

Save the Elephants

Donor Report



Rommel asleep in the Uaso River awaiting his collar

2004/2005

Save the Elephants Mission

"to secure a future for elephants and to sustain the beauty and ecological integrity of the places where they live; to promote man's delight in their intelligence and the diversity of their world, and to develop a tolerant relationship between the two species."





Message from the Chief Executive

Only by understanding how elephants take decisions are we able to help meet their needs and conserve the habitats on which they and other animals depend. 2005 marks our tenth anniversary of tracking elephants using GPS technology. Thanks to you, our donors, we have been able to travel together across the vast and arid lands of Northern Kenya, the Sahel in Mali, the South African bushveld and into the deepest forests of Central Africa, tracing the elephant footprints onto our maps and satellite images. The data we collect helps us stand up for elephants' right to space, as well as a host of other species and habitats. Ultimately, it is human beings who will determine wildlife survival or extinction. Through our research and presence in the field we have planted an important seed of conservation on the front line, among the people who share the land with elephants.

Ten years ago we deployed the first GPS animal tracking device in Africa, by tagging a big bull in Amboseli who had wandered across the border into Tanzania where he was in danger of being shot by sport hunters. Ever since we have followed elephants, in all kinds of weather and terrain, regardless of political or property boundaries, revealing their intimate lives and problems. Remote tracking generates information on an unprecedented scale never before available to researchers.

During forty years of working with elephants Oria and I have seen waves of ivory poaching. These were greatly reduced by the ivory trade ban in 1989, but protecting elephants and helping wildlife departments in their fight against ivory traders and poachers remains a priority. Massive encroachment on wild areas and a rise in human-elephant conflict are an increasing concern, highlighted by Mike Fay's Megaflyover project that charted the Human Footprint across Africa. Mike and his National Geographic team visited Samburu in their two bright red Cessna 182s earlier this year, helping us with high tech aerial imagery and joining the Tsavo elephant count which we sponsored.

We communicate daily elephant bulletins to the world through our web based news service, run by Melissa Groo. It is sent to over 400 hundred elephant specialists, keeping them up to date with the latest elephant events in Africa and Asia. We continue to disseminate information through films, publications, a computerized elephant library and our website, including the results of our work, and the knowledge that elephants are sensate creatures with complex levels of consciousness.

We also focus on basic human needs at the grassroots where people co-exist with elephants. Out of all the requests for aid, we are asked to assist with education the most. We now have a thriving scholarship programme supporting underprivileged children, many of whom are orphans and could never afford a secondary education. Local people have also been trained and are working on all aspects of our research side by side with young academics from overseas. Last year two PhD candidates from Oxford and Berkeley were each asked to be best man at a Samburu wedding where their closest research colleague was getting married.

In December 2004, our patron HRH Prince Bernhard of the Netherlands passed away, which was very sad for so many who loved him. He was one of our greatest supporters, whose unflinching optimism and loyalty to Africa, its wildlife and people, gave us inspiration and moral support and often the means to meet our challenges.

The following accounts give brief summaries of all our projects. It is only thanks to you, our donors, that we have been able to achieve anything in our struggle to save the elephants. Special thanks also go to Wildlife Conservation Network for their constant support and donor networking. We welcome you all to continue traveling with us on this long journey.

Iain Douglas-Hamilton



Summary

Save the Elephants (STE) work over the past few years has involved many and varied projects. Dr Iain Douglas-Hamilton continues to supervise these and has many researchers working under his direction.

EAST AFRICA

Radio-Tracking: The STE Animal Tracking Programme, supported by Safaricom, enables each tagged elephant to send text messages every hour of its exact position. This helps deepen both the bull and cow/calf social studies, and identifies crucial corridors that elephants use to travel between Samburu and Laikipia. Such information is vital for wildlife authorities and stakeholders to ensure plans to secure the future for the elephants and their habitats and is displayed and analysed by advanced computer mapping. David Gachuche, a geomaticist, works with Iain and writes the software.

Population and Long-Term Monitoring of Elephants: The population and long-term monitoring of the 900 plus elephants in Samburu and Buffalo Springs National Reserves continues daily. David Daballen, Daniel Lentipo, assisted by Shivani Bhalla work on this, and the births, deaths, oestrus, musth and associations are recorded. This work shows that births exceed deaths and the population is expanding at approximately 4.5% per annum, in contrast to the former years of poaching. This study assesses the well being of the elephants and is a benchmark against which to measure change.

George and Henrik Rasmussen have almost completed their PhDs at Berkeley and Oxford respectively. Cows and calves are studied by George. He is looking at how families come together and split apart. One of the key questions addressed is the extent to which elephant groups are based on underlying genetic kinship as opposed to associations that have formed between animals that have simply bonded together. Bull mating strategies are the subject of Henrik's study where he is looking at the competition amongst bulls as well as hormone levels as the bulls fluctuate in and out of musth. With Iain, he is looking at the long distance movements of the bulls in Samburu and Laikipia, by analyzing all the radio-collared data. Both studies explain how social factors affect elephant ranging behaviour.

At the same time, STE collaborates with universities to study hormones, DNA and isotopes collected from dung samples and tail hairs of known individuals. This gives another layer of understanding of what motivates elephants, from seasonal breeding to genetic relationships and food preferences.

The Monitoring of Illegal Killing of Elephants (MIKE): This project headed by Onesmas Kahindi and collaborates with the Kenya Wildlife Service. Onesmas has established a valuable network of contacts throughout the local community in an innovative participatory project, and has collected large amounts of data on elephant mortality in the Samburu/Laikipia MIKE site. This acts as a sensitive early warning system that will trigger alarm lights if there is any renewed surge in ivory poaching. Our project is in one of Kenya's four MIKE sites, part of a network of 55 MIKE SITES across Africa.

The Ewaso Ngiro Elephant Research and Conservation Project: Max Graham has produced interesting results in the Laikipia region and has effectively brought STE into Laikipia, the Kenya hotspot for Human-Elephant conflict. Max has provided a scientific approach to the interaction of agriculturalists and elephants and has produced novel ideas on how to help people live with elephants at the grass roots. Max is working towards his PhD with Cambridge University.

The Geographical Information Systems (GIS): The GIS team has expanded over the past year, as computerized mapping is moving centre stage in all land use and conservation planning exercises. Our data is particularly relevant. Barnerd Lesowapir, Boniface Mworia and Festus Ihwagi all work on different aspects of GIS and are being trained at the same time. The question of how different land uses



impact elephants, and vice versa, is receiving STE's full attention. Land uses vary from smallholdings in Southern Laikipia to the protected areas and nomadic rangelands of the North. Jake Wall, a Canadian volunteer, has helped by preparing map presentations of the elephant movement data. Jake also worked out a method of calculating elephant densities in order to identify density hotspots.

Human Settlements and Trees Surveys: In 2004 and 2005, Barnerd Lesowapir embarked on a Human Settlements Survey of the areas surrounding and adjacent to Samburu and Buffalo Springs in collaboration with the Samburu County Council, who are responsible for the management of the Samburu national reserve. All buildings and physical structures were counted and results were mapped. Within the reserves, elephants damage trees along the riverine belt. To assess the extent of destruction, Barnerd counted all the 45,000 trees along the river within the two reserves, and checked each one for ring-barking and damage. Both the settlements and tree surveys are excellent benchmarks against which change can be measured, vital information for planning the future.

Save the Elephants and Elephant Watch Safaris Education Programme: Under the supervision and guidance of Oria Douglas-Hamilton, Shivani Bhalla has now taken over this programme since early 2004. Currently, there are 14 students enrolled in the programme. A further 10 students will be selected towards the end of 2005 and an equal number in 2006. Students from poor backgrounds with high grades are specially interviewed and selected from the areas around the reserves, and are then sponsored for 4 years of secondary education. Guests coming to Elephant Watch Camp, Oria's self-sustaining eco-tourism enterprise, have been the primary donors of this education project.

Training: STE was involved in extensive training. In August 2004, David Daballen went to the College of African Wildlife Management in Mweka, Tanzania, to study for a Certificate in Wildlife Management. David successfully completed this course in June 2005. In May 2005, Daniel Lentipo traveled to Mali to contribute his expertise to the Gourma Elephant Project. Daniel spent 2 months in the Gourma Region assisting with the identification of the desert elephants. All researchers underwent intensive GIS training. A number of young Samburus have also qualified as Bronze members with the Kenya Professional Safari Guides Association. Two of them also undertook an extensive training programme at the Bush Academy in Tanzania and graduated with high marks.

Lion Population Study: STE partly supported a lion study undertaken by Shivani Bhalla. The MSc study provided the baseline information of the lion population in both reserves. Prides were identified and movements in the dry season were also looked at. This information is needed as lions face increasing difficulties when they go outside the reserve area. Within the reserve they are often harassed by tourists. The research is needed to find solutions to both these problems.

Camp News: The research camp in Samburu has had many wildlife visitors over the past few years. The camp has been a centre of attraction for lions and leopards, kudus and klipspringers, and bull elephants, including the redoubtable Chuck Yeager who loves camps and was named after his feisty human counterpart. The real Chuck Yeager sent a signed photograph when he heard that an elephant had been named after him.

WEST AFRICA

The Gourma Elephant Project: The last Sahelian elephants live South East of Timbuktoo in a bend of the Niger River in extreme conditions. Save the Elephants tracked these elephants in 2002, and described the longest elephant migration route in Africa. A new field project was started in Mali in 2004 by Richard Barnes and Emmanuel Hema in collaboration with WILD Foundation, STE and The Environmental Development Group in Oxford. Emmanuel works in the Gourma region, where along with his Malien colleagues is identifying the desert elephants. Susan Canney assists us with the mapping side of this



project. All three scientists came to Samburu to be trained in elephant observational techniques and to help analyse their data.

CENTRAL AFRICA

Central African Forest Elephant Program: Save the Elephants funded the first 6 collars deployed in Central Africa and have shared their vast experience and expertise with the Wildlife Conservation Society team, headed by Dr Stephen Blake, to gain vital information on seasonal movements on the forest elephants. Forest elephants are in sharp decline due to poaching, bush-meat trade and logging. Understanding elephant movements is vital while there is still time. STE has to date donated a total of 14 GPS telemetry collars. This information is used by WCS at the highest government levels to claim a stake for wildlife and forest survival at a national level.

SOUTHERN AFRICA

Save the Elephants Transboundary Project, Southern Africa: This project is based in Timbavati, South Africa and has two researchers working under it. Michelle and Steve Henley have been studying the Timbavati elephants for a few years now. This elephant population is on the edge of the vast Kruger ecosystem and with the new policy of removing elephant fences on all sides, it is important to monitor how elephants react in their movements. The elephants have been radio-collared and their movements studied. Part of this project began from the concept of Green Hunting that could harness the energy of hunters to an ethical alternative to lethal hunts. Linked to research it has provided invaluable information on the movements of big bull elephants in and out of the Kruger ecosystem, between the park and the adjacent private nature reserves. It is planned to follow the elephants across international boundaries too.

INTERNATIONAL

The Ivory Trade Study: Ivory Trade studies have justified the continuation of the ivory trade ban. Esmond Bradley-Martin continues to travel through Asia, Europe and Africa to provide the baseline data on the ivory trade in the main markets of South and South-East Asia, as well as Europe and Africa. He has written 4 books to date on his results, along with Daniel Stiles. Save the Elephants has been his sponsor and publisher. National governments, CITES officials and NGOs can now assess the effectiveness of policies, laws and enforcement activities relating to the internal and international trade in ivory now and in the future.

Travel and Awards: Iain Douglas-Hamilton and some of the researchers working under him traveled overseas to attend a number of conferences and expositions. Our GSM Tracking Project won an award for our sponsor Safaricom, at the Cannes GSM Awards Conference.

General News: With Iain Douglas-Hamilton as the new President and CEO of STE and Prof. Fritz Vollrath as the Chairman, STE has received a new plane and vehicle to replace those wrecked by forcible collisions with a zebra and elephant respectively. This has made it possible for STE to get involved in several new projects.

Public Awareness: The Ele News Serve run by Melissa Groo and the African Elephant Library managed by Mary Rigby have provided vital information to wildlife managers, conservationists and decision makers in both Africa and Asia.

Recent Publications: A number of scientific papers have been published over the past few years and many are also in the review process.

STE Partners: Save the Elephants has worked in collaboration with many organizations.



CONTENTS	PAGE
<u>EAST AFRICA</u>	
Radio-Tracking – Safaricom Foundation	8
Long-Term Population Monitoring	13
PhD Students	14
Monitoring of Illegal Killing of Elephants (MIKE) – US Fish & Wildlife	17
The Ewaso Ngiro Elephant Research and Conservation Project	18
Geographical Information Systems (GIS)	19
Human Settlements Survey	20
Bees and Trees Project	21
Scholarship Programme	22
Training	24
Lion Population Study	26
Camp News	27
<u>WEST AFRICA</u>	
Northern Desert Elephant Project – Wild Foundation & Environmental Development Group	28
<u>CENTRAL AFRICA</u>	
Forest Elephant Project – Wildlife Conservation Society	29
<u>SOUTH AFRICA</u>	
Southern Africa Transboundary Project	30
<u>INTERNATIONAL</u>	
The Ivory Trade Study	32
Travel and Awards	33
General News	35
Public Awareness	38
Recent Publications	39
STE Partners	40



Radio-Tracking

Save the Elephants is at the forefront of developing GPS technology to monitor and interpret elephant movements. GPS tracking has an advantage over conventional tracking, in that it allows animals to be continuously monitored in places where intensive study cannot be done, gathering frequent data and generating detailed maps of elephant movements. More and more detailed information on elephant movements and seasonal dispersal patterns are needed in order to protect and manage elephant populations effectively. Knowledge of fine-scale movements, obtained from GPS tracking, has enabled researchers to examine the routes used by elephants in moving from one part of their range to another. This information is used by managers in developing land-use plans to establish protected corridors and minimize conflict with surrounding communities.

The Save the Elephants GPS/GSM Animal Tracking Project ***David Gachuche***

David Gachuche came from Canada where he was tracking cargo ships in the North Sea and offered this knowledge to develop special software for tracking elephants. The overall objective of the project is to develop, implement and replicate the use of GPS-GSM (Global Positioning System - Global System for Mobile Communications) tag technology for wildlife tracking in Kenya, with a view to improving the conservation of elephants and other important animals.

In March of 2004, STE supported by a grant from Safaricom and Vodaphone Foundations, set out to achieve the following:

- Develop state-of-the-art radio-collar animal tracking tags using GSM mobile phone technology, for monitoring endangered wildlife in Kenya.
- Deploy and pilot test these collars on elephants in the Samburu-Laikipia rangelands, making full use of existing Safaricom and Save the Elephants infrastructure in the area.
- Develop custom software modules which analyse the movements recorded by the collars, and integrate these into industry standard Geographical Information Systems (GIS) maps.
- Compare the performance and cost of the GPS-GSM tag technology with existing techniques in use, such as GPS-VHF and Inmarsat satellite telephone tags, using elephants as the indicator species.
- Modify and deploy the GPS-GSM tag technology on other endangered wildlife species, such as Grevy's zebra, black rhino, and resources permitting, big cats in the greater Samburu-Laikipia rangelands.
- To explore the possibility of deploying the GPS-GSM tag technology in other sites in Kenya as well as on other critical wildlife species.

How does it all work?

The system combines the Global Positioning System (GPS) with GSM mobile phone communication technology. The positioning technology uses satellites to determine the exact location of the elephants. This location information is stored on a chip and sent as a text message using the Short Message Service (SMS). The GPS-GSM collars are designed to take GPS position fixes every hour, accurate to within a few meters.



The messages are sent to a base station and placed on our server in a spatially enabled database. Users can then access this information either over the internet, STE Animal Tracking Software or commercial GIS applications such as ArcGIS.

Visitors to the Save the Elephants website can access the locations of the elephants in real-time. The site is currently restricted to authorized usage for security reasons. Version 1.0 of the STE Elephant Tracking Software is now available. The software enables users to conduct analysis on elephant movement. Thanks to support from the Environmental Systems Research Institute (ESRI), the software is closely integrated with commercial GIS applications allowing users to integrate high-level GIS analysis.

Technical Achievements

To date we have deployed 24 GPS-GSM collars on elephants across the Samburu-Laikipia rangeland of northern Kenya. We are also testing the collars on the rare Grevy's Zebra.

Version 1.0 of the STE Elephant tracking software is complete and currently in distribution. See Fig 1.

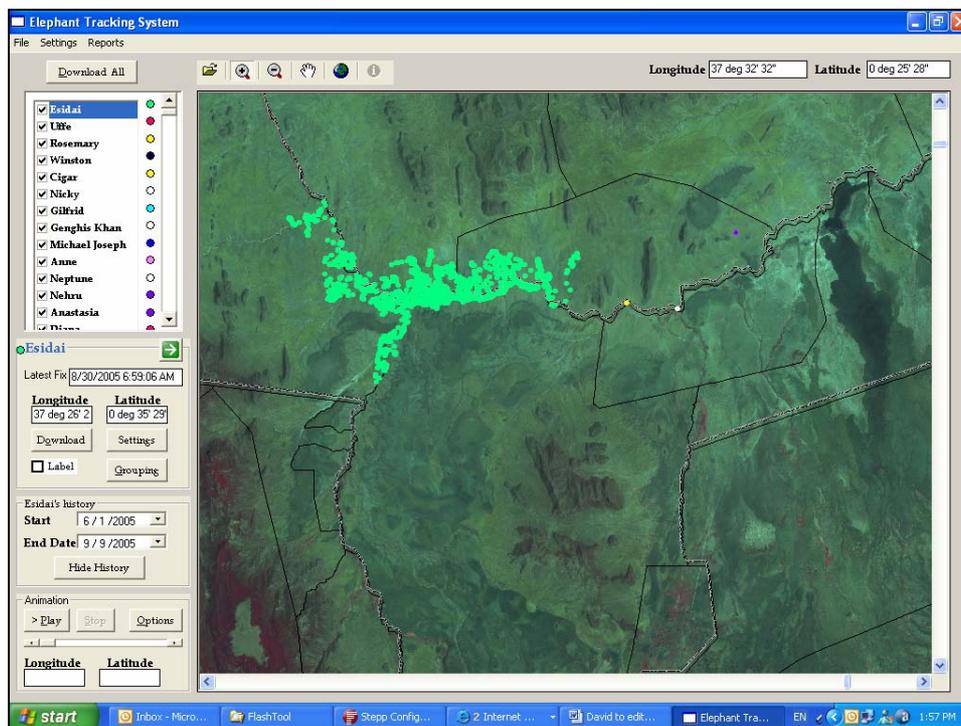


Fig 1. STE Animal Movement Analyst application allowing users to display and analyze animal movements on a map.

So far visual analysis is available by allowing users to plot and replay current and historical movements of the elephants on pre-authored GIS maps. The software is currently being developed further to add the ability to calculate elephant ranges, streaking, using different techniques, automatically.

At the end of the project, such knowledge will be applied to policy making on:

- Better fence positioning to lessen animal-human conflict in high risk zones;
- Re-routing animals or humans to forestall a human-animal conflict;
- Faster detection and action response times against potential threats;
- Enhanced early warning systems to detect changes in poaching levels;
- Better definition of sites for potential reintroduction of animals.

Conservation Achievements from Radio-Tracking in Northern Kenya

We are already acquiring a deeper knowledge of the critical habitats used by elephants and their fundamental needs. Elephant corridors between Samburu and Laikipia have been identified. Laikipia is a complex mosaic of land-use types. Figure 2 is a map of land-use and elephant movement in Laikipia, derived from our project collars. We show how elephants avoid some areas where they are not tolerated. A few private ranches such as Mogwooni farm and wildlife sanctuaries such as Solio Rhino Sanctuary have actively excluded elephants using electrified fences and active deterrents. On communally owned group ranches, the presence of large numbers of livestock together with armed pastoralists and occasional ivory poachers presents a considerable risk to elephants.

In effect this has created a labyrinth of risky and not-risky properties for elephants to negotiate and we are beginning to plot the movement strategies by which individuals negotiate this complex maze. It has in some places reduced the total area available to elephants, placing pressure on the habitats where elephants are tolerated. Fortunately for elephants in Laikipia there has been a growing trend among the remaining large-scale private and communally owned ranches to develop wildlife tourism as an alternative sustainable revenue stream. Ranchers and pastoralists consequently become more tolerant of elephants. Small-scale farmers residing on sub-divided ranches are currently less able and willing to tolerate elephants and other forms of wildlife. This issue presents the greatest challenge to conservation in this region and perhaps unprotected elephant ranges across Africa.

Our elephant tracking has already shown that there are certain crucial corridors that need to be left open so that elephants can reach their feeding grounds. We can identify precisely the location of several of these. The vital Oldonyiro corridor between Samburu and Laikipia is an example. Keeping them open should help to avoid conflict with people and reduce habitat destruction from confined elephants. Our results will help the design and configuration of fences, and have already led to Borana Ranch, and Mugie, creating gaps in their game fences to allow for the free movement of elephants. We will continue to inform other ranches on fence designs and alignments that will best accommodate migratory elephants.

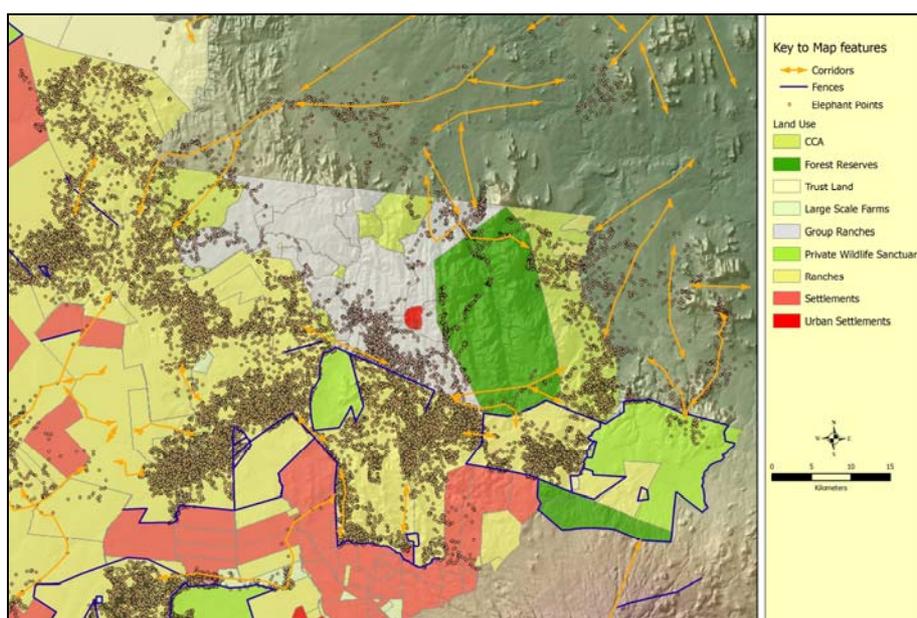


Fig 2. Land-use and elephant movement in the Laikipia area. Data are derived from GSM collars. The solid blue lines represent existing fences in the area.



SAVE THE ELEPHANTS

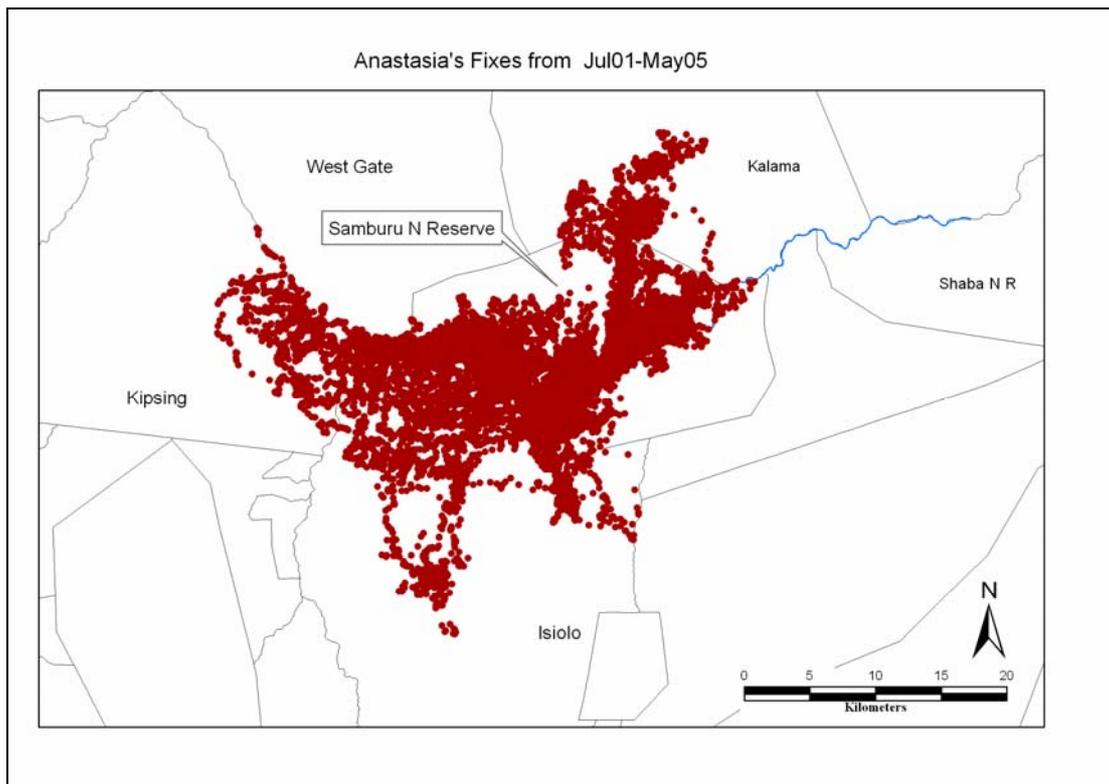
This new form of analysis relating precise animal movements to land use opens prospects of a far more sophisticated and detailed planning to reconcile human and wildlife interests.



Daniel tracking for elephants



Anastasia from the Royals Family with her GSM collar



Anastasia's movements in and out of the reserves

Radio-Collaring Operations

Save the Elephants (STE) radio-collared a total of 25 elephants in Samburu and Laikipia in 2004 and 3 in 2005. All operations were smooth, and the elephants were fitted with AWT (African Wildlife Tracking) GSM collars.



Uffe recovering from the collaring in 2004

Collar Retrievals



Kenyatta and his collar

Ndorobo, the newest reserve visitor

A number of collars were retrieved in both 2004 and 2005. Kenyatta's collar was taken off just in time in August 2005 and 30,000 data points downloaded. In April 2005, Ngalatoni and Cleopatra were darted and their collars recovered. Both operations were successful, with minimal disturbance to the elephants. Ngalatoni, from the Samburu Ladies Family, had been tracked for more than 10 years and excellent data on her movements had been collected.

Bulls who are bigger and stronger than females can rip their collars off. Abe Lincoln's collar dropped off in March 2005 by local game scouts in the West Gate Conservancy and handed over to STE. Ansel's collar was found in April 2005 at the Buffalo Springs boundary. Iain had picked up the signal aurally and a ground team recovered it. It was clear that his collar had been worn out and eventually ripped off. Uffe's AWT/GSM collar was recovered in May 2005 near Isiolo town. A fixed signal was apparent after downloading Uffe's movements over the internet showing that his collar had fallen off. STE field team headed towards the direction of the signal and discovered Uffe's collar in tall grass. It was split in two.

Columbus' collar was also picked up in May 2005 in Kalama, North of Samburu. His carcass was approximately 200 mts from the radio-collar, which had been found buried deep into a termite mound. This strong evidence suggests that Columbus was poached and his tusks removed.

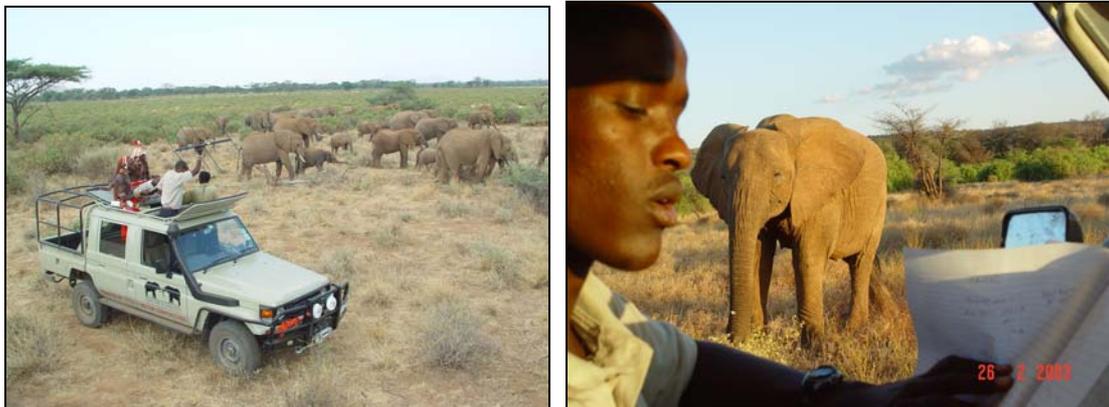
Elephants: Long-Term Population Monitoring

The population of over 5,000 elephants in the Samburu/Laikipia ecosystem is the largest population existing predominantly outside the network of protected areas in Kenya. The elephants are largely unconfined and much of the population shows seasonal migrations over large distances. The ecosystem is a mosaic of different land uses, including National Reserves, private and community wildlife conservancies, private farms and ranches, communal grazing areas and agricultural smallholdings. Elephants utilize these areas to varied extents and the tolerance of communities towards elephants in the area also differs.

The Samburu and Buffalo Springs National Reserves cover an area of approximately 300 km². The reserves are not fenced and the elephants are free ranging with no restrictions. This can be seen through our intensive daily monitoring which is done by several researchers and assistant researchers.

Population and Long-Term Monitoring

David Daballen, a young high school leaver and interested in conservation, patrolled the reserve with the rangers as a volunteer. His luck changed when he met researchers from STE. David came in as an intern 5 years ago and after being trained by George and Onesmas, is now STE's chief LTM researcher. The long-term monitoring (LTM), which is one of the core objectives of this project, has been ongoing for the last seven years. This project has in effect established an early warning system that will detect any population changes, for example a rise in elephant poaching. This capability is a valuable supplement to Kenya's MIKE programme. David, assisted by Daniel Lentipo and Shivani Bhalla have been building a database and updating files over the last seven years. The LTM project involves a close check-up of the already identified families', bulls and other un-identified migratory elephants. New calves, deaths and other social activities, e.g. musth bulls and oestrus females, are also recorded.



Population and Long-Term Monitoring in Samburu and Buffalo Springs Reserves

Other important observations include details on reunions between family members who have been separated from each other or from the reserve for a long time. Their reaction index is also recorded. When elephants are in the reserves, they appear calm and relaxed, however, when they go outside the protected areas, they are more nervous. It is also vital to check up on all wounded or snared elephants.

The long-term population monitoring process, requires a lot of effort to ensure the highest quality and accuracy of scientific data. After analysing this data, a rough picture is obtained of what is happening with the population and this acts as an indication if the numbers are going up or down. Normal calving intervals within known populations in other areas are between 3-4 years, however in this Samburu population, some shorter birth intervals have been observed.



PhD
George Wittemyer

Spatial and Social Structure of the Samburu Elephant Population

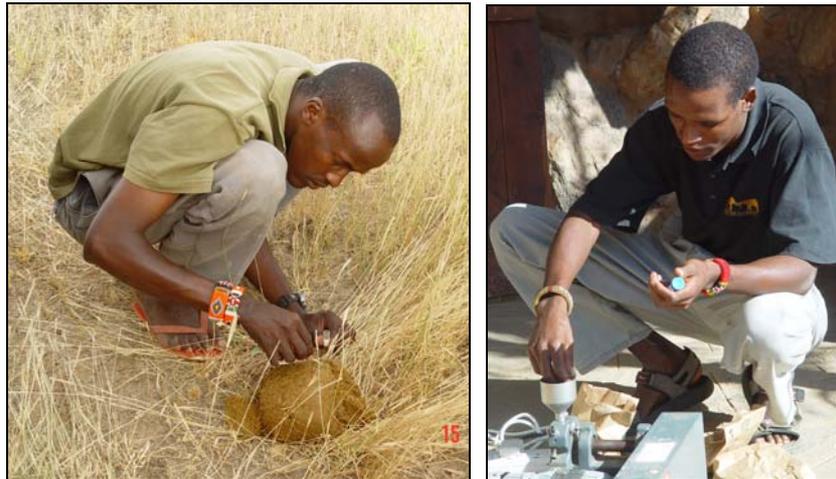
George Wittemyer began research on the Samburu elephant population in 1997 and started the individual ID file that is used and updated by STE today. In 2001, he returned to Samburu to begin fieldwork for his PhD which aims to gather an insight into the factors influencing elephant social organization and focuses on: the kinship basis for the association of elephants; kin discrimination and allomother-calf interactions; and factors affecting social cohesion and separation. George is carrying out detailed behavioral observations of social interactions and foraging behaviour on focal females and family groups. He has access to the data on their movements from GPS collars, and he collects faecal samples for genetic analysis of relatedness. Genetic, behavioral and spatial data is allowing him to examine the social organization of the Samburu elephant population.

For the first time, quantitative analysis of elephant social structure has been carried out on association data of 382 elephants: the 111 most frequently observed breeding females and 271 of their constantly associated offspring. Results quantitatively demonstrate the existence of four social tiers (1. mother-calf dyads, 2. family units, 3. bond groups and 4. clans) in a free-ranging population of African elephants from a cluster analysis of individual association data, with the existence of the third tier dependent upon season. Additionally the analysis suggests that neither families nor bond groups coalesce around an ideal size but that families led by matriarchs 35 years and older (those more likely than not to be grandmothers) are significantly larger than those of younger matriarchs. This is the first time that the existence of four organizational tiers has been statistically demonstrated in any non-human animal, as has been published in the *Animal Behaviour* journal under the title “The socioecology of elephants: analysis of the processes creating multitiered social structures”. The function of higher order structuring in elephant societies is thought to serve as a platform for intra-specific information exchange during times of drought and may also emerge during periods of human predation. George has also found evidence to suggest that ranging behaviour of family groups is influenced by rank, with dominant groups controlling resource access and lower ranking groups having to travel further for water and forage.

Results from genetic analyses carried out in collaboration with researchers from the Wildlife Genetics Project, will elucidate the role of kinship in defining social structure. Faecal samples, for genetic analysis, have been gathered from almost all of the known population of elephants utilizing the Samburu and Buffalo Springs National Reserves.

Population Genetics

In order to investigate the genetic structure of Kenya’s elephant populations on a regional basis, samples have currently been collected from Meru, Tsavo, Shimba Hills, Marsabit and Mt. Kenya National Parks. These samples in combination with samples to be collected from other parts of Kenya will provide information on gene flow and degree of isolation between the Kenyan elephant populations. These results are expected towards the end of 2005.



Dung collection and grinding

Seasonal dietary changes in elephants using isotopic analysis of tail hair

STE, Dr. Thure Cerling of the University of Utah, a paleontologist turned ecologist is collaborating with STE using tail hair samples collected from immobilized elephants to examine changes in diet, nutrition and water sources. This is done by analyzing changes in the isotope ratios of carbon, oxygen, nitrogen and hydrogen. By combining these results with data on the individual elephant's movements gathered from GPS collars, we can provide a temporal record of the diet of these elephants (and hence the group they are associating with) and examine dietary changes as they move through their range. Preliminary results from tail hairs of one individual elephant show a growth rate of tail hair of 0.76mm per day. Analysis of tail hairs from two different females, Aztec and Goya, show a remarkable correlation in peaks of isotopes of carbon and nitrogen suggesting that for the long and short rains, these elephants were feeding in the same area. The data show a dramatic increase in grasses in the diet of the elephants during the short and long rains and enable us to directly calculate the fraction of grass in the diet.

Combined with movement data it appears that elephants actively seek grass just after the onset of the rains, which usually takes them far outside the protected boundaries of the reserves. Their need should be accommodated in future development and land use plans for the area.

This expensive analysis has been funded by Dr Cerling's project, with field expenses covered by STE. Funding is being sought to continue this study in order to examine dietary changes in a large sample of elephants from which we have collected tail hairs.

PhD Male Reproductive Tactics in the African Elephant

Henrik Barner Rasmussen

Henrik Rasmussen has been studying reproductive strategies in bulls, as part of Save the Elephants research project in Samburu, since 1999. He is now finishing his DPhil thesis at Oxford. Results from his work have shown that a bull's sexual state affects its movements, which in turn has an impact on habitat use and group associations. For his doctoral study, Henrik has been gathering behavioral observations on individual bulls in combination with data on their movements from GPS collars, physiological data on reproductive and stress hormones and genetic data to establish relatedness of bulls and paternity of calves (analyzed from faecal samples). In collaboration with the German Primate Centre at Goettingen University (Germany), behavioral and endocrine correlates of musth in free-ranging bulls have been examined. Levels of testosterone metabolites and glucocorticoids in the faeces are measured as an indicator of levels of testosterone and stress hormones circulating in the blood. Most samples and field observations for this project have been collected and results so far are providing fascinating insight into what drives mating strategies in bulls. For the first time, data on the correlation between behavioral indicators and physiological parameters in free-ranging bull elephants is being gathered.

In a collaboration between STE and the Wildlife Genetics Project (Makerere University, Uganda, and University of Copenhagen, Denmark) the relatedness of all known bulls is being examined from faecal DNA. When the genetics results become available, inter bull relatedness will be investigated to see if genetic factors are underlying bull/bull associations. Faecal DNA samples have also been collected from calves in order to determine paternity, which will provide a measure of reproductive success of the individual bulls and will be analyzed for effect of age, rank and reproductive strategy.



Mungu, 51 year old, in Samburu National Reserve

Monitoring of Illegal Killing of Elephants (MIKE)

Onesmas Kahindi

Onesmas Kahindi came into our lives over a decade ago, offering his services as a volunteer during one of our long elephant counts. Passionate about conservation and wildlife, he has worked on everything, from birds to elephants. Save The Elephants (STE) in collaboration with the Kenya Wildlife Service (KWS) has conducted a study from January 2002 to date, with the aim to provide a baseline of elephant mortality within the Laikipia-Samburu MIKE site. The ecosystem is part of the worldwide network of sites under the CITES-MIKE programme. The Laikipia-Samburu MIKE site is a complex ecosystem composed of different land-uses through which elephants range. Distribution of resources for monitoring and protecting elephants varies throughout the ecosystem with patrolling carried out in Private Ranches, National Reserves and Community Conservation Areas only; there is little or no investment in wildlife protection in Forest Reserves, Settlement & Cultivation and Trust Land/Group Ranches.

Participatory approaches and the local information network were found to be more effective in gathering information on recent elephant mortality than enforcement patrolling and intelligence in most of the MIKE site, except on Private Ranches and National Reserves. Over 60% of carcasses that die in this region were first found by herdsmen or local people, compared with less than 30% of carcasses detected by ground patrols, aerial patrols, aerial surveys and KWS intelligence, combined. As a result, over 700 dead elephants have been documented and the information analysed. The intricate relationship between the project and the local communities has been critical to the success of the project, which in itself is an early warning system for ivory poaching for this wild population. Gaining the trust of local people will save the elephants in this unspoilt wilderness of Northern Kenya.



Samburu warriors age and sex dead elephant



Onesmas pulling out the jaw of a dead elephant from a river

The major challenge facing this early warning system is to make it sustainable by training local communities to record dead elephants through the seven already-established community-owned wildlife conservancies located in different locations of the ecosystem. The project requires support to train at least two local people from each conservancy to equip them with GPS units, a per diem for food, and establish communication of data through the mobile phone network.

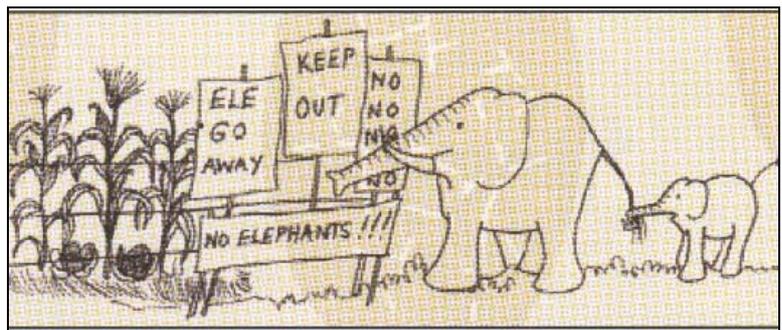
Ewaso Ngiro Elephant Research and Conservation Project

Max Graham

This project was designed by Max Graham and supported by the US Fish and Wildlife Services and the World Conservation Society. In addition the Laikipia Wildlife Forum (LWF) have loaned the project a motorbike. This is STE's first project in Laikipia and has involved the following ongoing activities:

1. ***GPS tracking of elephants in Laikipia*** (supported by Safaricom Foundation) to assess movement behaviour in relation to land-use and establish the location of these important movement corridors for a conservation strategy.
2. ***An elephant scout programme*** to establish the location and temporal patterns of negative forms of human-elephant interaction and ***support STE's MIKE programme***. On the back of this project a spatial and temporal model for crop-raiding are being generated. The latter is being carried out in collaboration with Mpala Research Centre.
3. ***Community Based Problem Animal Control*** demonstration sites. These have been established in crop-raiding hot spots in Laikipia with the objective of providing small-scale farmers with cheap and simple elephant deterrents. This includes chilli-based deterrents.
4. ***Community education*** through the production and distribution of a community-orientated booklet entitled '***Kuishi Pamoja***' (Living Together). The booklet describes why elephants are valuable, why people and elephants are coming into conflict and how people can avoid risks associated with living in an elephant range. The booklet was launched in May 2005.

Max Graham is currently writing up his PhD on 'land-use, risk and elephant ecology' at Cambridge University. Plans are underway to continue managing and building the Laikipia Elephant Project with particular emphasis on generating and helping to implement an elephant conservation and management plan in collaboration with the Kenya Wildlife Service (KWS), CETRAD and LWF. Max is also interested in helping STE with GPS tracking in the Karissia Hills and working with the Lewa Wildlife Conservancy, the Samburu Wildlife Forum, KWS and local community groups to alleviate elephant poaching in this important forest reserve.



Max (middle) and Iain with the Swiss Ambassador at the launch of "Kuishi Pamoja" booklet

Geographical Information Systems (GIS)

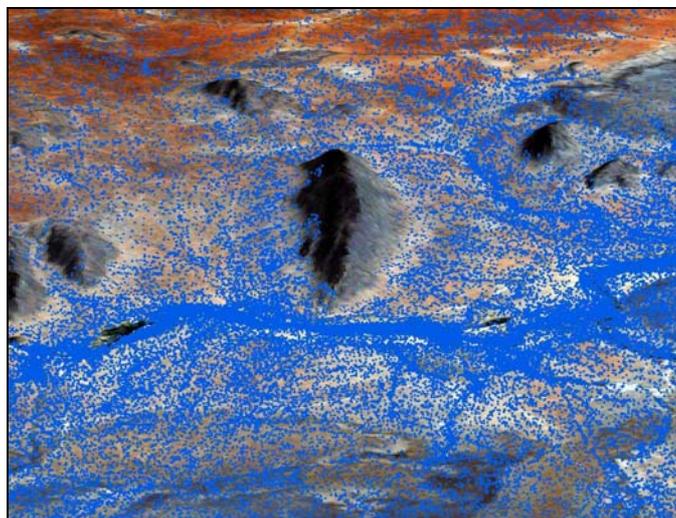
Barnerd Lesowapir, Boniface Mworia, Festus Ihwagi, Jake Wall

Barnerd Lesowapir, a teacher by profession and a long-distance runner, joined STE in 2001 to do the elephant IDs in Meru National Park. Whilst in the field, he was charged by an angry female whose tusk penetrated his leg. Barnerd managed to walk back to HQ to seek help, was flown to Nairobi and his leg is now fully recovered. He is a natural in GIS and now produces all our maps. He has been involved in the human settlement survey as well as the vegetation monitoring programme. Barnerd makes different maps on elephant movement tracks, surface and statistical analysis, cleans, projects and transforms data into a common coordinate system. He is currently developing a Spatial Geodatabase Structure for STE, whilst continuing his training on GIS with ESRI online.

Boniface Mworia has worked as a GIS consultant with STE since September 2004. His work included training of staff in GIS and the use of ArcGIS 9 and ArcView 3.3 software and the development and analysis of GIS data. Boni also conducted analysis of elephant tracks from GSM/GPS collars and produced and displayed the outputs from analysis using maps.

Festus Ihwagi, the GIS Scientific Officer and Data Base Manager, has been analysing elephant tracking data that has been collected since 1998. Festus has been plotting distribution and density maps using the downloaded GPS and GIS collar data. Overlaying these layers with land uses helps us to know the determinants of elephant movements.

Jake Wall, Canadian biker-hiker, Arctic researcher and Queens University postgraduate student, has worked with STE since May 2003. He has prepared map presentations of the elephant movement data and has also worked out a method of calculating elephant densities in order to identify density hotspots. Spatial and collar data was also consolidated and cleaned. Jake has collaborated with Iain and Professor Fritz Vollrath on a paper looking at the movements of elephants in relation to terrain in the Samburu region. This required the construction and geo-referencing of a digital terrain model. The results are showing a very interesting pattern on how elephants move on slopes with relation to temperature. Future work would include further analysis of elephants and terrain, and the possibility of using satellite imagery to help look at the 'human layer' around Samburu National Reserve and how the presence of humans effects elephant movements.



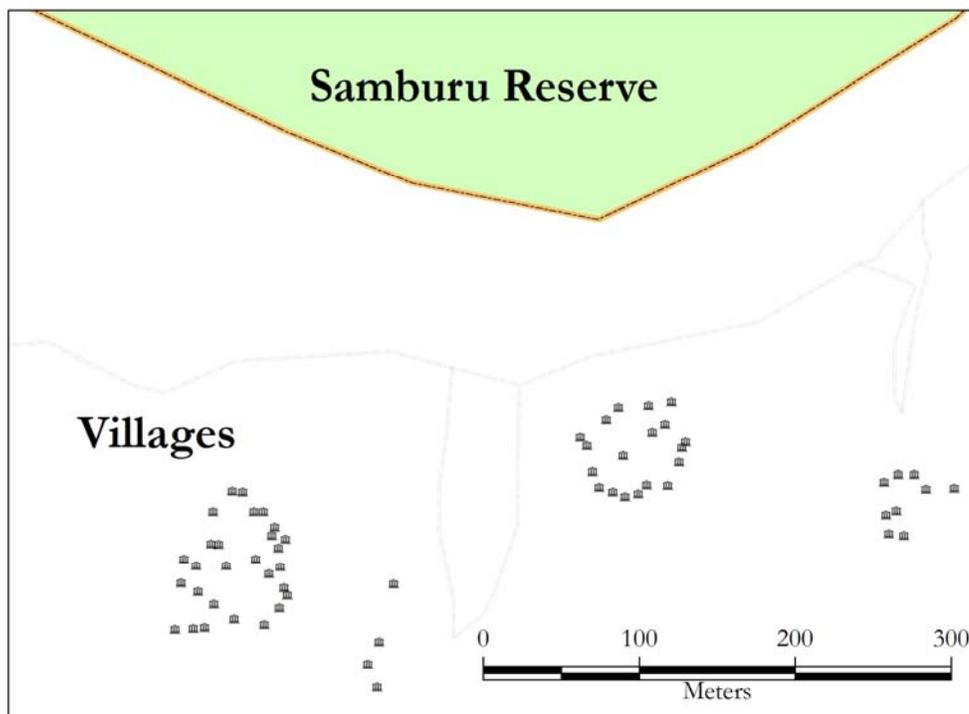
Digital Elevation Model of Samburu National Reserve showing elephant distribution and the concentration along the Uaso River

Human Settlements Survey Barnerd Lesowapir

In 2005, Samburu County Council surveyor Jonathan Lekeriyo and Barnerd Lesowapir conducted a human settlement survey programme in the areas surrounding Samburu National Reserve (SNR). In the light of the SNR Management Plan, the Council was concerned about possible human encroachment and pressures facing the reserve. The county council requested Save the Elephants to carry out a survey and assess the human encroachment around the Reserve Boundaries.

The primary objective of this preliminary survey was to produce a baseline study of the human settlements around the reserve as well as mapping the area of study to help understand elephant movements within the existing human settled areas.

The survey was conducted in two phases. Topographical Data was collected for every house in a “Boma” with both the GPS and the Total Station. Name of the owner if possible, type of the house (permanent or temporary) and the purpose of the house e.g. small businesses, were also recorded. The survey started at Archer’s Post town which is five kilometers from the reserve boundary. Archer’s Post was used as a base control point to direct all other reference points. A total of 851 individual houses were counted within the surveyed area. 552 of the total houses were surveyed using both the GPS and the total station surveying machine, while the remaining proportion of 299 was done using the GPS only.



Map showing the precise number and location of manyattas on one section of the southern Samburu National Reserve boundary

Bees and Trees Project

Both Save the Elephants (STE) and Elephant Watch Safaris (EWS) have applied two methods to protect the trees around the camps. The most common method used was wiring the circumference of the tree with chicken wire. Both *Acacia elatior* and *Acacia tortilis* trees were chosen. Some of the trees had been previously de-barked and the wire was added to try and prevent further damage. Placing bee hives in trees also was used as a preventative method. Both methods have been effective.

In an innovative experiment, Fritz Vollrath and Iain Douglas-Hamilton showed that African bees deter elephants from damaging the vegetation and trees that house their hives. Elephants, although thick-skinned, have weak spots that are vulnerable to bee stings such as the eyes, behind the ears and under the trunk, and local people have observed elephants being chased over long distances by bees. The researchers used native log beehives to ‘mine’ an area of Acacia trees in favorite elephant foraging spots where all trees without exception were regularly damaged by elephants when feeding. Results from the experiment showed trees with hives were more effective and a hive with bees provided full protection. A paper entitled “African bees to control African elephants” is published in *Naturwissenschaften* journal.

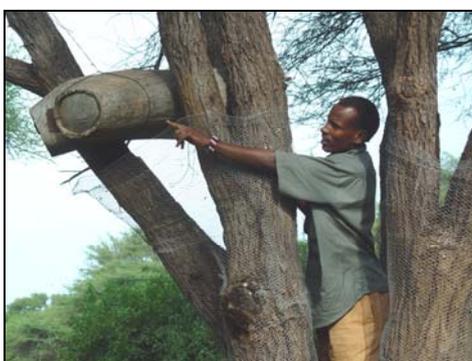
From these results, it appears that bees can be employed profitably (since income can be generated by selling the honey) to protect not only selected trees, but also selected areas, from elephant damage. More extensive experiments on the effect of bees on protecting vegetation from elephants are being conducted in STE’s study site of Samburu, and preliminary results show that 71% of the hived trees are untouched. At the Elephant Watch Camp, 11 hives out of 42 had bees in them and elephants avoided all these trees.

Vegetation Monitoring - Barnerd Lesowapir

Save the Elephants (STE) carried out a survey to assess the impact of elephants on the vegetation in Samburu and Buffalo Springs National Reserves in 2003 and 2004. The STE team surveyed riverine vegetation along the river in both Samburu and Buffalo Springs. At each plot, the trees were measured to 200m away from the river although on some occasions the woody riverine vegetation disappeared before this distance was reached. Global Positioning System (GPS) locations were used to mark each tree sampled. Each tree was plotted onto a detailed map of the sampled area, the species was recorded and its diameter measured at breast height using a meter rule. This was converted into circumference so as to give size categories of the different tree species. Where the trunk forked, the diameter of the separate stems was measured and added. Trees smaller than 0.5m were left out of the sample.



Measuring the diameter at breast height



Log hives and chicken wire on tree

A total of 45,000 trees along the river were sampled. Different damage categories were recorded and impact was measured using detailed criteria. *Acacia elatior* was the most damaged tree.



Save the Elephants and Elephant Watch Safaris Scholarship Programme Shivani Bhalla

The local communities surrounding Samburu and Buffalo Springs National Reserves struggle to send their children to secondary school. As part of the community projects, Save the Elephants (STE) and Elephant Watch Safaris (EWS) consulted the local people living around the reserves. The general consensus was that there was a strong need for secondary education and training opportunities, especially for girls. It was decided that efforts would be directed to providing bursaries. As a result of this, STE and EWS have created a fund for education and training opportunities with the aim of providing Kenyan children with an opportunity to good secondary education combined with hands-on elephant conservation, and environmental awareness.

We work closely with local primary schools to select young, highly motivated students for secondary school scholarships. Most of these children come from impoverished pastoralist backgrounds where their families are unable to afford the secondary school fees. Unfortunately, without a secondary school education, these students will have little access to higher training or employment opportunities. The local people are now beginning to realize the genuine value of better education on their child's future and are extremely supportive of the efforts of STE and EWS.

One of our main focuses is conservation education and we encourage students to become ambassadors of the area and their cultures. We now have an established project where a person can sponsor a student from the surrounding area and can create personal relationships with the individual. We select students based on merit, determination and motivation. These students build new friendships with their sponsors and stay in close contact through letters and pictures. Sponsoring the secondary school education for these young people provides them with a rare and precious opportunity that will change their lives.

At present 14 students are being sponsored from the Samburu, Borana, Turkana and Somali communities. The students come from all over Samburu and Isiolo Districts. Ten students will be selected in 2005, and the same in 2006. Plans are underway to visit schools further afield. One such area is Ol Donyiro in Isiolo District, where an important elephant corridor runs near the town. This corridor is the most vital elephant migratory corridor between Samburu and Laikipia.

Seven students have already completed their secondary school education under the programme and most are now actively involved in conservation and eco-tourism. Anthony Lekoitip, who achieved an A- grade was the best student in Isiolo District in 2004. Anthony's home town of Archer's Post celebrated when the news came out. We are hoping to send Anthony to university to study medicine.



Anthony Leaduma, Clerk of the Samburu County Council congratulates Anthony Lekoitip



Halima and Patina at the research centre



During the holidays, our sponsored children come as interns to STE's Research Centre where they see wildlife, often for the first time and learn about conservation. STE believes that raising environmental awareness in Africa is vital. Young conservationists need to know that people encroach on wilderness areas, plunder scarce resources and poaching for bushmeat, horn or ivory endangers vulnerable species. With careful planning there is a place for every living species. A central topic is the illegal ivory trade, sadly once again on the rise as governments resume debate at CITES on reopening the trade.

Our programme also involves working with and supporting primary schools in the area through donations. Funds are provided to refurbish schools and provide schooling materials. The local schools in the area get involved in wildlife art/writing competitions. Working in conjunction with Cheetah Conservation Fund in 2004, a "Cheetah Expressions Contest" was held amongst the schools in Samburu. The theme of the contest was "Living in Harmony". Submissions were received from all over and were then sent to a panel of judges in Nairobi, where prizes were awarded to all students. Three of the top prizes were awarded to students in Samburu. In 2005, a writing competition on elephants will be held. There will be various themes for this; Elephants and Humans, Elephant Conservation, the Ivory Trade.

The first Annual Education Party was held in March 2005. Thirteen students attended the party. Prizes were given to all the students, mainly educational books. Students were given presentations on the work carried out at STE and were also taken out into the field. The Education Party was a successful event. It was a great opportunity for all students to meet one another, as well as for Iain and Oria to meet them.



Shivani Bhalla and Students at Education Party 2005

Training

As part of Save the Elephants (STE) and Elephant Watch Safaris (EWS) community programme, members from villages on the outskirts of Samburu National Reserve were approached to prioritize areas for support and development. Education and training were identified as priorities. STE/EWS now supports a Samburu Women's Project by helping to educate and train their children, providing employment and income to the neighbouring villages.

STE/EWS has trained several young Samburu warriors specializing to be top wildlife guides and in conjunction with STE trains them in elephant biology and identification. Eight guides have now achieved their Bronze membership status with the Kenya Professional Safari Guides Association, and 3 of them will sit for their Silver level exams in November 2005.

Two guides undertook an extensive mammal and guiding course at the Bush Academy in Ndarakwai, Tanzania, in May 2005, where they were taught advanced guiding skills and were updated on the latest wildlife research. Four guides also attended the Ornithology Course in Naivasha, as well as the National Museums of Kenya "Know Kenya" course.

David Daballen, from STE, spent 1 year in Mweka, Tanzania at the College for African Wildlife Management. He successfully graduated with a Certificate in Wildlife Management in June 2005. Daniel Lentipo visited Emmanuel Hema in the Gourma region of Mali in May and June 2005. He assisted Emmanuel with the identifications of the desert elephants.



Women from the Kiltamany village

Josephine Nuria completed a 2 year Diploma in Nursing under the STE/EWS Training Programme in July 2005. She is now a qualified senior nurse and working in a health care centre near Samburu. Margaret Lepeta is also studying for a Diploma in Early Childhood Development. On completion in 2006, she will then be working with underprivileged children in the West Gate area of Samburu Reserve.

Since 2000, STE and EWS donors provided over US\$ 75,000 towards community education and training.



SAVE THE ELEPHANTS

Mary Reuling and Leela Hazzah, two volunteers from America spent almost 5 months in 2004 in Samburu. They trained the staff on GIS applications and mapping and at the same time, mapped out all the roads and tracks in both reserves. At the end, they produced the base line map for the reserves, which included all the topographical features and roads.

Nick Miller from Rift Valley Adventures, spent a few days in May 2005, at the research centre in Samburu training all staff, wardens from the reserves and guides from the Elephant Watch Camp, on Wilderness First Aid. Training included emergency procedures on life-threatening situations.



Nick Miller training staff on Wilderness First Aid



Hector Guinness helps guides with English

In August 2005, Hector and Malachy Guinness came to Samburu for 3 weeks. The Oxford University students trained the STE staff, students and guides from the Elephant Watch Camp on an intensive English programme and assisted with report writing and editing.

STE has assisted the Samburu County Council reserve management with training on mammal censuses within the reserve.



Two of our trained guides with warriors

Lion Population Study

Shivani Bhalla

Lions in Africa are decreasing in numbers, especially outside parks and reserves. Conflict with humans on the peripheries of these protected areas is the main problem resulting in their decline. No lion study had been conducted in Samburu and Buffalo Springs National Reserve before. The reason for the study was to provide the baseline information for the lion population in the area to establish their status.

The population size and structure of the lions in the area was looked at and their movements in the dry season were mapped. Their prey preferences were also recorded in the dry season.

Results

- Forty-eight lions have been identified; comprising 32 residents belonging to 3 prides and 6 nomadic males.
- Mean pride size was 10.7 (range: 6-14, n=3)
- Sex ratios was 1 males: 2.5 females and adult-sub-adult ratio is 1:1.46.
- Population density was 0.13 km²
- Conflicts with local people are common and lions are being killed especially in the wet season.
- The dry season ranges were mapped and their distributions were concentrated along the river.
- Impala were the main prey

Conclusions

- Samburu story states that there are 3 long distance trekkers; a Samburu warrior, an elephant and a lion. Radio-collaring the lions will tell us exactly where they move out to in the wet season.
- Further research is needed to monitor the lions and an extensive population study is required.
- There is no immediate threat to the lions, although they are still being killed. Lions are the biggest tourist attraction in the reserve and local people need to be persuaded to protect them.

Leopards are known to be incredible survivors. As far as we know there is no immediate threat to them.

Cheetahs are the most vulnerable of all cats. They are hounded by tourist vehicles who stop them from hunting, easily contract diseases from Samburu dogs and get speared or snared within close range of the livestock camps. Sixteen have been identified so far. There is urgent need for protection. All big cats pose the greatest threat to livestock and their movements could be transmitted to us via mobile phones supplied to nomads. It is a priority to introduce a conservation project involving the local communities.



KP3, Nashipai, on the banks of the Uaso Nyiro River, Samburu



Nashami in Samburu

Camp news

Wildlife visitors...

The camp continues to have elephants wander through. Yeagar, the well known tree pusher, managed to pull down a few trees within camp, including one that crushed one of the bathrooms. Our 7 kudus used to pay daily visits in camp for most of 2005. Sadly, 2 were killed by lions in the middle of our car park. A large group of impalas have made the camp their permanent home now and are often seen browsing outside the researcher's tents. Two klipspringer, Guenther's dik dik often come down from the rocky hill to feed on the *Acacia* pods around the kitchen.



Yeagar near the Generator House in camp



Young male kudu walks pas the radio-collar

Predators also often visit camp. A leopard who lives up on the STE tracking hill walks through camp often at night, coughing loudly. A pride of 14 lions killed an impala at the water bowser in May 2005. The lions fed on it for about 3 hours. The researchers were excited to see a pack of wild dogs behind the last tent in June 2005. They killed a dik dik and hid in the thick *Salvadora* bushes behind camp for a few days. The wild dogs were new to the reserve and had not been seen in more than 3 years.

Towards the end of March, a very small squirrel was rescued during the heavy rains at the Elephant Watch Camp. Oria looked after him for a few days before handing him over to the STE team. The squirrel named Lolichai (orphan in Samburu) a.k.a. Squiggle, was fed up to 6 times in a day starting at 6:00 am. After going through tins of Cerelac he began to grow and was a fun little creature to have around camp. We decided to send him back to the Elephant Watch Camp after a few scares with genet cats and baboons. Squiggle now has a new home at the EWS mess tent.



Squiggle covered in Cerelac



Squiggle on Shivani

Northern Desert Elephant Project

Emmanuel Hema

The project started in March 2004. The objectives of the project was to provide scientific data on the desert elephants of the Gourma region and to make recommendations to the Malien Government wildlife authorities to ensure the long term survival of this small elephant population.

Richard Barnes and Emmanuel Hema travelled to Samburu to begin training and to learn how the long-term monitoring project in Samburu was carried out. Following their training in Samburu, Richard and Hema went to the Gourma region in Mali, West Africa. They started their project and spent April and May in the field. Their main objective at this stage was to collect as many ID photos of the elephants as possible. From this first season, they took more than 1500 photos. Hema then returned to Samburu in August 2004, to work on these pictures and sort out the individual families and bulls. He was in Samburu until mid December. After sorting through all the photos, 260 elephants had been successfully identified with corresponding photos. Previous counts had estimated a population of 360 elephants. However, it was clear that results from the first season indicated that there were closer to 500 elephants.

Field work resumed in late March 2005. This continued until early August. During this time, Daniel Lentipo visited the Mali team and spent two months assisting with the project. The objectives of this second season was to improve and update the ID file. Data on habitat was also collected. Radio-collars had been put on the elephants in the late 90s and the two years worth of data gathered from these collars were mapped. All areas of elephant concentrations were visited to improve the ecological understanding of the area and to see what the elephants were doing at this concentrated points. Dung counts were also done in the Gourma region, especially around Banzena. It was clear from the dung counts, that livestock used this same area as well as the elephants.



Elephants, local people and their livestock

Human-elephant interactions with the local people were also investigated. The Gourma team visited many farms and collected the complaint forms where elephants had caused negative impacts.

The extent of the elephant's range was looked at in detail, to determine how big their range is. The Minimum Convex Polygons obtained from the collared data was verified by ground truthing. Presence/Absence of elephants was done by talking with the local people as well as looking at the extent of tree browsing and dung presence. This was mainly done in the South and North East of the Gourma Region. The North West has not yet been looked at.

A visit was made by the Gourma team to the research camp in Samburu where elephant IDs were worked on and updated. The project is supported by Wild Foundation and Environmental Development Group.



Forest Elephant Project, Central Africa

Dr Stephen Blake

The Forest Elephant GPS Telemetry Program was initiated in 1998 by Wildlife Conservation Society (WCS) in response to the near complete lack of information on the home range requirements, ranging patterns, and seasonal movements of forest elephants in Central African forests. Savannah elephants use thousands of square kilometers when their ranging is unrestricted, and if forest elephants need similar large area requirements, range management and national park design must be developed on an adequate scale. Operational in 3 nations, 6 national parks, and across a wide variety of habitats, this study provides critical information to land-use planners, park managers, and governments. This project is conducted in close collaboration with Save the Elephants. STE funded the first 6 collars deployed in Central Africa and have shared their vast experience and expertise with the WCS team. In total now, STE has donated a total of 14 GPS telemetry collars.

Twenty-two elephants have been collared to date, in 5 National Parks. Only one complete dataset exists at present, from Nouabalé-Ndoki, in Congo, where a female and her calf had a home range of over 2250 sq.km. Over half of Central Africa's National Parks are smaller than this. Forest elephants travel linear distances in excess of 100 km, crossing park boundaries and international borders frequently. One large bull crossed the entire Nouabalé-Ndoki NP in just 3 days. Forest elephant movements are most strongly determined by the distribution of water, fruit, mineral deposits, and most importantly, human activity. The data from the GPS collars provided an insight into the trans-border movements of one of the elephants between Central African Republic and Congo and has shown that forest elephants had larger home ranges than was previously known (MCP's between 700 and 2,250km²). These elephants avoided high human impact areas, and their movements were mainly restricted to a core area of forest more than 30km from permanent human habitation.

Despite the international ban on trade in elephant products, poaching for ivory is still the biggest cause of forest elephant decline. However as bushmeat supplies dwindle across Central Africa, elephant meat is becoming commercially viable. Forest loss and fragmentation are reducing elephant habitat, fragmenting contiguous populations, and allowing easy access to formerly isolated elephant poachers. Understanding elephant movements is vital while there is still time. Data from the GPS collars to define the elephant range, including concentration areas and corridors, is being used to lobby governments and logging companies to ensure protection of vital areas of forests through the establishment of forest reserves and national parks.



Central African forest elephant



Southern Africa Transboundary Project

Michelle and Steve Henley

Background

Private nature reserves and adjoining large national parks such as the 2.2 million ha Kruger National Park (KNP) in South Africa, not only need to function as integrated ecological units but also need to be financially viable to support efficient management practices. As very little demographic information was available on the elephant population of the Association of Private Nature Reserves (APNR) on the western border of the KNP, an individual elephant identification study was launched in 1997. Save the Elephants pioneered the first Green Hunt in the Timbavati Private Nature Reserve (TPNR) in 1998. To date five elephants have been Green Hunted which has not only enabled bulls to be fitted with satellite collars to track their movements, but has also contributed financially towards the management of the TPNR. Green Hunts adhere to strict protocols which ensure that Green Hunts can only take place under the supervision of a trained veterinarian and linked to a scientific research program.

Objectives

In keeping with the mission statement of Save the Elephants this project ultimately aims to help secure a future for the elephants by taking advantage of opportunities for:

- 1) Monitoring of individually identified animals
- 2) Satellite tracking technology
- 3) Understanding the population dynamics and movement of elephants within APNR and adjacent KNP.

This project aims to provide the necessary data to APNR managers. Many research questions concerning the behavioural ecology of elephants need to be answered. Insights into patterns of movement and the effects of dispersal as a population regulatory process can be employed as tools for developing operational guidelines by decision-makers.

Results

At present, close to 1000 individual elephants have been identified and recorded within the APNR based on unique patterns of tears, nicks, holes and veins in the ears. Re-sightings of known animals at localities other than where they were first sighted, provides information on their movement and associations with other elephants within the reserve. The long-term application of this technique can provide valuable demographic data to construct population models. Records furthermore indicate that areas within the APNR may serve as bull areas given the large aggregations of bulls found within the APNR.

At the outset of the Green Hunts the satellite collars were still in their developmental phases and were therefore only operational for a few months. In May 2002 however, a large tusked bull named Mac was Green Hunted and fitted with a satellite collar. Mac, our flagship elephant is, we believe, the largest elephant being tracked in Africa, one of Kruger's monster bulls, whose tusks we have measured and estimate at over 100 lbs a piece. This age and sex class have never been properly studied with remote sensing before. For three years now we have recorded the special attributes of his ranging pattern. His home range, spanning the national park and the private sanctuaries, includes concentration areas linked by travel corridors. Movement between these areas appears to be driven by Mac's reproductive status (*i.e.* musth cycle) and social benefits, rather than by any search for safety (as in East Africa). Mac moves in a north-south direction at the start of his musth cycle. The distance between Shingwedzi in the north of the



Kruger National Park and his most southerly point is close to 200km away. His total home range area exceeds 5 000km².



Mac with his satellite collar

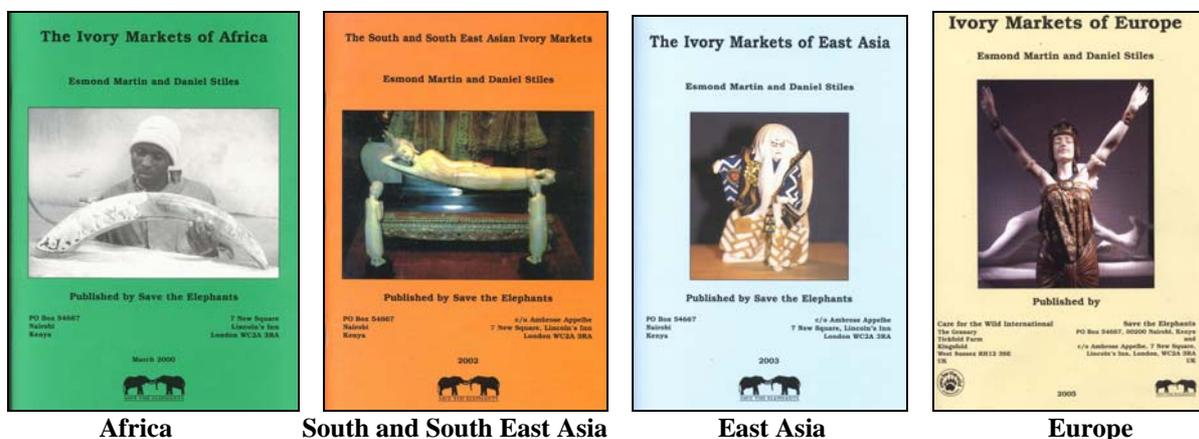
At present we have six satellite collars on elephants within the APNR and have recently deployed two GPS/GMS collars. The collaring of elephants will improve our understanding of the factors that motivate elephant movements. Placing satellite collars on elephants, especially large tusked bulls which are often targeted as trophy animals by poachers and hunters alike will also provide a means of monitoring and protecting these individuals. We hope soon to extend our research, in collaboration with the Kruger, to incorporate elephant movements between the Kruger and the newly founded Limpopo National Park in Mozambique. Our Save the Elephants Transboundary Project will record these movements and thereby make a significant contribution to elephant conservation in Southern Africa and the reduction of human elephant conflict in the region based upon increased levels of understanding of elephant ranging behaviour and dispersal patterns at a time when elephant management is faced with critical decisions.

The Ivory Trade Study

Drs Esmond Bradley Martin and Daniel Stiles

Save the Elephants, realizing there was still an active ivory trade in many parts of the world, funded research from 1999 to 2004 for Esmond Martin and Daniel Stiles to study the main ivory markets in Africa, Asia and Europe. As a result, four ivory reports were published in order to provide base-line data from which informed decisions could be made regarding ivory trade controls and law enforcement. The first three reports were entitled: *The Ivory Markets of Africa*, 2000, 84 pages; *The South and South East Asian Ivory Markets*, 2002, 88 pages; *The Ivory Markets of East Asia*, 2003, 112 pages - all published by Save the Elephants. They were each launched at the House of Commons in London, with further press conferences held in Nairobi. There was wide publicity on the findings world wide. The authors also wrote academic articles summarizing their work in *Pachyderm* and elsewhere, and more popular articles in *Swara* and *BBC Wildlife*. The findings in the reports were also disseminated on the BBC. The fourth report, *Ivory Markets of Europe*, was published in 2005 by Save the Elephants and Care for the Wild International, 104 pages, with a launching at the University of London.

The main conclusions in the first report were that tusks were being smuggled from the DRC, CAR, Cameroon and Gabon, in particular, to Abidjan, Lagos and Dakar, and from the DRC and CAR up to Sudan and Egypt for carving, with a little from Kenya and Sudan going to Addis Ababa. About 110,000 ivory items were counted for sale in 657 outlets in the 15 countries that were visited, with Abidjan displaying the most, followed by Harare and then Cairo. Most buyers are expatriates. The second report revealed that wild elephant populations in Cambodia, Laos and Vietnam declined from 1988 to 2000 by about 75% down to 1,510 animals. Most tusks were being smuggled from Myanmar to Thailand where there were over 80% of the 105,000 ivory items counted for sale in the eight countries surveyed (within 521 outlets in 17 towns and cities). Some of the items on display were made from illegal African ivory carved in China and Thailand especially. The third report showed East Asia had over 54,000 items for sale in 413 outlets in 11 cities. Hong Kong had by far the most, then China and Japan. Japan's industry was mostly legal and for domestic use only, while China had the largest number of carvers and the largest illegal industry, mostly for export all over the world. The fourth report showed that in Europe there were over 27,000 ivory items counted in 1,143 outlets in 14 cities and towns, mostly antiques or objects made before 1989 when the trade was still legal. Germany and the UK had by far the most number of items. France and Germany still have active carvers using old ivory stockpiles, consuming about 300-400 kg per country a year. In all countries, it was found that carvers are giving up their profession as they see no future in their work. But still ivory from Africa does supply the illegal markets.



Save the Elephants is now looking for funds for their final study – that of the ivory markets in the United States of America where there is a big internal market still.

Travel and Awards

Iain Douglas-Hamilton serves on the following scientific committees; the data review task force of the African Elephant Specialist Group of IUCN, and the Technical Advisory Group for MIKE. Iain conducts regular lecture tours and works with the media to promote Save the Elephants' mission and awareness of elephants in general. Over the last few years Iain has made presentations at numerous conferences including the Wildlife Conservation Network, the 7th World Wilderness Congress, the International Elephant and Rhino Research Symposium in Vienna, and was the keynote speaker at the International Elephant Foundation conference on 'Human-elephant relationships and conflict' in Sri Lanka. Additionally, Iain has spoken at Universities, Zoological Societies and private fundraising functions throughout Europe and America. In October 2003 and 2004, Iain presented his work and that of STE at the Royal Geographical Society in London.

Iain and David Gachuche, STE's software engineer, attended the Wildlife Conservation Network (WCN) Expo in California from 16-17 October 2004. This was the third annual WCN Expo where 14 of the world's leading animal conservationists gave presentations about their conservation programs in Africa, Asia and South America. They emphasized the opportunities for wildlife conservation worldwide through community-based programs that help local communities: resolve conflicts over livestock loss from wildlife through unique livestock management programs, create jobs, encourage ecotourism and instill pride in communities for their contribution to saving endangered animal populations. The two-day Expo, which included a gala dinner raised over \$250,000 for WCN to support the WCN conservation partners.

In October 2004, Onesmas Kahindi traveled to Bangkok where he represented the Government of Kenya and Save the Elephants in the battle for the elephants. STE was involved in the preparations in the run up to, and also during the CITES Conference of the Parties (COP) 13.

STE were the co-recipients with Safaricom of the 2005 GSM Association "Mobility in the Environment Award" for their innovative program to apply GSM mobile technology to monitor wild animals to help secure their future. The annual award announced in February 2005 at the GSM Association World Congress in Cannes, France. The Awards recognize organizations and individuals for their contribution in promoting wireless products, services and initiatives based on the GSM wireless standard. Iain traveled to Cannes to receive the award along with the CEO of Safaricom, Mr Michael Joseph.



**The Winning Team - GSM Association
Mobility in the Environment Award**



**David Gachuche, Charles Convis and Iain at
the WCN Expo in 2004**

In March 2005, Iain was invited to the UK to present a paper at the Compassion in World Farming Trust International Conference. He presented a paper on the “Conscious Decision-Making in Elephants”. The proceedings of his presentation are soon to be published in a paper.



Iain at the CIWF Conference



Mark Bekoff and Saba Douglas-Hamilton at The CIWF Conference

In September 2005, Festus Ihwagi and Jake Wall traveled to Washington D.C. WWF head quarters to represent STE at the Global Conservation Planning (GCP) – II Landscape Planning Learning Workshop about Ewaso Ecosystem. The workshop drew the five GCP partners; Wildlife Conservation Society, Conservation International, World Wildlife Fund, The Nature Conservancy and African Wildlife Fund and stakeholders in Laikipia and Samburu, namely Save the Elephants, Lewa Wildlife Conservancy and Mpala Research Centre. The aim of the workshop was to learn each organizations approach to landscape planning and it emerged at this workshop that STE plays the leading role in its research in the ecosystem.

Iain Douglas-Hamilton, Shivani Bhalla and Emmanuel Hema will be traveling to Alaska, USA, from the 23rd of September 2005 onwards, to attend the World Wilderness Congress (WWC). Shivani was awarded a scholarship to attend the congress. The WWC is the longest-running, public, international environmental forum and was launched by The Wild Foundation. The last WWC was held in South Africa, which Iain attended. This year, Iain and Emmanuel will be presenting their findings on the Mali desert elephants, and Shivani on “The Benefits of Education among Nomadic People”. Both Shivani and Hema have been invited to attend a training session called the International Wilderness Concepts and Practice course.

General News

In 2003, Iain resigned as Chairman of Save the Elephants and took up the position of President and CEO. Prof. Fritz Vollrath accepted the position of Chairman and Peter Henderson joined as a trustee in 2004. In March 2005, STE held the first Trustees/Staff meeting in Samburu. All researchers and employees of STE gave presentations to the trustees on the work that is being carried out and recent results to date.



Research Staff and Trustees

Death of 5Y-AOT and the new 5Y-STE

An unfortunate incident took place as our aircraft 5Y-AOT was landing at Samburu airstrip and collided with a zebra dashing across the strip. The crash destroyed the aircraft, but it was replaced by another second hand Cessna 185, thanks to donors, Prince Bernard of the Netherlands and Sanjay Kumar, who gave specifically for this purpose. STE has thus been able to continue the aerial monitoring, radio-tracking and administration required in the remote areas where we work.



Iain and David Daballen at the scene of the incident
September 11th, 2003



The new 5Y-STE with National Geographic
Megaflyover plane 2005

Rescue of Naserian

On the 12th of May 2004, STE observed an obviously orphaned elephant that had been trailing wild herds but was suffering continuous rejection by them. As night fell, STE called in Daphne Sheldrick's team from the elephant orphanage in Nairobi to come and rescue the young elephant. The 6 month old calf was picked up by the orphanage staff and taken to Nairobi. She was called Naserian, meaning "The Lucky One" in Samburu. Naserian is still in Nairobi and has become the surrogate mother to 10 other orphans. Soon, she will move to Tsavo National Park where she will join the other elephant orphans.

Lilac's Treatment

In May 2004, Lilac from the Flowers family, was seen for 5 days with a swollen rear left leg. She had a 1 year old male calf at the time. Lilac was treated on the 31st of May near the Ngare Mara Gate. She was limping badly and in the 3 hours prior to her treatment, moved less than 50 metres. A vet from the Kenya Wildlife Service darted and treated Lilac with antibiotics. Her wound was flushed with Hydrogen Peroxide and Iodine applied. During the treatment, Lilac's calf remained at his mother's side, showing complete trust towards the STE team who were helping his mother.



Lilac being treated whilst her calf remains calm nearby

Lilac's treatment took half an hour, after which the antidote was administered and she was back on her feet. Lilac was seen on several occasions with her calf and the Flowers. The swelling on her leg was much reduced and she was walking normally.

Save the Elephants in the Press

Gina Din Productions with Safaricom Kenya sent a film crew to Samburu in January 2005 and covered the work being carried out by STE. The show was aired on local TV stations in Kenya for a month.

A BBC team traveled to Samburu in February 2005 to learn about STE's work. They were able to assist and film a radio-collaring operation of a young bull in Lewa. CNN and Reuters Television also visited Samburu in April 2005. CNN was hosted by Gary Strieker for the Global Challenges Programme which was aired on CNN International in June 2005. Both TV networks filmed the successful removal and retrieval of radio-collars.



Toyota comes to the rescue

STE received a new Toyota Landcruiser in October 2003, donated by Toyota Motor Corporation, to replace a Hilux pick-up that was destroyed by Rommel, a bull elephant.



The destroyed Hilux replaced by a new Toyota



“May He Walk in Peace”

In Memory of HRH Prince Bernhard of the Netherlands

Prince Bernhard of the Netherlands, patron of STE, died of cancer on December 1st, 2004 at the age of 93. Though he had a long and distinguished career in Europe’s turbulent 20th century, he will be remembered in Africa principally as one who promoted the wildlife cause over many years. PB drew a picture of an elephant walking away with the caption “may he walk in peace”. That is what he spent so much of his life trying to achieve, to help animals and people in far off corners of the world to preserve their space and peace. Above all he strove to reward people who put their heart and life into conservation.

Human Footprint – Mike Fay

One of the outstanding scientist explorers, Mike Fay in 1999 spent more than a year hiking 2,000 miles across Africa's Congo Basin to explore the ecology and environmental status of the region. We met him in Central African Republic in 1979 during our central African elephant count, where he was working as a Peace Corps volunteer and have remained in close contact. STE assisted Mike with the Human Footprint Project. In 2004, as part of the National Geographic Society and the Wildlife Conservation Society project, Mike began his African "MegaFlyover." He collected data from a much larger perspective - this time, spending months flying over most of the continent of Africa in a small plane at low altitude, photographing the ground below. Mike and pilot Peter Ragg followed a general map of the "human footprint" on the continent while automatic cameras snapped a photo of the ground below every 20 seconds. While much of what they witnessed is cause for alarm, in many ways Africa is ahead of the rest of the world when it comes to how humans and wild places can co-exist.



Public Awareness

Elephant News Service – Melissa Groo

Melissa Groo works with Dr Katie Payne and joined the team on this important project. There is a critical need for information on the part of elephant managers and decision makers in both Africa and Asia as they face ever increasing difficulties to maintain populations in the wild. Common problems include loss of habitat, compression of elephants into protected areas, competition and conflict with human beings for resources, poaching for meat and ivory, and lack of resources for conservation. It is difficult for wildlife authorities, concerned NGOs and donors to gain access to all the latest developments through the news. STE felt that a need existed for an electronic information network, or listserv, that links and informs all persons interested in the management, conservation, and science of elephants worldwide. A service that circulates African as well as Asian elephant news stories, research results, new publications, conference details and other new resources can benefit all subscribers who work with these endangered species.

Thus the Save the Elephants News Service was started in 2000 as a free email service that circulates elephant-related articles currently to over 390 recipients for the African elephant news and over 260 recipients for the Asian elephant news (there is substantial overlap among these lists as many people subscribe to both newsletters). Subscribers include the world's foremost elephant researchers and conservationists; park managers; zookeepers; and animal welfare organizations.

This service is run by Melissa Groo, based in the United States, who works for STE on a part-time basis conducting daily searches of the web to find interesting stories on both African and Asian elephants. The news items are taken from a variety of sources and seek to provide a timely and unbiased account of the lives and circumstances of wild elephants worldwide. This service is widely becoming more and more popular and keeps researchers, conservationists and elephant enthusiasts alike up-to-date on the current issues of the elephant world. STE has secured a grant from the International Elephant Fund to support the Elephant News Service.



Melissa in Samburu in 2004

The African Elephant Library – Mary Rigby

The African Elephant Library is a collection of literature, reprints and reports on the biology, status and management of the African elephant, originally based on the private collection of Iain Douglas-Hamilton. Since 1996, Mary Rigby, a professional librarian has substantially updated the material and STE continues to support Mary's work. The library contains over 4,000 articles and is the largest collection of references dedicated to the African elephant. A hard copy is available for use by researchers and interested parties at STE's offices in Nairobi and African Elephant Specialist Group offices. An annotated bibliography of the library with summaries of all articles is available through the STE website.



Recent Publications

Papers published:

Douglas-Hamilton, I., Krink, T., Vollrath, F., 2005. Movements and corridors of African elephants in relation to protected areas. *Naturwissenschaften* 92, 158–163.

Vollrath, F., & Douglas-Hamilton, I., 2002. African bees to control African Elephants. *Naturwissenschaften* 89: 508-511.

Wittemyer, G., Douglas-Hamilton, I., Getz, W.M., 2005. The socioecology of elephants: analysis of the processes creating multitiered social structures. *Anim. Behav.* 69, 1357–1371.

Wittemyer G., Daballen, D., Rasmussen H., Kahindi, O., Douglas-Hamilton, I., 2005. Demographic status of elephants in the Samburu and Buffalo Springs National Reserves, Kenya. *Afr. J. Ecol.* 43, 44–47.

Papers accepted:

Rasmussen, H.B., Kahindi, O., Vollrath, F., & Douglas-Hamilton, I. (Accepted) Estimating elephant densities from wells and droppings in dried out riverbeds. *African Journal of Ecology*.

Rasmussen, H.B., Wittemyer, G., & Douglas-Hamilton, I. (Accepted) Estimating age of immobilized elephants from teeth impressions using dental silicon. *Journal of African Ecology*.

Papers submitted for review:

Douglas-Hamilton, I., Bhalla, S., Wittemyer, G., & Vollrath, F, *In review*. Behavioural reactions of elephants towards a dying and deceased matriarch. *Applied Animal Behaviour Science*.

Ganswindt, A., Rasmussen, H.B., Heistermann, M., & Keith, J. (2004) The sexually active states of free-ranging male African elephants (*Loxodonta africana*): defining musth and non-musth using endocrinology, physical signals, and behavior. *Hormones and Behaviour*.

Rasmussen, H. B., Wittemyer, G., & Douglas-Hamilton, I. *In review*. Predicting time specific reproductive rates using remote sensing. *Journal of Applied Ecology*.

Rasmussen, H.B., Lunter, G., Vollrath, F., & Douglas-Hamilton, I. (Submitted) Identifying sexual active and inactive periods in male African elephants with Hidden Markov Models. *Animal Behaviour*.

Rasmussen, H.B., Wittemyer, G., & Douglas-Hamilton, I. (Submitted) Predicting Time Specific Reproductive Rates using Remote Sensing Data. *Journal of Applied Ecology*.

Wittemyer, G., Rasmussen, H.B., & Douglas-Hamilton, I. (submitted) Elephant Babies Require Both Capital and Income Investments for Successful Rearing. *Journal of Animal Ecology*

Wittemyer, G., Rasmussen, H. B., & Douglas-Hamilton, I. *In review*. Using both sides of the capital-income breeder continuum: elephant reproductive strategies. *Journal of Animal Ecology*

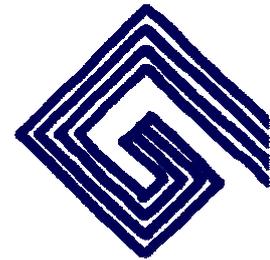


Save the Elephants Partners

It has been stimulating for Save the Elephants to work on a number of projects with these organizations.



ELEPHANT WATCH SAFARIS



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