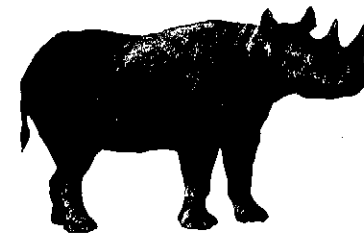


fascinating creatures, we find new ways to help them live longer and better lives in captivity, ensuring that they remain a part of our world for a long time to come.

ABOUT THE AUTHOR

Michael K. Stoskopf is a professor at North Carolina State University. He received his veterinary degree from Colorado State University, earned a PhD in toxicology from Johns Hopkins University, and is a diplomate in the American College of Zoological Medicine. In the course of his varied career, Dr. Stoskopf has run an unusual ambulatory practice in the mountains of Colorado, served as the veterinarian for the Overton Park Zoo in Memphis and the Baltimore Zoo, and taught on the faculty of the Johns Hopkins School of Medicine. He was the founding chief of medicine for the National Aquarium in Baltimore before taking on the challenges of teaching at a veterinary college. He and his wife, Dr. Suzanne Kennedy-Stoskopf, live on a small farm outside Raleigh, North Carolina, where they devote much of their energy to providing the next generation of veterinarians the knowledge and the skills necessary to make the world a better place for wildlife, people, and their domestic animals.



On the Horn of a Dilemma

by Steve Osofsky, DVM

I trained intensively to become a wildlife veterinarian in Africa—something I'd wanted to be for as long as I can remember, back to the time when I was six or seven years old watching (the original) Mutual of Omaha's *Wild Kingdom*. After veterinary school, I had purposely sought out a small animal internship in medicine and surgery in order to help me reinforce the top-notch way of doing everything. I wanted to make sure that when I did find myself out in remote bush someday, I'd be able to extrapolate and do my best with locally available materials.

When the government of Botswana hired me in 1991 to establish the Department of Wildlife and National Parks (DWNP) Wildlife Veterinary Unit, my childhood dream became a reality. At the same time, Botswana increased its

efforts to curtail poaching. A new Anti-Poaching Unit had begun to patrol remote areas of northern Botswana. These long-overdue forays into the bush firmly established that rhinos had for years been slaughtered for their horns. Botswana was on the verge of losing all of its white rhinos—again.

Between 1967 and 1982, South Africa had helped restock Botswana's then poacher-depleted rhino population by translocating ninety-four animals into protected areas in the northern part of the country. Had these rhinos been adequately protected from that time on, there indeed should have been *hundreds* in the wild by the early 1990s. But new surveys revealed evidence of *only seven white rhinos*. Twelve poached carcasses were identified in 1992 alone. By 1993, emergency measures were clearly required.

In an all-out effort, a group of concerned citizens in the large town of Serowe (birthplace of Sir Seretse Khama, the beloved first president of Botswana) established the Khama Rhino Sanctuary in close collaboration with the DWNP. Located in the central part of the country, far from the poaching threat in the north, the locally managed sanctuary would provide the land, staff housing, and care for any rhinos that had to be brought into captivity to protect them. While several of us in the DWNP would provide the logistics support for capture, we didn't have the experience or equipment to carry out such a massive operation alone.

At my urging, the Botswana DWNP asked South Africa's Natal Parks Board Rhino Capture Team to assist us. We had two goals: to save the remaining white rhinos (and any black rhinos we might find), and to train a DWNP team in the challenging art and science of rhino capture and translocation.

The middle of the rainy season is the worst time of the year to be hauling heavy trucks through the bush and mud. Of course, this was when we found three sets of rhino tracks leading to two rhinos—a cow and a calf shot dead by poachers. From the tracks, it looked as if one rhino had gotten away. With little time left to save the country's last wild rhinos, the DWNP's Cessna went out on reconnaissance.

On February 12, a rhino and calf in thick bush were spotted from the plane. The helicopter with the darting team was quickly guided into the area, and the capture trucks headed to a feasible rendezvous point. Radios crackled and tree branches cracked as the ground team rushed to the coordinates called out from the aircraft. Anesthetic darts shot from the helicopter found their marks: a thirty-year-old cow and her nine-month-old calf. The animals were successfully loaded into special rhino crates brought in from South Africa, and transported to the sanctuary *bomas* (pens) in Serowe.

That same day, another adult white rhino, an approximately thirty-year-old bull, was also darted, crated, and driven the fourteen hours to Serowe. Both the cow and bull had notched ears; the bull also sported a hole from an old ear tag. These ID markers meant that these animals were part of the group originally translocated from South Africa at least a decade ago. How sad that they now needed to be saved—but how honored we were to do it. I sawed off the big bull's horn before we crated him, and we made sure the word got out that there would be no horns for the picking in Serowe. A rhino's horn, like one's fingernails, slowly grows back. This was the safest approach for all concerned.

On February 15, a three- to four-year-old bull was found wandering on his own about twenty kilometers from where the other animals had been caught. Once we'd darted him and were able to give him a thorough hands-on exam, I saw that he had three bullet wounds, which were about seven to ten days old. Had he made the tracks found with those of the poached pair? One of his wounds was in the right shoulder, one was in his skull above the frontal sinus, and the third consisted of an entry and exit wound below the right ear near the angle of his lower jaw. We cleaned the wounds, flushed them with antibiotic preparations, and injected the rhino with intramuscular antibiotics. "The Little Guy," as we initially named him, traveled well by truck to Serowe and was released into his own boma the next morning.

The young bull's boma was between those of the old bull on one side and the cow and calf on the other. The Little Guy had difficulty settling in. He was the most aggressive of the animals, often charging the shade-cloth-covered walls of the wooden bomas when caretakers approached. He spent a fair amount of time appearing to seek social interaction with the cow and calf, rubbing up against the fence separating the two bomas and calling to them in high-pitched vocalizations classified as "whining" and "squeaking." He sounded almost guinea pig-like, but with a slower cadence.

Biologists have differentiated rhino vocalizations. The whining noise The Little Guy made was considered a juvenile begging call; the squeaking, a juvenile distress call. Given his behavior, his age, and the spoor (tracks) found near his capture site, it seemed quite certain that the cow and calf killed just before the capture operation were indeed the mother

and younger sibling of this little bull. The Little Guy was more than a little lonely.

Not only did he feel alone, but he also wouldn't eat. Post-capture inappetence is a frequent problem that can be life-threatening in free-ranging white rhinos placed into captivity. Some animals, especially older bulls, will not eat for the first week or ten days (or longer) postcapture. As a result, rhino bomas are generally situated in the same areas where the rhinos are being captured. Grasses can then be cut at the capture sites and offered to newly confined animals. If a rhino refuses this local food and continues its hunger strike, it can be released from the boma back into the park without any further transport. But, for security reasons, our rhino sanctuary had to be located far from the capture site. Release into the land adjacent to the sanctuary, part of the eventual plan, was not an option at the time—money was still being raised to build the necessary perimeter fence.

The calf was the first to eat postcapture, having suckled within twenty-four hours. Its mother started eating on day four, and the adult bull two days later. But by day ten, The Little Guy had taken only a few bites of grass. His behavior surprised us, as it's usually the older bulls that refuse to eat. We offered the young bull grasses cut at the capture site, a variety of fresh fruits, and even fresher local grasses. He ignored them all. We even tried coating some of the grass with molasses, a tactic I'd employed successfully in a zoo setting—but to no avail. The rhino was drinking water, he appeared bright and alert, but he just wouldn't eat. We had to do something to get him to take in sustenance.

First, I needed to determine the cause of the little bull's

anorexia. Was this the "classic" confinement-related response? Given his subadult age and the good appetite of the adult male, we thought not. Could his wounds be causing a diminished appetite? There was no way to assess his injuries at this point without further anesthesia, and I was not ready to risk additional postanesthesia inappetence or to further disturb him or the other animals by darting him and working inside the boma. Besides, The Little Guy was not showing other overt signs of being a sick animal: no lethargy, no depression. He was plenty active, appearing to be seeking rhino-to-rhino interaction. We decided to give the little bull the social contact he seemed to want.

There were two choices: put him with the mother and calf or with the adult bull. Both were risky options. If we put the young bull with the family pair, we could upset the cow, potentially interfering with her care of the calf. There was also the danger that The Little Guy would injure the calf. On the other hand, if we put the two bulls together, we ran the risk of extreme injury to the younger bull. Wild-caught rhinos from different social groups and different ages/size classes tend not to get along when put together in tight spaces.

Yet the two bulls could now see each other (since the rhinos had ripped down all of the shade-cloth that had been serving as a visual barrier between bomas), and the big bull did not seem disturbed by The Little Guy's presence. We decided the lesser risk was to remove the barrier between the two bulls—and to be prepared to separate them again if all did not go well.

Twelve days postcapture, the gate between the two males

was removed. Nothing happened at first. We watched nervously for an hour. Finally, the young bull crossed over to his senior's boma. I held my breath. Initially, he was escorted back out by the big bull ("Ol' Boss" is what we were calling him at this point). But, much to our joy and relief, there was no aggression. The Little Guy headed right back into the older bull's boma and followed him around constantly. And the old bull let him.

The Little Guy had now all but stopped charging the fence, a clear departure from his previously agitated behavior. And when Ol' Boss went to eat, The Little Guy ate with him! Over the course of the day, the older bull would occasionally horn his new boma-mate in the axilla (armpit), but this seemed more a reminder to let elders eat or drink first than a serious attempt to dominate him. Eventually, Ol' Boss even let The Little Guy lie next to him when they rested.

On the second and third days of the housing experiment, days thirteen and fourteen postcapture, the young bull continued to eat small amounts. He even defecated on day fourteen. (We veterinarians love the arrival of a long-awaited bowel movement!) The Little Guy seemed content for those three days. And then came day fifteen: the little bull appeared weak and depressed. Given how well he'd responded to companionship, I now considered bullet-related infection to be at the root of his symptoms. He was now refusing to eat again.

When the rhino first refused to eat, we'd considered additional antibiotic therapy. But an animal of his size would need a large-volume dart delivered periodically into thigh or neck muscle, something that very much disturbs the patient on the receiving end. We also didn't want to disrupt his acclimation

period in the boma. Plus, antibiotics can induce their own gastrointestinal disturbances, and I had not wanted to risk adding to the little bull's as-yet-unexplained anorexia when he looked so bright and alert otherwise.

Whether your patient is a wild animal or a pet—or even a person—every treatment option comes with an implicit cost-benefit analysis. This calculation is especially tricky in a case like this where getting even basic laboratory or other diagnostic work done easily and safely was impossible. We had no clinic, no rhino-handling facilities, just our experience and intuition. Now that the young bull clearly appeared ill, the risk of upsetting him was less than the risk of losing him to infection. He was started on a broad-spectrum antibiotic by dart. We also began supplementing his drinking water with dextrose, sucrose, and B-complex vitamin syrup.

On the following day, I added electrolytes to The Little Guy's water and darted him again with antibiotic. It was now seventeen days postcapture, and the little bull was doing poorly. We had been observing him around the clock, and had not seen him eat anything. I made the decision, in consultation with the on-site board members of the Khama Rhino Sanctuary, to immobilize him that day for more intensive care.

I administered a low dose of etorphine hydrochloride to anesthetize The Little Guy. He responded quickly to the narcotic. While constantly monitoring the rhino's heart rate, respiratory rate, and blood oxygenation (by pulse oximetry), I gave him oxygen intranasally as an extra precaution, given his debilitated condition. A flexible tube passed into his stomach allowed for the administration of a calorically dense

multisource carbohydrate/amino acid/vegetable oil/vitamin/electrolyte liquid mixture. I also administered intravenous fluids to treat dehydration, more antibiotics, and an injection of vitamins and minerals. When anesthesia was reversed with an injection of the antidote, the little bull immediately sat up, shook his head, and walked away.

On day eighteen postcapture, on March 5, 1993, at five PM local time, Botswana's bravest rhino died. I was devastated, perhaps more so by this loss than by the loss of any other patient I'd ever had. Fifteen years later, I still feel a bleak numbness when I think about seeing him dead in the boma. Saving him had been a moral imperative. His death seemed like an affirmation that all was not well with the world—that the bad guys had won.

I thought back to my small animal internship days and to my days as a zoo veterinarian as well. The truth is, people cause much of the suffering we deal with as veterinarians. Whether it's cats hit by cars, or dogs that have eaten rat poison, or seals that have swallowed the coins zoo visitors carelessly throw into their pools, the veterinarian constantly finds him- or herself trying to pick up the pieces, figuratively and literally, because of thoughtless, selfish, cruel, or stupid human acts. This little rhino with bullet wounds was no different. He was another animal who had been perfectly healthy the moment before he ran into a member of our species, one who happened to have a gun.

Emotionally drained, I performed the necropsy in the boma where The Little Guy had spent his last days. I found that the bullet that had entered the right shoulder prior to capture had passed all the way through the chest and abdomen,

where it had caused further damage, leading to diffuse infection and his death. From the start, I had hoped that those bullet wounds did not go as deep as it was now obvious they had. The 7.62mm-caliber round, which I found in the rhino's abdomen, came from the type of semiautomatic weapon regional rhino poachers were famous for.

This was no zoo or university setting—I had no X-rays or MRIs and even had to scramble to find some of the drugs we'd needed. But I knew I had done my absolute best in this remote setting. My veterinary colleagues in the region were astounded that a wildlife vet kept an emergency oxygen tank and equipment like endotracheal tubes on hand, never mind a portable blood oxygen monitor. But this was still ultimately bush medicine, and doing my best had meant making do with locally available materials, just as I'd envisioned years earlier.

Everyone at the sanctuary was saddened by the loss of The Little Guy. We had rooted for him day and night and come to know him. He had tried so hard to make it. But we took great solace in the fact that he hadn't died alone. Instead of following the rules laid out in capture books and lore, we'd read the rhino's desires and provided him with the companionship he craved. I believe his last days were made more bearable because we'd taken a calculated risk to let him be with Ol' Boss. I could only guess that Ol' Boss must have been wondering what had happened to his little gray shadow.

Although we'd managed to capture and transport him to a safe place, and had helped him acclimate to captivity with an unorthodox intervention, the poachers who were decimating his kind got him in the end. At least they did not get his

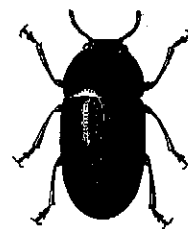
small horn. Posthumously, we renamed him Lerumo, "bullet" in the local Setswana language. I felt that this name fit him, and the sad situation, best.

Overall, the 1993 rhino translocation project was a pioneering success for the DWNP in terms of accomplishments and the staff training it provided—success that would not have been possible without our Natal Parks Board colleagues. The Khama Rhino Sanctuary continues its conservation and education mission. An additional male was captured in 1994, calves have been born, and South Africa has donated several more rhinos to Botswana, some of which are back in the wild, this time under much more intensive protection than in the past. I think of them as Lerumo's legacy.

ABOUT THE AUTHOR

Steven A. Osofsky is a wildlife veterinarian with a long-standing focus on international conservation. His first experience in Africa was as a Harvard University Traveling Fellow in 1984. He attended veterinary school at Cornell University, receiving his doctor of veterinary medicine degree in 1989. Dr. Osofsky went to Botswana in 1991 to serve as the government of Botswana's first Wildlife Veterinary Officer, a post he left in 1994. He has also worked as a clinical zoological veterinarian, as an American Association for the Advancement of Science fellow and biodiversity specialist for the US Agency for International Development, and as director of field support for the World Wildlife Fund's (WWF-US) Species Conservation Program. The author of more than thirty scientific papers

and book chapters, he is currently senior policy advisor for wildlife health for the Wildlife Conservation Society (WCS), with a focus on the wildlife/domestic animal/human health interface. He and his veterinarian wife, Dr. Karen J. Hirsch, have two young children who so far seem to like animals.



The Bugs Have Bugs?

by Maryanne Tocidlowski, DVM

I had mixed emotions when a supervisor from the children's zoo—part of the Houston Zoo, where I worked as staff veterinarian—called to say that their collection of dung beetles had red spots on them. Could I come take a look? There were seven beetles, from the *Canthon* genus; they'd been collected locally in Texas. I thought to myself, *I don't do bugs; I don't know anything about insects. I guess I could go look at them at least; maybe I can do something, but what?*

Like most budding veterinarians, I had a small collection of my own pets as a child, I loved science and animals—at least, most of them—and if I found an injured or sick wild creature, I'd try to take care of it. But insects and spiders had never interested me. I don't like being surprised by bugs landing on my shoulder or getting caught in my hair. I'm