

ENDANGERED SPECIES

Technical Bulletin Reprint

Wildland Management Center
School of Natural Resources
The University of Michigan

From the New York Zoological Society

First Jaguar Preserve in the Americas

In October 1982, Dr. Alan Rabinowitz of Wildlife Conservation International (WCI), a division of the New York Zoological Society, went to Belize, Central America to assess the relative abundance of jaguar throughout the country. A request for this survey had been made by the Belize Audubon Society to Dr. Archie Carr III, Assistant Director of WCI.

The survey indicated relative abundant jaguar populations throughout the country, a significant find since jaguars have been severely depleted throughout their neotropical range and are a threatened species. The major reasons for the jaguar's decline are hunting and loss of habitat. These factors are present in Belize as well, although they have not had a major impact yet due to low human populations density and large areas of rugged inaccessible terrain.

Dr. Rabinowitz returned to Belize in January 1983 to initiate a two-year study of the jaguar. Although jaguar hunting is illegal in Belize, poaching persists and there are increasing pressures on the government from hunters and cattle ranchers to allow increased killing of jaguars. Thus the purpose of the study was three-fold:

1) To investigate the general ecology and behavior of wild jaguar in tropical rain forest habitat.

2) To investigate jaguar-livestock problems and establish management recommendations for the government.

3) To help the government establish conservation guidelines for the jaguar and possibly set up a jaguar preserve for the future.

Dr. Rabinowitz decided that the best place in the country to conduct his study was the Cockscomb Basin area

in south central Belize. This is ideal because it is rugged, relatively uninhabited jungle. There are abundant jaguar and it is somewhat accessible due to an old logging operation. It is also naturally protected on three sides by mountains.

From January 1983 through January 1984 Dr. Rabinowitz radiocollared seven jaguars. Five of these were males from within the Cockscomb Basin. The other two were known cattle-killing jaguars, one adult female and the other a young male; both were captured in the Orange Walk in the north of the country, then radiocollared and transferred deep into the jungles of Cockscomb. This translocation of jaguars was the first ever attempted and was done to see if cattle-killing jaguars, when placed back in the jungle where there is abundant wild game available, will remain in the jungle and resume their wild habits.

By following the five local jaguars using radiotelemetry on the ground and in the air, Rabinowitz and his assistants found the following:

1) The jaguars captured within the Cockscomb Basin tended to stay within the area. None of these jaguars was ever known to go out of the basin and kill cattle on surrounding ranches. Analysis of the feces of these jaguars also indicated that they were eating only wild game.

2) One of the wild jaguars captured had come into Cockscomb after being driven from adjoining land which was being cut for citrus. Although this jaguar had its home partially in and partially out of Cockscomb and roamed near cattle, it showed no inclination towards cattle killing. In fact, its behavior seemed to indicate that it was seeking new jungle and wild game after part of its home range had been taken from it.

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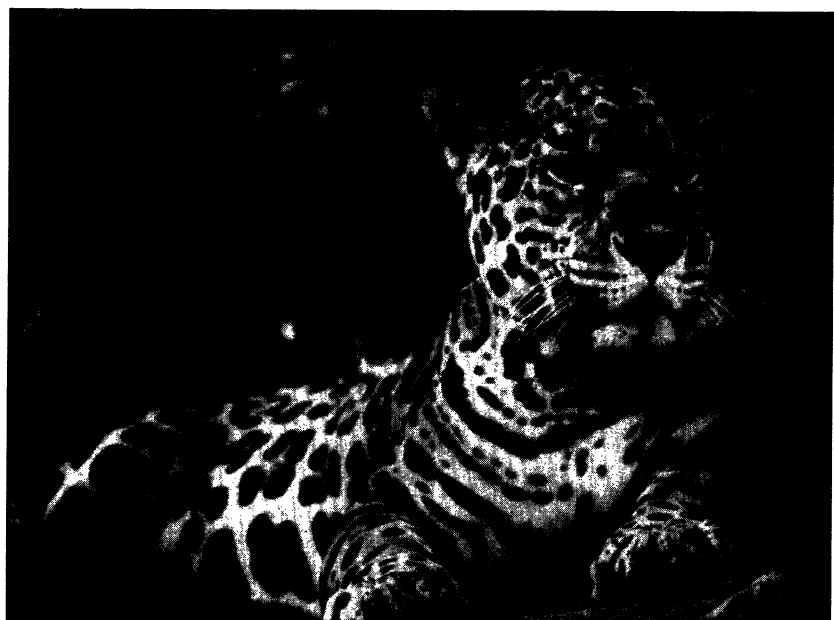


photo by Richard Foster

Jaguar Preserve continued

3) The jaguars captured in Cockscomb had specific home ranges within which they remained, for the most part.

4) The numbers of visual encounters between the jaguars and humans (Indians or Dr. Rabinowitz) in the study area supported the fact that these cats are very nonaggressive and basically want nothing to do with people.

5) One wild jaguar, captured within Cockscomb, occasionally roamed on the outskirts of a cattle ranch that borders Cockscomb Basin but never took cattle. In fact, when space opened up further in the basin, due to the death of a large male jaguar in that area, this jaguar moved away from the cattle and further into the jungle and never returned during the course of Rabinowitz' tracking.

The two cattle-killing jaguars raised different questions:

1) Neither of the transplanted jaguars stayed within Cockscomb

Basin for any more than three weeks, despite the fact that fecal analysis showed them eating wild game during that time. Both eventually headed north, the direction from which they had come.

2) The female cattle-killer, upon reaching a cattle ranch, remained in that area and seemed to set up a home range incorporating the ranch.

3) The young male was last located approximately 12 miles north of the Cockscomb Range and was never found again.

4) It appears that once a jaguar learns to kill cattle for food, for whatever reason, it will then recognize cattle as a food item and will continue to kill cattle when encountered, despite the availability of other game.

5) It seems unlikely that cattle-killing or problem jaguar can be rehabilitated or translocated.



Dr. Alan Rabinowitz

New York Zoological Society

... the overwhelming number of problem jaguars are either injured, very old or very young animals who have been taught to kill cattle from their parent.

From examining remains of jaguar killed while killing cattle it appears that the overwhelming number of problem jaguars are either injured, very old or very young animals who have been taught to kill cattle from their parent. This supports the data on wild, healthy jaguars with abundant food resources that may come near cattle but never touch them. It also helps explain the jaguar whose area was being cut down but chose to move into other jungle areas such as Cockscomb instead of killing cattle on nearby ranches. Data on natural feeding indicated a diverse diet, but a strong preference for armadillos.

Dr. Rabinowitz prepared a report for the government of Belize with his recommendations for the Cockscomb Basin. After meeting with former Prime Minister George Price, and several key members of the government in September 1984, the government of-

ficially designated Cockscomb Basin the world's first and only jaguar preserve. Although the Cockscomb Basin area itself consists of only approximately 150 sq. miles and contains approximately 30-40 jaguars, it is surrounded to the north, south and west by additional forest reserve land. This combined tract should be enough to maintain a healthy jaguar population for many years to come.

One of the major arguments used in preserving the integrity of the Cockscomb Basin is that saving a major watershed area such as this helps the future economic development of the country. The area comprises three major southern water systems — S. Stann Creek, Sittee River and Swasey River — which control potential flooding that could wipe out bridges and infrastructure along the Southern Highway. In addition, destruction of this watershed and others like it would cause massive erosion and siltation of waterways which eventually would cause siltation of the reef system so crucial to the fishing industry.

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A forum for information
exchange on
endangered species from

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Quaternary Extinctions: Culture or Climate?

A book review by John R. Alden

At the end of the last glacial advance, some twelve thousand years ago, many Pleistocene mammals became extinct. The losses were most obvious in the faunas of the Americas and Western Europe, where mammoth, mastodon, giant sloth, cave bear, and many other creatures disappeared forever. But Asia and Africa lost species too. Why so many extinctions occurred almost simultaneously has always been a question of intrigue and endless debate.

Two general factors have been proposed as explaining this wave of extinction: post-glacial climatic change, and overkill by prehistoric human hunters. Even after many years of study, the community of scientific experts remains divided. For North America, the reason for this continuing disagreement is obvious — the temporal and spatial correlation of Pleistocene extinctions is as good with climatic changes as it is with human arrival. In the Old World, the coincidence between extinctions and major changes in Paleolithic cultural assemblages leaves us facing exactly the same question. Do the post-glacial extinctions reflect the effects of cultural or climatic changes?

Quaternary Extinctions is a state-of-the-art examination of this long-standing and energetically debated issue. The book's 38 chapters offer the ideas of 45 scholars from around the world, a group including specialists in archeology, biogeography, geology, paleontology, and Quaternary flora and fauna. Most parts of the world are examined (Western Europe is the notable exception), but North America and Australia/New Zealand garner the most attention.

In terms of theory, the papers are divided almost equally between those favoring climatic models and proponents of cultural causes. But most positions fall between the two extremes. This makes good sense. After all, environmental and cultural pressures combine to cause most of the extinctions we can study historically, and it seems likely that this was as true at the end of the Pleistocene as it is today. Still, this general under-

standing does little to elucidate the particular combination of factors responsible for the wave of Quaternary extinctions.

It is only when examining specifics that this debate becomes truly interesting. Each species, each land-mass, and each geological era reveals a different set of circumstances. For example, the fossil record shows several phases of intensified extinction over the last ten million years, when human intervention could not possibly have been a factor. And if over-hunting eliminated the Pleistocene megafauna, why did several bird and small mammal species disappear along with the big game? But if climatic changes killed off the North American horse, how did it so easily re-establish itself after being brought back by the Spaniards?

. . . environmental and cultural pressures combine to cause most of the extinctions we can study historically, and it seems likely that this was as true at the end of the Pleistocene as it is today.

Unfortunately, there is no easy way to discuss the wealth of careful argument and intriguing detail contained in this extraordinary (and weighty) book. Instead, I will limit my comments to the two papers that struck me most forcefully. Among the theoretical chapters, R. Dale Guthrie's *Mosaics, Allelochemicals, and Nutrients: An Ecological Theory of Late Pleistocene Megafaunal Extinctions* was particularly impressive, while Larry G. Marshall's *Who Killed Cock Robin* neatly summarizes the volume's theoretical and factual contents.

Guthrie's contribution is striking because of the depth to which he examines post-glacial environmental change in North America. His

unabashedly technical discussion of biomes, growing seasons, plant defenses against herbivore predation, animal digestive systems, and gestation times makes a marvelously coherent case of climatic and biotic change as the cause of North America's Quaternary extinctions.

Marshall's summary gives a clear, concise overview of the concepts and arguments developed elsewhere in the book. Marshall's most important contribution may be that he ends his paper with a set of cautions rather than with any firm conclusions. Reduced to essentials, he warns that there seem to be no single cause for the worldwide phenomena grouped under the heading of post-Pleistocene extinctions. The search for universality may be leading us, he warns, badly astray. In hindsight, this useful synthesis probably should have been the book's first chapter rather than one of the last.

The high cost and specialized content of *Quaternary Extinctions* should not dissuade wildlife managers and conservationists from buying and consulting this book. Its subject is the past, but it offers management professionals valuable insights on the present and the future. The biotic changes created by recent human activity are probably as great or greater than those precipitated by the last glacial retreat, and our ability to threaten large animals is almost infinitely greater than it was a few millennia ago. Understanding the ecological and cultural causes and contexts of prehistoric extinctions will surely help concerned specialists protect against a modern repetition of that sad process.

Quaternary Extinctions

Edited by Paul S. Martin and Richard G. Klein. Tucson: Univ. of Arizona Press, 1984, 892 pp., cloth, \$65.00.

Dr. Alden is an archeologist living in Ann Arbor, Michigan.

Resources. . .

A major international conference on Botanic Gardens and the World Conservation Strategy will be held in Las Palmas, Canary Islands, November 26-31. It is being organized by IUCN, Gobierno de Canarias & Cabildo Insular de Gran Canaria, and is sponsored by the World Wildlife Fund. The aim of the conference is to review the involvement of botanic gardens in implementing the World Conservation Strategy and provide garden managers with policy guidelines and successful models to follow. Sessions will include: botanic gardens and the community, research and rescue, botanic gardens for sustainable development, and international collaboration. Speakers will include: Dr. P. Ashton, Dr. D. Bramwell, Prof. C. Gomez-Campo, Prof. V. Heywood, Dr. K. Miller, Dr. P. Raven, and Mr. J. Simmons.

The organizers plan to draft a Botanic Gardens Conservation Strategy for discussion at the meeting. Arranged rather like the World Conservation Strategy, it will be designed to help gardens improve their image problem with funding agencies. The conference is one of IUCN's set of activities to promote the conservation role of botanic gardens and was recommended by the IUCN/WWF Plant Advisory Group. For further information write: Dr. D. Bramwell, Jardin Botanico "Viero de Clavijo", P.O. Box 14 de Tafira Alta, 35017 Las Palmas de Gran Canaria, Canary Islands, Spain. ■

Three hundred conservationists in nearly 45 countries in South and Central America and the Caribbean have joined forces to save the region's most important wetlands. Their efforts will be recorded in the first Neotropical Wetland Directory, now being compiled by Dr. Derek Scott and Dr. Montserrat Carbonell of the International Waterfowl Research Bureau (IWRB).

The Directory, to be published this summer, will provide the first comprehensive overview of one of the richest, most diverse and least disturbed of the world's biogeographical realms. It is the second of a four-volume IUCN series. The information contained in the directory will provide IUCN's Conservation Monitoring Centre with a computerized database on the world's wetlands which will support the forthcoming WWF Wetlands Campaign. Over the past two years Drs. Scott and Carbonell have visited nearly every country in the Neotropical Realm meeting with experts and conservationists to collect information on more than 1,000 wetlands.

There are 700 neotropical wetlands of international importance, covering an area of 116 million hectares, of which only 30% have legal protection. Eighty-five sites are in imminent danger while 50% are under moderate to serious threat. Major threats to the wetlands include general population pressure in the form of drainage for agricultural land, ranching, urban expansion, industrial development, recreation, tourism, and pollution. The most endangered areas include the Lesser and Greater Antilles, the cen-

tral Pacific coast of Mexico and much of Central America. Extreme north-east and south-east Brazil, coastal Peru and the north coast of Chile also face grave problems. ■

IUCN has published *Species Conservation Priorities in the Tropical Forests of Southeast Asia* which includes the six papers presented at the Species Survival Commission's October 1982 meeting in Kuala Lumpur, Malaysia. The papers concern species conservation priorities in the tropical forests of Malaysia, Sarawak, Sabah, Indonesia, Thailand, and Burma. The 60-page book is illustrated with wildlife photographs, maps, and wildlife posters used in several countries. ■

Resource Information was provided by Jane Lamlein from the Smithsonian's Museum of Natural History.

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