

CHEETAH

SAVING THE WORLD'S FASTEST RUNNERS



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Reaching speeds of up to 70 miles per hour, the cheetah (*Acinonyx jubatus*) is the world's fastest land mammal. Referred to as the greyhound of the cats, cheetahs' bodies are perfectly **adapted** for running. They are aerodynamic, with a flexible spine and a thin, muscular body. Cheetahs' internal organs are designed for sprinting: they have oversized livers, powerful hearts, increased lung capacity, and strong arteries. Cheetahs also have enlarged nostrils for taking in oxygen and a small head with large eyes for exceptional daytime vision. The black tear marks on the cheetah's face keeps the sun out of its eyes while hunting. Its long muscular tail acts as a rudder for balance during sprints, which involve quick, fast turns. The cheetah is the only cat with non-retractable claws; their feet grip the ground like cleats when they chase prey.

Unfortunately, these fast cats may be losing the only race that matters – the race against extinction. Cheetahs once numbered more than 100,000 animals in 44 countries in Africa and Asia. Today, the total wild cheetah population is estimated to be 12,000–15,000 animals in 25 African countries, and about 100 cheetahs in Iran. Cheetahs are now extinct throughout much of their former range, due to habitat loss, declines in prey, high infant mortality (90 percent in some areas), poaching, and shooting by ranchers.

Cheetahs are also troubled by **inbreeding**, or lack of genetic variation. About 10,000 years ago, at the end of the last Great Ice Age, the world's climate changed radically and about 75 percent of

the mammal species in North America and Europe died. Cheetahs survived this mass extinction, but their numbers were severely reduced. The cheetahs repopulated from the individuals left, but the next generation had a very reduced gene pool – called a genetic bottleneck. Every cheetah alive today is as closely related to its relatives as siblings are to each other – they share nearly all of the same genetic material. This lack of genetic diversity makes cheetahs more susceptible to disease, decreases reproduction, and increases their mortality rate.

All cheetah populations are classified as "vulnerable" or "endangered" by the World Conservation Union (IUCN). The status "vulnerable" generally means that the animal has a 10 percent chance of going extinct in 100 years, where "endangered" generally means that the animal has a 20 percent chance of going extinct in the next 20 years or five generations, whichever is longer.

WHERE THE WILD CATS ARE

The largest remaining wild population can be found in the southwestern African country of Namibia. Here, much of the cheetah's preferred habitat has been converted to livestock farmlands, and the cheetahs have to compete with lions and hyenas for food on the remaining undeveloped lands. When confronted by larger predators, including lions and hyenas, the cheetahs, built for speed but not for fighting, often lose their kills and sometimes their



VICIOUS HONEY BADGERS

During the first weeks of a cheetah's life, a thick yellowish-grey coat, called a mantle, grows along its back. The mantle serves as a **mimicry** defense to protect them from predators. When hiding in the tall grass, the cub resembles a honey badger, a small, vicious mammal that most animals are wise enough to leave alone. With an extremely high infant mortality rate, this feature gives the young cheetahs a slightly better chance.



young. Even in protected areas, like national parks, cheetahs have trouble maintaining viable populations due to competition with other large carnivores.

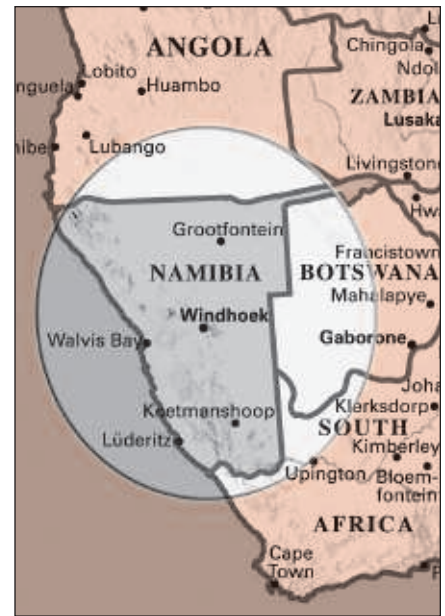
Today, 95 percent of Namibian cheetahs are found on farmlands, where wildlife legally belongs to the landowner. The farmers may be farming either livestock or **game** animals. Farmers have successfully killed off lions and leopards from their farmlands, but with plentiful natural prey animals, cheetah have found a niche for themselves on Namibian farms, much to the chagrin of the local ranchers. When Namibia was hit hard by drought in the 1980s, farmers killed off natural prey animals to save the water for their livestock – and so cheetahs turned to preying on livestock. Although they are protected by the Namibian government, farmers are permitted to trap and shoot cheetahs that prey on their livestock – and in the 1980s, farmers killed more than 10,000 cheetahs. The country's population was cut in half, and has continued to decline mostly due to what farmers and ranchers see as the cheetahs' threat to livestock. Scientists estimate that there around 2,500 cheetahs remaining in Namibia. If this population continues to decline and habitat conservation efforts fail to help cheetahs, the species could be extinct in 15 years.

A SCIENTIST WITH A MISSION

Dr. Laurie Marker has been working with cheetahs for more than 30 years. In 1990, Marker founded the Cheetah Conservation Fund (CCF) in Namibia with the mission to protect habitat for the long-term survival of cheetahs and their ecosystems. Marker hopes to save the wild cheetah from extinction in Namibia. Marker's and CCF's main priorities are to understand the factors affecting the cheetah's survival on farmlands through data collection and to develop policies and programs to sustain the cheetah population.

STUDYING CHEETAHS ON THE FARM AND IN THE FIELD

Working with CCF scientists and volunteers, Marker uses various techniques to gather data on the ecology of cheetahs in the area, including density, feeding, group size, population **demographics**, and distribution use. To gather this data, researchers get help from



the local livestock and game farmers.

Farmers live-trap cheetahs using capture cages, usually measuring about 2 meters x 0.75 meters, with trap release doors at each end a trigger plate in the middle. Farms also kill cheetahs they consider a threat.

Researchers examine the cheetahs, dead or alive, and record information on its size, age, sex, identifying marks, body condition, and where it was found. Marker also takes samples of blood, semen, and feces, and ear-tags the animals before release. The semen samples are used for reproductive research and are collected in the **Genome** Resource Bank.

CCF works in collaboration with the University of California, Davis on the effects of stress on captive and wild cheetahs and their levels of disease. Cheetahs often suffer from **gastritis**, or inflammation of the stomach, which can be caused by stress, so researchers are monitoring stress hormone levels in blood and fecal samples. Researchers sometimes do **endoscopies** on cheetahs to get samples of the cheetah's stomach lining, as well. The researches also analyze feces for reproductive hormones, which helps them better understand the reproductive cycles of cheetahs, and extract DNA from blood and skin samples to determine the amount of genetic variation in cheetahs.

If alive and healthy, the cheetah is released after the examination. Depending on whether the cheetah is considered a problem animal, it is either released where it was trapped or moved to a different

location. If the animal is not fit for release, e.g., is sick or is missing teeth, the cheetah will go into captivity. The research team also radio-collars some cheetahs that are being released.

To get data on the cheetahs' range on commercial farmlands and communal lands, the research team conducts extensive personal interviews with farmers. The farmers provide important information, such as cheetah sightings and any accounts of livestock losses to cheetahs. Researchers also tune into the cheetah's individual frequencies to monitor their movements around the area, on and off farmlands.

Marker is also gathering information on game densities, movements, demographics, and habitat use to understand the whole ecosystem. This requires researchers to travel along roads getting visual animal counts, to track and count animals and **spoor**. In addition, Marker is monitoring vegetation with fixed-point photography, which simply means that at particular locations (established using GPS), photos are taken at predetermined intervals, and the vegetation in each photo is identified, quantified, and catalogued. Since 70 percent of Namibia's game lives on farmlands, getting good data on the farmland ecosystem is very important to being able to establish an effective and cooperative conservation plan.

The researchers work to restore cheetah habitat by clearing invasive bush that encroaches on the open savannahs and grasslands. Cheetahs have more difficulty hunting in bushy areas. Bush encroachment is also a problem for farmers, as thick bush reduces the numbers of natural prey species (like springbok) and other wild game species (red hartebeest, oryx, eland), making the game farmers less tolerant of any losses they suffer at the paws of the big cats.

WORKING WITH FARMERS, FINDING SOLUTIONS

Marker has been gathering data on cheetahs in Namibia for more than 15 years, and has learned a great deal about cheetah habitat needs and the challenges that both cheetahs and farmers face. The data Marker has gathered has been very valuable in developing management strategies for these endangered animals.

One of the most effective solutions for

minimizing conflicts with farmers over livestock that Marker is working with farmers on is using guard dogs. Sheep herding dogs use a behavior called "eye-stalking" to move sheep, which is the same kind of behavior that predators use. When a predator approaches, the herding dogs start herding the animals, which actually stimulates the predatory motor pattern of the predator. Thus, sheepdogs, while good for herding, are not very effective guards against predators. Guard dogs, on the other hand, will bark while moving towards a predator, and then will retreat back into the herd without causing the herd to run. This behavior breaks up the predator's motor pattern. Non-aggressive predators, like cheetahs, will usually go elsewhere when challenged.

The CCF dog-breeding program has now placed more than 300 well-trained livestock guard dogs on ranches, and monitors the dogs' health and success through physical examinations and questionnaires from farmers on the dogs' performance.

Another simple solution that Marker is studying is the effectiveness of swing-gates in the fences of game farmers. Swing-gates may prove to be valuable to farmers as they allow game through but prevent cheetahs and other predators from entering fenced areas.

One of the most important elements in establishing a successful conservation program for the Namibian cheetah involves community education. CCF works with farmers, teachers, and the general public to teach people about cheetahs, their importance, and the benefits to everyone of protecting their habitat. Marker and CCF have become internationally recognized for their efforts to save endangered cheetahs in Namibia, and Marker also lectures around the world on the work she has done.

GETTING RESULTS

Marker's work has raised awareness of cheetahs among farmers, and as a result fewer cheetahs are shot and killed each year. CCF's Livestock Guarding Dog program has been a great success, with the project being used by both Namibia's president on his own farm and by communal farmers. The program has significantly reduced livestock losses on commercial and communal farms, and has also reduced anger at cheetahs. Cheetah



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DR. LAURIE MARKER

Laurie Marker began her career as a veterinary clinic assistant at Oregon's Wildlife Safari. Marker went on to become the Cheetah Curator and established a captive cheetah-breeding program. Marker traveled to Namibia in 1977 with a captive-born, hand-raised cheetah to determine if the cheetah's hunting behaviors were instinctual or if cheetahs must be taught to hunt. This was the first study to discover whether captive-born cheetahs could be re-introduced into the wild. During her time in Namibia, Marker learned about the conflict between cheetahs and farmers. Realizing that wild cheetahs were in great need of help, Marker spent the next 10 years traveling to Namibia to learn more about cheetahs. She helped identify the cheetah's lack of genetic variation, which also threatens the species' survival. In 1990, Marker moved to Namibia permanently and co-founded the Cheetah Conservation Fund (CCF). Marker's work studying cheetahs and educating the local population is crucial to the long-term survival of this endangered big cat. In 2003, Marker's research earned her a Ph.D. in Zoology from the University of Oxford in the United Kingdom.

shootings have declined as a result.

CCF educates the public through outreach to schools, farming associations, and individuals. Marker and her colleagues regularly give talks locally and internationally, and publish a CCF newsletter that they distribute widely to anyone interested in cheetah conservation. CCF has produced a teacher's training guide called, "Cheetahs: A Predator's Role in the Ecosystem," that is used in schools throughout southern Africa. CCF also brings groups from nature and youth clubs to its research site to give young people a close-up look at cheetahs, and teach them about cheetahs and their struggle for survival. Marker and her colleagues also work with college students, giving the next generation of teachers, wildlife managers, and farmers hands-on experience with these magnificent cats. In 2000, CCF opened its Visitor Education Center and improved research facilities. It is the only public education center in Namibia where people can learn about the wild cheetah.

CCF's research is crucial for the long-term survival of cheetahs in Namibia, but is also important for the conservation of wild and captive cheetahs around the world. Marker's work has inspired other countries with cheetah populations, such as Kenya, Botswana, and Iran, to collect and share data on their cheetahs. The

programs Marker has developed can be used in other African countries, as well. Marker's research has been instrumental in mobilizing Namibia to focus attention on conserving its cheetah population, and has spurred the Namibian government into considering legislation on trophy hunting and keeping cheetahs in captivity.

Marker helped establish a very successful captive cheetah-breeding program in North America, and is the keeper of the International Cheetah Studbook, a world registry of all captive cheetahs. The studbook is part of the cheetah's Species Survival Plan (SSP), a plan developed by members of the American Zoo and Aquarium Association. By keeping careful records of the genetic make-up of all captive individuals and selectively breeding individuals that maximize and diversify the cheetah gene pool, the breeders hope to help ensure the survival of endangered wildlife species. Whether captive cheetahs can be released into the wild to repopulate wild cheetah populations is an open question, though generally such efforts with other large predators are not very successful...yet.

By building relationships with other organizations in the fight to save cheetahs from extinction, Marker is raising awareness of the cheetah's precarious position and giving people ways to take action to save cheetahs.

FIND OUT MORE

Publications

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Web Site

Cheetah Conservation Fund
<http://www.cheetah.org>

Key Words

Cheetah, Cheetah Conservation Fund, Laurie Marker, Namibia, livestock farmlands, livestock guarding dogs, habitat loss

Volunteers have joined this project through Earthwatch Institute. Read more about this study and other scientific field research at www.earthwatch.org.

GLOSSARY

adaptation – the adjustment of an organism to its environment or the process by which it enhances such fitness.

demographics – the statistical characteristics of populations.

endoscopy – a surgical procedure through which a long tube is inserted into the body, usually through a small incision, and a sample of some tissues or cells are taken for diagnosis.

game – animals pursued and taken by hunters.

gastritis – inflammation, especially of the mucous membrane of the stomach.

genome – the genetic material of an organism.

feces – The excrement discharged from the intestines, consisting of bacteria, cells exfoliated from the intestines, secretions, chiefly of the liver, and a small amount of food residue.

inbreeding – The mating of two closely related individuals, such as parents and children or siblings.

mimicry – protective resemblance; the resemblance which certain animals and plants exhibit to other animals and plants or to the natural objects among which they live, a characteristic which serves as their chief means of protection against enemies.

spoor – a track, a scent, a trail or droppings of a wild animal.



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