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# JOURNAL

OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION



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### About the Cover

*Two Elephants* was drawn by Dr. Elizabeth Watson in 1987. Dr. Watson, who used pastels for this drawing, is a board certified veterinary radiologist in Redmond, Wash.

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## Botswana's wildlife resource: a veterinary perspective

The southern African Republic of Botswana, nestled among Namibia, Zambia, Zimbabwe, and South Africa, provides habitats to some of the most extensive, free-ranging wildlife populations left in Africa. This Texas-sized nation faces immense developmental challenges as its population of 1.3 million continues to multiply rapidly.

With cattle playing vital cultural and economic roles in daily life, land-use conflicts between livestock and wildlife are intensifying. At the same time, safari hunting and photographic tourism are major industries, set up to potentially supplant beef sales in foreign exchange earnings if the wildlife resource is managed sustainably into the next century.

Dr. Steven A. Osofsky traveled from Texas to Botswana in November 1991 after hearing through the conservation grapevine that a veterinary post might be available in Botswana's national wildlife department. With seed funding for travel and basic field equipment from his former employers at the Fossil Rim Wildlife Center in Glen Rose, Tex, he set off to see whether he could "make a difference" in the realm of African wildlife conservation. Some of the experiences he relates here are excerpted from the journal he kept as he lived and worked in the deserts, forests, swamps, and villages of Botswana.

### Getting started

Shortly after my arrival in the capital of Gaborone, I completed a two-week consultancy at the request of the Botswana Department of Wildlife and National Parks (DWNP). Upon considering my findings, the department decided a veterinarian would be a useful member of its team.

The Wildlife Veterinary Unit (WVU) was formed within the DWNP on Jan 13, 1992. With 17% of



Dr. Steven Osofsky takes final samples from an elephant prior to anesthetic reversal. Elephant anatomy mandates that they be kept in lateral recumbancy during anesthesia to preclude life-threatening respiratory compromise.

the nation's land area designated as national parks and game reserves, Botswana relies on the department for all wildlife-related research and management activities. Before the WVU was established, the DWNP relied on intermittent assistance from veterinarians in the Department of Animal Health and Production.

Fortunately for me, English is the official language of business and is spoken widely, except in remote areas. I had difficulty trying to learn Setswana, the language most people speak in daily conversation.

I was responsible for developing a program serving the needs of a protected-areas system in dire need of rejuvenation. My first task was to lay the groundwork for what would become the WVU by designing a work plan appropriate for the needs of all four divisions of the DWNP: Re-

search, Management and Utilization, National Parks, and Education.

Within six months, our unit was equipped fairly well and had a mandate to provide veterinary support services for a variety of research and management actions. Countrywide, we provided advice, assistance, and direct support on all wildlife capture, translocation, and care for departmental and approved private-sector projects. Our responsibilities included the following:

- ❑ developing the administrative infrastructure to serve the wildlife veterinary needs of the nation, obtaining and maintaining field and laboratory equipment, and developing capture, safety, animal welfare, and data collection protocols
- ❑ handling all wildlife immobilizations in parks and reserves for re-



Dr. Karen Hirsch evaluates blood in the mobile mini-lab.

search or management purposes, and recommending designs for safe modes of transportation and holding facilities

- maximizing the biomedical information gained whenever an animal was handled
- developing a problem-predator management protocol that included nonlethal measures when appropriate, in conjunction with disease monitoring and quarantine procedures
- training field officers in techniques for safe chemical capture and wildlife transport, disease investigation, postmortem examinations, and biomedical sample collection and evaluation
- consulting on game ranches, ostrich farms, and crocodile farms

By May, the WVU comprised myself as wildlife veterinary officer; my fiancée (and now, wife), Dr. Karen Hirsch, as field and laboratory assistant; and a game scout assistant, Mr. Anton Ben Manuel. Over the next year, our unit gained an assistant game warden (veterinary assistant) and two game wardens (assistant wildlife biologists).

Despite my continuous pleas, no *Motswana* (citizen; plural, *Batswana*) veterinarian was ever assigned to our

unit. It was ironic and disheartening that most of the expatriate expertise in the DWNP was recruited to train local counterparts, yet such partnerships rarely materialized. All *Batswana* veterinarians who were sent to school by the government were required, upon their return, to work exclusively with livestock in the Department of Animal Health and Production. The country's approximately 20 veterinarians were trained at such veterinary schools as Edinburgh, Zimbabwe, and Nairobi.

To practice in Botswana, one must present credentials showing graduation from a veterinary school recognized by the Botswana Veterinary Association, which the veterinarian is then required to join for 10 *pula* (literally, "raindrops," or about 5 US dollars). Expatriate veterinarians, most of them funded by the British Overseas Development Agency, play an integral role in the Department of Animal Health and Production. Two private practices serve the entire country, performing mostly small animal work in the capital, but also providing bovine and equine services. Dr. Hirsch did relief work at one of these practices.

Our start-up phase was a real test of patience. The Tswana culture has a tradition of community-based decision making, which makes Botswana the most democratic country in Af-

rica. However, that, coupled with a British-style hierarchical bureaucracy, meant that every decision, every purchase, almost every idea required a meeting of nearly the entire department. On the positive side, the country's natural diamond resources have led to an overall foreign exchange surplus. Our programs were well funded and we were able to obtain the best veterinary pharmaceuticals as well as field anesthesia and laboratory equipment available in the world.

### Finally, into the field

Our first zebra capture was, undoubtedly, the highlight of this development phase. We were called to Chobe National Park to capture zebras for a migration/habitat study being performed by a South African doctoral student. I learned a lot about variables I had not had to think much about before, such as the appearance of predators while the zebras were being immobilized and were vulnerable. We caught six zebras and one wildebeest and set up the minilab in the bush each evening to do CBCs and differentials, blood glucoses, BUN, and fecal examinations. We also started a serum bank that eventually allowed us to do comprehensive serosurveys of a variety of species.

One of the first policies our department needed now that a wildlife veterinarian was on staff was the "General Protocol for Sick, Injured, or Orphaned Wildlife," which I developed. This would guide field officers and administrators as to when veterinary services should be provided to sick, injured, or orphaned wild animals—and when they should not.

The protocol provided that veterinary intervention may be indicated when (1) the injury, illness, or orphaning is the result of human activity, (2) the animal is a protected or endangered species, (3) in its current condition, the animal is considered a threat to human beings or livestock, or (4) the condition observed may involve a potential epizootic and require further investigation.

Situations involving obviously

suffering animals (in which euthanasia may be the humane response) were to be considered on a case-by-case basis. Healthy animals out of their normal range (close to human settlements) and subject to poaching fell into the "problem animal" category and were addressed by the Problem Animal Control Unit, in conjunction with the wildlife veterinary officer.

While therapeutic intervention involving single animals was a relatively small part of our unit's overall responsibilities, we occasionally removed snares from elephants or kudus, treated rhinos shot by poachers, euthanatized elephants wounded irreparably by poachers, and translocated problem predators.

On the other hand, I found myself explaining to tourists why we were not treating the male lion they saw injured in a territorial dispute with another lion or why we were not intervening when an elephant cow was seen to abandon her calf.

### Elephants of great importance

Certainly, one of the most interesting species we worked with was the African elephant. Most of this work involved anesthetizing elephants for radio collaring and biomedical evaluation. Botswana has 60,000 elephants, the largest population in any African country. Documenting elephant migrations and habitat-use patterns is vital for successful land-use planning. Methods to count them must minimize double-counting of herds that sometimes cross international borders.

Of all the species I have had a chance to work with, elephants seem most susceptible to social disruption and stress during capture. Herd matriarchs were the target animals for radio collaring because their movements were most representative of the herd's, but this also led to the most social disruption. To see a group of youngsters huddled around a drugged cow, struggling to help her stay up, was traumatic for all concerned. The temporary disruption in their lives, however, was hopefully justified by the information gained through long-term radio telemetry monitoring.



*Blood and other samples collected from a variety of species have allowed for comparisons of wildlife health status in various parts of the country.*

After working on 25 elephants in Botswana, I developed a capture protocol that should help researchers maximize the information they collect, while minimizing stress on family groups.

### Buffalo and FMD

Botswana is often described as cattle country. Because cattle are a national priority, fear of diseases such as foot-and-mouth disease (FMD) has led to erection of miles of fences separating cattle from wildlife. Buffalo are the main reservoir of FMD, and any time they break through a fence, it is a national emergency.

In the past, the Department of Animal Health (known by some as the "cow department") automatically shot buffalo that had broken through a cordon fence. Things started to change over the past two years after a more open-minded director took charge of that department and once we had developed capture capability within the DWNP. For the first time, the Department of Animal Health asked the DWNP to catch a group of buffalo that was on the wrong side of a veterinary cordon fence and return them to Moremi Game Reserve.

The buffalo were part of a herd that had gone around the northernmost point of a fence and wandered east during the wet season. As the dry season approached, they became trapped, without water. Now on the cattle side of the fence, they had followed the fence line southward in search of water and grazing. Many animals had died on the several-hundred-kilometer trek. Only 15 emaciated buffalo were left.

We chased them into a cattle holding pen with a helicopter and spent two days building a capture boma (funnel). Ultimately, this method failed, so we resorted to darting as many as we could from a helicopter and killing whatever couldn't be loaded because of a lack of space. After we overcame a series of logistic problems related to immobilization and, particularly, transport, the release went beautifully, at a permanent water hole in the game reserve. All in all, the translocation of 9 of 15 buffalo had to be considered a great success, especially because it greatly improved the relationship between two departments historically "at war."

I formulated much of what we learned on this operation into the



*Sometimes, narcotized rhinos walk into things we would rather have them avoid.*

“Protocol for Responding to Buffalo Movements Across Cordon Fences.” Buffalo are a valuable resource, one of the most preferred animals for subsistence as well as safari hunters. Furthermore, overall buffalo numbers in Botswana are on a steep decline, down more than 18% per year from 1987 to 1993. The decision whether to translocate or destroy animals must take into account the number involved, the perceived disease risk, the cost of response options, the potential value of the animals, humane considerations, and public relations repercussions.

#### **Other livestock/wildlife conflicts also increasing**

Conflicts between wildlife and the livestock resource were not limited to buffalo. For cultural and economic reasons, most *Batswana* keep cattle, donkeys, and goats. Unsupervised animals, especially neonates, are easy prey for lions, leopards, cheetahs, hyenas, wild dogs, and even jackals. The problem is most intense around park and reserve boundaries. Protected areas in Botswana generally have no buffer zones.

The WVU played direct roles in problem-predator policy development and implementation. Extension efforts with villagers were the primary response, with emphasis on livestock

management (eg, the use of herd boys and holding pens at night). Efforts to frighten away predators and use fencing were also part of our response. Translocation of predators, which was our responsibility, was also an option. Lethal control was employed when other efforts failed.

#### **Rhinos in serious trouble**

The rhino situation over most of Africa is truly tragic. Botswana's natural population of southern white rhino is believed to have become extinct at the turn of the century. Between 1974 and 1983, 94 white rhinos were reintroduced from Natal, South Africa into Botswana. If they had been left unharassed, at least 200

white rhinos would live in the Botswana bush today. We found only four on our search-and-rescue operation. Poachers have probably been taking their toll on these rhinos for years. The DWNP started a serious Anti-Poaching Unit only at about the time the WVU began operating. The Swiss national hired to establish that unit found rhino carcasses in the field. Botswana lost at least a dozen white rhinos to poaching in the year prior to the first attempted rescue in February 1993.

As for black rhinos, a few native animals may be left, but none has been seen in years.

By using the government's interest in finally intervening to protect the remaining rhinos, we brought a training component into the project and contracted with the Natal Parks Board to bring up three specialized rhino transport trucks, rhino crates, their helicopter and pilot, eight Zulu rhino capture workers, and leaders of their rhino capture team: Dr. Pete Rogers and Mr. Pete Openshaw.

The idea was to train DWNP game scouts in this type of capture so that we could carry out such a major operation ourselves, once we obtained the equipment. The Natal Parks Board team has caught thousands of rhinos, and its organized, methodical approach was impressive.

Besides the shortage of rhinos, the other major factor against us was that the hot, wet season was upon us. The only reason we attempted to catch rhinos in February was that, had



*Giraffe capture for translocation to a new reserve: a labor-intensive and potentially dangerous proposition for all concerned. Namibia's Dr. Pete Morkel, a world authority on the chemical capture of giraffe, helped train personnel in Botswana's Department of Wildlife and Natural Resources in the process.*

we waited any longer, there surely would have been none left. While we were working, one of our anti-poaching unit trackers was shot in an ambush by poachers; he later recovered.

Our rhino search was conducted on foot, in the helicopter, and in a fixed-wing plane. We focused on a remote area of Chobe National Park. Two days before the actual capture, three sets of tracks were found leading to two carcasses. One rhino had escaped the poachers' ambush; we came to call the three- to four-year-old male "Bullet." He was found wandering alone after sustaining three bullet wounds a week to 10 days earlier.

We captured Bullet, a cow and her eight-month-old calf, and a 30-year-old bull. We cleaned Bullet's wounds and loaded him with antibiotics. Driving 14 hours nonstop, we took the rhinos to a privately funded sanctuary in east-central Botswana.

It is important to note that, typically, 10% to 20% of captured white rhinos refuse to eat in captivity. In Natal, if they do not eat within 10 days, they are released. Bullet did not eat for days after capture, but for some tangible reasons. Twelve days after capture, Bullet took his first bite of feed. Later, he ate heartily on some dry, poor-quality hay. As with any animal that hasn't eaten for a while, it is often the less rich stuff they go for. But he never ate much after that time. I anesthetized the little rhino for a variety of supportive measures, including stomach tubing of a calorically dense but easily digestible supplement. Nevertheless, he died a few days later. Necropsy revealed that one of the bullets had gone through his chest and abdomen, wreaking havoc as it traveled.

### Endangered wild dogs assisted

One of our last field projects before my two-year contract ended involved African wild dogs in and around the Okavango Delta and Moremi Game Reserve. A private researcher doing a long-term behavioral ecology study had been given official permission to immobilize dogs for collaring. Not being a veterinarian, he



*An African wild dog receives the best care possible as it is evaluated and radio collared. Knowledge gained via projects like this one will, hopefully, help prevent the species' extinction.*

was allowed to use only ketamine for immobilization, per Botswana veterinary regulations. This meant spending three to six hours waiting for his subjects to recover in the bush, which also posed a risk of lion attacks on the dogs. I introduced him to a low-dose ketamine/xylazine/atropine cocktail that I reversed with yohimbine. The use of a portable pulse oximeter as well as a portable ECG unit helped maximize anesthetic safety for these highly endangered canid patients. Our unit helped increase the information gained, through physical examinations and sample collection. This was a truly positive experience: providing a wildlife researcher with veterinary services while we learned a great deal about wild dog ecology and behavior.

### What does the future hold?

I could have renewed for another two to three years when my contract came to a close in January 1994, but serious bureaucratic and political problems plague the DWNP to the point that I did not feel I could continue to develop my programs and make a meaningful contribution as a civil servant. I think we would be welcome to pursue projects as private researchers in Botswana, ideally through an affiliation with a major university or conservation organization.

Over the two-year contract, the WVU worked with buffalo, cheetah,

wild dog, eland, elephant, giraffe, impala, kudu, leopard, lion, ostrich, white rhinoceros, springbok, tortoise, vulture, wildebeest, and zebra. Much of our energy was also devoted to policy design. Dozens of our veterinary colleagues in conservation in southern Africa helped us make the WVU a reality by assisting us with projects, providing training opportunities, and helping us locate vendors of veterinary supplies in the region.

Ultimately, I would like to see more veterinarians involved on the policy side of donor-aid projects, working in the natural resources sector. Veterinary input could be instrumental in conserving what is left in places like Botswana. Veterinary issues will be increasingly prominent as the livestock/wildlife interface expands to the point of buckling all over the world. Human population pressure is, of course, the fundamental issue that must be addressed more effectively than it has been. However harsh it may sound, one thing seems clear: if wildlife in developing countries does not provide income through nonconsumptive (eg, photographic tourism) or consumptive (eg, hunting, live sales) sustainable use, there simply is not going to be any wildlife left. ♣

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*Dr. Osofsky is now director of animal health services at the Fossil Rim Wildlife Center in Glen Rose, Tex.*