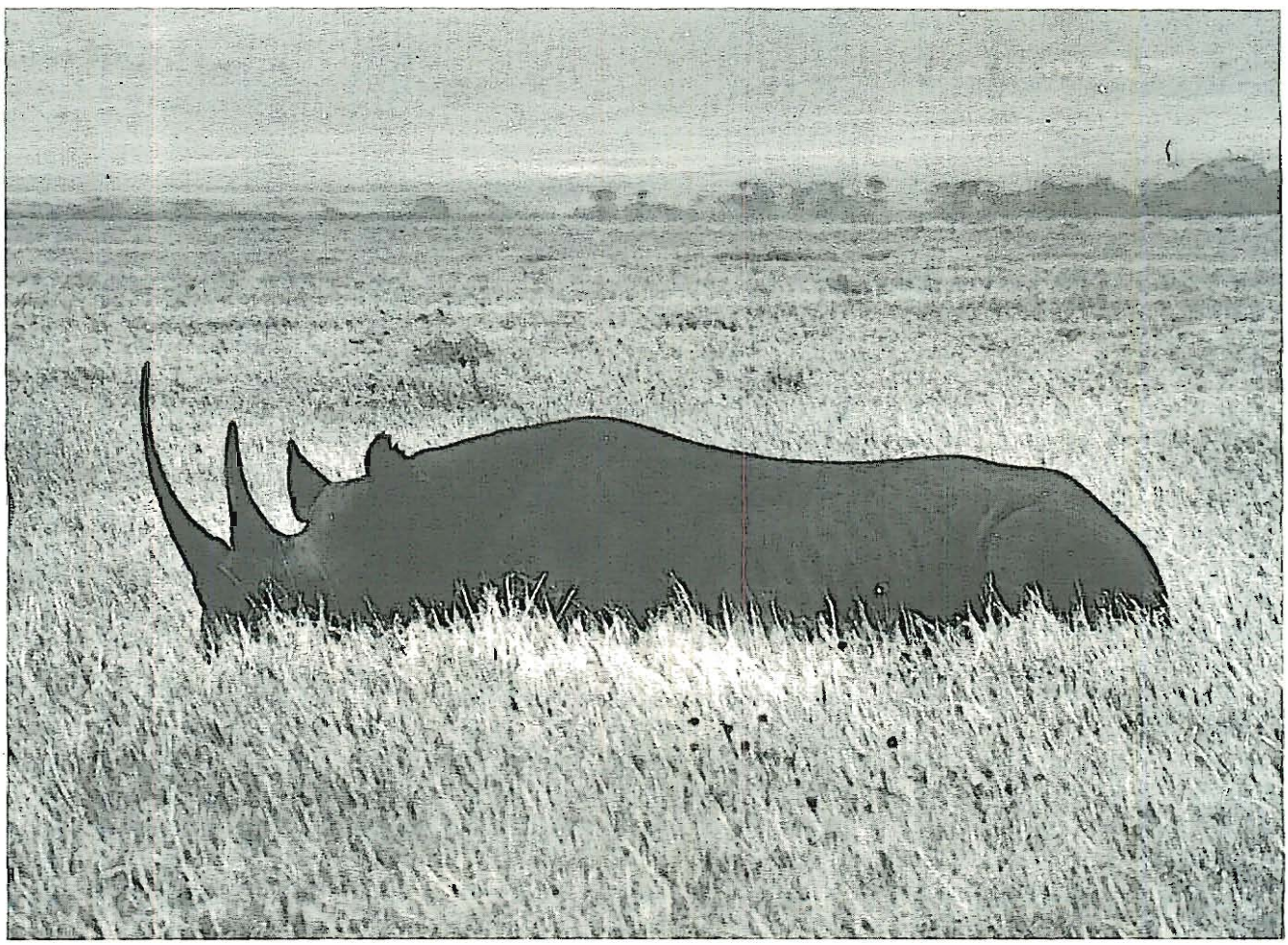
Endangered Species UPDATE

Including a Reprint of the latest USFWS Endangered Species Technical Bulletin

January 1992 Vol. 9 No. 3

THE UNIVERSITY OF MICHIGAN
School of Natural Resources



In this Issue

Elephant and Rhinoceros Conservation in Kenya

by

Stan Braude

Populations of African elephant (*Loxodonta africana*) and black rhinoceros (*Diceros bicornis*) have been steadily decreasing in this century. During the first half of this century the decline was mainly due to hunting for ivory and horn. East Africa is well known for the hunting safaris of the period. However, in 1977 game hunting was outlawed in Kenya in order to stop the decimation of wildlife populations. Ironically, the rate of destruction accelerated severely as illegal poaching replaced sport hunting. East African black rhino are on the verge of extinction (Western and Vigne 1985) and elephants are not far behind.

In 1979 the African elephant population numbered 1.3 million, but by 1989 it had decreased to as few as 609,000. While southern African populations are currently stable, east and central African elephants have been disappearing at an alarming rate. In Kenya, the population dropped from 130,000 in 1973 to 16,000 in 1989 (Brett and Poole 1990). In Ethiopia, Somalia, and Sudan elephants are close to extinction (Largen and Yalden 1987).

Black rhino populations have taken an even more dramatic plunge from 65,000 across Africa in 1968 to fewer than 3,500 in 1989. Tanzania has fewer than 60 black rhino remaining and there are perhaps 10 individuals left in all of Uganda and Somalia. In Kenya, the population has fallen from 20,000 in 1970 to approximately 400 today (Brett and Poole 1990).

These declines have resulted from a combination of factors. A major factor is loss of habitat due to expansion of human habitation and agriculture resulting from the rapidly increasing human population in East Africa (Western 1982). Kenya has the highest birthrate in the world. Free food and medical care provided by international aid organizations over the past 20 years have been major contributors to this human population growth. The human population increase has serious consequences for the Kenyan people and is bound to destroy the resources upon which they depend.

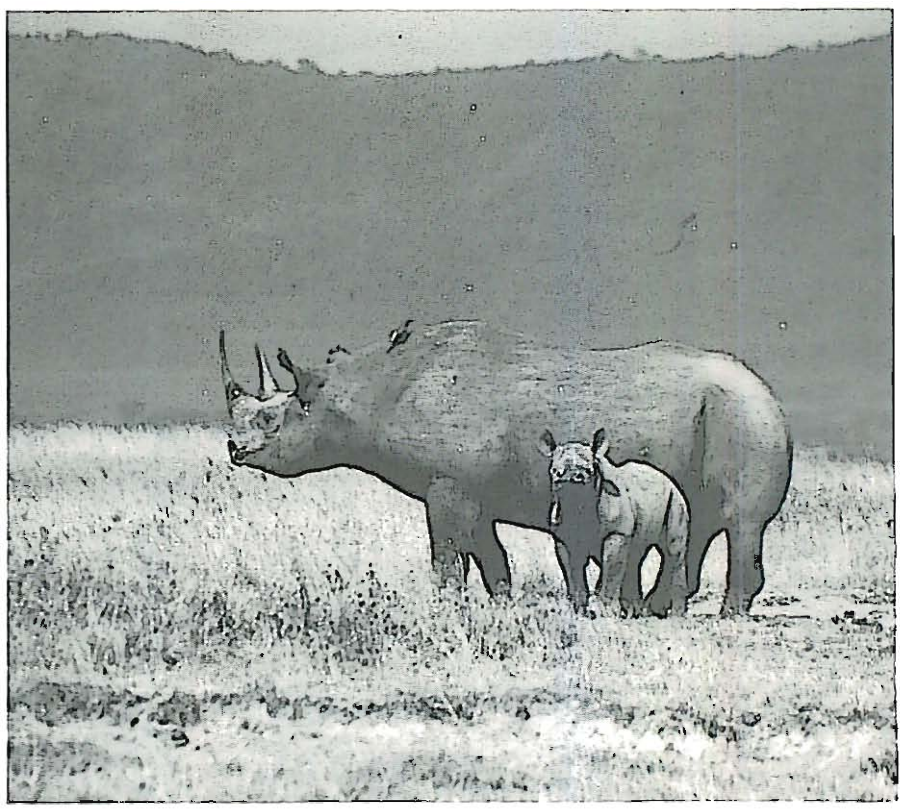


Figure 1. Most of the remaining black rhinoceros in Kenya are being translocated to a few fenced reserves where they can be better protected. Photo by John Blake.

Most of the elephants and rhinos, however, have been killed by well armed poachers who, until recently, could sell the horns and ivory for enormous profits. In 1988 ivory was selling at close to $300 per kilogram and rhino horn could fetch from $5,000 to $15,000 per horn on the Hong Kong market. Political instability in the region, with ongoing wars in Uganda, Ethiopia, and Sudan, has increased the availability of guns to poachers and bandits. Guerilla organizations have also been able to use dollars earned from sale of illegal ivory and horn to fund their revolutionary activities (Brett and Poole 1990).

Poaching actually became easier after the Kenyan hunting ban, because professional hunters and their trackers and staff were no longer patrolling their hunting blocks. Tourists and safari guides partly filled this role but only in a few of the most popular game parks and reserves (Western 1982).

Recognizing the precarious position of the east African rhino, veteran park warden Peter Jenkins founded Rhino Rescue in 1984. The goal of Rhino Rescue has been to protect the remaining individuals and to increase breeding opportunities by creating locally higher population densities. To accomplish this Rhino Rescue supported the darting and translocation of rhinos from unprotected lands into fenced sanctuaries. This also allowed the then meager resources available for armed ranger protection to be concentrated on

smaller, more manageable areas (Figure 1).

While the goal was to avoid the extinction of east African black rhinos, critics have worried that mixing rhinos from different populations would lead to outbreeding depression (Templeton 1986). Recent examination of mitochondrial DNA from black rhinos from three east African locations has shown that there is already such little genetic variation that the Kenyan black rhinos can safely be considered a single breeding population (Ashley *et al.* 1990).

"While southern African populations are currently stable, east and central African elephants have been disappearing at an alarming rate."

Elephant populations in Kenya have not reached the point of concern over loss of genetic diversity or breeding opportunities. There are, however, other serious problems caused by poaching. Elephants are long lived, highly social mammals. Old females, which lead the herds have information about the home range and where to go to find food and water during the frequent but unpredictable droughts suffered in many parts of the country (Figure 2). Old females also have large tusks and are more frequently shot by poachers. After the loss of a matriarch, family groups are left in turmoil and have greater difficulty finding food and water in the large ranges over which they must wander to survive (Figure 3). Thus, drought and other environmental challenges are taking a higher toll on elephant populations than they would otherwise (Moss 1988).

Two major events in 1989 have given the elephant and rhino conservation efforts in Kenya a big boost. In April 1989, Richard Leakey, a strongly patriotic Kenyan and a vocal critic of prior Kenyan wildlife policy and management, was appointed director of National Parks. In October 1989, African elephants were raised from Appendix II protection to Appendix I by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Leakey has begun a complete reorganization of the Kenyan wildlife establishment. He has fired a majority of the ranger force and numerous officers in an effort to purge corruption from the department. He has recruited new, young talent and has raised funds internationally to support the training and equipping of the new, paramilitary ranger

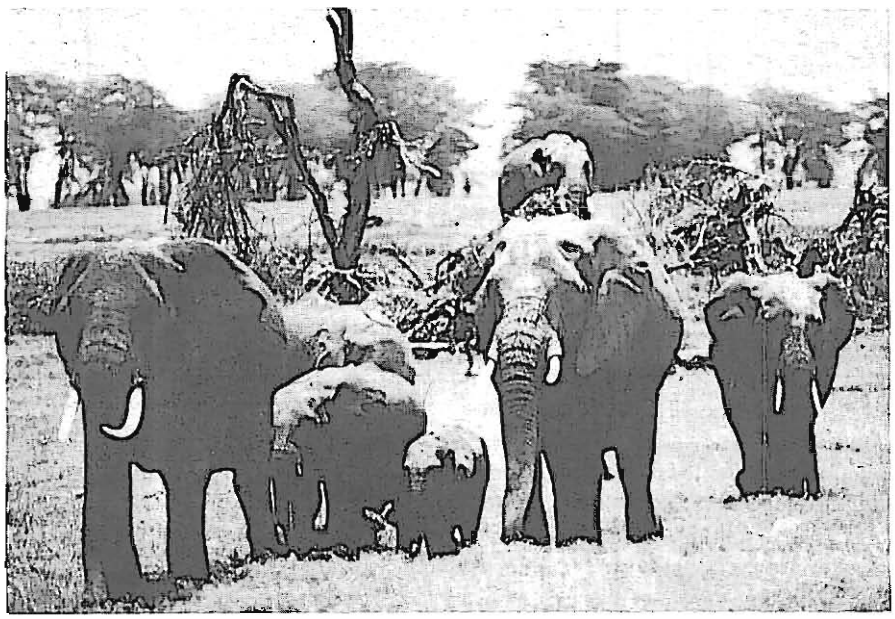


Figure 2. The age structure of the Kenyan elephant population has shifted to include a greater proportion of young individuals. Photo by Stan Braude.

Endangered Species UPDATE

A forum for information exchange on endangered species issues
January 1992
Vol. 9 No. 3

Alice Clarke .....Editor
Laurie Manor.....Editorial Assistant
Terry Root .....Faculty Advisor
Jon Jensen .....Staff Advisor

Instructions for Authors:
The Endangered Species UPDATE welcomes articles related to species protection in a wide range of areas including but not limited to: research and mangement activities for endangered species, theoretical approaches to species conservation, and habitat protection and preserve design. Book reviews, editorial comments, and announcements of current events and publications are also welcome.

Readers include a broad range of professionals in both scientific and policy fields. Articles should be written in an easily understandable style for a knowledgeable audience. Manuscripts should be 10-12 double-spaced typed pages. For further information, contact the editors at the number listed below.

Subscription Information:
The Endangered Species UPDATE is published approximately ten times per year by the School of Natural Resources at The University of Michigan. Annual rates are $23 for regular subscriptions, and $18 for students and senior citizens (add $5 for postage outside the US). Students please enclose advisor's signature on university letterhead; senior citizens enclose proof of age. Send check or money order (payable to The University of Michigan) to:

Endangered Species UPDATE
School of Natural Resources
The University of Michigan
Ann Arbor, MI 48109-1115
(313)763-3243

Cover:
Black rhinoceros
(*Diceros bicornis*)
Photo by John Blake

The views expressed in the Endangered Species UPDATE are those of the author and may not necessarily reflect those of the US Fish and Wildlife Service or The University of Michigan.

Production of this issue was made possible in part by support from the Chevron Corporation.

Chevron

printed on recycled paper

force. His leadership has raised the morale of the department, and the new members seem to have caught his sense of urgency about reversing the population declines of the past 20 years.

Although Kenya's new "shoot to kill" policy for dealing with poachers has been widely criticized, it is essential for maintaining an effective deterrent. In the past park rangers were handicapped by lack of training, outmoded world war II rifles, and lack of transport or air support. They preferred to avoid the poachers, who were armed with AK47s, and who had demonstrated their ruthlessness by killing rangers, local farmers, and tourists.

Leakey has said that his efforts have had less of an effect than the CITES ban and points out that poaching has virtually stopped in neighboring Uganda and Tanzania in the past year. However, the trade of rhino horn has been banned by CITES for over 10 years, and the poaching of rhinos continued steadily until Leakey began reforming the Kenya parks department in 1989.

"Leakey has begun a complete reorganization of the Kenyan wildlife establishment."

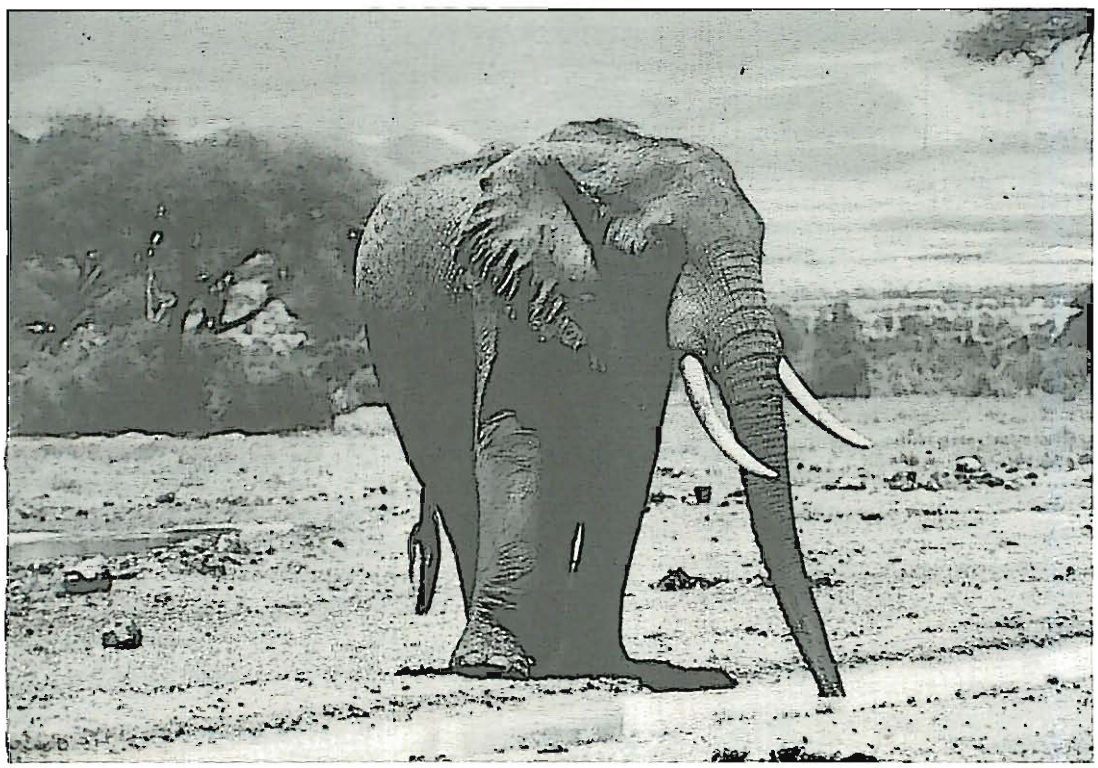


Figure 3. Old elephants are often the only ones in the herd who know where to find food and water during drought. Photo by Stan Braude.

The 1989 CITES ban on the trade of ivory also has had a major impact on poaching. It has lowered the demand for ivory and thus driven the price from a high of $300 per kilo in 1988 to $3 per kilo in 1990. Consequently, while Leakey and Kenya Wildlife Services (KWS) have raised the risk to poachers, CITES has effectively lowered the payoff. As a result, only 55 elephants were poached in Kenya in 1990 as opposed to an average of 5,000 per year in the prior fifteen years (Brett and Poole 1990).

In spite of the obvious benefits of the CITES ban, many southern African states have declared their desire to reverse the ban on ivory from their populations at the next CITES convention in March 1992. They argue that they are being unfairly denied the revenue from their stable elephant populations and that those populations actually need to be culled. Joyce Poole, however, argues that very little legal revenue was ever earned from the export of southern African ivory and that if the market opens up there will be no way to prevent the illegal east African ivory trade from reemerging (Figure 4).

The recent official interest in elephant and rhino conservation in Kenya does not appear to stem from a sudden awareness of the ecological, scientific, or aesthetic value of these animals. There are important economic reasons for their continued presence in the wild in Kenya. In 1977 combined coffee and tea earnings in Kenya were six times greater than the foreign exchange earned by tourism. In 1989, tourism was the leading foreign exchange earner for Kenya and was equal to coffee and tea combined (Brett and Poole 1990). Elephants and rhino are a major tourist attraction and without them tourism in Kenya is certain to fall, especially in light of major competition expected from South Africa in coming years and in light of the recent growth of the tourist industry in Uganda and Tanzania. The new political will to protect elephants and rhinos was boldly demonstrated by Kenya's President Moi when he burned 3,000 confiscated tusks on July 17, 1989 and 283 horns on January 25, 1990.

There has been some criticism of the disproportionate conservation efforts to save elephant and rhino. It is argued that conservation organizations should spend as much effort to protect less charismatic endangered rodents, lizards, and insects. This criticism fails to recognize

"Although Kenya's new 'shoot to kill' policy for dealing with poachers has been widely criticized, it is essential for maintaining an effective deterrent."

Continued on UPDATE page 4

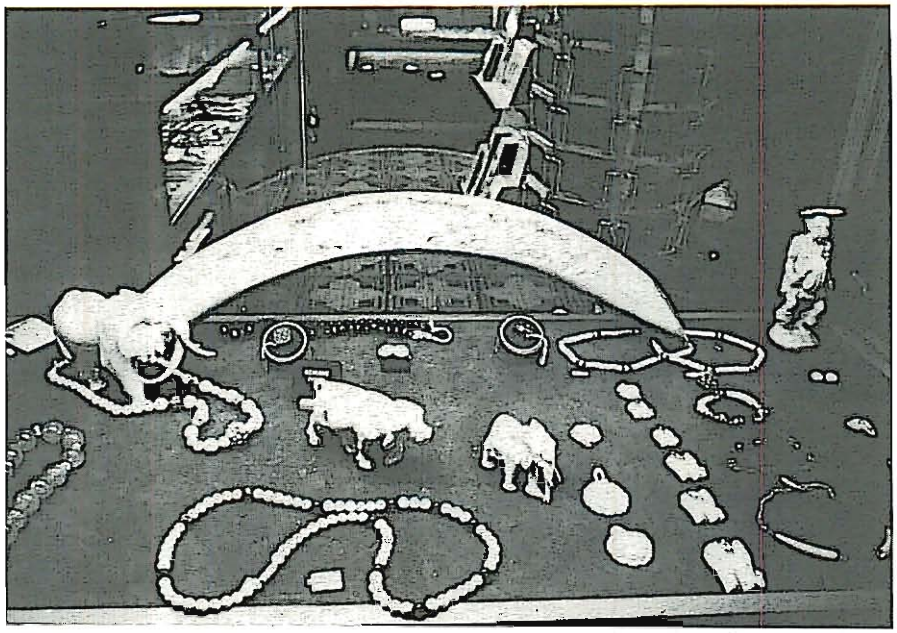


Figure 4. Although export has been banned, ivory is still sold in southern Africa. Carved ivory is displayed in the giftshop of the Gabarone Sun Hotel. Photo by Steve Tomey.

the trickle-down consequences of large mammal conservation in Africa. Elephants and rhinos bring in the tourist income that provides incentives to the government to maintain parks and reserves where other species are *de facto* protected. In Tanzania, where protection has been relaxed, poachers have shifted to meat poaching now that there are fewer elephants and rhinos left for them to hunt. An estimated 156,000 metric tons of illegal game meat is sold there per year (Friends of Conservation 1991). In addition, grazing and browsing by large mammals is a major force in maintaining open savannah grassland habitat (Norton-Griffiths 1979, Pimm 1986, Weiss *et al.* 1991).

"In spite of the obvious benefits of the CITES ban, many southern African states have declared their desire to reverse the ban on ivory from their populations at the next CITES convention in March 1992."

The explosive human population in Kenya is the most powerful threat to their wildlife. There will be growing political pressure for the government to allow grazing and watering of livestock in the parks and for the parks eventually to be carved up into garden plots for landless citizens. Continued CITES protection and continued support for Leakey's efforts to reform his department are crucial to the short term protection of all wildlife in Kenya. Full integration of parks and wildlife into the Kenyan economy, conservation education, effective population policy, and heightened national consciousness of wildlife and conservation are essential for lasting protection.

Acknowledgments

I am greatly indebted to Joyce Poole, Robert Bensted-Smith, and Rob Brett of Kenya Wildlife Services for providing me with the most recent data on elephant and rhino populations and conservation efforts in Kenya. Thanks also to Friends of Conservation for back issues of their *Survivor* Newsletter. And special thanks to Debra Snelson and Mark Stanley Price of African Wildlife Foundation, Nairobi for access to their extensive library and for comments on this article. I am also grateful to Nancy Berg, John Blake, Joel Heinen, Jim Hunt, and Steve Tomey for reviewing earlier drafts of this article.

Literature Cited

Ashley, M.V., Melnick, D., and Western, D. 1990. Conservation genetics of the black rhinoceros (*Diceros bicornis*), I: Evidence from the mitochondrial DNA of three populations. Conservation Biology 4 (1): 71-77.

Brett, R.A. and Poole, J. 1990. A policy framework and development program 1991-1996. Annex 7, Special Issues: The conservation of elephants and rhinos. Kenya Wildlife Service, Nairobi, Kenya.

Friends of Conservation. 1991. Meat poachers wreak havoc on Africa's wildlife. Survivor Newsletter IX. Oak Brook, Illinois.

Largen, M. and Yalden, D. 1987. The decline of elephant and black rhinoceros in Ethiopia. Oryx 21 (2): 103-106.

Moss, C. 1988. *Elephant memories: Thirteen years in the life of an elephant family.* William Morrow, New York.

Norton-Griffiths, M. 1979. The influence of grazing, browsing, and fire on the vegetation dynamics of the Serengeti. *In* Sinclair, A. and Norton-Griffiths, M. eds. *Serengeti: Dynamics of an ecosystem.* University of Chicago Press, Chicago.

Pimm, S. 1986. Community Stability and Structure. *In* Soule, M. ed. *Conservation Biology: The science of scarcity and diversity.* pp. 309-329. Sinauer, Sunderland, Massachusetts.

Templeton, A. 1986. Coadaptation and outbreeding depression. *In* Soule, M. ed. *Conservation Biology: The science of scarcity and diversity.* pp. 105-116. Sinauer, Sunderland, Massachusetts.

Weiss, S. B., Switky, K.R., and Murphy, D. D. 1991. Grazing and Endangered Species Management. Endangered Species UPDATE. 8(8):6.

Western, D. 1982. Patterns of depletion in a Kenya rhino population and the conservation implications. Biological Conservation 24: 147-156.

Western, D. and Vigne, L. 1985. The deteriorating status of African rhinos. Oryx 19 (4): 215-220.

Stan Braude is Adjunct Assistant Professor, Department of Biology, University of Missouri, St. Louis, MO 63121-4499. USA.

Book Review

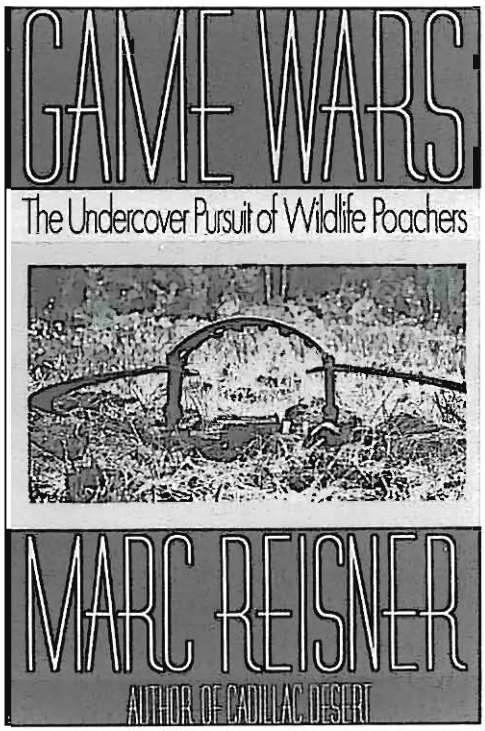
Game Wars: The Undercover Pursuit of Wildlife Poachers

by Marc Reisner

1991. Viking Penguin, New York.

Marc Reisner, author of the award-winning *Cadillac Desert*, once again brings his audience a well-written, well-researched, and informative book on a timely environmental issue. *Game Wars* takes the reader on a journey into the intimate dealings of large-scale wildlife poachers in the United States. The book is written mostly about the cases of Dave Hall, the larger-than-life US Fish and Wildlife Service Special Agent based in Louisiana, whose job it is to pursue and prosecute some of our most notorious modern criminals. The book, however, is much broader than that; it provides the reader with an appreciation for the magnitude of the poaching problem right here in the United States - a problem many of us associate with third-world kings or dictators. It is divided into four parts: Alligators, Ivory, Sacalait, and Loss. The first three provide in-depth profiles of colorful criminals, corruption by petty officials, believable disguises, greed, intrigue, and justification surrounding particular poaching issues. The last section provides a more general and moving portrayal of the natural world we have lost since the founding of the nation.

The first part provides a detailed and rather sympathetic account of some of the more notorious Louisiana alligator poachers through the 1960s and 1970s, and an expose of the connection of poaching with organized crime in the New York/Long Island area and its largely Japanese clientele. Hall was able to infiltrate the poaching ring with the help of poacher-turned informer Louisiana native Woody Dufrene, after Dufrene's arrest. Despite the obvious harm the poaching caused to alligator populations, Hall was frequently sympathetic toward the poachers themselves, many of whom were uneducated bayou-dwellers whose very way of life was in jeopardy due to forces beyond their control. In researching the book, Reisner accompanied Hall to meet some of the players in the Louisiana bayous, and he



describes them with literary fervor.

Of course, the story of the American alligator had a happy ending; the species is recovering throughout its range, and is now common in Louisiana to the point where some hunting is again permitted. The second part of the book discusses the ivory trade internationally - a timely issue given the precarious status of both extant elephant species. The first few pages document the rapid decline of the African elephant, e.g. from 45,000 animals in Tsavo National Park in 1969, to 5,000 now. Most of this section, however, describes the killing of walrus in Alaska for the same precious material. Once again, Dave Hall was involved in infiltrating, pursuing, and prosecuting a poaching ring that included native Americans, mercenaries, drug dealers, bikers, murderers, and others based out of Nome, Alaska. At one point in 1980, walrus poaching was so bad in our largest state that the USSR made a formal complaint to the USA because so many decapitated walrus were turning up on Siberian beaches. Once again, an Oriental connection is documented; East Asian nations are the biggest buyers of ivory. What is not known is whether the ending will also be happy for ivory-bearing species such as walrus, which is subject to legal exploitation by "subsistence" hunters, some of whom turn criminal.

The third section of the book deals mostly with the case of a gang of poachers from Larto Lake, LA, who were harvesting huge quantities of sacalait, a popular fish preferred by many black Americans. In this case, the market lies mostly in Chicago, and the product is consumed and not worn; somehow, the criminality is not nearly so profound as that described in the previous two sections. However, the intrigue is; Hall actually allowed Reisner to go undercover in infiltrating this gang, thereby allowing the author to gain first-hand experience so rare in books of this nature. The section ends on a sad note; the wife of a special agent left him due to the pressures his career imposed on their lives: another casualty of the game wars.

The fourth and last part of the book gives a broad overview of the love/hate relationship we Americans seem to have with wildlife. Reisner describes with eloquence the slaughter of beaver, bison, passenger pigeon, Carolina parakeet, great auk, etc. etc. throughout our history, but he also discusses the fact that many species are making a comeback recently. Reisner spent over 5 years following the cases of Dave Hall and thinking about the magnitude of problems he presents; his well-written, timely, and important book is required reading for conservation professionals and should be of great interest to the general public.

Reviewed by Joel Heinen, Doctoral Candidate and past editor of the Endangered Species UPDATE, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115. USA.

Opinion

Remembering Elephants at CITES

by Chris A. Wold

This March, the fate of the African elephant once again will be in the hands of the countries party to the Convention on International Trade in Endangered Species (CITES) when they will respond to southern African requests to resume international trade in ivory by downlisting the elephant to Appendix II. Once united, the coalition of southern African countries (Botswana, Malawi, Namibia, South Africa, Zambia, an Zimbabwe), now is deeply divided over the legal, economic, and ecological implications of resumed ivory trade.

In early February, Zambia withdrew its support for downlisting the elephant to Appendix II and lifted its reservation to the CITES Appendix I listing, a reservation that left Zambia a non-party concerning elephants. Moreover, it burned its nine-ton ivory stockpile along with weapons confiscated from poachers. The Chief Executive of South Africa's National Parks and South African CITES delegate, Dr. G. A. Robinson, announced in late December that he opposes renewed trade in ivory and would try to persuade the rest of South Africa's delegation to vote against downlisting the African elephant. The strain of the elephant debate has cut both ways. Dr. Richard Leakey, Kenyan Director of Wildlife and ardent supporter of a trade ban on all elephant products, has said that he is willing to allow trade in elephant products if the ivory trade ban continues. The US Fish and Wildlife Service, meanwhile, has kept its position a mystery, but has made clear that it believes some trade could be beneficial to elephants.

The elephant issue also has left many conservation groups unable to find common ground. Many organizations, including Greenpeace, the Environmental Investigation Agency, and the Humane Society, vehemently oppose anything but Appendix I listing. They note that, although ivory prices and demand for ivory have declined sharply, the southern African nations cannot enforce adequately illegal or legal ivory trade, and high ranking government officials may be involved in illegal ivory trafficking (Environmental Investigation Agency, Briefing: Elephant Poaching Down After CITES Ban - undated). Others, such as the World Wildlife Fund, suggest that a skin-only trade is possible and that, under certain conditions, they would support renewed international trade in ivory.

From a legal perspective, retaining the African elephant on Appendix I and rejecting all transfer proposals would continue the prohibition on all commercial trade in the elephant and its parts, including ivory. The combination of legal prohibition and moral repugnance brought about by media campaigns has proven highly successful in reducing demand for ivory products and, consequently, virtually halting poaching in many countries. Unconditional Appendix II listing, on the other hand, would resume commercial trade in ivory and all elephant parts subject only to the requirement that exporting countries find that the proposed export is "not detrimental to the survival of the species."

Another alternative would transfer certain countries' elephant populations to Appendix II subject to a 'zero-quota' on ivory. This would allow some range for countries to trade in skins and meat, but keep ivory off the market. Although CITES specifically permits "split listings" by country, whereby geographically separated species are listed on different Appendices, it does not provide for split listings by product. In making Appendix listings, Parties are to consider whether 'species' are threatened with extinction or may become threatened with extinction. Thus, an agreement to continue the ivory trade ban while the elephant is listed on Appendix II could be accomplished only by a resolution or by an 'annotation' to the Appendix. Resolutions of the Parties are non-binding, however, merely outlining how Parties *should* comply with CITES. The zero-quota option would be insufficient to stop imports in some countries in which national legislation allows them to ban only those products from Appendix I species. In addition, if Parties simply decided not to comply with the resolution, very little, if anything, could be done to force them into compliance with the resolution.

An annotation is a condition attached to a species listing within the Appendix itself. However, there is no provision within the treaty language permitting this type of listing, and, even if there was, the Parties have not created criteria to remove the annotation. Nonetheless, the Parties have listed specific populations of vicuna on Appendix II subject to the annotation that only the wool of the vicuna, which must be sheared from a live animal, can be traded. The case of the elephant raises more serious questions, because the elephant's skin, meat, and ivory all are considered valuable commercial products. With the vicuna, commercial products are not separated because only the wool is a valuable commercial product. Unlike the vicuna situation, the elephant, after its skin and meat are shipped to market, is quite dead.

These two options also present the practical problem of stockpiled ivory, which promotes speculation that a legal ivory market will appear. Already the southern African downlisting proposals and a newly established ivory marketing cartel have cause speculation that trade will reopen, and poaching has increased throughout Africa.

When countries vote to protect the elephant, they also must consider that because few economic opportunities are as lucrative as selling ivory, poachers will continue to exploit elephants, even to extinction. Moreover, the new ivory cartel will allow countries to sell ivory confiscated from poachers, a provision which proved an enormous failure under previous CITES regimes. Poaching continues throughout Africa due to the mere speculation that a legal trade will resume. Retention of the elephant on Appendix I is strongly encouraged.

Chris Wold is Law Associate, Center for International Environmental Law-US, 1621 Connecticut Ave., NW, Suite 300, Washington DC. 20009-1076.

Bulletin Board

US Fish & Wildlife Endangered Species Technical Bulletin

As described in our last issue (Nov/Dec 1991; Vol. 9 No. 1&2), production of the Technical Bulletin is running behind schedule. We will include the Technical Bulletin again as soon as it is available.

Endangered Species Act: An ESU Bibliography

Interested in brushing up on your *history* of the Endangered Species Act? The following bibliograpy contains related articles published in the *UPDATE*. Just dig out your old issues, head to the library, or give us a call to order back issues (313 763-3243).

Bean, Michael. 1988. The 1973 Endangered Species Act: Looking Back Over the First 15 Years. Endangered Species Update. 5(10):4-6.

Bean, Michael. 1991. Issues and Controversies in the Forthcoming Reauthorization Battle. Endangered Species Update. 9(1&2):1-4.

Bixby, Kevin. 1988. The Next Step: Part One. Endangered Species Update. 6(1&2):6.

Bixby, Kevin. 1989. The Next Step: Part Two. Endangered Species Update. 6(3&4):6.

Brown, Steve; Larmer, Paul; Thomas, Amy; & Wall, Scott. 1985. Why Save Endangered Species: An Ethical Perspective. Endangered Species Update. 2(7):1-2,4.

Campbell, Faith. 1988. The Appropriations History of the 1973 Endangered Species Act. Endangered Species Update. 5(10):20-26.

Campbell, Faith. 1991. Endangered Plant Species Shortchanged: Increased Funding Needed. Endangered Species Update. 9(1&2):6.

Clark, Alan. 1991. Book Review: 'Balancing on the Brink of Extinction.' Endangered Species Update. 9(1&2):5.

Clark, Tim & Harvey, Ann. 1988. Implementing Endangered Species Recovery Policy: Learning As We Go? Endangered Species Update. 5(10):35-42.

Culbert, Robert. 1989. Local Planning and Biological Diversity. Endangered Species Update. 6(7):6.

Culbert, Robert & Blair, Robert. 1989. Recovery Planning and Endangered Species. Endangered Species Update. 6(10):2-8.

Fitzgerald, John. 1988. Withering Wildlife: Whither the Endangered Species Act? A Review of Amendments to the Act. Endangered Species Update; 5(10):27-34.

Fitzgerald, John. 1989.. The 1988 Recovery Amendment: Its Evolution and Content. Endangered Species Update. 7(1&2):1-5.

Greenwalt, Lynn. 1988. Reflection on the Power and Potential of the Endangered Species Act. Endangered Species Update. 5(10):7-9.

Liverman, Marc. 1990. The (Endangered) Endangered Species Act: Political Economy of the Northern Spotted Owl. Endangered Species Update. 7(10&11)1-4.

Murphy, Dennis. 1989. Invertebrate Subspecies and the Endangered Species Act. Endangered Species Update. 6(9):6.

Murphy, Dennis & Freas, Kathy. 1988. Using the Endangered Species Act to Resolve Conflict Between Habitat Protection and Resource Development. Endangered Species Update. 5(2&3):6.

Murphy, Dennis & Noon, Barry. 1991. Exorcising Ambiguity from the Endangered Species Act: Critical Habitat as an Example. Endangered Species Update. 8(12):6.

Reffalt, William. 1988. United States Listing for Endangered Species: Chronicles of Extinction? Endangered Species Update. 5(10):10-13.

Scott, Michael; Csuti, Blair; Smith, Kent; Estes, J. E.; & Caicco, Steve. 1988. Beyond Endangered Species: An Integrated Conservation Strategy for the Preservation of Biological Diversity. Endangered Species Update. 5(10):43-48.

Tate, James. 1990. Captive Propagation and the Conservation of Species: A U.S. Fish and Wildlife Service Perspective. Endangered Species Update. 8(1):30-31.

Yaffee, Steven. 1988. Protecting Endangered Species Through Interagency Consultation. Endangered Species Update. 5(10):14-19.

William, Robert Irvin. 1990. An Endangered Species Review of the 101st Congress. Endangered Species Update. 7(12):5.

Announcements for the Bulletin Board are welcomed.

Endangered Species UPDATE

School of Natural Resources
The University of Michigan
Ann Arbor, MI 48109-1115

Non-Profit
Organization
U.S. POSTAGE
PAID
Ann Arbor, MI
Permit No. 144