



The Cheetah Conservation Fund's (CCF) mission is *to be an internationally recognised centre of excellence in research and education on cheetahs and their eco-systems, working with all stakeholders to achieve best practice in the conservation and management of the world's cheetahs.*"

With this aim in mind, CCF undertakes scientific research regarding cheetahs and their habitat, publishing scientific papers and sharing findings internationally via conferences and the press; assists in the management of captive and free-ranging cheetah throughout the world; maintains a major public conservation awareness and education programme for local and international communities and school groups from primary through college education; and conducts community conservation and predator conflict resolution programmes.

In 2006 and 2007, CCF continued working towards achieving its research objectives, with significant progress being made on several fronts, including the reproductive issues facing captive female cheetah, cheetah population estimates using camera trapping methodology and analysing historic spoor tracking data. CCF continued to strengthen collaborative efforts with experts in the areas of genetics, reproduction, veterinary medicine, pathology and conservation work

2006/2007 CCF Research Highlights

Publications in peer-reviewed journals:

1. Marker, L.L, Dickman, A.J., Mills, M.G.L., Jeo, R.M., Macdonald, D.W. Factors influencing the spatial distribution of cheetahs (*Acinonyx jubatus*) on north-central Namibian farmlands. Journal of Zoology (in press).
2. Marker, L.L; Pearks-Wilkerson, A.J.; Martenson, J.; Sarno, R.J.; Breitenmoser-Würsten C., O'Brien, S.J.; Johnson, W.E., Patterns of molecular genetic variation in Namibian cheetahs. Journal of Heredity (in press).
3. Muntifering, J.R., Dickman, A.J., Perlow, L.M., Hruska, T., Ryan, P.G., Marker, L.L & Jeo, R.M. Managing the matrix for large carnivores: a novel approach and perspective from cheetah (*Acinonyx jubatus*) habitat suitability modelling. Animal Conservation 9 (2006) 103-112.
4. Fabiano, E., Hamer, M., Nghikembua, M., & Marker, L..Evaluation of spoor tracking to monitor cheetah abundance in North-Central Namibia. South African Journal of Wildlife Research. (Submitted)
5. Schumann *et al.* 2006. Assessing the use of swing gates in game fences as a potential non-lethal predator exclusion technique. South African Journal of Wildlife Research 36(2): 173 – 181

6. Crosier, A.E., B.S. Pukazhenth, J.N. Henghali, J. Howard, A.J. Dickman, L. Marker, D.E. Wildt. 2006. Cryopreservation of spermatozoa from wild-born Namibian cheetahs (*Acinonyx jubatus*) and influence of glycerol on cryosurvival. *Cryobiology* 52:169-181.

7. Crosier, A. E., L.L. Marker, J. Howard, B.S. Pukazhenth, J. Henghali, and D.E. Wildt,. (2007) Ejaculate traits in the Namibian cheetah (*Acinonyx jubatus*): influence of age, season and captivity. *Reproduction, Fertility and Development*,19: 370-382.

Posters at Professional Conferences

Society of Conservation Biology Conference

Marker, L., Fabiano, E., Nghikembua, M. Cheetah Conservation Fund, P.O. Box 1755, Otjiwarongo, Namibia, cheetah@iway.com.na, The feasibility of using remote camera traps at marking trees to estimate density of free-ranging cheetahs in north-central Namibia. (2007)

Society for the Study of Reproduction

Crosier, A., Comizzoli, P., Baker, T., Pukazhenth, P., Howard, J., Marker, L. & Wildt, D. Oocyte Fertilization and Uterine Morphology in Aged Female Cheetahs(*Acinonyx jubatus*) are Similar to Younger Counterparts. (2007).

American Association of Zoo Veterinarian Conference

Sanchez, C., Murray, S., Brown, S., Marker, L., & Citino, S. Single-injection inulin clearance for routine determination of glomerular filtration rate in cheetahs (*Acinonyx jubatus*).

Contributions to/production of management plans and reports:

INTERNATIONAL CHEETAH STUDBOOK

CCF manages the International Cheetah Studbook. The 2003 & 2004 International Cheetah Studbooks were finished and distributed to all participating facilities. The 2003 captive cheetah population was 1353 (696M.657F) animals, while the 2004 population was 1387 (708M.673F.6UNK). The 2004 captive cheetah population was housed in 238 facilities in 47 countries. The 2004 Studbook is the fourteenth edition of this registry. The processing of data for the 2005/2006 is currently underway.

CONSERVANCY ASSOCIATION OF NAMIBIA (CANAM) Dr. Marker was again elected the Chairperson for the Conservancy Association of Namibia (CANAM) – for the fourth year. CANAM is the umbrella association for conservancies and works closely with all conservation organizations including the government and rural communities.

Under the auspices of the Chairperson, CCF's Dr. Laurie Marker, in 2006, CANAM hosted a workshop entitled "Building Synergy Between National Parks, Communal and Commercial Conservancies Towards Improved Game Management." The results from the plans will have strong implications on cheetah conservation and survival. Areas identified for collaboration included 1) developing a common and standardised game census that can be useful for regional and national planning; 2) optimising game nationally and use the collective knowledge to understand best practice, carrying capacities, translocations, managing population genetics, and allowing proper gene flow; 3) relocating game on a national level; 4) coordinating a National Utilization Plan for optimum game management - i.e. culling. Guidelines were

identified for the structured utilisation of game: tourism, trophy hunting, and management of excess game. In order to address these issues, the group identified the following as areas of collaborations: 1) Improve consumptive use of wildlife (excess game); 2) Conservation and preservation of veldt and habitat; 3) Improve the policy on environment to provide incentive-based consumptive use and the devolution of power; 4) Improve the monitoring processes, biomass, game census, carrying capacities, diversification, population optimisation, and off-take optimisation; 4) Improve the 'green' issues of conservation (e.g. water and energy savings); 5) Develop a removal strategy based on Namibia's inherent variability, i.e. seasonal marketing for meat and live off-take; 6) Improve removal and marketing systems for excess game that is commercially based, i.e. financial benefits, and develop a local market; 6) Develop a national relocation system to optimise gene pools, populations, and species mix; 7) Develop a social responsibility programme for the wildlife industry; 8) Reduce market failures for game translocation in Namibia; 9) Improve co-operation with the veterinarian services to achieve a win-win situation for game and beef; 10) Unlock the economic potential of parks by exploring means of utilizing it, particularly in relation to neighbouring farms and 11) Encourage fence removal by developing incentives for better conservation.

THE LARGE CARNIVORE MANAGEMENT ASSOCIATION

The Large Carnivore Management Association's (LCMAN's) primary objective is to ensure the conservation of Namibia's large carnivores through collaboration with all stakeholders. As secretary of LCMAN for four years, Bonnie Schuman, CCF's senior research assistant, plays an active role representing CCF in this organisation. Issues including the progress of the Cheetah Status Report for Namibia, the involvement of communal conservancies in the activities of LCMAN, the fate of captive carnivores and the hunting of carnivores with dogs, remain high on the agenda.

WATERBERG CONSERVANCY

CCF presented results compiled from the 2005 Waterhole Count to the members of the Waterberg Conservancy at their Annual General Meeting. CCF's General Manager, Dr. Bruce Brewer, continues as Treasurer. In August 2006 and 2007, CCF organized the 10th and 11th Annual Water Hole Counts.

EAST AFRICAN REGIONAL AND KENYA CHEETAH STRATEGIC PLANNING WORKSHOP

CCF worked in collaboration with the Canid and Cat Specialist Groups of IUCN, and Wildlife Conservation Society (WCS) to initiate a process for cheetah and wild dogs together, to develop range-wide priority conservation plans for the cheetah and the African wild dogs as well as a strategic planning meeting for Kenya.

1. Identify priority sites for the conservation of wild dogs and cheetahs.
2. Foster appreciation for the need to conserve wild dogs and cheetahs, particularly at priority sites, among conservation practitioners in range states.
3. Develop local capacity to conserve cheetahs and wild dogs by implementing conservation action.
4. Encourage policymakers to incorporate wild dogs' and cheetahs' conservation requirements into land use planning at both national and regional scales.
5. Prepare specific global and national conservation action plans for both cheetahs and wild dogs.
6. Collate information on wild dog and cheetah distribution and abundance in an updateable database.

SOUTHERN AFRICAN and NAMIBIAN STATUS REPORT

CCF sponsored a special issue of Cat News which highlighted the accomplishments in cheetah conservation in the southern African region over the past few years. The reports from different countries prioritized research and conservation objectives for the future. CCF compiled the Namibian report which was the compilation of current knowledge presenting the needs for conservation of cheetah outside and within protected areas and problems facing the cheetah due to human-predator issues and reveals extension and educational initiatives that have been implemented.

CHEETAH CONSERVATION COMPENDIUM

CCF has co-sponsored the Cheetah Compendium (http://www.catsg.org/cheetah/20_cc-compendium/index.htm) with the IUCN Cat Specialist group to bring together all information on cheetah. The "Cheetah Conservation Compendium" is a library and forum providing a collection of information, data, documents, maps and other material relevant to the conservation of the cheetah. It provides scientific baseline information, but also popular material, news and public political documents. It is a tool to share knowledge and experience, to manage the wealth of information, and to make all this readily available for all institutions and individuals working in favour of the conservation of the cheetah. CCF has one of the world's largest libraries on cheetah – all data was put into PDF files and is now available in the Compendium.

LEOPARD POPULATION STUDY

PhD candidate from University of Massachusetts, and CCF research assistant, Andrew Stein, completed his three year research study on leopards and brown hyenas in the Waterberg area and he is now writing up his thesis. The project addressed issues of large carnivore conflict and interaction between the co-occurring large carnivore species. The results of the study will provide information on population estimates, range size and movements, diet and prey availability, inter-specific interactions and the impacts on farming on these carnivores. The final report was submitted to the Ministry of Environmental Affairs and Tourism in Namibia.

Threatened IUCN species studied

ESTIMATING CHEETAH DENSITIES THROUGH INDIRECT CENSUS METHODS

During 2006 and 2007, CCF continued with their estimation of cheetah densities using a number of different methods – camera trapping, spoor counts and radio telemetry – with the aim of determining the feasibility and accuracy of these methods as census techniques. GSM collars have recently been placed on four male cheetahs.

Preliminary results from camera trapping in 2006 showed the following with 14 camera trapping stations monitored for three months. Fourteen cheetahs were identified, using spot patterns, in 250 photos (4% of the photos taken) in 72 captures, and 1302 trap nights. Cheetah density in the study area showed $4.1 \pm 0.08/1000\text{km}^2$.

Data submitted to conventions, agendas and policy:

CCF'S SCIENTIFIC BOARD

In November 2006, at the White Oak Conservation Centre in Florida, CCF's Scientific Board of Advisors met to discuss CCF's long-term research. Thirteen research collaborators gathered to discuss five key topics: (1) CCF's Bush Initiative, (2) An accredited Conservation Biology Field School in cooperation with North Carolina

State University, (3) On-going cheetah biology & ecology research, (4) Cheetah Research in other countries and (5) CCF's captive cheetah initiatives as they related to those in Namibia and internationally

LEOPARD CONFLICT IN INDIA

In January 2007, Dr. Marker participated in the Human-Leopard Conflict Management Workshop hosted by the Wildlife Trust of India. The Indian governmental agencies charged with monitoring the leopards have very little training and few policies that can assist them in addressing the human-wildlife interaction. This workshop was designed to put some programs in place that will help resolve some of the problems.

Livelihoods maintained and enhanced

FARMER WORKSHOPS

During 2006 and 2007, CCF has presented more than 15 farmer and farm worker training workshops. These workshops target the emerging commercial and communal farmers, and are aimed at teaching intergrated approaches to livestock and predator management, as well as helping farmers improve productivity on their lands while working in harmony with nature. More than 300 farmers attended these courses throughout the 2006 and 2007 period.

EDUCATION

In 2006, 30 groups (six youth groups, 18 Namibian schools, four university groups, and two other volunteer groups), totalling over 1000 individuals, visited CCF. Sixteen of these groups stayed at CCF's campsite, while the other 14 visited CCF for the day. During the 1st half of 2007, CCF conducted out outreach programmes in 16 schools and reached 1,490 students. In addition, 6 groups totalling 107 individuals visited CCF and stayed at CCF's campsite.

Threatened IUCN species maintained or enhanced

CHEETAH HEALTH, REPRODUCTION, AND THE GENOME RESOURCE BANK

During 2006, CCF worked on 60 (37M.23F) cheetahs. Of these 12 (10M 2F) were tagged and released back into the wild; 48(27M.21F) were captive animals receiving annual physical examinations. In addition, in July, 11 of CCF's resident females were part of an international collaboration looking at factors affecting female cheetah reproduction, and seven of CCF's resident male cheetahs were part of a sperm assessment study carried out in November.

Since 2002, a total of 244 semen collections have been added to the CCF Genome Resource Bank (GRB). In 2006 a total of 19 semen collections were banked into the CCF Genome Resource Bank (GRB). The year's collections came from three wild males, and the rest were from resident captive cheetahs. In the first six months of 2007, eight semen collections were banked into the CCF GRB, which now contains a total of 173 cryo-preserved sperm samples from captive and wild cheetahs in Namibia, representing 64 individual cheetahs. The collections came from two wild males, and the rest were from resident captive cheetahs.

In 2006 and 2007, CCF worked in collaboration with the Smithsonian Institution on female reproductive research. The team used ultrasound to examine the reproductive organs of CCF's captive female cheetahs and performed egg extraction using laparoscopic technique immediately before the female ovulates. Oocyte quality,

embryo development and uterine health were evaluated. Semen samples were extracted from a resident male cheetah and used for in-vitro fertilisation (IVF). The team performed cheetah IVF at CCF's reproductive laboratory and tracked the development of the embryos in an incubator. This was the first time that this intricate research has been conducted and is a big success story for CCF.

Between January and June 2007, CCF worked on 60 (26M.34F) cheetahs. Of those 16 (11M.5F) were tagged and released back into the wild, 13 cheetahs (4M.9F) were kept at CCF due to young age or health problems, and 31(11M.20F) were captive animals receiving annual physical exams.

In 2006 & 2007, as part of a long-term gastritis study, CCF captive cheetahs were endoscoped during their annual physicals. In addition in 2007, in cooperation with the Smithsonian, a study was initiated on renal disease, which is considered the leading cause of mortality in captive cheetahs. An insulin excretion test was conducted on a subset of CCF's captive cheetahs. Using this technique it was determined the glomerular filtration rate on cheetah offers the possibility of establishing baseline parameters that could potentially help in the diagnosis of renal disease in early stages.