THE
CAPE LEOPARD
TRUST

ANNUAL REPORT 2012

Letter from the Chairman

I am pleased to report that the Cape Leopard Trust (CLT) has had yet another year of progress and great achievements. It has experienced notable growth in its scope of activities while building on the solid relationships every organization needs. Striving to promote partnerships saw the strengthening of collaborations with conservation organizations sharing the goal of preserving our environment. Furthermore, we are blessed to have long-standing affiliations with a core of wonderful corporate sponsors and benefactors ensuring that the foundations of our organization remain solid and secure.

Conducting predator research in the vast and remote Cape mountains is difficult, requiring patience, great physical effort and commitment to achieve the pioneering research results we are known for. We work within communities where emotive and complex issues arise when stock losses occur due to predators. Supporting the principles of sustainable development, we build sound relationships with livestock farmers, many of whom are eager to find solutions to their environmental challenges. We encourage them to farm productively yet maintaining a healthy ecosystem. Our efforts are focussed on finding solutions for them.

We fundamentally believe that for our research projects to be meaningful, they must be augmented by conservation education. We are particularly excited about the excellent achievements of our education programmes. The education camp in the Cederberg is open to all age groups, but priority is given to school groups. Thousands of school children have already attended these camps benefitting from our environmental curriculum. What is pleasing is that many schools are returning on repeat visits, indeed a sure sign of approval of the quality and value of this programme.

The Cape Leopard Trust's vision for the future is to broaden its research activities and education programmes. The year ahead will present its own challenges, as well as prospects. We will continue to develop even greater efficiency and improve our effectiveness.

I would like to thank all our partners, sponsors and benefactors once again for their continuing support. Lastly, I would like to thank the members of our staff for their dedication and hard work and the Board of Trustees, who are always available to provide knowledge and guidance. It is a privilege to be associated with this pioneering organization and its people.

Johan van der Westhuizen
Chairman—The Cape Leopard Trust

Creatures Worth Conserving

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Letter from the CEO

Dr Quinton Martins

The Cape Leopard Trust prides itself in being a dynamic and well-grounded conservation initiative. Over the past 8 years we have capitalised on opportunities which have led to rapid growth of the project. This has coincided with a difficult economic climate over the past couple of years. In the business world, prudence by restraining operational facets and consolidating may be promoted in such circumstances. However, our role of having a positive impact on our environment and the people living in it means the bigger the scope of the project, the greater the impact. As long as we can justifiably secure the funding required, we need to grow the project to fill in the gaps where research, education and conservation efforts are needed. I am pleased to say that despite the occasional speed-wobble along the way, we have identified who and what is needed to ensure the next growth phase of the project is well managed and that the systems needed to accommodate this growth are put in place.

We wish to share our vision of the project and showcase the work done over the course of the year in this annual report. We have established a credible and well-run conservation organisation, and have built up valuable partnerships with government, conservation NGO's, educational institutions and landowners. Going forward, we will maintain and further build on this concrete foundation on the road to achieving our project goals.

Lastly, I wish to thank my dedicated team of staff and students for their commitment to the Cape Leopard Trust and their respective projects. I also wish to extend my gratitude to my fellow trustees who so willingly contribute their time, knowledge and support to ensure the wellbeing of this project. And finally, I wish to acknowledge and thank all of our project donors for their generous and valuable contributions to our work.

Dr Quinton Martins
CEO
The Cape Leopard Trust

Overview

Research has played a vital role in the work of The Cape Leopard Trust. We maintain that sound empirical research opens the way to a better understanding and balanced approach to implementing conservation strategies. Research results are also filtered down into our education programme, providing our education team with relevant and applicable biological or social-economic data to work with. In 2012, all sectors of the project produced excellent results: the Gouritz PhD final year of fieldwork on leopards obtained significant collar and camera data; the Boland Leopard Project excelled both in camera trapping, awareness raising and recent leopard captures; the caracal/leopard research in the Cederberg has produced the most comprehensive data on caracal movement and behavior across their range, while the Black Eagle project has produced unrivalled data on this aerial apex predator. Finally, our Education Project has reached its largest audience yet with excellent feedback from participants and teachers/facilitators.

The Cape Leopard Trust and its dedicated team has assimilated unprecedented predator/mammal data for the Cape which is being used for developing management strategies and conserving biodiversity: we have captured over 40,000 mammal camera trap photographs, 1,500 leopard photographs and identified over 100 leopards in the Western and Northern Cape. This year, a total of 6 leopards and 3 caracals were collared and 3 Black Eagles tagged using the most advanced equipment available for monitoring purposes.

Research results are fast evolving into credible, peer-reviewed scientific publications (local and international). Our track record is being recognized globally and a visible increase in international PhD and MSc student applications to work on our project has been observed.
We have fostered our relationship with government bodies, while recognizing the need to work with all sectors including the public and farming/business sector. Recognition of our work has seen high level meetings with officials on how to address current farmer-predator conflict issues and we have been elected on the Wildlife Conflict Forum to help address these issues. We are also a proud founding partner of MammalMAP, a project of the Animal Demographic Unit of the University of Cape Town, contributing research data towards its database and the largest mammal survey in Africa.

We do not limit our world view and are constantly looking to improve. We believe that as an organisation we have a great deal to offer. International exposure, such as Quinton's USA research trip, has proven to be a valuable contribution to the project. His experiences have added a new dimension to the project while simultaneously creating new opportunities. International project recognition has also been witnessed through Quinton being invited by the Saudi Arabian government to help address their needs to study and conserve the critically endangered Arabian leopard of which possibly only 40 are left in the world.

Finally, at the time The Cape Leopard Trust was established in the Cederberg Mountains (2004), an average of 8 leopards was legally killed every year. We wish to highlight that through our work and partnerships with land owners and Cape Nature, not a single leopard has been killed due to farmer conflict in the Cederberg since 2007.

The Cape Leopard Trust Team

Board of Trustees:
Johan van der Westhuizen (Chairman)
Professor Chris Henshilwood
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Dr Quinton Martins
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Anita Meyer— Boland Project Coordinator
Pierre van der Spuy— Administrative and Communications Coordinator
Elizabeth Martins—Education Project Coordinator
Matthew Dowling—Environmental Educator
Jeannie Hayward— Boland Project Coordinator

Students
Jeannie Hayward—PhD (University of Cape Town) - leopards
Gareth Mann—PhD (Rhodes University) - leopards
Megan Murgatroyd—PhD (University of Cape Town) - Black Eagles

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The Cape Leopard Trust Vehicles

Cape Leopard Trust research, education and administration vehicles

Research

Cederberg Predator Research

"I dream of a day when the current assemblage of wild animals in the vast and desolate Karoo landscape can move freely without threat from human persecution. Persevering with my predator research will help me achieve this goal."

- Quinton Martins

Quinton Martins began researching leopards in the Cederberg Mountains in 2003. He conducted the first leopard population density study using infra-red camera-traps in 2004. Over time, the project grew and he was able to further his research to include monitoring using GPS radio-collars. In 2010 Quinton completed his PhD through the University of Bristol, the title of his work: "The ecology of the leopard *Panthera pardus* in the Cederberg Mountains". This ground-breaking work was to form the foundation for further research in the region.

The evolution of research activities in the Cederberg has seen the move to studying prey as well as other predators, not only leopards. For example, a health study on fluctuating rock hyrax (dassie) populations was one study that led to a scientific publication on the presence of a specific form of dassie tuberculosis (see publications).

Furthermore, understanding the role or impact of leopards as apex predators on smaller “meso-predators” such as caracal was another important ecological question needing to be addressed. Evidence through the use of camera traps suggests caracals are not using the same habitat as leopards - and vice versa. Understanding ecosystem functionality is a key interest of our project, and as such, understanding the roles large predators play in a system and whether they impact on the behaviour and ecology of other predators, both currently and historically, is important.

Caracals are widespread in sub-Saharan Africa and in the Middle-East, yet are rarely seen in the wild as they are mostly nocturnal, solitary and cryptic animals. Consequently, few studies have been carried out on them and little is known about their general ecology. They are reputedly responsible for the most small-livestock losses by any member of the cat family in South Africa, demonstrating the need to answer basic ecological questions to develop management strategies aimed at reducing conflict with farmers while conserving the species and broader biodiversity. It is possible that current human-wildlife conflict issues are linked to local extirpation of large predators.

Quinton began a study investigating and comparing the behaviour and spatial ecology of both leopards and caracals in the Cederberg. Results could provide valuable insight into alleviating farmer-caracal conflict in areas beyond the Cederberg.

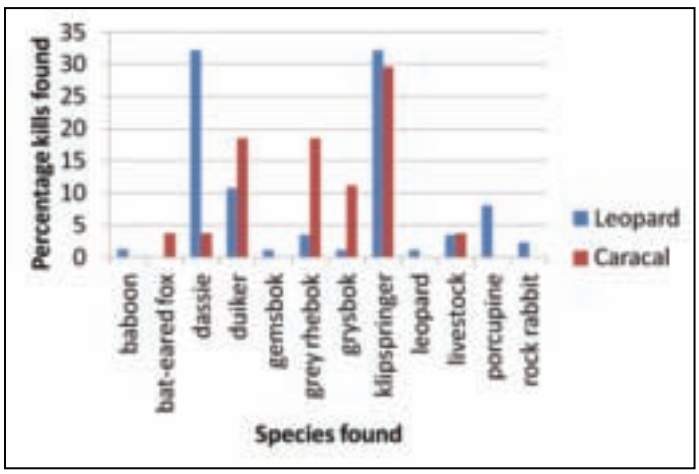
Research

The success of the Cape Leopard Trust in the Cederberg Mountains has resulted in both leopards and caracals being protected to a large degree in farming areas, allowing him to conduct his study on stable populations. Results will later be compared to other areas where they are managed by lethal means, so that the impact of persecution on their behaviour or ecology can be gauged.

2012 Research

Diet

Results from intensive fieldwork have provided valuable data on homes range and diet of four caracals in the Cederberg. High resolution collar GPS data allow for prey remains to be found providing insight into their feeding ecology. Surprisingly, caracals are feeding on a large number of medium-sized antelope species, such as klipspringers, grey rhebok and grysbok. They are also feeding on other predators such as Cape fox and even black-backed jackal! Of 27 larger kills made in less than 1 year, only one was a domestic lamb. Caracals are impressive predators - data collected on one of our collared females illustrated that she was able to kill prey 3 to 4 times her own body mass.



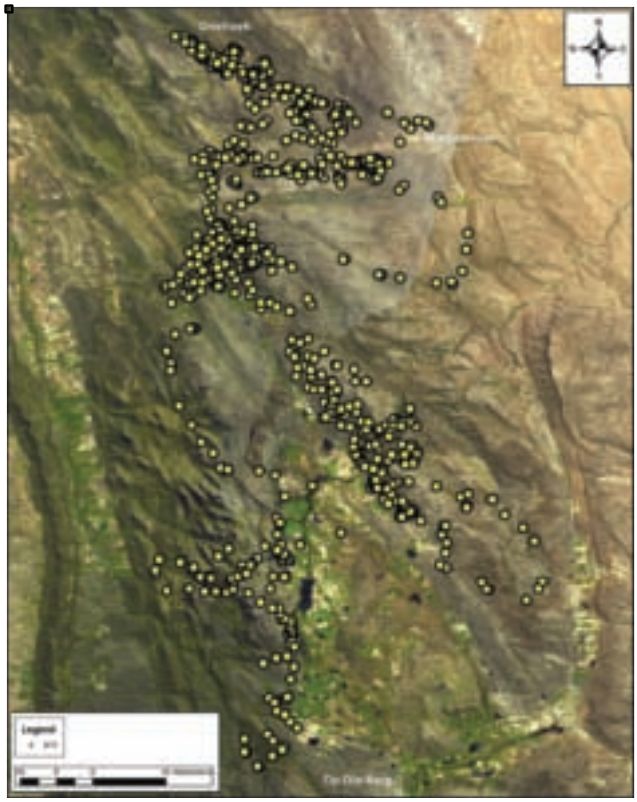
Percentage kills found using GPS clusters

Dispersal behaviour

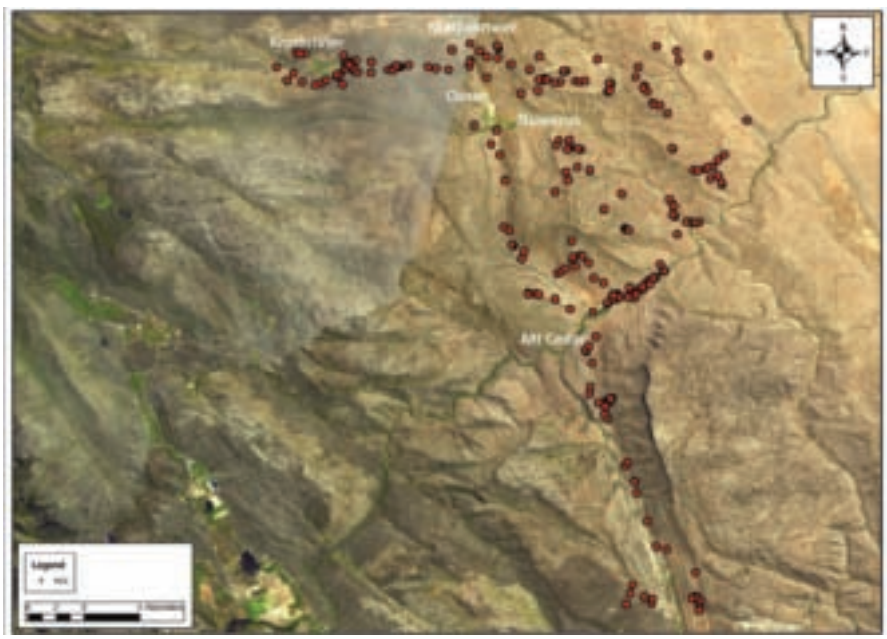
Due to the degree of difficulty, understanding sub-adult or dispersal predator behaviour is another topic needing urgent attention. To address this, we are looking at ways in which to monitor younger animals with GPS technology. A 2-year old male leopard was collared for the first time in a manner that would not be problematic to him as he grew older. The data shows how he avoids prime leopard habitat, preferring to move in what we would consider caracal habitat. The caracals collared this year appear to select open areas versus rocky areas used by territorial, adult leopards.

GPS data

To-date, four caracals have been collared with GPS radio-collars. Together, these data will lead to a better understanding and significantly add to the available literature on caracal behaviour and ecology to further our knowledge of this much maligned cat. The outcomes of this project will, amongst others, determine how leopards and food availability influence caracal ecology, while addressing the management issues and consequential loss of biodiversity resulting from human-wildlife conflict.



GPS locations over a 6 month period for sub-adult male leopard M17 "Patch"



GPS locations over a 3 month period for male caracal MC3

Research

The Boland Leopard Project

"2012 has been a rollercoaster of a year. Apart from all the amazing hikes and fantastic camera trap photos we got with the second Southern survey, the highlight of the year has to be capturing and collaring the first Boland leopards. From the hard work and long hours in the sun to set the traps just right, the nervous but eager anticipation for that triggered trap signal, to the adrenaline rush of the darting and the awe of handling such a magnificent animal. What a privilege!"

- Jeannie Hayward -

"These cats really seem to know no boundaries apart from those they set amongst themselves. They live truly wild lives still and never cease to amaze me! It's a privilege to be able to study them, to share what we learn with the public and to hopefully in this way ensure their survival."

- Anita Meyer -

Background

The CLT Boland Project was initiated in March 2010 - a study of the Cape leopard population along the north-south axis of the Cape Fold Mountains, stretching from the Groot Winterhoek Mountains in the north to the Kogelberg Biosphere Reserve in the south. The last study on leopards in this region was conducted in the mid 1980's in the Jonkershoek Mountains near Stellenbosch. Our study area is significantly larger as leopard distribution and population size was largely unknown for this area. With the launch of a rigorous large-scale camera trap survey, the CLT Boland Project set out to fill this gap with Anita Meyer and Jeannie Hayward as coordinators.

Camera trap surveys

Recent advances in camera technology brought ecologists and conservationists a new research tool – the digital remote-sensing camera, or in short a "camera trap", ideal for recording and monitoring species distribution, activity and behaviour. They are particularly useful for studying animals with unique markings or coat patterns such as leopards where individuals can be identified and counted. The Boland Project has used this method to gather baseline information on the leopard population while simultaneously surveying the diversity of medium-sized mammals in the study area.

Research

Since 2010, sixty-five camera traps distributed over 95 different sites have been used to survey the central and southern study area. Areas include CapeNature and City of Cape Town managed land as well as water catchment areas and private property with suitable mountain habitat adjacent to these reserves. Fifty-five adult and sub-adult leopards have been identified. Leopard densities appear higher here than in the Cederberg.

Table 1: *The CLT Boland Project in numbers*

Total number of CLT camera stations	96
Success rate in terms of leopards	88 out of 96
Total number of mammal photos	>11 000
Total number of leopard photos	>800
Total number of leopards identified	55
Number of mammal species identified	25
Kilometres driven	>60 000
Kilometres hiked	>2 000
Total private landowners with camera traps	26

Camera trap photo

The best way to get to a camera trap or track a leopard.

Globally, leopards are classified as near-threatened by the IUCN. Although leopards have a wide range and are locally common in some parts of Africa and tropical Asia, their population numbers are declining in large parts of their range due to habitat loss and fragmentation, hunting for the skin trade and conflict with humans. These threats may be significant enough that the species could soon be classified as vulnerable. Due to their low densities, large home ranges, and fragmented and limited suitable habitat, leopards in the Cape are more threatened than many other leopard populations. The total population of leopards in the Western Cape numbers no more than a few hundred individuals, and the Boland mountain complex may well contain some of the highest densities of Cape leopards. However, the Boland mountains are almost completely enveloped by human habitation – urban areas (towns and informal settlements) or agricultural land.

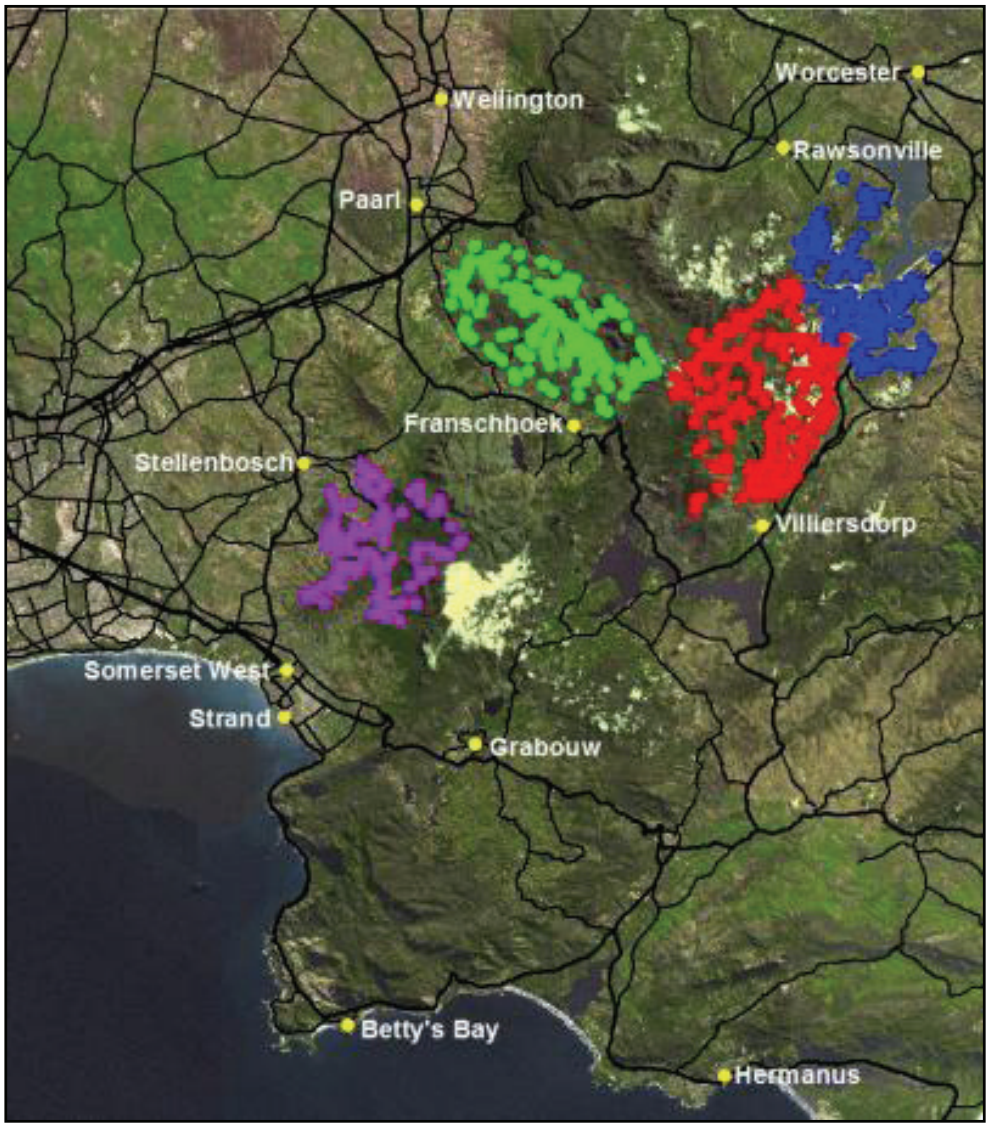
Although the core mountain reserves remain preserved, edges are heavily impacted by habitat alteration, and in essence the Boland mountains represent an island of leopard habitat within a sea of degraded land. The increasing loss of wilderness through farming and human habitation is a major factor for leopards as well as their prey. Furthermore, the Boland ecosystem is both fire-prone and fire-driven, and the potential impact of this fire-dependence on fynbos fauna (especially a long-lived territorial species such as leopard) is very poorly understood. Information on the extent to which land transformation and other anthropogenic disturbances influence leopard behaviour and movement in the Boland area is urgently needed for determining effective management strategies for the species and its associated habitat.

Researchers hiking in the Boland mountains.

Research

The main objectives of this PhD on Boland leopards is to:

- Quantify leopard habitat use and preference through analysing fine-scale movement using GPS radio collar data;
- Determine the diet, distribution, density and home range sizes;
- Assess public and farmer sentiment towards leopards, identify conflict hotspots, assess the levels of conflict associated with different types of land use while assessing direct and indirect threats to leopards.



GPS collared leopards

To achieve this, Jeannie needs to collar a minimum of six target male leopards. She was trained in trapping methods of the highest international standards by Dr Quinton Martins and Jeff Sikich – an expert animal trapper and wildlife biologist with the National Park Service in the USA whose visit was funded by the International Foundation for Animal Welfare (IFAW). Three male leopards were captured and fitted with GPS radio collars. A fourth leopard was collared after being rescued from an illegal snare. The GPS data obtained has already provided interesting insights into the habits and diet of leopards in the Boland. Of the seven leopard feeding sites indentified from GPS location clusters and investigated, we found 3 porcupines, 1 common duiker, 1 grysbok, 1 red rock rabbit, and 1 baboon.

Jeannie and Anita focused on the task at hand. Teamwork has been one of their key ingredients and has made the Boland Leopard Project a huge success on all levels.

Research

The Gouritz Project

" If 2010 was a year of beginnings and 2011 was a year of hard work, 2012 has been the year plans started coming together."

- Gareth Mann -

The year began with some tough fieldwork under challenging conditions, hiking deep into the Gamkaberg and Swartberg mountains to move cameras around in temperatures regularly exceeding 40°C. This was part of our ongoing camera trap survey to establish the size and density of the leopard population in the Little Karoo. As the first survey of its kind ever to be done in this area, this will provide us with a valuable benchmark against which to measure leopard population fluctuations in the future.

The survey was completed in September, with 143 sites surveyed over an area of approximately 3000 km^2. The over 12,000 mammal photographs represent a veritable treasure trove of biodiversity information providing valuable insights into current biodiversity trends. Again, these data will provide an invaluable resource in future, allowing us to track changes in biodiversity patterns in the Little Karoo.

Whilst gathering information on current state of biodiversity in the Little Karoo is undoubtedly important, it is crucial to remember that we are working in an area that has been subjected to hundreds of years of land-use change, which has undoubtedly had an impact on biodiversity. It is probable that animals such as lions, cheetahs, elephants and rhino all roamed the area prior to the arrival of European settlers, and the removal of these large animals is likely to have had a substantial knock-on effect on the rest of the ecosystem. Our research has shown that leopards are only found in mountainous areas in the Little Karoo. Whether this is their natural distribution (it's possible that lions may have largely excluded them from more open areas), or simply the only place in which they have been able to survive human persecution is open to debate.

This demonstrates the importance of historical context in understanding current ecosystem trends, and this is one of the reasons for conducting interviews with landowners within the Gouritz study area. A significant (but decreasing) number of Little Karoo farms are still owned by families that have farmed them for generations, and we have attempted to tap into this long-term knowledge by asking farmers about changes in the number and type of indigenous species that inhabit their farms.

Of course, the indigenous species that are of the most concern to farmers are those that impact on them financially. While conflict with leopards in the Little Karoo is low, species such as black-backed jackals, caracals and baboons are frequently cited as causing damage to crops and livestock. Understanding this conflict, and how farmers attempt to manage it, has been one of the major goals of the survey. We hope to use these data to identify the most effective conflict mitigation strategies, and then to provide feedback to both farmers and conservation authorities. Encouragingly, the use of non-lethal predator controls (particularly Anatolian shepherd dogs) is fairly widespread in the area, and is generally seen as being a very effective predator management technique.

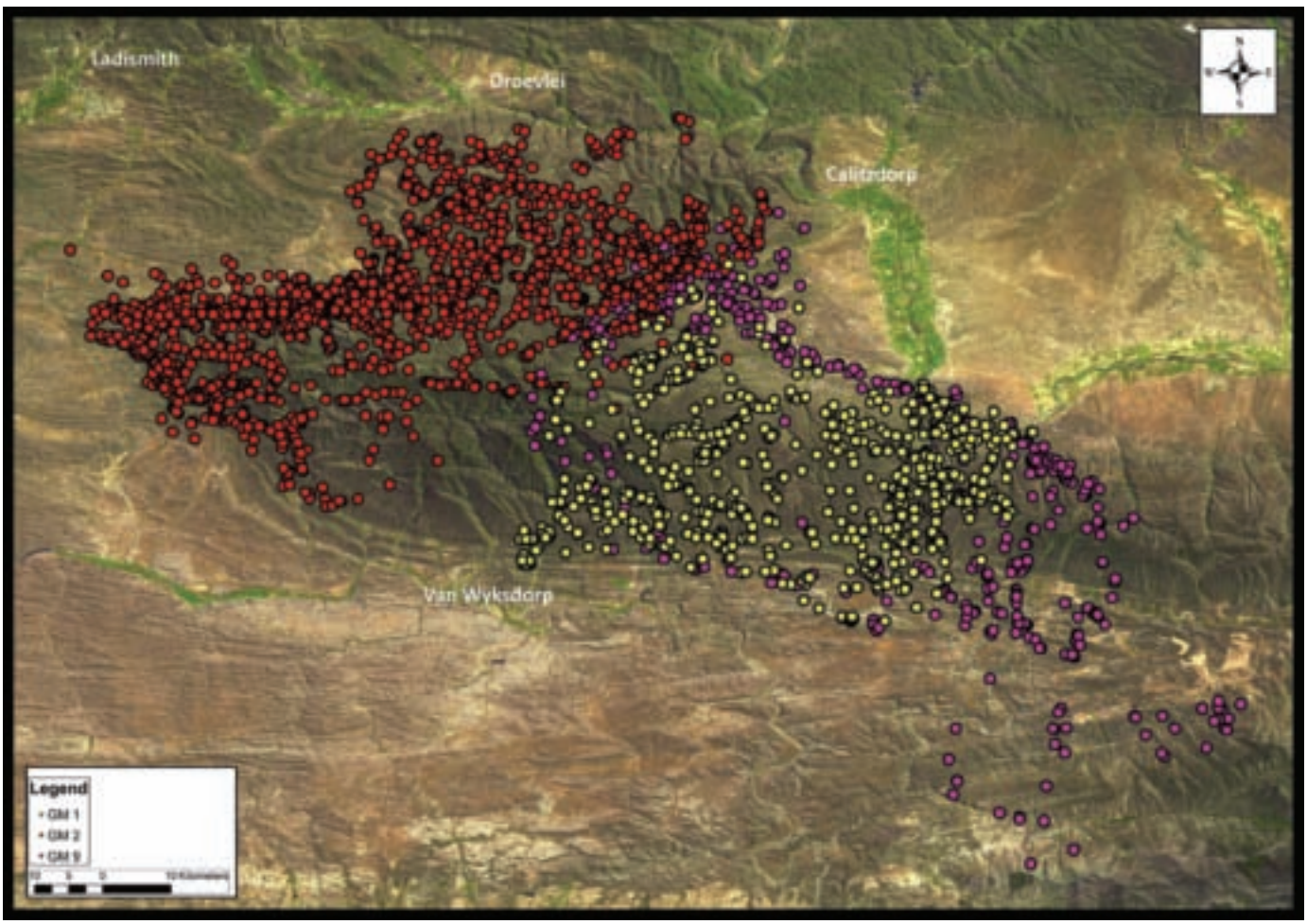
Finally, we spent several months attempting to trap leopards. The goal of trapping this year was to recapture the last remaining collared leopard in the area, GM2, 'Hugo'. This proved to be a far more lengthy process than we had hoped, with trapping commencing in late April and Hugo only being recaptured in September. There was some excitement in May when we recaptured GM10, 'Frikkie', a young male leopard that we first captured in June last year. Although still too young to be collared, Frikkie appeared to be in good health, and it was encouraging to see that he had managed to survive another year without any potentially lethal encounters with territorial adult males.

Table 1: The CLT Gouritz Project in numbers

Total number of CLT camera stations	68
Total number of mammal photos	>12 000
Total number of leopard photos	163
Total number of leopards identified	29
Number of mammal species identified	44
Camera stations set up	68
Landowner interviews	27
Landowner meetings	75

The purpose of recapturing Hugo was to remove his collar, which had ceased to function due to the battery running flat. With Hugo finally recaptured, we were able to access all the data from the collar, which had collected 18 months of detailed movement and activity data. These data also provided locations of potential sites of kills. Despite only weighing 40kg, Hugo had caught large numbers of relatively large prey while collared, including several eland calves and donkeys, duikers and porcupines. An unusual dietary component was the inclusion of baboons. Elsewhere, baboons form a small percentage of leopard diet.

Next year will mark an exciting new chapter for the Gouritz project, with a new team taking over the running of the project from Gareth Mann, who will be writing up his PhD thesis based on the data collected over the past three years.



GPS collared leopards

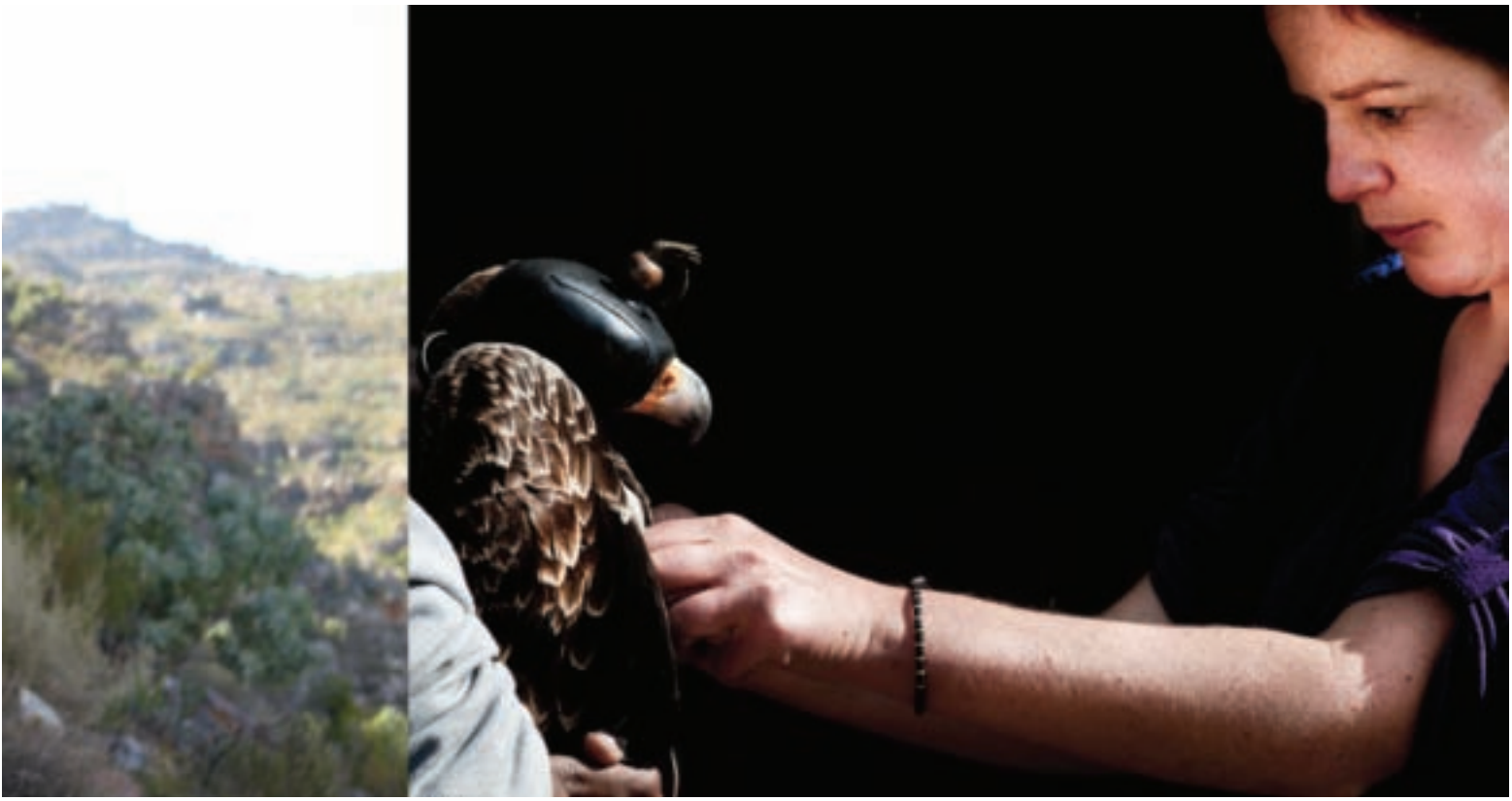
Research

The Black Eagle Project

"The more I learn about the eagles, the more questions I have, so the Black Eagle Project just gets more and more exciting."

- Megan Murgatroyd -

The Black Eagle Project was initiated by Megan Murgatroyd, a PhD student in the Animal Demography Unit at the University of Cape Town. The project aims to compare and contrast the status of Black eagles in the unspoiled Cederberg Mountains and the agricultural Sandveld region of the Western Cape. Megan has been searching for nests and monitoring the breeding success of Black eagles in these areas since 2011 and currently follows the progress of more than 30 eagle pairs.



GPS Tracking

A major component of Megan's research entails the use of a state of the art GPS tracking system which is known as the University of Amsterdam Bird Tracking System or UvA-BiTS. The tracking device is a lightweight solar powered tag with rechargeable batteries and a tri-axial accelerometer and can take GPS positions up to every three seconds. It provides high resolution data on bird movements allowing for fine scale behavioural analysis. Remote data transmission takes place allowing GPS data to be downloaded as well as settings on the tag to be reviewed or altered.

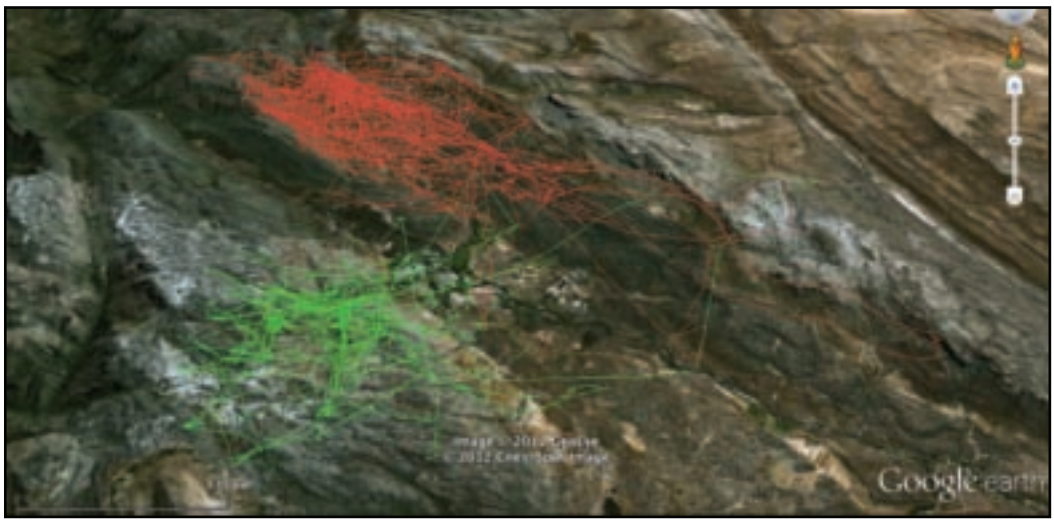
The 2012 season's fieldwork began with the deployment of the first GPS tag in April. This was the first step in understanding the effects land-use has on these birds and the way which they utilize their available habitat. Since then a further two eagles were tagged with these small backpack transmitters and tagging will continue in the coming season.

Preliminary results show Sandveld eagles flying further than Cederberg eagles, possibly indicating higher foraging effort. GPS tracks below each represent one week of data per eagle.

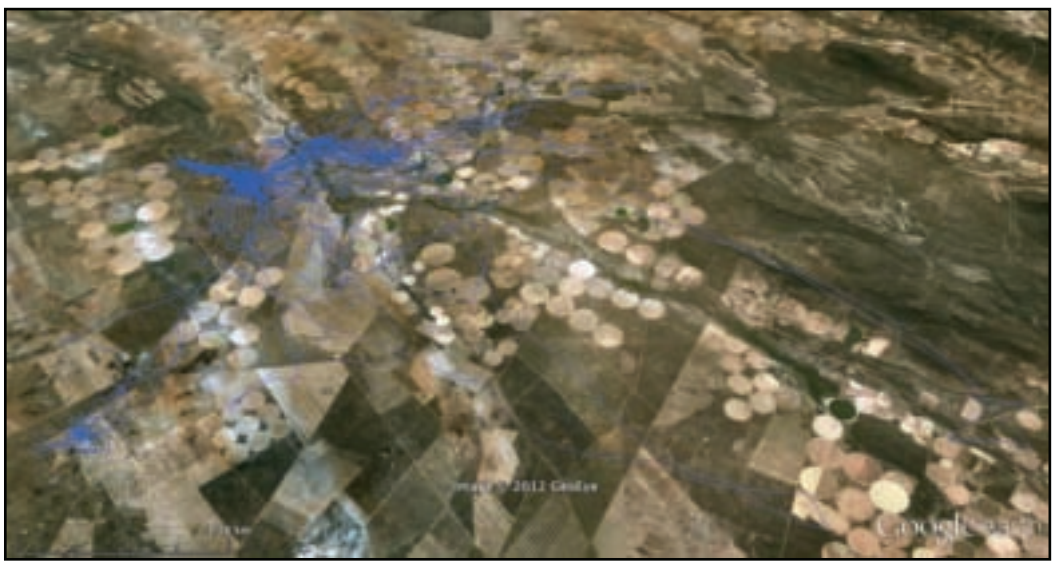
Research

Nest Cameras

Black eagles are generally thought to be prey-specific, relying heavily on the presence of dassie (rock hyraxes). However, through observations and collections of prey remains below nests it has become clear that the eagles of the Sandveld have a diverse diet that includes dassie, tortoises, mole rats and guinea fowl. To investigate these dietary differences, camera traps were installed at five nests during the final stages of incubation to record prey delivery to the chick – another novel use of these cameras used by the CLT. The survey will be repeated the next breeding season. We are thrilled with the insight we have gained from these nest cameras.



GPS tracks from two Black eagles in the Cederberg Mountains.



GPS tracks from a Black eagle in the Sandveld region.

Aerial surveys

The Black eagle research season ended in November with a helicopter survey looking for eagle nests on the inaccessible cliffs of the Cederberg Mountains. During the three day survey the team covered vast areas otherwise unreachable to Megan on foot. An outstanding 46 previously unknown nests were found using this method. Although it will now take more research to uncover which of these nests are active and which were old nest structures, this research has brought us much closer to understanding the population and nest density in the previously uncharted areas of







Education

Environmental Education Programme

" In my view, the best way develop a culture of caring for the environment is to create opportunities for people to experience nature and awaken them to its stories. This interest can then lead to a loving concern."

- Elizabeth Martins -

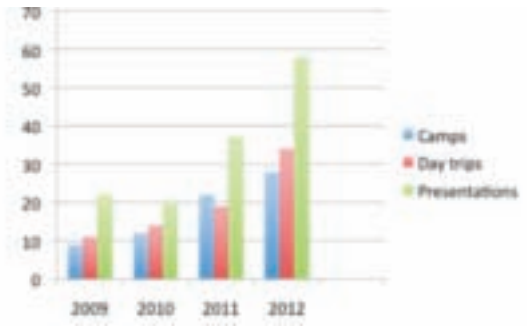
The Cape Leopard Trust Environmental Education Programme was established in 2009 with the aim of providing children and adults with quality experiences that teach them more about the wilderness and themselves. Activities consist primarily of environmental camps held at the Matjiesrivier Nature Reserve (partnered by Cape Nature) in the Cederberg; day outings in Cape Town; and presentations.

Cederberg Environmental Camps

We have had a successful year, running more environmental camps, day outings and presentations than ever before. Due to the generous funding by the National Lottery Distribution Trust Fund (NLDTF), well over half of the camps and outings have been sponsored.

Staff

This has been a year of exciting personal change for Elizabeth Martins, Education Project Coordinator, with the birth of her and Quinton's first child, Ayla. This has led to some temporary changes in the running of the education project, with Matthew Dowling, Environmental Educator, leading the camps and Elizabeth focussing more on the administration and overall management of the programme. During the second season we have had the assistance of an intern, Sheryl Key-Moore, from the United States, who provided great support on the camps as well as with the predator research in the Cederberg. We are looking to arrange a similar placement for next year, as this is a cost effective way of securing assistance while contributing to the intern's own education and career.



Graph showing Education Project growth.

Education

Cederberg Camps

In total we have run 28 camps in 2012. Of these, 19 have been sponsored or partially sponsored through NLDTF funds. Our first season (February – April) was well, but not fully booked, while our second season (September – December) was completely booked out, with many camps running back to back. Twelve of the camps have been schools or organisations returning with a new group – an indication that the camps are a valuable experience, worth repeating. The camps this year have been varied, with participants ranging in age from 10 to 65 and schools ranging from tiny farm schools to well-known private schools. We have had camps for schools, youth groups, community farmers, community guides, women, university and college students. It is something to be said for the environment and our programme that our camps really do seem to 'have something for everyone' as a teacher recently told us.

Camp themes continue to be broad but all relate to the environment and people's interaction with it in some way. Furthermore, our ability to bring in predator research makes this programme unique. Participants are always involved in some form of predator research, which may include setting infra-red cameras; checking traps set to capture and collar leopards or caracals; and finding the kill-sites of these predators to identify their prey. Other favourite activities include animal tracking, exploring the magnificent rock formations at Stadsaal caves, conquering the Wolfberg Cracks, searching for scorpions with a UV light at night, learning about the stars, and, of course, swimming in the beautiful, clean Cederberg rivers.

We have made some improvements to our campsite this year, most notably adding solar panels from which we can now run lights for the kitchen, dining area and bathrooms, as well as fans for the dry eco-toilets. We also had a solar cooker donated and have improved our recycling scheme. Our campsite is therefore more than ever a place that demonstrates 'green' solutions in action with the ability to use little, wisely take responsibility for waste, and live with nature, not just taking from it. Our thanks go to all the volunteers who helped with the camp development.

Cederberg Art Classes

This year Elizabeth ran weekly art classes at the Dwarsrivier School for the first and second terms. The themes were nature based, beginning with an artistic exploration of a range of plants (from fungi, algae and lichen right through to flowering plants), followed by a section on mammals and birds. The artistic work was supplemented and deepened through poetry, in English and Afrikaans. This was a wonderful way to interest the children in the natural world of plants and animals. The children, who have very little art at their school, were exposed to a variety of techniques, including wax crayon and paint, water colours, chalk pastel and shaded colour pencil drawing. They delighted in the exploration of colour and the chalk pastels seemed to be the favourite medium. The children's confidence grew over the period and the sessions ended with the children enthusiastically entering a schools art competition!

Networking and Partnerships

The CLT Education Project has successfully formed relationships with others in the Environmental Education sector as well as with partners in the Youth Development field and with schools. The partnerships that have proved most fruitful have been with the NGOs 'I Am Somebody!', IKAMVA Youth, WESSA and Earthchild; and the Steenberg Primary School and Imhoff Waldorf School. We have been in communication with a number of organisations for collaborations in 2013, including Mamelani, various CapeNature reserves, LapaLala Foundation, SANParks, SAEP and the Afritwin Programme that twins South African and UK schools, as well as many schools around the Peninsula.

CLT Education has also taken part in forums and workshops discussing Environmental Education and Youth Development often with a view to form healthy partnerships with organizations that share similar goals. The most notable of these this year being the EE Friends Forum hosted at the Tygervalley Nature Reserve. This saw partners in environmental education from all over the metropole discussing their initiatives and provided a platform to share insights on growing trends in the sector. 'I Am Somebody!' also hosted a sharing conference midyear, which was attended by youth development and environmental organisations and individuals looking to set down common goals and establish ways to share resources.

Education

Public Awareness and Environmental Outings

The Cape Leopard Trust public awareness campaign really started to take shape this year with Matthew Dowling visiting approximately 70 schools to drop off leopard posters and introduce them to our programmes. These visits have generated a great deal of interest and led to an increase in interest in our work, many presentations, outings and environmental camps. While 30 presentations were conducted in the Cederberg on camps and for other groups, a further 28 presentations were given in Cape Town and 23 in the Boland reaching over 2600 people. We have also formed links with new organisations through this process. We have worked closely with several schools and organisations, providing them with lessons and day trips into the Peninsula mountains and have done 11 day trips in the Cederberg and 23 in Cape Town. These have included visits to Cape Point's coastal fynbos, Silvermine's river systems, Noordhoek Peak's Black Eagle nest, and Kalk Bay's caves.

We are repeatedly struck with the general lack of knowledge about the animals in the mountains surrounding Cape Town. Most people are unaware that leopards exist in the Western Cape, much less in the mountains that they see every day. We will continue to strive to broaden people's awareness as this ignites an interest in their local environment. The Boland Project study area's close proximity to Cape Town and other major towns such as Paarl, Stellenbosch, Somerset West, Villiersdorp, Grabouw and Kleinmond provides an ideal platform for creating public awareness about the research of the Trust as well as the mammal diversity in the surrounding mountains.

Tracking a leopard with a group of emerging farmers

Volunteer in action...trap monitoring can be hard work.

Media exposure for the project during the year includes featured articles on numerous different websites, newspapers and magazine articles, including Die Burger and Buiteburger, Paarl Post, Eikestad News, Africa Geographic, Wineland and Bridgestone's Going Places magazine. The project also collaborated with and received exposure at the Cape Epic, Ommieberg Wine Festival, Slanghoek Summer Splash, launch of the Simonsberg Education Centre and RMB WineX Cape Town 2012.

We also promote public participation in our research. Although a wide-scale volunteer programme is not feasible at present, we do have opportunities for volunteers to assist with specific project needs. We also encourage private landowners to purchase their own camera traps and submit their data to the Trust. It was through the participation of landowners in this manner that the Boland Project was able to record the presence of leopard on the isolated Simonsberg and Paardeberg mountains. These photos are an important contribution to the current knowledge about leopard distribution in the Boland area. Very little is known about how extensively inselbergs (isolated mountains) such as these are utilised by leopards.

Challenges

Human Wildlife Conflict

Whether we like it or not, humans play an integral role in the future of our environment. Predators too represent important agents of ecosystem structure and functioning, yet pose threats to commercial and subsistence agriculture. Conflict between predators and humans is a challenge to biodiversity conservation and food security in farmlands, and is projected to increase in relation to human expansion. In the Cape region, most top predator species have been eradicated from their historical range because of human persecution and habitat transformation and apart from leopards, currently do not persist outside small fenced game reserves. Loss of top predators (leopards) can result in population explosion of smaller predators (black-backed jackals and caracals), through 'mesopredator release', causing major depredation of small livestock. Ecologically destructive and cost ineffective control of predator populations or guilds has proved ineffective also impacting non-target species. This could alter the intensity of herbivory by wild ungulates, small mammals and other prey regulated by predators, thus adversely affecting plant and animal biodiversity and even the commercial viability of farming, by decreasing range productivity for small livestock.

In the Boland mountains, rather than large-scale livestock farms, urban settlements, orchards and vineyards dominate, creating different issues which threaten our ecosystem. Conflict may primarily include damage to crops by baboons or small ungulates. Inadvertently, controlling these species affects leopards and other predators. There are, however, a number of areas where small-scale livestock farming is still practised. Leopards are often blamed for livestock depredation, but upon closer inspection the culprits often turn out to be packs of feral dogs or livestock thieves.

Further issues where humans affect wildlife are in the increase of fires and setting of illegal wire snares for bush meat. Despite the Fynbos being a fire-driven system, too many fires at the wrong time may have a negative impact on the ecosystem. Very little is known of the role of fire and how it affects the mammals of the Fynbos. Snaring for bush meat is often an issue in the poorer farming communities. Apart from diminishing the natural prey base, this also poses a direct threat to leopards and other predators. This year, the Boland team were notified of a leopard caught in such an illegal snare set by farm labourers on private property. It was snared around the lower abdomen and underwent surgery on site. Subsequent camera trap photographs show that this animal has fortunately made a full recovery. This incidence highlighted the importance of public awareness and education campaigns on illegal snaring and trapping on farms.

Leopard rescued from illegal wire snare in the Boland

International Exposure

Research in the USA

In May, Quinton Martins spent a few weeks in the USA visiting research projects and giving a series of talks. The research trip was to gain a better understanding of leopard and caracal behaviour and ecology through work conducted on analogous species in comparable circumstances. Mountain lions *Puma concolor*, also known as cougars or pumas would be the closest equivalent to our leopards, while bobcats *Felis rufus* most similar to our caracal. His exposure included work in the urban environment; and as well as arid and rugged mountain environment.

California was the ideal place to understand how large predators interact with humans, inhabiting human-fragmented and impacted landscapes. In the Santa Monica Mountains, north of LA, mountain lions, bobcats and coyotes coexist with humans in an extraordinary set of circumstances, rubbing shoulders with the wealthy in Malibu, or heading downtown to Griffith Park. Natural areas are bisected by large multi-lane highways inhibiting free movement of a many mammal species, and even some small bird species. These natural refugia can clearly support a plethora of mammal species, including large carnivores and persist despite fragmentation due to housing estates, golf courses or malls. Mountain lions have large ranges and occur in low densities. Consequently, they also have the biggest dispersal and movement issues. Mountain lions are being captured to understand their movements and find ways of creating corridors allowing movement between available natural areas. Younger dispersing lions have a significantly low survival rate – they are either killed by vehicles trying to cross the highways, or killed by resident adults intolerant of their presence. Camera traps on possible cross-over points are one way to monitor the effectiveness of corridors.

Camera Trap keeping an eye out for animal movement over a bridge in the Hollywood district

Bobcat – slightly smaller than our caracal

Bobcats are being studied in the Santa Monica's. Of great concern to these and other carnivores, is poisoning due to human use of rodenticides. Potent anticoagulants such as Heparin have been recorded in up to 90% of carnivores captured, resulting in significant mortality rates. The Cape Leopard Trust would like to investigate how this compares to what we have in Cape Town with our resident caracals or even our leopards bordering towns or agricultural areas?

In the arid mountains of Nevada, Quinton joined PhD mountain lion researcher Alyson Andreasen. Working in the Sierra-Nevada Mountains on the border of Nevada and California, Alyson has done some unbelievable work, adding to Quinton's overall impression that carnivore research in the USA is of the highest standard. She has collared over 40 mountain lions, documented over 1000 GPS clusters looking for kills, hiked, horse-backed, ridden on quad bikes and generally slaved away over the past few years to collect these data in an amazing landscape of dry and rugged mountains. Quinton took part in3 lion captures while he was there.

Quinton collaring a 101 lb female mountain lion.

Future

Going Forward – 2013 and Beyond

Biodiversity conservation and predator-farmer conflict mitigation

This is a 3 year project aimed at taking over from where Gareth Mann ends off in the Gouritz. It will however, cover a vast area beyond the Gouritz, including the Cederberg, Great Karoo and Namaqualand. The project aims to ensure further long-term monitoring and has a two-fold goal: (i) to promote biodiversity and top predator conservation by providing evidence of the importance of top predators in maintaining biodiverse and productive ecosystems; (ii) to facilitate food security by scientifically assessing methods for minimizing livestock depredation while adding to job creation by employing locals as stewards of the land. Several students will be involved in different components of the project, including two exceptionally qualifies students from Canada - 1 post-doctoral and 1 PhD student.

The work will benefit biodiversity hotspots of global importance as well as local farmer productivity by rigorously identifying and studying predator species and individuals that are predominantly responsible for depredation. This information will allow focused management efforts to decrease depredation, with an emphasis on non-lethal techniques, such as the use of herders and guardian dogs. This project can illustrate that biodiversity conservation (mediated by top predators), food security (through decreased livestock depredation and increased range productivity) and poverty alleviation (by employing locals as herders) are achievable simultaneously. The framework is envisioned to serve as a model for other areas experiencing similar ecological and economical challenges.

The Cape Leopard Trust has secured valuable partners in this endeavour including WWF, Conservation South Africa, Cape Nature and the Northern Cape Department of Environment and Nature Conservation.

Depredation of livestock is a real issue.

Management often results in non-target species death.

Future

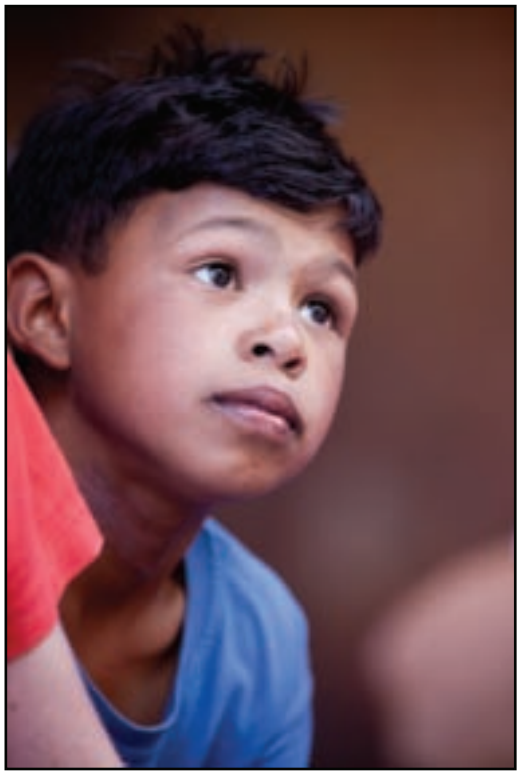
Boland Leopard Sanctuary

A large-scale public awareness project was initiated in the Boland study area at the end of 2012, with plans for development and implementation during 2013. The Trust is working towards declaring a Cape Mountain Leopard Sanctuary in the Boland mountains. Private mountain catchment land surrounding the core protected reserves are fundamentally important areas in terms of leopard movement and habitat use, and private landowners will play an integral role in the long-term persistence of leopards in this area. The protected mountain reserves are surrounded by private land owned by over 300 landowners. The edge effects so critical to sensitive ecosystems can be dealt with by getting all the surrounding landowners involved with this project and encouraged to agree to 1) dedicate remaining mountain land to conservation and not develop it into more orchards and vineyards, 2) to educate permanent and seasonal farm workers about biodiversity and proactively act against illegal snaring and hunting with packs of dogs, 3) to make a concerted effort to clear their property of alien invasive plants and 4) purchase camera traps to monitor mammal activity on their land. Road signs will be erected in strategic places informing people that they are entering or passing through a Cape leopard area (on the N1 and N2 for example), along with suitably placed education notice boards on leopards and their role in the ecosystem.

Future sites for Boland Leopard Sanctuary signs

Future

Education Project



We look forward to another year of growth, and further expansion of the Education Project in the Cape Town area. Our plans include a schools leopard calendar competition, sponsored by Bridgestone SA, which will both teach the children about Cape leopards and inspire them to share that knowledge creatively. The winning calendar will be printed and distributed to sponsors for use in 2014. If we are able to secure funding, we aim to complete two books in 2013. One is a Cape leopard book for children - a fun, informative storybook, highlighting Cape leopards, CLT research, human-wildlife conflict and other animals in the leopard's environment. The other is a guide to tracking in the Cape mountains – a practical guide to recognising local animal tracks, including tips, drawings and camera trap photos.

Future

Capture for Conservation (C4C)

Currently thousands of projects are taking place around the world where students are involved in the capture and handling of wild animals for monitoring and research purposes. Often, lack of training and funds for suitable trapping equipment result in (i) low trapping success rates, equating to poorer research results; (ii) increase in risks to animals – target or non-target species; (iii) increase in risks to researchers and (iv) questionable ethics validity surrounding the research in question du e to insufficient information published on the techniques.

C4C aims to address these needs by offering the services of professional trappers and the best technical equipment to worthy projects across the globe. Students will be trained in the process making it a sustainable initiative. Funders will be sought to fund these high profile project deemed crucial for conservation purposes. Funders will be acknowledged in all reports both by C4C as well as any reports or scientific publications emanating from the work in question, where it be jaguars in Argentina, giant otters in Peru or snow leopards in China. C4C will also document all studies in a manner so as to publish trapping results as future scientific references that can be used by ethics committees at academic institutions.

Handling of wildlife must be by trained personnel and must be safe and humane for the animal.

Fitting a GPS collar to a leopard requires experience and training.

Academic

Publications

The Cape Leopard Trust has authored and co-authored a number of peer-reviewed academic articles. These contributions are vital to improving the understanding of felid ecology and behaviour in CLT project areas. Scientific papers also assist other researchers in their efforts in further investigating big cats, as well as resource managers who can use this information in designing and implementing conservation strategies.

Fröhlich, M., Berger, A., Kramer-Schadt, S., Heckmann, I. & Martins, Q. (2012). Complementing GPS cluster analysis with activity data for studies of leopard (Panthera pardus) diet. South African Journal of Wildlife Research 42 (2).

Martins, Q. (2011). The ecology of the leopard *Panthera pardus* in the Cederberg Mountains. PhD Thesis, University of Bristol.

Martins, Q., Horsnell, W.G.C., Titus, W., Rautenbach, T. & Harris, S. (2010). Diet determination of the Cape Mountain leopards using global positioning system location clusters and scat analysis. *Journal of Zoology* 283, 81-87.

Fröhlich, M. (2011). Studying the foraging ecology of leopards (*Panthera pardus*) using activity and location data: an exploratory attempt. Masters Thesis.

Rautenbach, T. (2009) Assessing the diet of the Cape leopard (*Panthera pardus*) in the Cederberg and Gamka Mountains, South Africa. Master's Thesis, Nelson Mandela Metropolitan University, South Africa (Scholarship provided by the Cape Leopard Trust).

Lindsay, P. (2008) A spatio-temporal analysis of the habitat use of leopards (*Panthera pardus*) in the Karoo biome of the Cederberg Mountains, South Africa. Honours Thesis, University of Cape Town, South Africa (in collaboration with the Cape Leopard Trust).

Parsons, S., Smith, S.G.D., Martins, Q., Horsnell, W.G.C, Gouse, T.A., Streichera, E.M., Warrena, R.M., van Helden, P.D. & van Pittiusa, N.C.G. (2008) Pulmonary infection due to the dassie bacillus (*Mycobacterium tuberculosis complex sp.*) in a free-living dassie (rock hyrax—*Procavia capensis*) from South Africa. *Tuberculosis* 88, 80-83.

Martins, N. (2006) Conservation genetics of *Panthera pardus* in South Africa: Phylogeography of mitochondrial lineages. Master's Thesis, University of Bergen, Norway (Scholarship provided by the Cape Leopard Trust).

Martins, Q. & Martins, N. (2006) Leopards of the Cape: Conservation and Conservation concerns. *International Journal of Environmental Studies*, 63(5), 579-585.

Sponsors

A Word of Thanks

Special thanks must go to the following donors making a significant contribution to our project over the past year. Several of these sponsors have been supporting the Cape Leopard Trust since its inception in 2004.

Further thanks must go to the following supporting individual projects:

Education Project Sponsors

The CLT Education Programme continues to be funded primarily by the NLDTF through a three-year grant, of which one year remains. This has allowed the project to flourish and most importantly to make the activities that we offer available to all. We are sincerely grateful for this privilege. Thanks also to Wallace Vosloo for personal donations of interesting implements, including a solar cooker and star-gazer. We would like to acknowledge all the volunteers who have given of their time to help the education project.

Black Eagle Project Sponsors

Thank you to: Base 4 Aviation, Driehoek Wines, Darling Brew, Cederberg Cellars, K-way and Evosat.

Donors

We wish to thank all donors to the project no matter how big or small the contribution. All contributions are recognised on our website. Your support is greatly appreciated.