TOMMY OWENS, SAN DIEGO ZOO

Guatemalan Beaded Lizards (*Heloderma horridum charlesbogerti*) are endemic to the semiarid Motagua Valley in Guatemala.

The Guatemalan Beaded Lizard: Endangered Inhabitant of a Unique Ecosystem

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Photographs by the author except where indicated.

The semiarid Motagua Valley in Guatemala is one of the most endangered and unique ecosystems in the world. This region receives the lowest average rainfall in Central America (ca. 500 mm) and is characterized by many endemic species. This region once occupied about 200,000 ha, most of which is now a heterogeneous landscape of crops, grasslands, thornscrub, and very dry deciduous forest remnants. The latter are home to the very rarely encountered endemic Guatemalan Beaded Lizard (*Heloderma horridum charlesbogerti*).

Natural History

The Guatemalan Beaded Lizard, which (in conjunction with *H. h. alvarezi*) may actually represent a distinct species, is restricted to forest remnants in the Motagua Valley. The Beaded Lizards and Gila Monsters (*H. suspectum*) comprise the Helodermatidae, a unique family of lizards with venom glands. Although the subspecies *H. h. charlesbogerti* was described in 1988, it had not been studied until very recently.

This species reduces its activity drastically during the dry season (December to May), when individuals remain almost constantly concealed in subterranean shelters that provide protection from extreme temperatures and desiccation. Suitable shelters are limited resources in the remaining forests and may limit population size. Recent estimates, based on average home-range sizes of this and other subspecies and on remaining available habitat, suggest that only 200–250 individuals remain in the wild.

Only 24,000 ha of suitable habitat remain, and these are comprised of patches ranging in size from < 1 ha to around 1,500 ha. If only those patches of > 100 ha are considered, the potential distribution of these lizards is reduced to 17,000 ha. This area comprises the localities of Cabañas, Usumatlán, and Gualán in the Zacapa Department, and El Jicaro in the El Progreso Department, in the semiarid region of the Motagua Valley in Guatemala.

Conservation Status

The Guatemalan Beaded Lizard is almost certainly the most endangered species in Guatemala. It is listed in CITES Appendix II and as vulnerable in the IUCN Red List of Threatened species. The greatest threats to its continued existence are agricultural practices not compatible with conserva-

A female Guatemalan Beaded Lizard (*Heloderma horridum charlesbogerti*) in the wild.

tion, illegal extraction for local and international collectors, and persecution by local people, who consider it to be dangerous. From 1994–2000, an estimated 30 animals were illegally collected, and, from 2000–2001, local people at only one locality killed 11 lizards.

Another factor that may have had a negative impact on wild populations of *H. h. charlesbogerti* was Hurricane Mitch in November 1998. Vast zones of the most arid portions of the Motagua Valley were flooded that year, causing considerable damage to the human population and to the wildlife of the region. Late October-early November is the beginning of the egg-laying season for Beaded Lizards, and the eggs are known to be very sensitive to humidity. A number of clutches may well have been lost or failed to hatch because of floods. Unfortunately, no baseline data existed at that time, so the impact on wild populations cannot be evaluated.

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Land-use changes within the distribution of *Heloderma horridum charlesbogerti*: Changes are primarily attributable to production of commercial crops like melon (top) and subsistence crops like corn (bottom).

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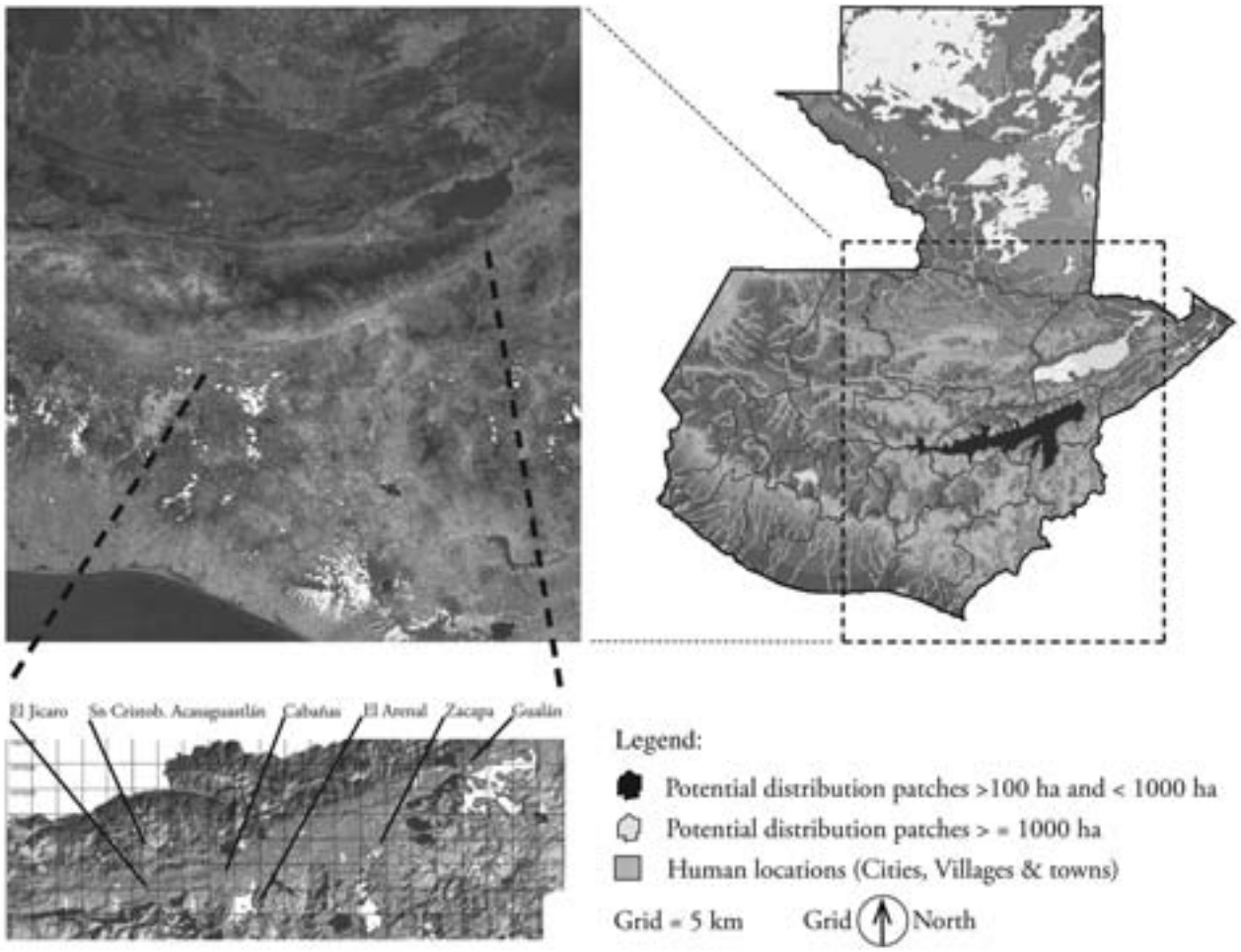
Guatemalan Beaded Lizards (*Heloderma horridum charlesbogerti*) emerging from and resting in subterranean shelters.

Conservation Efforts

Since the initiation of intensive studies in 2002, conservation efforts have increased, in part because of an increased public awareness regarding the threatened status of the species. These efforts have been led by a local NGO, "Zootropic." The program is constituted of four basic elements: (1) education, (2) applied scientific research, (3) habitat conservation, and (4) development of conservation policies for this species. Research has focused on determining distribution, the nature and cause of threats, the basic biology of the species, movement patterns, shelter use and their availability as a limiting resource, and characterization of venom. The education program has been ongoing since mid-2003 in localities where this species occurs and in coordination with local authorities and local partners of Zootropic. The habitat conservation component has two approaches: (1) conservation of private lands by commitment of owners to preserve forest remnants and (2) an official declaration of municipal, communal, and private natural reserves as



Potential distribution of *Heloderma horridum charlesbogerti* in the semiarid Motagua Valley in Guatemala (indicated by the shaded area on the map). Determination of the potential distribution took into account historical and recent collection sites, land use patterns, rainfall and temperature data, forest types, and distances to human settlements.

part of the Guatemalan protected areas system. Finally, Zootropic has promoted and coordinated the planning of a national strategy for Guatemalan Beaded Lizard conservation with the support of The Nature Conservancy. This conservation plan was generated in collaboration with local and international experts representing 16 institutions, including the National Council of Protected Areas (CONAP), which is Guatemala's official institution in charge of biodiversity conservation.

Local People: Poachers and Conservationists

Considering that two of the most serious threats to the species are illegal trade and extermination, environmental education has been strongly emphasized. This program actively engages local people, some of whom were poachers of *Heloderma* in the past. Today, they are proud conservationists. Demonstrating the uniqueness and importance of conserving this species, locals have learned that many of the myths associated with the species were not true. Some individuals have learned to use the radiotelemetry equipment and implement basic research techniques. The principal objective of this involvement is to incorporate members of the community in the research in order to instill an appreciation for this species. Only with a strong relationship between locals and scientific researchers is an understanding of the importance of the project possible. These people now function as promoters of the conservation plan within their own communities.

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Current research is using radiotelemetry to reveal movement patterns and shelter selection in the wild

A *Heloderma horridum charlesbogerti* with a radiotransmiter is entering a subterranean shelter.

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The environmental education program addresses local farmers (top) and school children (bottom).

A group of local and international experts (representing 16 institutions) are collectively responsible for the National Strategy for Guatemalan Beaded Lizard Conservation.

Next Steps

In spite of strong conservation efforts already implemented, gaps still exist in the data. Very little is known, for instance, about the species' ecology, characteristics of the nests, and which specific physical factors affect shelter selection. Reproductive behavior has not been observed or documented in the wild. Such data are of great importance for implementing *ex situ* and *in situ* conservation strategies. Also, emphasis continues on strengthening environmental education programs and continuing to promote the conservation of this species to official environmental agencies. A captive-breeding program has been initiated. Within the year, genetic analyses of wild and captive populations are slated to begin.

Land owners have designated forest remnants on their farms for protection; this large remnant near El Arenal is inhabited by Guatemalan Beaded Lizards.

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