us with a very necessary supply of batteries for all our camera traps and for your incredibly generous donations of items for the local schools. Your generosity was over-whelming. For those of you who are connected to our project’s facebook page - we hope you enjoyed the photos and noticed the kids happy faces on receiving stationary items.
African Parks are continuing to grow their portfolio of rehabilitated and managed parks and the organizations aim is 20 parks by 2020. Please help spread the word about African Parks and the wonderful work they are doing (www.african-parks.org).

We hope to have some of you join another of our teams in the not too distant future...and if not, do send a friend or two!

Thank you for all your support and the wonderful encouraging words.

Warmest regards from
Alison and the entire research team

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Summary

- Field work completed for two MSc students.
- 550 antelope translocated out of Majete
- One new male rhino introduced
- Two new rhino calves were born
- Currently over 220,000 camera trap photos
- Two new projects in 2017: Ecology of Black Rhinoceros in Majete Wildlife Reserve; Herbivore - vegetation dynamics with a focus on artificial waterpoints.

Goals, Objectives, and Results

Objective #1. Assessing and modeling the population dynamics of various re-introduced herbivore species.

This greater project commenced in June 2013 with an initial focus on the population ecology, distribution and diet of impala and waterbuck within the reserve. These two species are so called “aggressive” species as they are very successful, currently rapidly increasing in numbers and thriving in the park. Monitoring will provide the data necessary for the development of models that can be used to make predictions about the impacts of potential future management interventions, for example, the removal of excess herbivores from Majete for further re-stocking programs elsewhere. This project was completed in 2015.

The following is the abstract from the completed thesis which is available in its entirety from Stellenbosch University’s library: http://hdl.handle.net/10019.1/101141.

Ecology of impala (Aepyceros melampus) and waterbuck (Kobus ellipsiprymnus) in Majete Wildlife Reserve, Malawi.

By Katherine Spies

Abstract

Protected areas in Africa are under increasing pressure as the human population and their associated activities continue to rise. Habitat loss and fragmentation has led to the isolation of wildlife areas, which are commonly fenced to protect biodiversity and to reduce human-wildlife conflicts. As fencing impacts ecological processes, intense management is required to conserve biodiversity and prevent habitat degradation in these areas. Effective management and biodiversity conservation strategies depend on a good understanding of the ecological requirements and characteristics of dominant species.

African Parks is an example of an organization that has overcome many challenges to make an extraordinary contribution to conservation in Africa. After the decimation of most mammals by excessive
poaching in Majete Wildlife Reserve (MWR), Malawi, the park underwent one of the largest reintroduction programmes on the African continent.

Of the 14 species and 2559 animals reintroduced, were 737 impala and 402 waterbuck, both of which are successful breeders and can compete vigorously for resources. Population abundance and density estimates were determined for a 140km$^2$ section of MWR using distance sampling methods on drive counts for 14 consecutive months (2013-2014). The data were analyzed in the software programme DISTANCE. Estimates indicated that post-reintroduction impala and waterbuck populations have increased significantly and displayed a preference for habitats adjacent to the perennial Shire and Mkulumadzi Rivers in the north-east of the reserve. Population control strategies need to be implemented in the near future to curtail the impacts of habitat over-utilization by these two species and other ungulates.

An apt understanding of species behaviour in specific areas assists managers to develop management strategies. Baseline ecology for impala and waterbuck were determined using behavioural observations on drive counts, and waterhole counts. Overall, impala and waterbuck had similar ecology to other populations previously studied. However the impala lambing season occurred marginally earlier and the waterbuck calving season peaked in May-June i.e. not in March and October as determined by other studies. Furthermore, it was established that impala and waterbuck adult males utilized waterholes more frequently than females. In addition, impala and waterbuck males displayed a preference for waterholes according to surrounding vegetation type. Managers should consider these trends when revising the artificial water point management for the reserve.

The foraging behaviour of impala and waterbuck were investigated in more detail. Stable isotope analysis of dung was used to estimate the graze and browse composition in these two ungulates’ diets. It was determined that impala are mixed feeders that readily shift from a high graze content in the wet summer season to relatively high browse content in the dry winter season. Waterbuck were typical grazers that were able to utilize browse species in more stressful environmental conditions. Contrary to a typical dietary overlap occurring in the dry season, impala and waterbuck have a dietary overlap in the wet, summer months when both species have a high graze species content in their diet.

MWR management required a better understanding of the ecology of impala and waterbuck post reintroduction to contribute toward management planning. Based on the information gleaned from the various studies conducted, both ungulates have successfully established themselves in MWR and their populations have significantly increased and require intensive management to prevent environmental degradation. Population management strategies should include the translocation of wildlife from MWR to other parks, as part of a national reintroduction programme in Malawi.
A new herbivore project commenced in 2016. Masters student, Charli de Vos, has undertaken a study on the ecology of Bohms zebra in Majete. Below is a brief progress report about her project. Charli plans to complete her degree in December 2017.

**Progress Report:**

**Ecology of plains zebra (Equus quagga) in Majete Wildlife Reserve, Malawi**

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In partnership with: Conservation Ecology and Entomology, Stellenbosch University, Majete Wildlife Research Programme, Malawi, East Africa; African Parks Majete; Earthwatch Institute
Introduction

Plains zebras occur throughout Africa and play a vital role in maintaining the overall dynamics and well-being of its habitat (Hack et al., 2002). However, plains zebras have experienced significant population declines and range reductions during the last 100 years are currently categorized by the IUCN redlist as near threatened (King & Moehlman, 2016).

Within Majete Wildlife Reserve, located in southern Malawi, plains zebras, as well as other large mammals were eradicated from the reserve by 1985 due to high levels of poaching and a lack of law enforcement (Patton, 2011). This however, all changed in 2003, when African Parks entered into a 25-year partnership with the Department of National Parks and Wildlife of Malawi, in which they aimed to restore and develop Majete (Wienand, 2013). Since then, 174 plains zebra have been reintroduced into Majete and after conducting an aerial survey in September 2015, it was estimated that the currently population of plains zebra within the reserve, stands at approximately 571 individuals (marking an increase from 2012’s aerial survey that only estimated a population of 262 zebra) (Wienand, 2013; IUCN, 2016).

Even though zebras have been successfully re-introduced and established in Majete, there is still a need to investigate and monitor the period after reintroduction, for as species adapt and establish themselves to their new environment there may be discrepancies (Sarrazin & Barbault, 1996; King & Moehlman, 2016). Therefore, this project aimed to enhance our current understanding on the ecology of plains zebra after reintroduction, in order to ensure that management and conservation agencies continue to advance the long-term persistence of the plains zebra within Majete Wildlife Reserve and to predict how they will respond to future human-induced changes (Hack et al., 2002).

Research goal and objectives

Goal

To provide guidelines for Majete Wildlife Reserve on zebra management and conservation based on scientific and ecologically sound research; as well as to provide guidelines for future zebra reintroductions into Malawi. These guidelines will aim to incorporate demographics, behaviour, waterhole usage and dietary requirements related to the plains zebra.

Objectives

1. To quantify and understand the demography and distribution of the plains zebra within Majete Wildlife Reserve;

2. To determine the basic dietary preference of the plains zebra and how this may vary between seasons;

3. To analyse the artificial waterhole usage of plains zebras;

4. To determine the basic behaviour of the plains zebra and their daily time budgets.
Demographics and distribution

The demographics and distribution of Majete’s zebra population was determined by conducting driving transects during which zebras that were encountered were documented (number of individuals, age and sex class) and each zebra was photographed individually, as well as a group. Zebras were identified based on their unique stripe patterns and the data collected will provide information on the number of zebras within the reserve, their sex ratios and age structure, as well as the growth rate of the population over the last few years, which will allow for the calculation of Majete’s carrying capacity of plains zebra. Furthermore, this data was supplemented by 96 camera stations that were set in the field, as well as data on Majete’s zebra retrieved from an aerial survey conducted in September 2015. To date, 235 individual zebras have been identified, of which 78 are adult stallions, 90 adult mares, 26 sub-adults and 41 foals.

Figure 1. A map showing the distribution of plains zebra in Majete Wildlife Reserve, Malawi, as well as the road network and two perennial rivers.
Seasonal dietary preference

The seasonal dietary preference of Majete’s zebra was determined by collecting fresh zebra dung samples in order to determine the percentage of graze (C₄) versus browse (C₃) plant species eaten with the use of stable isotopic analysis. The faecal samples will be analysed in June/July 2017 at the Stable Isotope Laboratory of the Mammal Research Institute at the University of Pretoria. The isotopic values of the faecal samples will thereafter be compared to the isotopic values of Majete’s grasses, trees and shrubs using an analysis program, namely IsoSource. It is currently predicted that the diet of Majete’s zebras will consist primarily of grass (C₄ plants), however in the dry season they will perhaps occasionally browse (consume C₃ plants) to sustain sufficient protein levels.

Artificial waterhole usage

The artificial waterhole usage of zebras within the reserve was investigated in order to determine if zebras were utilizing the artificial waterholes, at what time of the day they preferred to drink and to investigate whether there was a seasonal difference in their usage of the artificial waterholes.

Figure 2. Number of plains zebra sightings recorded accessing artificial water points during hourly intervals over 24 hours
This was done by monitoring four artificial waterholes for an entire year with the use of camera traps. The results indicated that zebras are utilizing the artificial waterholes, especially during the late dry season (September - November) and that they prefer to visit the waterholes during daylight hours, peaking from 13:00-14:00.

**Time budgets**

The behaviour and social interactions of Majete's zebra were also investigated. This was done by filming zebras for a minimum of twenty minutes per session. The recording was then analysed by marking each individual zebra's behaviour at one minute intervals. Social interactions were documented as all occurrence data. The Figure 3 displays the results to date.

![Time budget of Majete's plains zebra](image)

**Figure 3. The time budget of Majete's plains zebra**
References


An essential part of fulfilling objective #1 is a study regarding the vegetation dynamics in the reserve. In 2013 we started with a fixed-point photography study. Fifty-eight sites were selected throughout the reserve. At each of the sites the vegetation was initially described and a number of photographs were taken. The idea with fixed-point photography is that identical photographs are taken within a specific time frame and compared over time. In 2013, many of the sites were pre and post-burn sites allowing us to determine vegetation growth rates and changes post fire. Fixed-point photography is a very valuable vegetation monitoring tool and can be continued for years, with some of the longest studies spanning several decades. From August 2013 to November 2015 we took photographs at the various suites every 3 months. From 2016 photographs were taken in the wet season (March) and at the peak of the dry season (November). Another aim for early 2015 was to re-do the Majete vegetation map. This was subsequently done by a consulting firm and was very beneficial to the project in 2016. In 2017 the vegetation map will be ground-truthed by a student from the Netherlands.

Additionally, a new vegetation study is planned for 2017 and will be conducted by MSc student Kayla Greenen. This study will focus on artificial water hole use and herbivore / vegetation dynamics, an essential study for management purposes.
Objective #2. Implementation of a predator monitoring program to assess the species success and their impact on various prey species.

This project was initially started by African Parks when the first four leopards were introduced in 2011. These leopards were collared with satellite collars and released. An additional two leopards were collared and re-introduced in early 2012 and towards the end of 2012, three adult lions, of which two were satellite collared, were also re-introduced into Majete. GPS data were collected from the animals on a daily basis. However, by mid-2013 all but one remaining collar had stopped working (battery life depleted). In October 2013 a trapping session was conducted and collars were removed from three leopards. These were the individuals that were tagged/collared as sub-adults and had subsequently grown, so this had to be done so as to avoid the collars becoming too tight. We currently have a very large database with all the satellite data and camera trap photographs and we commenced with analyzing these data in 2016. Additionally, a new predator ecology study commenced in early 2016 (see progress report below). This is a long-term research project which will focus on predator/prey associations, home-range overlaps and the interactions between lions, leopards and hyenas. This is crucial to understand particularly when competing top predators are confined to small to medium sized fenced areas.

Progress report:

ECOLOGY OF THE APEX PREDATORS IN MAJETE WILDLIFE RESERVE, MALAWI
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1Department of Conservation Ecology and Entomology, Stellenbosch University, South Africa
March 2016 - April 2017

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In partnership with: Majete Wildlife Research Programme, Malawi, East Africa; African Parks (Majete); Stellenbosch University, Stellenbosch, South Africa; Earthwatch Institute, African Parks.
Introduction

The decline of apex predators is of global concern (Weber & Rabinowitz, 1996). In Africa, large predators have suffered some of the most dramatic range losses and population reductions (Ray, Hunter & Zigouris, 2005). For example, leopards have suffered a 48-67% range reduction (Jacobson et al., 2016), while lions have lost 75% of their former range in the last 100 years (Riggio et al., 2013). These losses are largely attributed to direct and indirect anthropogenic effects such as habitat fragmentation, human-wildlife conflict and illegal trade (Ray et al., 2005).

Apex predators are important because they occur at the top of the food chain (Ordiz, Bischof & Swenson, 2013), which means that they regulate lower trophic levels through top-down predatory forces (Terborgh et al., 1999; Miller et al., 2001). The removal of an apex predator from an ecosystem can have detrimental effects on community structure (Estes et al., 2011). For example, the extirpation of the gray wolf, Canis lupus, from Yellowstone National Park resulted in the release of herbivore species, which severely impacted vegetation structure and function (Beschta, 2005; Ripple & Larsen, 2000). Once the wolves were reintroduced, ecosystem functioning was restored (Ripple & Beschta, 2012), highlighting the significance of apex predators in ecosystems.

Majete Wildlife Reserve (MWR) in the south of Malawi, East Africa was previously mismanaged and heavily poached. Although apex predators were once abundant in the area (Hayes, 1979), human-wildlife conflict resulted in large-scale population reductions. Lion, Panthera leo, were occasionally sighted by scouts between 1959 and 1976, but after 1976, they were completely extirpated from the reserve (Bell, 1984). Leopard, Panthera pardus suffered the same fate as the lions, as they were last sighted in 1992 along the Shire River on the eastern border of MWR (Moses pers. comm. 25th October 2016). By the early 2000s, only spotted hyenas, Crocuta crocuta, were remaining in the reserve despite on-going pressure from the surrounding villages.

However, the future of Majete changed when African Parks and the Malawian Department of National Parks and Wildlife (DNPW) collaborated in a venture to manage and restore Majete. Firstly, a sanctuary fence-line (140km²) was constructed in the north east corner of the reserve. Secondly, over 2550 animals from 12 different species were reintroduced into the sanctuary between 2003 and 2011. Thirdly, the completion of the perimeter fence-line allowed management to remove the sanctuary fence-line to allow the animals to utilise the entire reserve. Finally, between 2011 and 2012, three lions and six leopards were reintroduced from various parts of South Africa in an attempt to restore ecosystem functioning through predation and to enhance ecotourism.

Very little data exists on large predators in Malawi and to our knowledge this is the first study to document the reintroduction of apex predators in Malawi. This reintroduction of apex predators into Majete provided a unique opportunity to study these species in a new environment. Thus the aim of this study was to investigate the ecology of reintroduced lions and leopard as well as a resident spotted hyena population. This involved determining early-post release movements, home ranges, dietary preference and population dynamics of these charismatic species.
Chapter Layout

(i) Early post-release movements of reintroduced lion and leopard in MWR
(ii) Home range and habitat use of reintroduced lion and leopard in MWR
(iii) Diet comparison of lion, leopard and spotted hyena in MWR
(iv) Population size and population dynamics of the three apex predators of MWR

1 Early post-release movements

1.1 Methods

Two lions and six leopards were fitted with radio collars (n=8, African Wildlife Tracking, Pretoria, South Africa) and one male lion was fitted with a VHF tracking collar (n=1, African Wildlife Tracking, Pretoria, South Africa) upon their release into Majete Wildlife Reserve. All individuals were kept in specially designed acclimation enclosures (bomas). Individuals were kept in these boma for approximately four weeks prior to their release. This is known as a soft release, which enhances the likelihood of reintroduction success (Hunter, 1998).

The GPS collars transmitted location points and were directly available for download from the server. However, the VHF collar required actively tracking the animal and unfortunately too little data were collected to draw any conclusions for movement patterns. This was largely due to the thick vegetation and lack of extensive road network in the non-tourism section of Majete. Early post-release monitoring was determined for the first three months after reintroduction (Hunter, 1998). Data are still to be analysed, but all eight collared individuals and their respective identity codes, ages and GPS fixes within the three-month sampling period are indicated in Table 1.

<table>
<thead>
<tr>
<th>Species</th>
<th>Sex</th>
<th>ID</th>
<th>Age (years)</th>
<th>Total GPS fixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lion</td>
<td>Male</td>
<td>LIM1</td>
<td>3</td>
<td>585</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>LIF1</td>
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<td>434</td>
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<td></td>
<td>Male</td>
<td>LEM158</td>
<td>3</td>
<td>512</td>
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<td></td>
<td>Female</td>
<td>LEF159</td>
<td>2</td>
<td>492</td>
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<td></td>
<td>Female</td>
<td>LEF578</td>
<td>5</td>
<td>108</td>
</tr>
</tbody>
</table>

Table 1 – Detailed information of the GPS radio collared lions and leopard reintroduced in Majete Wildlife Reserve. Sex, ID code, age in years and total number of location points obtained during the study are.
2 Home ranges of reintroduced lion and leopard

2.1 Methods

All eight GPS radio collars were set on a four-hour interval, which translated into six location points per day. A minimum of 30–50 location points was required to estimate home ranges of animals (Seaman, Millspaugh, Kernohan, Brundige, Raedeke & Gitzen, 1999). Home range was determined using 100% Minimum convex polygon (MCP) in Quantum GIS (QGis) (http://www.qgis.co.za/en/site/forusers/download.html (accessed 12/08/2016)). 100% MCP’s use all location points to determine home range and can therefore include large, unused areas or areas that are only occasionally visited. However, the advantage of this method is that it is comparable between studies. Further home range analyses using Kernel Utilization Distribution are still to be conducted using ArcGIS (Environmental Systems Research Institute (ESRI), Redlands, California, U.S.A.). Additionally, range overlap and habitat selection are also to be determined.

2.2 Preliminary results and discussion

All individuals appear to have established post-release. The soft release method clearly helped individuals acclimatise to their new environment. Lion home range is concentrated in the northern half of the reserve; with occasional territorial patrols down into the south. Lion home range increased from an average of 251.05km² (range: 171.08–331.02km²) post-release to 407.32km² (range: 273.45–541.84km²) after establishment (Figure 1). This could be due to the lack of conspecifics in the reserve and therefore the lions are free to utilise the entire reserve without competition from conspecifics. Leopard home ranges were on average larger than those of lions (Figure 1). Minimum home range was 209.47km² for a female leopard and the maximum was 3150.64km² for a male leopard that escaped twice through small openings in the perimeter fence line. However, the male leopard returned on both occasions and has since been photographed on camera traps within the reserve. Our preliminary home range estimates for leopards appear to be larger than those found by Weilenmann, Gusset, Mills, Gabanapelo & Scheiss-Meier (2010) for translocated leopards in Botswana. Therefore, this suggests that our findings on the home ranges of leopards in Majete Wildlife Reserve are the largest ranges recorded to date.

Table 1 - Home range sizes of reintroduced lion and leopard in Majete Wildlife Reserve using 100% MCP.

<table>
<thead>
<tr>
<th>Species</th>
<th>2011-2013</th>
<th>2014-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average (km²)</td>
<td>Range (km²)</td>
</tr>
<tr>
<td>Lion</td>
<td>251.05</td>
<td>171.08 – 331.02</td>
</tr>
<tr>
<td>Leopard</td>
<td>928.03</td>
<td>209.47 – 3150.64</td>
</tr>
</tbody>
</table>
Figure 2 – Home ranges of six reintroduced leopards in Majete Wildlife Reserve.
3. Diet

3.1 Methods

*Diet determination from scat samples*

Lion, leopard and spotted hyena scats were collected opportunistically along roads and trails from March 2016 to April 2017. Scats often contain undigested material such as hair and bones, which can help to reveal the diet of a carnivore. All scats were identified, washed and stored in brown paper envelopes until further analyses. As a result, all scat samples are yet to be analysed.

*Diet determination from GPS clusters*

Since lions usually remain close to a kill for several hours or days, when these animals are fitted with GPS radio collars, a cluster of location points may reveal a potential kill site. Therefore, GPS clusters were used to investigate potential kill sites of radio collared lions between August 2016 and April 2017. GPS cluster sites were manually identified by two or more locations within 50m of each other (Martins et al., 2011). Clusters were visited with an armed scout and a handheld Garmin eTrex® 30 (Garmin International Inc., Olathe, Kansas, USA) was used to navigate to the central point of the cluster. Field teams searched around a kill site for up to 30 minutes, covering a radius of at least 50m. Once a carcass was located, photographs were taken and representative material (e.g. bones or hair) were collected using latex gloves. Carcasses were identified to species level and where possible, species were sexed and aged. Data were entered into an excel document and further analysed.

3.2 Preliminary results

Lions typically prefer the most abundant medium-to-large ungulate prey in the 190 - 550 kg range (Hayward & Kerley, 2005). Figure 3 shows that waterbuck (25%), warthog (25%) and kudu (12%) make up more than 60% of the overall diet of lions, which are three of the most abundant prey species in Majete. The abundance as well as the large size of waterbuck and kudu can explain the large proportion of these species in the lion’s diet. Warthogs on the other hand are smaller, but their abundance and the ability of lions to ambush warthogs around their burrows, are possible explanations for their high occurrence in the lion’s diet.

![Prey items (%) obtained from lion carcasses using GPS cluster site analysis](image-url)
4 Population sizes

4.1 Methods

Camera trapping

A camera trapping survey was conducted between September and November 2016 to estimate the population size of leopard and spotted hyena in Majete. Lions were not included in this estimate as the population size is already known (n=8). The reserve was divided into four grids (~175km²) and 24 Cuddeback camera traps were placed in each grid for 20 days. Camera traps sites were positioned 3–4km apart to ensure that all individuals had at least some chance of being ‘captured’ on the cameras. Cameras were set along road and trails and were fixed to a suitable tree. Each camera had a steel casing to prevent damage from inclement weather and animals such as spotted hyena and elephants.

Two software programmes (CAPTURE and SPACECAP) will be used and compared to estimate population sizes of leopard and spotted hyena. These data have not yet been analysed.

References


Objective #3. Determining the impact of megaherbivores (elephant, buffalo and rhino) on the habitat.

This project commenced in 2011 with a student from Stellenbosch University studying the “Woody vegetation change and elephant water point use in Majete Wildlife Reserve: implications for water management strategies”. The project was completed at the end of 2013 (the abstract was provided in the 2013 field report). A new project, undertaken by Frances Forrer commenced in 2015, and was completed in December 2016.

The following is the abstract from the completed thesis which is available in its entirety from Stellenbosch University's library (http://hdl.handle.net/10019.1/101294)

The population status, habitat use and seasonal diet of African elephant (Loxodonta africana) in Majete Wildlife Reserve, Malawi.

By Frances Forrer

Abstract

The African elephant (Loxodonta africana) is classified as a keystone species as it is critical to the integrity of the ecosystems it occupies. It influences a variety of factors in these ecosystems that include, but are not limited to, canopy cover, seed dispersal and various plant and animal species distributions. In addition to being classified as mixed feeders, elephants are water-dependent and the location and availability of water affects the extent and intensity at which elephants make use of vegetation. Confinement through the fencing of many elephant populations, particularly in Southern Africa, has adversely affected the management of this species. Population numbers tend to rapidly increase due to improved protection and supplementation of resources, intensifying the species negative effects on other herbivore species. Majete Wildlife Reserve, located in Malawi, was almost entirely devoid of wildlife but was revived by African Parks in 2003. The reserve was fenced, artificial waterholes were installed and an abundance of wildlife was reintroduced, including 213 elephants. Five years post reintroduction, elephant numbers have dramatically increased and concern has been raised regarding the potential impact of this species on the vegetation and other herbivore species in the reserve. In this study, a review of all relevant literature was reported and two field studies were conducted on the population status, habitat use and diet of elephants in the reserve.

The population status of the elephants was assessed with aerial survey data and individual identification techniques. The population has increased to an estimated 389 individuals, of which 366 were positively
identified. Results revealed a sex ratio of 1:1 and a population growth rate of 13.8% per annum. Additionally, habitat use of the elephants was investigated using camera trap gridlines throughout the reserve. It was determined that a higher number of elephant frequented habitat near perennial water sources and at lower altitudes. Furthermore, waterhole usage was determined using camera traps placed at artificial water sources in Majete. Results suggested that fewer elephants utilised artificial waterholes during the wet season and that family herds tended to dominate the use of the majority of the artificial waterholes. Lastly, it was determined that the use of artificial waterholes was increasingly homogenous in the dry season. The increasing elephant population resulted in dispersal to less preferred areas, namely that of higher altitude miombo woodland as lower altitude regions were potentially becoming too densely populated.

Diet of the elephants was investigated using stable isotope analysis of faecal samples to determine seasonal grass and browse composition. Elephants’ diets displayed a clear seasonal difference in the proportion of C3 browse consumed. In the dry season the diet contained 98% C3 browse but decreased to 59% in the early wet season and to 65% in the late wet season. This indicates that a greater proportion of C4 grass was consumed in the wetter seasons, typical of other elephant populations.

The results from this study will contribute towards the compilation of an elephant management plan that will be provided to African Parks, Majete, for further implementation.

A new black rhino ecology study is planned for 2017. This will be conducted by Stellenbosch University Masters student, Anel Olivier.
Objective #4. Studying the population dynamics and distribution of spotted hyena.

This study was completed in December 2016, however monitoring of the hyena population will continue.

The following is the abstract from the completed thesis which is available in its entirety from Stellenbosch University’s library (http://hdl.handle.net/10019.1/98847):

The ecology of spotted hyena, *Crocuta crocuta*, in Majete Wildlife Reserve, Malawi.

By Francois Retief

Abstract

The management of predators plays an important role in conservation management today because of the intensive management requirement of small fenced off protected areas. Apex predators such as spotted hyena, *Crocuta crocuta*, are situated at the top of food chains and have the ability to influence the composition and density of meso-predators and herbivores. Knowledge of apex predators through research can assist in effective management decisions which will ensure ecosystem functioning.

Majete Wildlife Reserve (MWR) in the south of Malawi, is a 700km² reserve, which had no information on the resident spotted hyena population until this study. The aims of this study were to gather and make available as much information as possible on the ecology of this apex predator in the reserve for management purposes.

A total of 47 camera traps were stationed throughout the reserve for 22 months from 2013 - 2015 and from these data population size, the number of clans (groups), home range size and activity patterns were determined. Faecal analysis was performed to identify the preferred species preyed upon.

The reserve has two small, low density resident spotted hyena populations, each with a large home range. These are distinct traits of hyenas residing in arid regions with a clumped resource distribution. The activity patterns of MWR hyenas were similar to East African hyenas in some aspects but peaks in
activity differed between the two populations. A total of 17 prey species were identified, with some obvious preferred species.

Based on the results from this study, is it recommended that management should make decisions which would favour an increase in the hyena population. At this stage, further lion, *Panthera leo*, reintroductions should be avoided, as they are the number one competitor of spotted hyena. Both prey and hyena numbers should be monitored in the future to determine whether the hyena population might be in an Allee effect, in which case hyena reintroduction may be considered to restore the balance. It is also suggested that local communities should be educated about hyenas and their role in the environment. This would increase the protection of hyena clans outside the reserve boundaries. These populations are needed for genetic diversity in the MWR hyena population since contact between the populations has been found. Genetic diversity is important for the long term conservation of small populations such as the spotted hyena population in MWR.

**Objective #5. Studying population performance and habitat use of black rhinoceros.**

This project is in collaboration with African Parks, Majete and their rhino monitoring scouts. The scouts are currently conducting all the field work and we as a research team provide scientific monitoring advice and will help with the analysis of all the data. Throughout 2013 and 2014 monitoring was on a daily basis to achieve between 30 - 35 rhino tracking outings per month. Rhino trackers have a camera to take photographs of each sighting as evidence of which rhino they have seen as far as possible. Sightings are recorded on a daily basis and a sighting of each individual is attempted per week. Majete Wildlife Reserve revamped the rhino monitoring program in 2015 and an additional 2 rhino scouts were added to the team bringing the total to four. In 2015 a number of the sub-adults were ear-notched by the African Parks Majete team and one calf was born in November 2015. In 2016 a fourth year Conservation Ecology student from Stellenbosch University studied rhino activity patterns and drinking behaviour based on over 30 000 camera trap photographs.

**Objective #6. Implementation of a best practice fire management strategy.**

We have not as yet commenced with this study. Majete Wildlife Reserve does have a basic fire management plan and burning takes place annually from early June to mid-August. We will be revising this plan in due course now that the vegetation map has been updated.
Objective #7. Capacity building and implementation of human-wildlife conflict mitigation measures.

A number of studies have been conducted over the past few years with regards to the various local communities’ attitudes towards African Parks and Majete Wildlife Reserve in general. Community benefits provided by African Parks have been through enterprise development and infrastructural projects including: five health clinics, four school blocks, a maize mill, three boreholes, four cattle troughs and several capacity building program. Additionally, a Resource Utilization Program has been established that uses a permit system that provides bordering communities regulated access into the Protected Area to harvest allowable natural resources such as thatching grass, bamboo and fire wood. Several HIV/AIDS committees and Home Based Care groups have been established that engages volunteers from the local communities.

African Parks have also established a well-run Community Based Natural Resource Management (CBNRM) program and have provided training in areas of CBRM, forestry management techniques, beekeeping, poultry and livestock production, scone baking and banana production. Several training sessions have also been conducted for reserve scouts and extension staff. There are still many challenges ahead, in particular with regards to people’s attitudes towards the newly enclosed park.

In 2015 we started a project specifically to develop a management plan for community based natural resource harvesting in Majete Wildlife Reserve. The study was undertaken by Master’s student, Claire Gordon and was completed in December 2016.

The following is the abstract from the completed thesis which is available in its entirety from Stellenbosch University’s library (http://hdl.handle.net/10019.1/101141):

People and protected areas: Natural resource harvesting as an approach to support rural communities surrounding Majete Wildlife Reserve, Southern Malawi: A Case Study
By Claire Gordon

Abstract
Protected areas across the developing world are increasingly incorporating the needs of local rural communities into their management decisions. The African Parks managed Majete Wildlife Reserve (MWR) in the lower Shire valley of southern Malawi is no exception. Through African Parks’ extension department they aim to incorporate the needs of local communities into their management framework in order to maintain support for their conservation activities. A resource use program (RUP) which facilitates sustainable harvesting was implemented to allow community members access to thatching grass inside the reserve, via 8 RUP gates on the perimeter fence. Each RUP gate is opened once annually
for 7 days and game scouts are made available to escort community members into the reserve to harvest grass.

As a case study, we assessed the 2015 RUP activities at 5 of the 8 RUP gates to determine the number of community members utilising the program, the biomass of grass removed, the variation in grass bundle masses and the distances walked by community members to access the RUP gates. We determined that a total of 2211 community members accessed the reserve via the 5 monitored RUP gates and removed 134,073 kg of thatching grass in 2015. Additionally, we found a significant variation in the bundle masses between individual harvesters, as well as the harvesting characteristics at each RUP gate. We also confirmed anecdotal suggestions from the African Parks extension assistants (EAs) that community members’ walk significant distances from their homes to the RUP gates to harvest grass.

To assess the possibility of extending the current RUP to include medicinal plant harvesting we conducted interviews with 12 traditional healers in communities adjacent to the reserve. In conjunction with interviews, we conducted rapid ethnobotanical surveys, where we accompanied the traditional healers into the field to collect and formally identify plants used for medicinal purposes. We identified a total of 96 different plant species used by these healers, the majority of which were trees and shrubs. The most commonly used plant parts were roots, leaves and bark, and traditional healers currently treat 27 different ailments and illnesses. Additionally, we found a substantial variation in the local names for medicinal plants, with some plants having 5-6 local names. Almost all the traditional healers we interviewed listed their healing practice as their main source of formal income (n = 11), while all of the healers stated that prior to the reserve fence being erected they harvested medicinal plants in the reserve (n = 12), and that they would like to be able to harvest medicinal plants in the reserve again (n = 12).

We conducted a household survey to determine general perceptions of the current RUP. Our findings suggest that overall; community members are satisfied with the RUP (92%) however there is some room for improvement. The majority of respondents requested that the annual RUP grass harvesting window is increased (96%), as currently it is not long enough for community members to harvest enough grass for their household needs. A significant number of community members also requested the addition of medicinal plant (70%) and firewood (70%) harvesting to the RUP. This feedback adds support to the traditional healers request for medicinal plant harvesting inside MWR.
The findings of this study provide useful baseline data from which African Parks can continue to ensure that the RUP stays relevant to communities surrounding the reserve in the future. The long-term success of the reserve will ultimately depend on the continued support from local communities and the RUP is one way in which MWR can continue to engage with community members. The research acts as a useful case study to support the theory that communities are more likely to support continued conservation efforts when they can benefit and extract value from a protected area.

In 2016 we continued with our school visiting and educational program, visiting six village schools during the fielding season. Volunteers were given an opportunity to not only share something about Majete Wildlife Reserve and their own countries but also to learn about the life of the children in some of the remote and extremely poor areas surrounding the reserve. School choirs often put on a show and drama productions are performed. These outings are always thoroughly enjoyed by all. Throughout 2016 volunteers once again very generously brought all sorts of school goods with them to donate to various schools in the Shire Valley.

Objective #8. Investigating the potential of Payments for Ecosystem Services and Reducing Emissions from Deforestation and Forest Degradation (REDD) as a conservation tool (this project is being driven by African Parks, Majete, but was put on hold in 2016, for several reasons.

Majete Wildlife Reserve was assessed for its potential as a REDD project by a consultant group towards the end of 2012. The results from this assessment indicated (estimated) that Majete could sell approximately 100,000 carbon credits per year.

It is however, unclear what the future market for REDD will be like - and this is key in assessing the viability of a REDD project at Majete. At the current carbon prices of approximately $2 per ton, it probably would not be worthwhile for African Parks to proceed with the project. But African Parks is currently in discussions with possible partners with the necessary expertise in the carbon markets to assess the feasibility of the project, and explore the opportunities for possible collaboration.

A big challenge is the next step, which is the substantial upfront development costs involved with formally accrediting the carbon credits, and the risk of an unknown future market for these credits.
Project Impacts

1. Increasing Scientific Knowledge
   a. Total citizen science research hours: A total of 25 volunteers were at the project site for 10 full days (excluding the 2 x travel days). Volunteers contributed on average of 10 hours per person per day = ~2500 total hours.

   b. Peer-reviewed publications:
      A number of publications are in prep. A concerted effort will be made to 2017 to get manuscripts submitted.
      In prep:
      - Retief, F. and A. Leslie. The diet of spotted hyena, (Crocuta crocuta) in Majete Wildlife Reserve, Malawi.
      - Retief, F. & A. Leslie. Spotted hyena (Crocuta crocuta) clans and home ranges in Majete Wildlife Reserve, Malawi.
      - Spies, K. and A. Leslie. The diet of impala and waterbuck in Majete Wildlife Reserve using stable isotope analysis.
      - Forrer, FA. And A. Leslie. The diet of elephant, Loxodonta africana, in Majete Wildlife reserve, Malawi.
      - Gordon, C. and A. Leslie. Medicinal plants used by traditional healers in Majete Wildlife Reserve, Malawi.

   c. Non-peer reviewed publications:
      2. The Eye, Sep - Dec 2016, p 70-71. Sustainable Harvesting project in Majete Wildlife Reserve. By Claire Gordon and Dr Alison Leslie (see appendix).
      3. Several university website short articles.

   d. Presentations:
      Several presentations to the Malawi Wildlife Society in Blantyre (Claire Gordon & Frances Forrer)
      Several presentations to African Parks management throughout the year.
2. **Mentoring**
   
a. **Graduate students:**

Only students from 2016 onwards listed.

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Graduate Degree</th>
<th>Project Title</th>
<th>Anticipated Year of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claire N. Gordon</td>
<td>MSc Conservation Ecology</td>
<td>People and protected areas: Natural resource harvesting as an approach to support rural communities surrounding Majete Wildlife Reserve, Southern Malawi: A Case Study</td>
<td>Dec 2016</td>
</tr>
<tr>
<td>Willem Daniel Briers-Louw</td>
<td>MSc Conservation Ecology</td>
<td>Ecology of three apex predators in Majete Wildlife Reserve, Malawi</td>
<td>Dec 2017</td>
</tr>
<tr>
<td>Charli de Vos</td>
<td>MSc Conservation Ecology</td>
<td>Ecology of Boehm's zebra (<em>Equus quagga boehmi</em>) in Majete Wildlife Reserve, Malawi</td>
<td>Dec 2017</td>
</tr>
<tr>
<td>Aneil Olivier</td>
<td>MSc Conservation Ecology</td>
<td>Ecology of Black Rhinoceros in Majete Wildlife Reserve, Malawi</td>
<td>Dec 2018</td>
</tr>
<tr>
<td>Kayla Geenen</td>
<td>MSc Conservation Ecology</td>
<td>The impact of herbivores on vegetation surrounding artificial water points within Majete Wildlife Reserve</td>
<td>Dec 2018</td>
</tr>
</tbody>
</table>
b. Community outreach:

<table>
<thead>
<tr>
<th>Name of school, organization, or group</th>
<th>Education level</th>
<th>Participants-local or non-local</th>
<th>Details on contributions/ activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kandeu School</td>
<td>12/13 years old (grade 6-7)</td>
<td>Local</td>
<td>Elephant talk and school clothes handed-out</td>
</tr>
<tr>
<td>Douglas Village</td>
<td>5-18 years old (grade 0 -12)</td>
<td>Local</td>
<td>Elephant talk, soccer practice and stationary handed-out</td>
</tr>
<tr>
<td>Maganga Village</td>
<td>10-13 years old (grade 4-7)</td>
<td>Local</td>
<td>Elephant talk, litter pick-up and soccer practice</td>
</tr>
<tr>
<td>Maganga Village</td>
<td>14-15 years old (grade 8 - 9)</td>
<td>Local</td>
<td>Took 10 kids on their very first game drive in Majete and gave a talk on wildlife conservation (saw elephants, waterbuck, warthog, impala, hippopotamus, crocodiles, baboons, nyala)</td>
</tr>
<tr>
<td>Gaga School</td>
<td>16-18 years old (grade 10 - 12)</td>
<td>Local</td>
<td>Elephant talk, tree planting and watering and stationary handed-out</td>
</tr>
<tr>
<td>Njereza School Wildlife Club</td>
<td>13-18 years old (grade 8-12)</td>
<td>Local</td>
<td>Elephant talk, soccer practice and stationary handed-out</td>
</tr>
</tbody>
</table>

All of the above activities were run with the help of Earthwatch volunteers.

3. Partnerships:

<table>
<thead>
<tr>
<th>Partner</th>
<th>Support Type(s)¹</th>
<th>Years of Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Parks (PTY) Ltd</td>
<td>Collaboration &amp; logistics</td>
<td>2013 - present</td>
</tr>
<tr>
<td>Cape Leopard Trust</td>
<td>Collaboration</td>
<td>2013 - present</td>
</tr>
<tr>
<td>Texas A &amp; M University</td>
<td>Academic support/collaboration</td>
<td>2015 - present</td>
</tr>
<tr>
<td>Malawi’s National Commission for Science &amp; Technology</td>
<td>Logistics</td>
<td>2013 - present</td>
</tr>
<tr>
<td>Lilongwe University of Agriculture &amp; Natural Resources</td>
<td>Collaboration</td>
<td>2013 - present</td>
</tr>
<tr>
<td>University of Colorado/Department of Fish &amp; Wildlife, USA. Dr J.I. Ransom</td>
<td>Collaboration / academic support</td>
<td>2016 - present</td>
</tr>
<tr>
<td>University of Stellenbosch. A.J Leslie publication fund.</td>
<td>Funding</td>
<td>2013 - present</td>
</tr>
</tbody>
</table>
4. Contributions to management plans or policies:

<table>
<thead>
<tr>
<th>Plan/Policy Name</th>
<th>Type²</th>
<th>Level of Impact³</th>
<th>New or Existing?</th>
<th>Primary goal of plan/policy⁴</th>
<th>Stage of plan/policy⁵</th>
<th>Description of Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management plan for impala and waterbuck</td>
<td>Management plan</td>
<td>local</td>
<td>New</td>
<td>Natural resource management</td>
<td>Proposed</td>
<td>Suggested management options</td>
</tr>
<tr>
<td>Elephant management plan</td>
<td>Management plan</td>
<td>local</td>
<td>New</td>
<td>Species conservation</td>
<td>Proposed</td>
<td>Suggested management options</td>
</tr>
<tr>
<td>Hyena management plan</td>
<td>Management plan</td>
<td>local</td>
<td>New</td>
<td>Species conservation</td>
<td>Proposed</td>
<td>Suggested management options</td>
</tr>
</tbody>
</table>

5. Conserving natural and sociocultural capital
   a. Conservation of taxa -
      i. In the past year, has your project helped conserve or restore populations of species of conservation significance? If so, please describe below.

<table>
<thead>
<tr>
<th>Species</th>
<th>IUCN Red List category</th>
<th>Local/regional conservation status</th>
<th>Local/regional conservation status source</th>
<th>Description of contribution</th>
<th>Resulting effect⁶</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyena</td>
<td>Least threatened</td>
<td>Unknown (assumed low)</td>
<td>Dept National Parks &amp; Wildlife (pers. Comm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Con’t

<table>
<thead>
<tr>
<th>Sable antelope</th>
<th>Least concern</th>
<th>Rare</th>
<th>Rare. Dept National Parks &amp; Wildlife</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black rhino</td>
<td>Critically endangered</td>
<td>Critically endangered</td>
<td>Dept National Parks &amp; Wildlife</td>
</tr>
<tr>
<td>Elephant</td>
<td>Vulnerable A2a</td>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>

b. Conservation of ecosystems:

<table>
<thead>
<tr>
<th>Habitat type</th>
<th>Habitat significance</th>
<th>Description of contribution</th>
<th>Resulting effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Miombo Ecoregion (an endangered, species-rich African tropical savanna ecosystem)</td>
<td>All of the below mentioned.</td>
<td>Providing an understanding of ecosystem dynamics</td>
<td>Helping to maintain the extent thereof.</td>
</tr>
</tbody>
</table>

c. Ecosystem services:

- ☐ X Food and water
- ☐ Flood and disease control
- ☐ X Spiritual, recreational, and cultural benefits
- ☐ X Nutrient cycling

Details:

All research projects are related to ecosystem management and restoration. The ecological studies are all focusing on spatial ecology, diet and waterhole use.

The sustainable harvesting project certainly has cultural benefits, in particular as the medicinal harvesting of plants may be encouraged.

Indirectly the research programme will contribute to the conservation of endangered remnant east African miombo woodland.

d. Conservation of cultural heritage:

<table>
<thead>
<tr>
<th>Cultural heritage component</th>
<th>Description of contribution</th>
<th>Resulting effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional subsistence living</td>
<td>By quantifying the extent of natural resource harvesting within Majete. A future project is planned to determine the available biomass of preferred plant species to be harvested.</td>
<td>Current harvesting seems to be sustainable and can possibly be increased to include the harvesting of medicinal plants.</td>
</tr>
</tbody>
</table>
Research Plan Updates

1. Have you added a new research site or has your research site location changed? ☐ Yes ☐ X No
2. Has the protected area status of your research site changed? ☐ Yes ☐ X No
3. Has the conservation status of a species you study changed? ☐ Yes ☐ X No
4. Have there been any changes in project scientists or field crew? ☐ X Yes ☐ No

Dr Jason Ransom joined the research team in 2016 as a co-supervisor for the new zebra ecology study.

5. Provide details on any changes to your objectives, volunteer tasks, or methods, include reason for the change: New research projects are added annually, however volunteer tasks remain the same.

Acknowledgements

During the 2016 Earthwatch season there were a number of organisations and people who helped us tremendously and without whom the season would have been a success. Thanks go to Stellenbosch University for the opportunity. From African Parks the following people all played a vital role in making sure we could operate. Park Manager, Craig Hay and Field Operations Manager, Gervaz Tamala provided vital support to the project. Shelley Preece, Tourism Manager, assisted with all bookings and her team, including: Lusungu at Thawale, and Mike and Henry at the campsite, made sure that our volunteers were always attended to. Steve Wemba and extension assistant Carol were invaluable in organising and accompanying volunteers on school and community visits, while extension assistants Alexandar, Joseph and Kamiza provided invaluable support to the sustainable harvesting project. From Law enforcement, Martin Awazi and his team of scouts must be thanked for always making sure that our volunteers stayed safe in the field; in particular we would like to thank: Kenneth, Biliat, Damiano, Ado and Mike Chambo. A special thank you to the fantastic Isaac Mlilo, mechanic extraordinaire, who helped us keep our vehicles running under tough circumstances.

Last by not least, to all the volunteers of the 2016 expedition season, thank you for providing us the opportunity to conduct our research in Malawi and for making a lasting contribution to conservation in this part of Africa. Without your financial support and additional hands, this research programme would not be possible. Your spirit and enthusiasm in the field was always inspirational and it is through your effort that we were able to collect the data we did in 2016 and hopefully long into the future…..

Literature Cited: Please see the individual reports / theses.

Our plan for 2017:

- The www.500elephants.org translocation programme continues in 2017. Another 250 elephants will be translocated to Nkhotokota Wildlife Reserve to join the 250 from 2016’s translocation and the other 550 translocated antelope.
- A new PhD project involving the translocated elephants where DNA samples will be taken.
- African Parks are discussing the possibility of another female lion reintroduction of lion and possibly cheetah at the end of the 2017.
- Two new MSc studies as mentioned above.
Appendices
The revived Majete Wildlife Reserve (MWR), established in the eastern Shire Valley in the southeast of Malawi, has become one of the major success stories in Africa. Sadly, the reserve experienced decades of rampant poaching which eventually led to the extinction of much of its wildlife, and with it, the hope of the ecosystem recovering without assistance. Fortunately, the collaboration between African Wildlife and the Department of National Parks and Wildlife (DNPW) has allowed MWR to return to its former glory through effective and collaborative conservation management. The 3-year partnership between AW & DNPW started in 2003 with the improvement of security by installing the reserves with sufficient fencing and much needed equipment and much needed infrastructure. Prior to the reintroduction of wildlife, an initial action (April 2003) of the so-called known as the "command and" was forced off to allow for reintroduced wildlife species to habituate and possibly increase while the rest of the reserve was being fenced. The reintroduction programme eventually reached a threshold and with the completion of the predator-proof perimeter fence, the sanctuary became a sanctuary in 2013, allowing animals to utilise the entire reserve (5000km).

Despite the trials and errors in the reintroduction process, MWR is an incredible achievement which is attributable to excellent collaborative management. Going to the reserve, the first thing that strikes is a truly exceptionally beautiful and varied landscape. The Majete Wildlife Reserve is known for one of the largest wildlife reintroductions in Africa. Since 2003, over 1500 individuals from 24 different species were introduced, all of which previous disappeared in the area. The Department of the wildlife reintroductions were to restore ecosystem integrity and function a successful management. The major conservation programme implemented included creating a bison and elephant reserve, creating a rewilding area, establishing a protected area, and establishing a corridor between the two. These efforts were successful, with the bison and elephant populations increasing steadily. Other conservation efforts included the establishment of a corridor, which was opened in 2013, to allow animals to move between the two areas.

In 2013, the reserve was surveyed, and it was found that the number of wildlife species had increased significantly. The reserve was declared a protected area, and the wildlife populations continued to grow. Today, the Majete Wildlife Reserve is home to a diverse range of wildlife species, including elephants, bison, and antelopes. The reserve is also home to a variety of plant species, creating a rich and diverse ecosystem. The reserve is managed by the Majete Wildlife Research Organisation, which ensures that the reserve is sustainably managed to protect the wildlife and their habitats.

In conclusion, the Majete Wildlife Reserve is a success story of wildlife conservation and restoration. The reserve has been transformed from a barren landscape to a thriving ecosystem with diverse wildlife populations. The success of the Majete Wildlife Reserve serves as an inspiration for other wildlife conservation efforts around the world.
Cont. from pg 98

This predominantly occurs in communities or situations where livestock is present and hyenas are then blamed for livestock depredation, whether confirmed or unconfirmed. Furthermore, game management and hunting by, or for, hyenas and hyena populations by the culling of larger predators has also contributed to hyena populations being perceived as beneficial to livestock and pastoralists. Without the intervention of livestock, hyenas are often considered to be predators that pose a threat to livestock in the area. However, the presence of livestock and hyenas can lead to conflict, and hyenas can also lead to the spread of diseases such as African wild dog rabies, which can be transmitted to livestock. In some cases, livestock has been killed by hyenas, which can be considered a threat to livestock in the area. However, livestock can also pose a threat to hyenas, as they may also be killed by hyenas in the process of hunting or defending their territory. Hyenas also have a valuable role in the ecosystem, as they help control the population of other species such as rodents and small mammals. Therefore, it is important to manage hyena populations in a way that minimizes the impact on livestock and pastoralists while also protecting hyenas and their habitat.
Sustainable Harvesting Project
Majete Wildlife Research

By Claire Gordon and Alison Leslie
Majete Wildlife Research Programme
Stellenbosch University, South Africa

Successful conservation of any protected area anywhere in the world depends largely on the economic and social security of the local people living directly in its shadow. Conservation needs active buy-in from communities in order to ensure that there is long-term collective local support. However, in many cases conservation organizations are forced to fence in large protected areas. Fences help to protect surrounding communities from the large dangerous game species often found in these areas, and in the same breath they help to protect large and often valuable game species from poaching and over exploitation by people. Fences although providing invaluable protection, have the detrimental side-effect of excluding communities from areas that they may have used extensively in the past. In many cases this exclusion can cause significant levels of animosity and resentment within communities towards the organizations managing these protected areas. To this end the concept of community based natural resource management (CBNRM) has become increasingly popular among conservation organizations around the world. The aim being to encourage community involvement in the use and management of protected areas. African Parks Majete, are one of the organizations embracing community engagement in natural area protection.

Around Majete they have set up Community Based Organizations (CBOs), started wildlife clubs in schools to promote environmental education, started micro-enterprise projects in communities such as harrow and moringa powder production, and maintained an active Resource Use Program (RUP) which allows villagers access to the park to harvest thatching grass and bamboo.

The Majete Wildlife Research team is currently conducting a study into the impact that the RUP activities have on the park and local communities. The vast majority of villagers around the more remote parts of Majete still rely on subsistence agriculture as their primary source of food and income. Some people generate a small amount of formal income through the sale of cotton or other activities, but in most cases access to a formal income stream is extremely limited. Due to this, communities still rely heavily on natural resources as a source of roofing and building material, as well as medicines and fodder for livestock. Through Majete’s resource use program villagers are still able to collect thatching grass in order to roof their homes. Our project aims to both determine what quantity of grass is being removed from the park, how many people access the park, to harvest grass and how important the harvesting program is to surrounding communities. Together with the research on the existing resource use program we are also researching what plants traditional healers use in the area and what plants they would like to harvest beside the park. Traditional medicine still plays a major role in the Healthcare System in many rural communities, particularly those that are remote and far from formal healthcare centers. Certain communities on Majete’s south western boundary are half a day’s drive on unreliable public transport and bad roads to the closest hospital. Many people living in these areas can’t afford public transport and so rely almost entirely on community healthcare workers and traditional healers for medical care. Unfortunately, because of habitat loss of natural vegetation outside of the park many plants and trees that the traditional healers use are no longer easily accessible. Some traditional healers reported walking as far as 20km each way into Mozambique in search of particular plants. Many of these plants and trees are still found inside Majete. Extending the current resource use program in Majete to include the sustainable harvesting of medicinal plants by traditional healers is an exciting new way in which the park could continue to strengthen its positive impact on local communities and continue to build support for conservation in southern Malawi.

Ultimately conservation of Malawi’s natural resources rests on the shoulders of us all, particularly those living directly in the shadow of protected areas. If sustainable harvesting can teach people the value that conserving patches of indigenous vegetation and wildlife has to themselves and their families then it is an initiative well worth supporting.

For further information contact Claire Gordon: 16002894@sun.ac.za