

# **S**NAKES. THE EVOLUTION OF MYSTERY IN NATURE

We asked and got permission from Mr. Harry Greene and his publisher, University of California Press, to publish a part from the magnificent book *Snakes. The Evolution of Mystery in Nature in Litteratura Serpentina* (reviewed in LS 18-6) We are author and publisher very grateful for this permission. We have chosen a passus from chapter 16: 'Snakes and others: past, present and future', in particular the part in which Harry Greene deals in a convincing way with the necessity of conservating and managing the mondial herpetofauna (pages 298-301).

## **CONSERVATION STATUS AND MANAGEMENT**

*Harry Greene*

Snakes have been killed by humans and other primates for millions of years, but with few exceptions, we have not caused the extinction of entire species of serpents until the past couple of centuries. About 200 species of snakes are currently listed as threatened or endangered or are otherwise afforded special protective status, but that number vastly underestimates the proportion of the world's snake fauna vulnerable to extinction in the near future. Beyond the fact that dozens of species remain undiscovered or known from only a single specimen (e.g., 7 species in Sri Lanka alone), the conservation status of most snakes has not been critically examined. In Europe, where the snake fauna is small and well studied, 19 of 27 species need active management; by contrast, the conservation status of almost all of South America's hundreds of species of snakes is unknown. Worldwide, only

about 12 species of pitvipers are formally singled out for protection, but sustained persecution, habitat destruction, and intrinsically small distributions (e.g., the Aruba Island Rattlesnake [*Crotalus unicolor*] and other island populations) imply that perhaps 60 percent or more of the 157 species in that group are now threatened or endangered. In fact, many snakes might be especially vulnerable to extinction because of their slow growth rates, small clutch and litter sizes.

For most serpents currently listed as threatened or endangered, habitat destruction and fragmentation are undoubtedly the most severe and frequent culprits. Rattlesnake roundups and other forms of wanton killing, the leather trade, and the pet trade result in the deaths of millions of snakes annually, but the impact of those activities is generally focused on a few widespread species. Snakes that inhabit the North American Great Plains and other grasslands have sustained massive habitat loss during the past century, with some species already restricted to small remnant populations. Tropical forests everywhere are being destroyed at accelerating rates, and those extraordinarily rich habitats-especially in Madagascar, south-eastern Asia (including the nearby archipelagoes), and South America-include more severely endangered snake species than anywhere else. Some temperate forests also are at risk, their destruction causing the precarious status of Louisiana Pinesnakes (*Pituophis ruthveni*) and several species of Eurasian vipers (*Vipera*), among others.

Often snake habitats are destroyed on a large scale-essentially cleared of all native plants and



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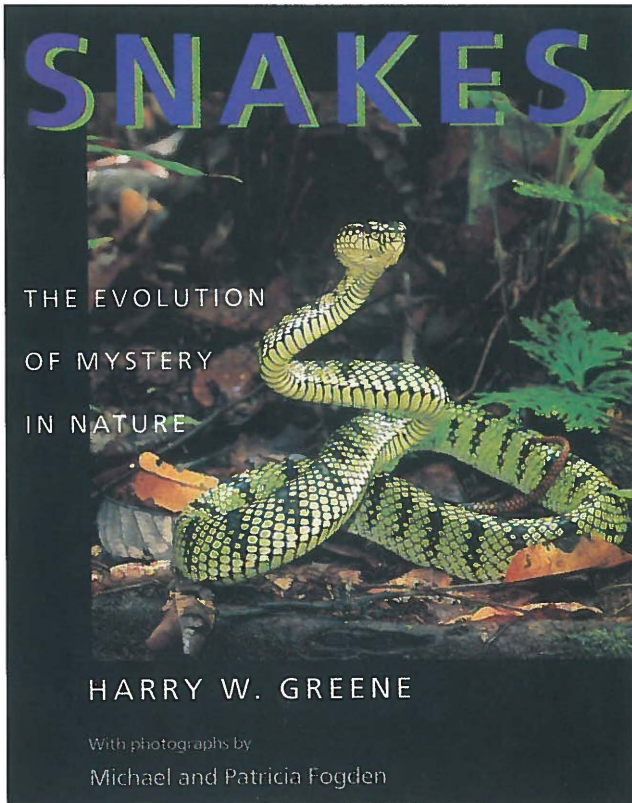


animals for agriculture, water impoundments, and other human activities-but sometimes the damage is more localized. Removal of sandstones for decorative gardens threatens the Broad-headed Snake (*Hoplocephalus bungaroides*), an Australian elapid restricted to rocky outcrops; in North America, unscrupulous collectors destroy many granite flakes and cap rocks in their search for California Mountain Kingsnakes (*Lampropeltis zonata*), Rosy Boas (*Charina trivirgata*), and other commercially valuable species. Some paved highways pose particularly severe threats to snake populations, by interrupting travel routes and causing heavy mortality. On just one 44-km

stretch of roadway in southern Arizona, traffic kills between 500 and 1,000 snakes each year, which amounts to the annual removal of more than a square kilometer of snake populations.

Invading species and other environmental modifications pose extremely serious threats to snake populations throughout the world. Lowered water tables, invading shrubby vegetation, and the resulting demise of native grasslands in southern Arizona have changed the distributions of some snakes and severely diminished the ranges of others. In the Indian Ocean, Round Island Ground Boas (*Casarea dussumieri*) formerly inhabited nearby Mauritius as well, but they disappeared from that larger island after rats arrived on shipping; likewise, deliberately introduced Mongoose (*erpestesauropunctatus*) probably destroyed several West Indian snake populations. Fire Ants (*Solenopsis invicta*) and Nine-banded Armadillos (*Dasypus novemcinctus*), recent invaders of the south-eastern United States, have annihilated many invertebrates and small reptiles, including snakes.

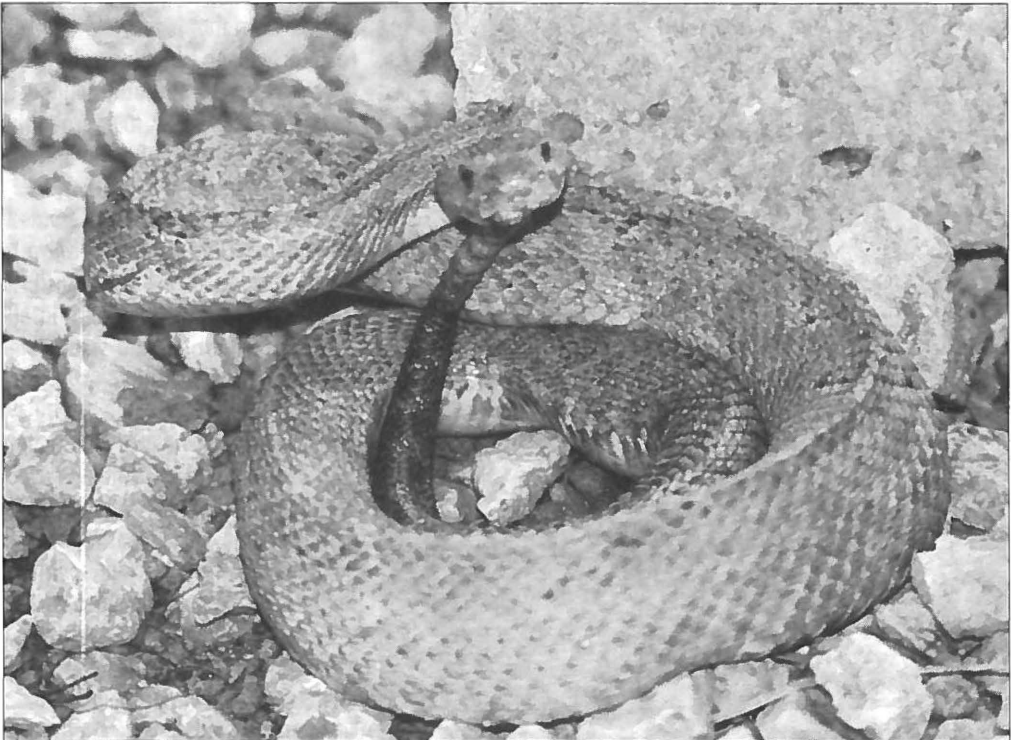
Circumstantial evidence illustrates how toxic substances are among the most insidious threats to snakes, and perhaps to all life on earth. Of two adjacent river valleys in southern Texas, one has never been subjected to extensive agricultural pesticides, whereas the other has been repeatedly treated with various highly toxic compounds. The first valley harbors a typical snake fauna, while the second



lacks ratsnakes (*Elaphe*) and other egg-laying species; given their proven effects on reproduction in other vertebrates, a reasonable guess is that pesticides eliminated those Texas snakes.

An environmental catastrophe of global proportions is fast upon us, not just looming on some distant horizon. More than six billion people will burden the earth by the year 2000, and the irrevocable loss of many plant and animal species is under way now; new species of vertebrates are literally going extinct before their formal descriptions have been published. Simply stated, unlimited reproduction, technology, and greed have caused this biodiversity crisis, although a

more detailed assessment would include complex social, political, and economic forces; only urgent, difficult measures will bring this tragic process under control. We must rapidly increase our understanding of nature and preserve chunks of landscape with as much as possible of what remains. We must drastically reduce pollution and other environmentally unsound by-products of technology, for which those of us in the large, excessively developed and consumptive countries are most responsible. We must eliminate overexploitation and special persecution of wild populations, increasingly serious problems for serpents; we need to better understand the ecology of highly altered environments, as these



*Crotalus unicolor*. Photo by Marcel van der Voort



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increasingly will provide most of the available wildlife habitat (someone should study urban rattlesnakes). All possible compassion for people cannot erase one final, overarching reality - that ever more of us are depleting increasingly scarce resources and further reducing the quality of life; we must control human population growth.

Our environmental crisis will not be solved quickly, and not everyone will like snakes; I prefer optimism to despair, however, and there are grounds for hope. In the 1930s, Boy Scouts received bronze 'Junior Conservationist' medals for killing Northern Watersnakes (*Nerodia sipedon*), believing they were thereby protecting trout; now there is a fine children's book about those much-maligned serpents.

Today Arizona staunchly protects all of its small rattlesnake species, and the plight of the Timber Rattlesnake (*Crotalus horridus*) in eastern North America is gaining widespread recognition. As the millennium approaches, Uganda's Bwindi-Impenetrable Forest is a national park, and Brazilian

wilderness reserves for indigenous peoples might protect a large portion of Amazonian snake diversity. *The Nature Conservancy* recently purchased the Gray Ranch, including a mountain range inhabited by the endangered New Mexico Ridge-nosed Rattlesnake (*Crotalus willardi obscurus*), then sold it to a cowboy poet. Drum Hadley and his *Animas Foundation* are combining careful ranching with conservation on that spectacular property, hectare for hectare the biologically richest piece of land in the United States.

As so eloquently stated by the Senegalese conservationist Baba Dioum, we must learn about, understand, and appreciate nature in order to save her. If you agree with me that the world is richer for its serpents and other unpopular creatures, then use your money, your time, and your votes to encourage biodiversity research, habitat conservation, and population control. We are all teachers in one sense or another, whether in classrooms or over the backyard fence, so take what you know and introduce others to the marvelous world of snakes.