

ENDANGERED SPECIES

Technical Bulletin Reprint

Wildland Management Center
The University of Michigan

From the Smithsonian Tropical Research Institute

Securing Survival of the Green Iguana

by
Dagmar Werner

For over 7,000 years the green iguana has been a source of protein for people in Central America. It is still eaten today. However, the green iguana is also dramatically decreasing in numbers. Indiscriminate hunting for meat and eggs, along with habitat destruction and increased use of herbicides and pesticides, are all contributing to the extinction of this large herbivorous reptile.

Rational exploitation of **Iguana iguana** may be one way of both providing an important protein source for rural populations that consume iguana meat and eggs, and securing the survival of this reptile. With this concept in mind, the Iguana Management Project began in early 1983 with support from the W. Alton Jones Foundation. The Project was proposed by the Smithsonian Tropical Research Institute (STRI) through A.S. Rand in 1982. Its main objective is to investigate the feasibility of profitably exploiting this renewable natural resource through management.

During the 18 months since the start of research in the Iguana Management Project we have answered three fundamental questions, promising success of the proposed idea: (1) Through captive

raising of hatchlings, iguana survival during the first year of life has been increased from an estimated 5-10% in the wild to 90-95%; (2) An artificial incubation technique has been elaborated that resulted in a 95% hatching success, compared to an average 50% in natural nests; (3) An artificial nest was designed in a 10m x 10m enclosure that allows for easy collection of eggs for incubation and other purposes. The females actually preferred these nests over digging their own.

In an independent project at the Centro de Recursos Naturales in El Salvador, several reproductive colonies of iguanas are kept in captivity. The techniques developed so far allow researchers to produce a predictable number of young iguanas and an increase in survival by a factor of 20 to 40, compared to the wild.

Profitable management of iguanas is thought to be feasible only if the young are released into the wild at an age (size) when their mortality is low compared to that estimated for the first months of their lives in the wild. The investment in raising iguanas would be limited to six months to one year. They then would be released into gallery forests, farmland with

trees, or in the backyards of farms. They would feed primarily on leaves, flowers, and fruits which would otherwise be infrequently or not competed for by other animals and man. The iguanas could be harvested two or more years later, after they have reached sexual maturity.

To secure a high survival of the captive raised iguanas after release into the wild, a series of experiments concerned with habituation to food, coprophagy as an essential factor for growth, social behavior and population density and composition have been started.

Experiments on cropping and recruitment schemes are topics for future research. Should the findings prove biologically and economically feasible, education programs and reinforcement of protection laws could secure the survival of this large reptile through rational exploitation.

Dr. Dagmar Werner is a biologist with the Smithsonian Tropical Research Institute. Dr. Werner is the director of the Iguana Management Project.

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BOOK REVIEW

The World of the Grizzly

by

John R. Alden

Thomas McNamee. *The Grizzly Bear*. Knopf Publishers. 1984, 308 pp. \$18.95.

Grizzly bears are the largest terrestrial carnivores on earth. They are big, fast, smart, and aggressive, with good eyesight, excellent hearing, and an extraordinary sense of smell. Yet we could make them extinct in a couple of years. As terrifying as this creature can be, in encounters between man and bear, the bear almost always loses.

Even though grizzlies are dangerous, humans, at least in the aggregate, have decided that we want them around. It isn't exactly clear why. Their very wildness may make them attractive. They may remind people of our prehistoric past, of Lewis and Clark, or the power of nature. It could be because they are large and impressive, or interesting to study. Perhaps we just like animals.

Unfortunately, this species' sur-

vival may be difficult to ensure. In *The Grizzly Bear*, a fascinating examination of bear ecology, behavior, and the Byzantine world of research, politics and management policies, Thomas McNamee explains why.

"They need space. They need solitude. They need to be left alone." But grizzly habitat is under constant pressure for development, grazing, logging, mining, and recreation. Hunters and hikers spook them, poachers shoot them, and researchers plague them unmercifully. Even the national parks and wilderness areas aren't safe. An adult male may need a range of up to 600 square miles, and the most desirable environmental zones for a grizzly are the very areas most attractive to humans.

We have made considerable progress. Nearly a fifth of Yellowstone's backcountry is closed to hikers every summer, giving the bears a bit of needed privacy. The information researchers have collected on grizzly behavior and physiology is being used to improve state and federal management practices. There is still far too much illegal killing (it is the major cause of grizzly mortality),

but even here things are improving. Free-roaming grizzlies may actually survive in the contiguous forty-eight states.

The Grizzly Bear is thorough, informative, and very, very interesting, but it has one problem. McNamee is so devoted to these creatures that his ideals sometimes interfere with his good sense. For example, why shouldn't Yellowstone's bears be fed by shooting small numbers of elk and leaving the carcasses for hungry grizzlies to find? It might not be pure and natural, but it would surely improve the bear's chances for survival and reproduction.

In the end, however, grizzlies need impassioned advocates. They need some good publicity, and increased public attention and understanding. McNamee has done this and more, giving us a fine summary of the present state of bear affairs and a book well worth reading.

John Alden is a wilderness fancier and free-lance writer living in Ann Arbor. His review originally appeared in the **Cleveland Plain Dealer**.



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A forum for information
exchange on
endangered species from

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Annual subscriptions for the *Endangered Species Technical Bulletin Reprint* are \$12.00. Send check or money order (made payable to: The University of Michigan) to:

Endangered Species Technical Bulletin
School of Natural Resources
The University of Michigan
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Publications Worth Noting . . . *Endangered & Threatened Wildlife of the Chesapeake Bay Region*

Published as a cooperative project of the Chesapeake Bay Foundation and the U.S. Fish and Wildlife Service, this field guide documents the status, description, habitat, behavior, and distribution of each of 41 federally protected animal and plant species endangered or threatened in the Chesapeake Bay region. A section of the handbook lists the vertebrate animals possibly in

danger of extirpation from the tristate region, but which are common or stable in other parts of their domains. The federal status of species is designated as of January 1982.

Available from:
Tidewater Publishers
P.O. Box 456
Centreville, MD 21617
(\$5.50 payment with order)

Plants for Industry and Energy

People often forget to what extent they depend on plants. It is easy to see how plants provide food, timber and medicine, but plants also provide a host of other products. Many of these keep the wheels of industry turning by providing products such as waxes, oils, gums, essential oils, fibres and dyes. Furthermore, where raw materials are at present derived from rare wild species or non-renewable resources, such as oil, plants can often be found which act as substitutes — if they have not become extinct first.

Plants are unique in their ability to build complex chemicals using energy from the sun in the process of photosynthesis. These products form the basis of materials widely used in industry. The chemicals that plants produce to discourage predators, for example, can be exploited as commercial pesticides. Pyrethrum, produced by species of *Chrysanthemum*, is not toxic to mammals but has proved very effective against flying insects and more potent than DDT. It is now grown by about 200,000 farmers around the world.

Perhaps the most potent argument concerns plants for energy. Professor Arthur Bell, Director of Kew, put it this way in a letter to *The Times* of London:

“Green plants are the only organisms capable of utilising atmospheric carbon dioxide for the synthesis of organic compounds. Coal and oil are both of biological origin and the organic compounds in them owe their existence, directly or indirectly, to the photosynthetic capacity of countless generations of long-dead plants.

“Before the industrial revolution man lived within the world’s income. His numbers and standards of living were sustained and contrained by the capacity of green plants, fuelled by sunlight, to turn carbon dioxide into food and firewood.

“When James Watt developed the steam engine he opened the world’s savings bank and showed us how to spend the money: the coal and oil that had been accumulating over hundreds of million of years. By using this capital at an ever-increasing rate, we have raised food production and living standards in the developed world and population levels almost everywhere. In 1800, the world population was 1,000 million; it is now approaching 5,000 million.

“When the savings provided by those long-dead plants are finally exhausted, whether in 66 years or 166 years, we shall be dependent on the living plants, not only for our greatly inflated food requirements, but also for the chemical intermediates, solvents, drugs, plastics, insecticides, fungicides and all other products which we have come to expect from our coal and oil-based industry.

“It is imperative that we develop alternative energy sources; it is equally imperative that we halt the wholesale destruction of the world’s remaining forests and wilderness areas (an area of tropical rain forest approximately equivalent to that of England and Wales is being cut down every year) and exercise responsibility in the conservation and cultivation of our ultimate resource, the plant kingdom.

“If we fail in either task, there will be nowhere to turn when the oil runs out.”

Indeed, it can be argued that the plants of the past — coal and oil — are being used up as energy to destroy the plants of today — the forests of the world — as cheap petroleum enables large tracts of forest to be cleared at frightening speed.

Oil, too, is more than just a source of energy. The organic compounds in oil and coal are the raw materials in much of the chemical industry. Oils and waxes are widely used to produce polymers and plasticizers and around the home in the form of lubricants, sealers, varnishes and lacquers, and electrical insulating materials. Most are made from petroleum, but many could be produced from plants. For example the Babassu palm in northern S. America (two species of *Orbignya*) produces fruit with an oil content as high as 72%; the oil has the same potential as coconut oil and could be used in producing detergents and soaps — the problem at present is to shell the hard nut to get at the kernel. Another plant from America, Candelilla, *Euphorbia antisyphilitica*, produces a hard wax which has valuable industrial potential in candles, polishes, chewing gum, leather goods, paper sizing, dental moulds and electrical insulators.

Many plants were used more in the past. The biblical myrrh and frankincense are oleoresins harvested from the trees of *Commiphora* and *Boswellia carteri* (respectively) in parts of Somalia and elsewhere, but, because of desertification, are now in danger.

Other plants used in the past by tribal people have since been forgotten, only to jump to prominence as a new application is discovered. A good example is the famous ‘jojoba’ (*Simmondsia chinensis* from northern Mexico and southern U.S.A.). The seeds contain a remarkable liquid wax which is an excellent substitute for Sperm Whale oil in high-technology applications that must withstand extreme applications. American Indians used jojoba oil to treat the skin; now it is used for cosmetics and shampoos, and the nut is the star of TV commercials.

Gums are also important in industry. For example seeds of the leguminous guar, *Cyamopsis tetragonoloba*, which is grown widely in India, Pakistan and the southern United States, produces a valuable gum which has 5 to 8 times the thickening power of starch, and has a wide range of applications in the paper industry, in making ice-cream, desserts, cheese preparations, reconstituted tobacco, cosmetics and pharmaceuticals. It is even used in the oil industry to stabilise drilling muds!

The woody parts of numerous plants have been used as building and structural materials in addition to the many used purely for their timber. One of the best examples is rattan, which is the second most important forest product (after timber) in Southeast Asia, principally for export as cane furniture. Trade in raw rattans is said to be worth more than US\$50m per year and the shop value in world trade estimated to be in the order of a staggering US\$5 billion per year. In the village the stems are also used for cords, ropes and hawsers, are made into baskets and other containers, matting, furniture, and much else besides. Rattan is a very good crop being collected by villagers from the forest and it provides a powerful economic justification for conserving tropical forests in S.E. Asia.

While rattans have received much attention recently, bamboos are still a vastly neglected source. Best known as panda food, the many species actually have a host of uses in tropical countries: water pipes, scaffoldings, pillars, wells, rafting, floors, rafters, thatching, roofing, to name but a few. Paper manufacture is the most important industrial use, giving c. 600,000 tons of paper pulp per year in India.

We Need Your Help!

TO OUR READERS:

As we begin our second volume of the *Reprint* it is important to convey to you the urgent need to increase the number of subscriptions! We are only one-third of the way to making the publication self-sufficient so we rely heavily on subsidies from conservation organizations and supportive corporations.

We need your help in increasing the readership of this publication. We can only continue to provide the *Reprint* and the *Technical Bulletin* if we reach a self-sufficient number of subscribers (1,500) this year. Please share the *Reprint* with an associate, organization or professional group. If you would like extra copies to distribute at a meeting or conference, or would like to send copies to associates, just drop us a note and we will forward *Reprints* to you.

If you are aware of potential funders with an interest in the *Reprint* and *Technical Bulletin*, please send us their names. We still need to subsidize the printing and production of the *Reprint* for the 1985 year.

We are planning to expand the *Reprint* to 8 pages this year and hope that you submit articles, suggestions, book reviews and announcements of meetings appropriate to endangered species. We will have specific themes for issues this year that will include endangered species management strategies, the role of zoos, the Endangered Species Act reauthorization, and contributions to research and conservation in the corporate community.

If you are finding the *Reprint/Technical Bulletin* useful, write us! If you think there are some areas in which we can increase its utility to you, write us! We can only make the *Reprint* possible with your help.

-R.B.

December 1984

Vol. 2 No. 2

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Wildland Management Center
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Ann Arbor, MI 48109-1115

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