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A male *Ctenosaura bakeri* (Swamper or Utila Iguana) on Utila Island, Honduras, March 2003. Photograph by John Binns.



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In This Issue...

FEATURE: IIS Conference on Utila
Utila: Home to Three
Native Iguanas
Utila Island Swampers
Brief History of the Iguana Station
The Zen of Swamping — Adventures on Utila
SPECIES PROFILE: Utila's Reptiles
FEATURE: Stout Iguanas
Stout Iguanas: Historical Perspectives and Status Report
Guauna and Necker Island Population Assessments 2002
HUSBANDRY: Green Iguana Communication
PROFILE: Fred Burton: The Man Behind the Blue Iguana Recovery Plan
HISTORICAL PERSPECTIVES: The Black Iguana
IGUANA NEWSBRIEFS
LETTER FROM THE PRESIDENT

Editors' Remarks

This is a special issue of IGUANA. One reason is that it is half again as long as a regular issue. We owe this to a generous donation by Henry and Gloria Jarecki, who subsidized the extra pages in order to accommodate the feature on Stout Iguanas (p. 39). They already have made tremendous contributions to the species' chances for survival by providing it with a second home on Guauna.

This issue also includes for the first time several new regular features created in response to discussions by the Board of Directors during the IIS Conference on Utila (p. 27). Each issue from now on will include at least one article focusing on some aspect of iguana husbandry. The first of these, on Green Iguana communication (p. 50), was excerpted from the excellent book by Gunther Köhler, which, unfortunately for most U.S. iguana enthusiasts, is currently available only in German. In addition, each issue will profile an individual who has made significant contributions to our understanding of iguanas. The inaugural profile (p. 53) features Fred Burton, the man behind the Blue Iguana Recovery Programme. Also appearing for the first time is an historical perspective. These features will appear from time to time in order to lend some insights into the changing perceptions of iguanas over the years. This issue's perspective (p. 56) addresses Black Iguanas (Ctenosaura), which is particularly appropriate in light of the ctenosaurs of Utila that so delighted the Conference participants.

We also provide a Species Profile (p. 36) that presents a suite of species instead of only one. We do not necessarily intend for this to become the normal mode for these features, but decided that it was appropriate, at least this one time, because of the unusual reptilian diversity on Utila and because it emphasizes how iguana conservation can benefit an entire biotic community.

Bob Powell, AJ Gutman, and John Binns

Statement of Purpose

The International Iguana Society, Inc. is a not-for-profit corporation dedicated to preserving the biological diversity of iguanas. We believe that the best way to protect iguanas and other native plants and animals is to preserve natural habitats and to encourage development of sustainable economies compatible with the maintenance of biodiversity. To this end, we will: (1) engage in active conservation, initiating, assisting, and funding conservation efforts in cooperation with U.S. and international governmental and private agencies; (2) promote educational efforts related to the preservation of biodiversity; (3) build connections between individuals and the academic, zoo, and conservation communities, providing conduits for education and for involving the general public in efforts to preserve endangered species; and (4) encourage the dissemination and exchange of information on the ecology, population biology, behavior, captive husbandry, taxonomy, and evolution of iguanas.

Membership Information

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Members of the I.I.S. are encouraged to contribute articles, letters to the Editor, news items, and announcements for publication in Iguana. General articles can deal with any aspect of iguana biology, including conservation, behavior, ecology, physiology, systematics, or husbandry. Submission of photographs to accompany articles is encouraged.

Manuscripts may be submitted via e-mail (send to ctenosaura@cyclura.com). For any contribution, please include your name, address, phone number, and e-mail address. Authors of one page or more of print are entitled to five copies of the issue in which their article appears.

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UTILA: Home to Three Native Iguanas

Utila, site of the 2003 IIS Conference (see related stories, p. 32 and 59), is the smallest of the principal Honduran Bay Islands (41 km²). This relatively tiny body of land, however, supports a phenomenal reptilian diversity (see Species Profile, p. 36) that includes three native species of iguanas (*Ctenosaura bakeri*, *C. similis*, and *Iguana iguana*) — the only island so blessed anywhere in the world.

"Why do humans have an apparently insatiable desire to take something natural and beautiful, chop it down or kill it, cover it over with cement, and then proceed immediately to the local lumber, nursery, and pet stores to purchase poor copies of what they just destroyed?"

John Binns, IIS Director

continued on page 30



Adult male *Iguana iguana* at the Utila Iguana Research and Breeding Station. Photograph by John Binns.



Adult female *Ctenosaura bakeri* on a mangrove branch. Photograph by Robert Powell.



Adult male *Ctenosaura similis*; note the aggressive reaction to the photographer in the photo to the left. Photographs by Sandy Echternacht.

Utila Island Swampers

Alex Gutsche
Humboldt Universität, Berlin

"Swampers," as the endemic Utila Spiny-tailed Iguanas (*Ctenosaura bakeri*) are called locally, are arguably the most remarkable inhabitants of little Utila Island. Differing from all other species of *Ctenosaura*, which live almost exclusively in dry, open, sunny areas, *C. bakeri* is limited to mangrove swamps.

Maximum known size is 315 mm (head-body length) and 923 g for males and 229 mm and 424 g for females. Although ctenosaurs often are called "Black Iguanas," Swampers are relatively colorful. Juveniles are largely uniformly blackish-brown with a few darker brown stripes on the upper side of the body and tail (coloration that renders them quite cryptic against the muddy substrates of the swamp). Adults, in contrast, vary from grayish-brown to an amazing turquoise, which is most obvious in bright sunlight.

Living exclusively in a mangrove swamp requires special adaptations, including the need to deal with a salty diet and the lack of freshwater. In addition, the substrate is muddy and frequently submerged during high tides, forcing Swampers into the trees — where the only retreats are naturally occurring tree

holes. Suitable trees with holes are very much in demand. Juveniles and adults are strongly territorial and will strenuously defend their home trees even against larger opponents. Tree holes are mostly restricted to older mangroves, especially Black Mangroves (*Avicennia germinans*), which are scattered on Utila. The result is a patchwork-like distribution of *C. bakeri*, even in otherwise apparently suitable habitat.

The few other reptiles known to be mangrove specialists are exclusively carnivorous. Swampers, however, are omnivorous. Mangrove leaves and, if available, mangrove flowers form the main part of the diet. The second largest part of the diet is fiddler crabs, which have been found in 72% of analyzed scat. To catch crabs, iguanas wait for low tide and either forage actively for prey or, usually with more success, employ a sit-and-wait strategy until a crab crawls within range. The fact that mangrove leaves contain only 7% crude protein versus 34%

in crabs may explain the intensive efforts to hunt crabs. Both mangrove leaves and crabs are salty, which creates an osmotic problem for Swampers. Since freshwater is available only during the rainy season, water usually is acquired with food (50–70% water) or by drinking the brackish swamp water. Reptilian kidneys are unable to excrete excessive salt, so most is eliminated by specialized salt glands located in the nasal cavity. In effect, the salt is sneezed out.

Reproductive activity occurs during the dry season. Triggered by decreases in rainfall (to <200 mm/m²)

and increases in air temperature (to >24°C), usually from late January through March, adult males begin patrolling the invisible border around a mating territory, using displays and aggressive behavior to exclude male intruders. Egg-laying takes place from mid-March through early May, when the ground temperature is about 30°C. Hatching usually occurs from mid-June to early August, before the onset of the next rainy season. In association with recent warming trends, a shift of the entire reproductive season to as much as two weeks earlier has been recorded.

Because of the saturated substrate, gravid females must migrate to nesting sites, which are restricted to a few sandy beaches. Females may travel up to 1.3 km



Adult male *Ctenosaura bakeri* from Iron Bound. Photograph by Robert Powell.



An adult male "Swamper" (*Ctenosaura bakeri*) basking on a mangrove stump near the canal. Photograph by A.C. Echternacht.



A female *Ctenosaura bakeri* on a mangrove stump.
Photograph by John Binns.

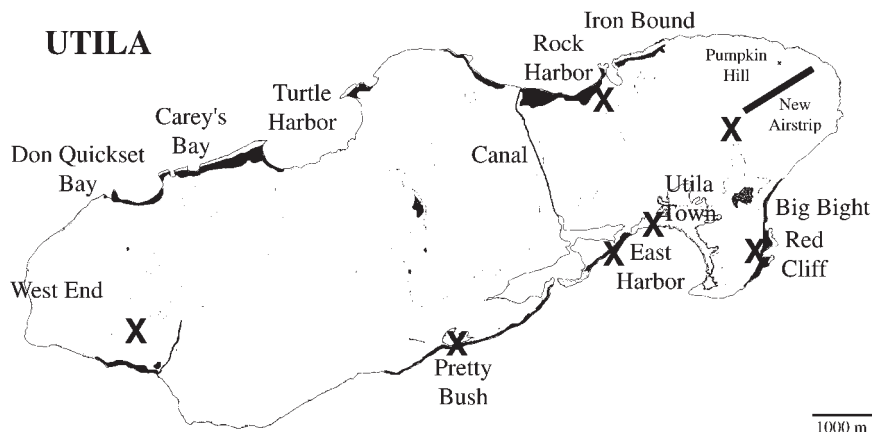
(direct line) to lay their eggs before returning to their home tree in the swamp. Nesting sites must have sandy, well-drained soil and realize an average incubation temperature of 30.5°C. Females stay at the beach for several days, searching for a suitable nesting site at up to 50°C surface temperatures. Nesting tunnels range from 510–1240 mm in length and nesting chamber are at depths of 150–450 mm. Clutches contain 6–16 eggs. Three months later, hatchlings emerge and head straight for the mangroves.

Large Brown Basilisks (*Basiliscus vittatus*), Great-tailed Grackles (*Quiscalus mexicanus*), raptors, and snakes all prey on juvenile iguanas, but only large boas (*Boa constrictor*) pose a significant threat to adults. Consequently, the major threats to *C. bakeri* are increases in uncontrolled human development and the consequent loss of habitat.

The total range of *C. bakeri* on Utila consists of three separate mangrove areas with a total area of about 10 km². Egglaying areas are much more limited and have a total size of less than 1 km². As a result, **Utila Iguanas have the smallest and most threatened distribution of any ctenosaur. Population numbers will invariably decrease in the near future if the habitat, especially the nesting areas, becomes unavailable.**

Although, hunting still occurs despite regulations against it, tourism and land sales that are increasing the extent of Utila Town are of greater concern. These result in deforestation or despoilment of mangrove areas with landfills. Sandy beaches are in great demand for development, so nesting sites close to town are cleared of debris, rendering them unsuitable for iguanas even before construction begins. Invasive plants also overgrow the open nesting sites and must be controlled.

Protection of suitable mangrove areas and nesting sites is critical — and must be implemented as quickly as possible. All beaches are privately owned, so purchasing key stretches for the use of iguanas is the only solution. Creating an iguana refuge on Utila will enhance the likelihood of the Utila Iguana's long-term survival and also would serve to protect areas used as roosts by migratory birds and as nesting sites for critically endangered Loggerhead and Hawksbill turtles.



The distribution of *Ctenosaura bakeri* on Utila Island (gray areas) corresponds closely to stands of old mangrove forest, especially large Black Mangroves with tree holes. Females must migrate to nesting beaches (dark gray) in order to lay their eggs. **All** nesting beaches are in imminent danger of development. Other threats to the species are indicated with X's: the area near West End is being deforested; Utila Town, especially near the new airstrip, and Pretty Bush are expanding into Swamper habitats and garbage is being dumped into the mangrove forests; iguanas in areas near East Harbor, Rock Harbor, and Red Cliff remain vulnerable to hunting, which continues despite prohibitions. *Modified from a figure by Alex Gutsche.*

continued from page 27

As might be expected when three large species with generally similar lifestyles occupy such a small area, they must in some way partition the severely limited resources in order to avoid direct and mutually disoperative competition. In fact, these iguanas are largely restricted to distinctly different habitats. Green Iguanas (*I. iguana*) inhabit the remaining upland forests, where continuous canopies allow them to remain inconspicuously hidden in the treetops — except when the females are forced to descend in order to nest. Black Iguanas (*C. similis*), referred to locally as “Highlanders,” favor more open areas, occupying forest edges and rockpiles, fallen logs, or isolated trees in otherwise open fields. These lizards are quite capable of effectively utilizing heavily disturbed areas and frequently coexist closely with humans (seeing individuals basking on rooftops or along heavily traveled roads is quite common). Unlike Green and Black iguanas, both of which have broad distributions throughout the entire Neotropics and Middle America, respectively, the Utila Iguana (*C. bakeri*) is found only on Utila. Possibly because of their smaller size or more retiring nature, Utila Iguanas are found only in the apparently inhospitable mangrove swamps, where they fare quite well on a diet of mangrove leaves supplemented with small fiddler crabs. Known to the local Utilians as “Swampers,” Utila Iguanas do face a problem when nesting seasons roll around. Since the swamps are regularly inundated and the soils totally saturated with brackish water, they are unsuitable nesting sites. Instead, females must migrate considerable distances to one of the relatively few sandy beaches (only 38 ha on the entire island) to lay their eggs. Interestingly, when they return, they reestablish residence in the very same mangrove they left some weeks before. How they find their homes with such inerring accuracy despite the bewildering similarities of one tangled tree and the next is one of several mysteries surrounding this ecologically unique iguana.

* Upon recommendations by the IIS, consideration is being given to holding hatchlings until two years of age, when chances for survival are greatly enhanced.

Brief History of the Iguana Station

Karsten Gees, Director

Utila Iguana Research and Breeding Station

The story began with an American Consul at the end of the 19th century. While visiting Utila, he collected some iguanas in the mangroves and sent them to the Washington Zoo. The zoo director, a Mr. Baker, sent these animals to the famous herpetologist, Leonhard Stejneger at the National Museum of Natural History in Washington, DC. Stejneger determined that the iguanas of Utila were a new species, and he described them formally in 1901, giving the Utila “Swamper” the name *Ctenosaura bakeri* in honor of Mr. Baker.

The herpetological world essentially forgot about *C. bakeri* until 1994, when a group of German researchers led by Gunther Köhler rediscovered these iguanas in the wild. In the following years, the group determined that *C. bakeri* is endemic to Utila and that its habitat is restricted to the mangrove swamps, with a total area of only 8 km² (see article on p. 28). Furthermore, they found that *C. bakeri* is threatened by hunting and by the unchecked development of infrastructure for the burgeoning tourist industry. Thus was born the Conservation and Research Project Utila Iguana. In 1997, a breeding program was established to support the wild population. Half of the hatchlings each year are released immediately to the wild while the others are reared at the Station for one year* before release. Concurrently, an ongoing research program was initiated for the study of the distribution and behavior of the Utila Iguana. The Zoologische Gesellschaft Frankfurt and the Senckenbergische Naturforschende Gesellschaft Frankfurt have been the principal supporters of the project and enabled the original acquisition of property and construction of the Iguana Research and Breeding Station in 1998.

The Iguana Station continues to grow and improve. It now has a visitors' center with exhibits focusing on *C. bakeri*, but also addressing the other reptiles and amphibians of Utila. Spacious cages have been constructed on the grounds for rearing hatchling Swampers, along with cages for Green Iguanas (*Iguana iguana*) and Black Iguanas (*C. similis*), both species of which also are native to Utila. About 100 tourists visit the Station each month.



An adult male "Swamper" (*Ctenosaura bakeri*) at the Research Station. Photograph by John Binns.



Main building at the Iguana Research and Breeding Station. Photograph by John Binns.



Outdoor enclosures for head-starting iguanas. Photograph by John Binns.

In addition to maintaining the breeding and research program, volunteers from all over the world provide environmental education programs for the local schools. In cooperation with BICA (Bay Island Conservation Organization), the other NGO on Utila, all grades have been covered this year. The goal of this outreach program is to enhance the sensibility and feelings of responsibility of the children for their island home, with its phenomenally abundant natural treasures. Last but not least, the Iguana Station is working with the IIS and other organizations to acquire funding for the purchase of beach properties that serve as nesting sites for *C. bakeri* and which are, at the moment, the most critically threatened portions of their habitat (see related story on p. 28).



Organizations that have supported the Conservation Project Utila Iguana: the Senckenbergische Naturforschende Gesellschaft Frankfurt, the International Reptile Conservation Foundation, and the Zoologische Gesellschaft Frankfurt.

John Binns, representing the International Reptile Conservation Foundation (IRCF), installed about \$2,500 in computer and network equipment in the lab at the Utila Iguana Research and Breeding Station. This replaced aged equipment and dramatically improved the Station's ability to communicate while also aiding in its research efforts.

David Nieves and Rick Morrow, representing the Kansas City Herpetological Society (KCHS), donated about \$500 worth of equipment including two electronic scales (full-size for the lab and a miniature version for use in the field), a Gentle Giant Tong®[®], and a selection of tools including forceps, hemostats, dosing needles, and probes. All of these items were purchased from Midwest Tongs (www.tongs.com).

The Zen of Swamping — Adventures on Utila

AJ Gutman

What do you do when you're dripping with sweat and knee-deep in fetid swamp mud that threatens to yank the boots off your feet with every step? You scramble to capture another tiny Fiddler Crab to stuff in your cargo pockets (to feed to the young Utila Iguanas in the rearing cages at the Iguana Research and Breeding Station). Eyes alert for an endangered "Swamper" (as the endemic mangrove swamp-dwelling iguana, *Ctenosaura bakeri*, is known locally), you reach for the hand of a smiling friend as you climb onto a sturdy mangrove root, ready to lend a hand to the next person stuck in the mud. As muddy hands meet, you both burst into laughter, repeating "smacks of adventure!"

Perhaps not everyone would answer that question in quite the same manner, but all of the participants in the 2003 International Iguana Society conference on Utila definitely would. Seventeen IIS members and assorted other conservation aficionados from around the world spent a week together on Utila, a small island off the northern coast of Honduras. Much of that time was devoted to trekking through wet and muddy Swamper habitat.

Our hosts included personnel from the Station on the island and Dr. Gunther Köhler, Director of the Conservation Project Utila Iguana (CPUI), from Frankfurt, Germany. I first read about Dr. Köhler and his research and conservation work on



Only true iguana lovers (i.e., IIS members) could have this much fun on a stomp through the swamp. *Photograph by John Binns.*



Gunther Köhler (right), indulging his passion for country and western music, is joined by his wife, Elke (center), and AJ Gutman (left), performs the "Swamper Song" for conference participants. *Photograph by John Binns.*

behalf of the remarkable Swamp Iguana years ago in the *Iguana Times*. Eager to meet him and his wife Elke, I was entirely prepared to be dumbstruck with awe. What I didn't expect was a warm and wonderful couple with whom I would make my country and western singing debut performing Gunther's original rendition of the "Swamper Song."

The Station also proved to be delightful. Walking there from where we were staying, we would regularly encounter several Black Iguanas, *Ctenosaura similis*, that had taken up residence in hollow trees and on piles of rocks along the edges of Utila Town. The Station "greeter" was Rosalita, a charming Red-naped Amazon Parrot who loved to have her neck scratched. The tidy grounds were dotted with Hibiscus flowers and spacious enclosures filled with hatching *C. bakeri*, as well as a few *C. similis* and *Iguana iguana* that are used in environmental



Rosalita, a Red-naped Amazon Parrot, was the Station "greeter." *Photograph by Joe Burgess.*

education programs for Utilian school children. Among my personal favorite animals were the large Swamper male, who I named Willy Nelson because of his long dorsal spines, and a gorgeous female I called "Marlene." Marlene is an astonishing hybrid between *C. bakeri* and *C. similis*. Half of her tail, divided along the midline, has scalation characteristic of *C. bakeri* and the other half is characteristic of *C. similis*!

One of our field trips was by boat through a mangrove-covered canal where we were delighted by numerous Swamper sightings. Our final destination that day was a beach in an area called "Rock Harbor," where we cleared exotic invasive vegetation choking important egg-laying sites. What we didn't know while we were doing this work is that this area is one of the few remaining beach sites available for purchase. In cooperation with the CPUI and the International Reptile Conservation Foundation, the IIS is initiating a fundraising



A juvenile "Highlander" (*Ctenosaura similis*) on a rock wall. *Photograph by Robert Powell.*

A Swallowtail Butterfly visits a Hibiscus flower at the Station. *Photograph by Robert Powell.*



effort to help purchase and preserve this area for the Utila Iguana (details are given in the letter from the President on p. 59). This site also is part of the proposed Ecotrail, which will allow tourist access to critical iguana habitat for the economic benefit of the island while minimizing impact on the endemic species.

Another field trip to the Big Bight took us past an extremely unattractive garbage dump (Utila currently has no formal plan for waste disposal and the risk of contamination to groundwater is very real). Given the number of *Anolis* enthusiasts in our group, many people were eager to hunt for the endemic *Anolis utilensis* (a really swell anole found in the swamp; see the Species Profile on p. 36). Up to our knees yet again in water-inundated swamp, we happily climbed trees in pursuit of little lizards under the watchful and amused gaze of a Black Hawk.

Additional hikes, in which at least some of the conferees participated, went through prime Swamper habitat to Iron Bound on the northern coast, to the beaches below Pumpkin Hill, which were graced by colorful “Shaky Paws” (see the Species Profile), and, after a long boat trip around the western tip of the island, on an unsuccessful search for Don Quickset Pond, freshwater home

to the few turtles known to occur on Utila. Although the pond remained elusive, hikers on that trip did manage to find a frog, one of five species known from the island but rarely seen except during the rainy season.



An educational sign near the harbor promoting Swamper conservation. *Photograph by John Binn.*



“Willie Nelson,” an adult male Swamper at the Station. *Photograph by Robert Powell.*



“Marlene,” a female hybrid *Ctenosaura bakeri x similis*. *Photograph by John Binns.*

After showering off the mud, we spent our evenings at the Bush Bar, a wonderful open-air pavilion, which the owner had graciously offered as a venue for our presentations. Conference participants, Iguana Station staff, and several Utilians were treated to talks on “Spiny-tailed Iguanas,” “Aspects of the Ecology and Population Biology

of *Ctenosaura bakeri*,” “Lizard Ecology on West Indian Islands,” “Lizard Wars” (invasive versus native reptiles in Florida), and “Modern Conservation Practices in the Caribbean.”



Bob Powell, Sandy Echtenacht, Alex Lau, Wendy Townsend, Mark Keoppen, and an unnamed boat driver (from front to back) heading for and through the canal to Rock Harbor. *Photographs by Joe Burgess.*



AJ Gutman, Joe Wasilewski, and Betsy Davis engage in some hands-on conservation by clearing invasive vines that are choking an important nesting site near Rock Harbor. *Photograph by John Binns.*

The IIS thanks Gunther Köhler, Sven Zörner, Alexander Gutsche, Karsten Gees, and the volunteer staff of the Iguana Research and Breeding Station for making our Conference an unforgettable experience. Special thanks also to the thoroughly wonderful Sandy Binns for making all of our impossible travel arrangements. We never could have done it without you!



Gunther Köhler addressing the conference. *Photograph by Alex Lau.*

A Common Black Hawk (*Buteogallus anthracinus*) supervising our *Anolis* hunt in the Big Bight. *Photograph by Robert Powell.*



The only frog (*Leptodactylus melanotus*) seen on the trip. *Photograph by Joe Burgess.*

SPECIES PROFILE: UTILA'S REPTILES

Robert Powell

In addition to an already remarkable three native iguanas, tiny Utila (only 41 km²) supports a phenomenal reptilian diversity: 15 lizards (including the three iguanas), 11 snakes, a freshwater turtle, and a crocodilian. Most are representatives of widely ranging Central American species, but two are endemic to Utila (*Anolis utilensis* and *Ctenosaura bakeri*) and three others are found only on the Bay Islands (*Anolis bicaorum*, *Phyllodactylus palmeus*, *Sphaerodactylus rosaurae*).

The American Crocodile (*Crocodylus acutus*) population on Utila may be extirpated already and the turtle, a Slider (*Trachemys* sp.), is known to occur in only very small numbers in a single, largely freshwater pond in the undeveloped western half of the island.

The snakes range in size from the *Boa constrictor* and Indigo Snake (*Drymarchon corais*), which may exceed 2 m in length, to the tiny Thread Snake (*Leptotyphlops goudotii*), a termite- and ant-eating specialist that reaches a maximum known total length of 18.5 cm. Swamp Snakes (*Tretanorhinus*

nigroluteus) are highly aquatic and the very slender Vine (*Oxybelis aeneus* and *O. fulgidus*) and Tree snakes (*Imantodes cenchoa*) are adapted for a largely arboreal existence. The remaining snakes tend to be habitat and prey generalists of moderate size. These include the Tropical Ratsnake (*Pseudelaphe flavirufa*) and three "racers" (*Coniophanes imperialis*, *Dryadophis melanolomus*, and *Leptophis mexicanus*).

The lizards include a beach-dwelling racerunner (*Cnemidophorus lemniscatus*), a skink (*Mabuya unimarginata*), the Common or Brown Basilisk (*Basiliscus vittatus*), three anoles (*Anolis bicaorum*, *A. sericeus*, and *A. utilensis*, all of which are sometimes assigned to the genus *Norops*), and six geckos (*Coleonyx mitratus*, *Hemidactylus frenatus*, *Phyllodactylus palmeus*, *Sphaerodactylus millepunctatus*, *S. rosaurae*, and *Thecadactylus rapicauda*).



The *Boa constrictor* usually is considered a predator of mammals, but it will readily hunt and consume iguanas and is relatively common in the mangroves, where *Ctenosaura bakeri* would seem to be the primary prey. Photograph by Robert Powell.



Tiny Dwarf Geckos (*Sphaerodactylus millepunctatus*) are abundant inside rotten logs and in surface debris, where they feed on a variety of small arthropods. Photograph by Joe Burgess.



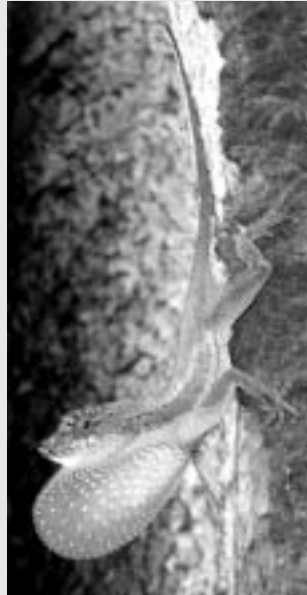
Like most skinks, the local species (*Mabuya unimarginata*) has smooth scales well-adapted to foraging in leaf litter. They are most frequently encountered when they climb vegetation to bask. Photograph by Robert Powell.



The Green-headed Parrot Snake (*Leptophis mexicanus*) is a habitat generalist that is equally at home on the ground or in trees and bushes. Although it will feed on birds and small mammals, its preferred prey is lizards. This may be the most common snake on Utila. Photograph by Robert Powell.



This brightly colored racerunner (*Cnemidophorus lemniscatus*) is sometimes referred to as the Rainbow Lizard. Because of a tendency to twitch an elevated forelimb when it pauses in its search for food (as this individual is doing), this lizard is known locally as the "Shaky-paw." They are locally abundant on sandy beaches. *Photograph by Robert Powell.*



Anolis bicaorum is the most common anole on Utila, but is abundant only in the forest-mangrove interfaces, where pairs occupy most of the larger trees. This male is responding to an intruder in its territory. *Photograph by Joe Burgess.*



Basilisks (*Basiliscus vittatus*) are known best for their ability to run quickly on their hindlegs, to the extent of being able to run on water. However, they are abundant in a variety of habitats, many of which are not associated with streams or ponds. *Photograph by Robert Powell.*



The very tiny Striped Thread Snakes (*Leptotyphlops goudotii*) are most frequently encountered in association with termite and ant nests, where they feed preferentially on eggs, larvae, and pupae. This specimen, however, was discovered in the open on a sandy beach. *Photograph by Robert Powell.*



The Tropical Rat Snake (*Pseudelaphe flavirufa*) is a capable climber. In addition to rodents and other mammals, this species, like all rat snakes, also will consume birds and lizards. *Photograph by Robert Powell.*



Anolis utilensis, like the other Utila endemic, *Ctenosaura bakeri*, is a mangrove specialist. Common only in the Black Mangroves of the Big Bight, these well-camouflaged lizards behave in a very gecko-like fashion, crawling on the tree trunks and adpressing themselves tightly against the bark when threatened. Photograph by Robert Powell.



The Turnip-tailed Gecko (*Thecadactylus rapicauda*) is named for the shape of its regenerated tail (the original is more typically tapered). These large geckos are abundant on trees and, more rarely, buildings. They are unusual among lizards in that they can retract their claws into "sheaths" when not in use. Photograph by Robert Powell.



This Leaf-toed Gecko (*Phyllodactylus palmeus*) is abundant on trees and buildings, but is being displaced on the latter by the recently introduced House Gecko (*Hemidactylus frenatus*). Photograph by Robert Powell.



Coleonyx mitratus is an unusual gecko in that it lacks adhesive lamellar scales on the undersides of its digits and doesn't climb. These lizards are common in and around surface debris and trash. Photograph by Robert Powell.

Stout Iguanas: Historical Perspectives and Status Report

John Binns

International Reptile Conservation Foundation

(All photographs are by the author unless otherwise indicated)

Anegada

R.H. Schomburgk first noted the presence of *Cyclura pinguis* (Stout or Anegada Iguana) on Anegada in 1832, but literature documenting the status of this species has been sparse. However, each progressive publication has described or implied an ever-increasing concern for its survival. Accounts from the 1940s and 1950s are essentially non-existent. By the early 1960s, large-scale development was planned for Anegada. Although these plans were never fully realized, the initial ground-work destroyed the traditional stone paddocks used to corral livestock, unleashing goats, sheep, cattle, and burros to roam and propagate freely. Excessive grazing has since reduced the natural plant community to secondary, largely toxic vegetation. Today, almost all free-ranging cattle and burros are emaciated and only goats are thriving.



This Anegada Iguana was estimated to be over 20 years old.

In 1968, W. Michael Carey conducted a field study on the ethoecology of the Stout Iguana and, in his classic 1975 paper, stated: “whatever the methods, steps must be taken now to ensure the continued existence of *C. pinguis* on Anegada.”



Emaciated cattle are a common sight on Anegada. Although the vegetation appears rich, the plant matter is all secondary growth.

This statement was based in large part on his observations of competition for available food between Stout Iguanas and livestock and of predation on iguanas by domestic mammals.

Following Carey, James Lazell worked with Stout Iguanas in 1980 and 1982–1986 and Numi Mitchell worked with them in 1987–1996. Glenn Gerber, then with the University of Tennessee and presently with the Zoological Society of San Diego, began working on the species in 1998 under auspices of the IUCN/SSC Iguana Specialist Group (now funded by the International Iguana Foundation) and the British Virgin Islands National Parks Trust (BVINPT).

James Lazell first observed Stout Iguanas on Anegada in 1980 while employed by The Department of Natural Resources and the Environment (DNRE), Government of the British Virgin Islands. Expecting to find large densities at Citron Bush, the site of Carey’s 1968 study, he instead found that iguanas had completely disappeared from the area in the intervening 11 years. Lazell subsequently found the highest remaining



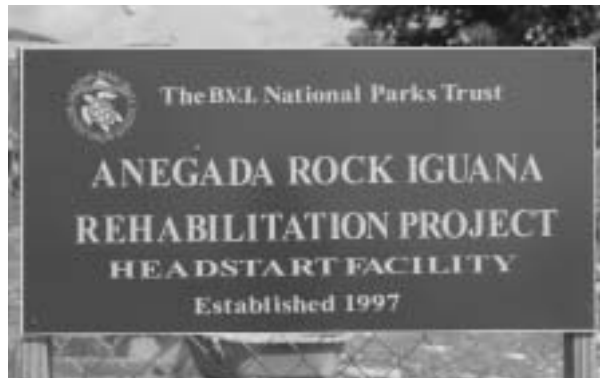
Aerial photograph of Bones and Windlass Bight, Aneгада, BVI. This small stretch of land that lies between the ocean and salt ponds is the only core Stout Iguana habitat left on Aneгада. Access cuts as well as the main road passing through the area are visible in the photograph.

concentration of iguanas at Bones Bight, which today remains one of the core areas for the species.

Carey's warning was reiterated by others, but efforts to fund the removal of livestock and feral predators remain mostly unsuccessful, despite some recent activity. In 1997, concrete efforts to secure the species' future materialized in the form of the Aneгада Iguana Headstart Facility. In October 1997, at the request of BVINPT, West Indian Iguana Specialist Group (WIISG) members Rick Hudson (Fort Worth Zoo), Jeff Lemm (San Diego Zoo, CRES), and Rondel Smith (BVINPT) constructed a small facility to house three juvenile Stout Iguanas found floating in Manhead Pond. The facility provides a safe haven for collected



The Aneгада Iguana Headstart Facilities currently hold about 80 captives. The two structures at the front left are new cages located close to the gate, allowing visitors to view these rare animals. The main cage system lies behind these new cages. Current keepers, Rondel Smith and Lee Vanterpool, have made substantial improvements and all animals are in good health.



The Aneгада Iguana Headstart Facility's new sign is displayed proudly at the entrance.

hatchlings until they are large enough to reduce the threat of feral predators. A year later, a grant from the UK Foreign Commonwealth Office to the BVINPT and WIISG T-shirt and poster sales funded construction of the main complex by Rick Hudson and Jeff Lemm, joined this time by Mike Fouraker and Glenn Gerber. In August 2001, the International Reptile Conservation Foundation (IRCF) and the BVINPT funded an upgrade to the facilities to increase captive capacity. Team members for this project were John and Sandy Binns (IRCF), Alberto Alvarez (PR-DNRE), Juliann Sweet, Joel Friesch (IRCF), and Rondel Smith and Lee Vanterpool (BVINPT).

To date, none of these head-started captives have been released into the wild, but a limited release on Aneгада, coupled with the relocation of a few captives to a neighboring island, has been discussed. In conjunction with this dialogue, a population assessment of Stout Iguanans is planned



This five-year-old captive Aneгада Iguana is one of the older animals at the facility. Captive iguanas at the facility tend to be smaller than iguanas observed on Guana and Necker in the same age groups.



Fallen Jerusalem, BVI: this small island is a possible relocation site for some of the head-started animals on Anegada. This island, with no feral livestock, is well fortified with large rock boulders that offer a degree of protection during heavy storms and hurricanes.

during July 2003 to update the previously published estimate of fewer than 200 remaining in existence.

Controlling livestock or feral predators on Anegada is nearly impossible due to the island's remote location and the tens of thousands of dollars that would be required. So, in 1980, in light of the obviously rapid and apparently unchecked decline of the iguana population during the previous decade, Lazell and his colleagues believed that the species was headed for extinction — unless something was done immediately. Because a solution on Anegada was not feasible and Anegada was the only place where the species still existed, the obvious recourse was to establish a second population — but where and by what means?



Heavily degraded habitat on the East End of Anegada near Crasy Pond once supported subpopulations of Stout Iguanas. In 1984, the DOA converted a deep freshwater limestone solution hole called "The Fountain" to an above-ground watering hole, providing a permanent water source for feral livestock. Recent surveys in and around the East End suggest that Stout Iguanas have been extirpated.

Guana

Essentially all possible relocation sites in the British Virgin Islands were equally infested with feral predators and goats. However, in 1932, Chapman Grant had noted the presence of iguanas on Guana Island and had identified the species as *Iguana iguana* (Common or Green Iguana), but the presence of that species was never confirmed and none has been seen since. Sometime in the mid-1930s, Louis Bigelow, then owner of Guana Island, had extirpated goats and had banned woodcutting for making charcoal. This had left only a couple of domesticated burros and free-ranging sheep on the island. The latter are far less destructive than goats.



A Guana Island view to the north showcases its rich flora.

In 1974, Henry and Gloria Jarecki purchased Guana Island. Access to this small island (300 ha) is limited, although it lies only a few kilometers from Tortola. The exclusive Guana Island Club had been constructed in a location designed to



Guana Island's lush habitat clearly demonstrates the positive results of controlling feral animals.

minimize impact on the natural habitat, attributable to the foresight of Louis Bigelow, who chose the construction site of the main clubhouse in the 1930s. Hiking trails around the island also were conceived to protect and minimize destruction of the lush vegetation.

In 1980, Lazell initially approached Mary Randall, then Guana Island Club Manager, to determine if the owners would allow relocation of Stout Iguanas. Randall was very enthusiastic about the concept, but two years would pass before Lazell would meet the owners and take the next step.

In the interim, he continued working on a plan that would establish a second population of Stout Iguanas while promoting other conservation and restoration goals in the British Virgin Islands. An idea for an exchange of species came with the realization that the vast salt ponds of Anegada, which had supported large colonies of Greater Flamingos (*Phoenicopterus ruber*) in the 19th century, could be restored if funds could be found. The beauty of this plan was the mutual benefits to all parties involved: the British Virgin Islands and the residents of Anegada would benefit from the reintroduction of flamingos and, at the same time, the second population would provide some assurance for the long-term survival of Stout Iguanas.



Practically any view from Guana Island is breathtaking.

Lazell first discussed the plan with several Anegada residents. One of them was the late Clement Faulkner, who maintained a Stout Iguana feeding station adjacent to his home in Bones Bight. The plan next was presented to Robert Creque (DNRE), Lazell's boss at that time. Everyone agreed that the idea made eminently good sense.

In March 1982, Lazell finally discussed the possibility of relocating iguanas with the Jareckis, who were initially apprehensive. Would Stout Iguanas damage the island they had worked so hard to protect? Would they bite staff or visitors or destroy ornamental plants on the hotel grounds? These questions would take some time to answer. However, that meeting was instrumental in developing the long-term relationship between the Jareckis and The Conservation Agency (Lazell) that continues today.

During the remainder of March and April 1982, Lazell surveyed the island with the help of Lianna, Divonne, and Tom Jarecki (nieces and son of Henry and Gloria) and the late author, Gerald Durrell, who happened to be vacationing there.



"Hambone," one of the founding iguanas on Guana Island, frequents the vicinity of the Club. Photograph by Numi Mitchell.

Lazell visited Guana regularly over the next several years, conducting fieldwork with the aid of the managers, Mary Randall and her successor John Damron. Lazell also continued to build a portfolio of published papers and testimonials noting the disastrous effects of feral competitors and predators on Stout Iguanas and their habitat. Major contributors were the late Dr. William MacLean (University of the Virgin Islands), Walter Phillips of Water Island, USVI, Dr. Robert Chipley, and Nick Clarke, former Director of the National Parks Trust, BVI.

In 1984, the Jareckis agreed to rid their island of sheep, provide a sanctuary for Stout Iguanas, and fund the relocation of flamingos. Their decision certainly was influenced by Lazell's efforts, but they also were drawn into wildlife conservation

through the interest their sons and nieces had shown. Today, Eugene Jarecki remains interested in conservation, Tom Jarecki works for the Environmental Defense Fund, and Lianna Jarecki is teaching biology at H.L. Stoutt Community College on Tortola, BVI and is finishing her Ph.D. with a thesis on salt pond ecology.

In July 1984, Lazell and four colleagues set off to Anegada in search of the first Stout Iguana destined for relocation to Guana Island. Lazell eventually captured a large, healthy, gravid female (SVL 46 cm) that was taken to Guana, where she was released on 29 July 1984. The other seven iguanas that comprised the founding stock (sex, SVL, and release date) were: male (41 cm; 19 July 1985), female (44 cm; 19 July 1986), female (22.4 cm, 27 July 1986), two females (33.5 and 43 cm, latter gravid) and two males (50.4 and 50.9 cm; 31 July 1986). Guana now had the foundation for a second population, but years would pass before the success of the relocation could be evaluated.

Lazell next set out to complete the species exchange plan. The Bermuda Aquarium, Museum, and Zoo (BAMZ) had both captive-bred and wild-stock flamingos and agreed to donate a number sufficient for establishing a population. Numi Mitchell (TCA) arranged the international transfer of the birds (BVI Agriculture and Fisheries Permit and veterinary certification of the birds' health, especially Newcastle's Disease). Numi and Glenn Mitchell (TCA) and James Conyers (BAMZ) transported the birds by jet from Bermuda to Tortola and then by boat to Anegada. The flamingos initially were released into a net holding pen at the salt ponds, allowing them to recuperate and



Greater Flamingos (*Phoenicopterus ruber*) in holding pens shortly after their arrival on Anegada. Photograph by Numi Mitchell.

adjust to their new environment. On 7 March 1992, in a ceremony at the north end of the salt ponds, the Governor, the National Parks Trust, and the Anegada community celebrated the arrival of the first 18 birds. By 2002, the flock had multiplied to approximately 80 resident birds (Guana also supports six pinioned flamingos in a small salt pond, but they do not reproduce because the population density is too low).

Necker

Necker Island, like Guana, is privately owned and exclusive, with a single luxurious resort, the Balinese Great House, situated on the highest point and overlooking the coral reef-studded waters of the Caribbean. The island supports dense tropical vegetation, composed of both native and non-native plants and enhanced by irrigation. The other half of the island is more typical of the region, with rocky terrain and small clusters of hardy trees, low shrubs, and dense stands of cacti. Designated a bird sanctuary, Necker is home to pelicans, doves, and hummingbirds.



Necker Island, BVI: high atop the island is the Balinese Great House.

In 1994, Richard Branson, owner of Necker Island (30 ha), expressed an interest in establishing a third population of Stout Iguanas. Because the iguanas on Guana had enhanced the natural setting of the island and were well received by visitors, Branson was eager to expand the conservation effort. Lazell had worked previously on Necker and knew the island to be free of feral livestock and rats.

In October 1995, four hatchlings were taken to Necker and head-started for a year before being released. During that time, one female escaped, but was seen later and appeared to be gravid. In 2000, Lazell reported seeing the first hatchling and subsequent reports from the island indicated that Stout Iguana hatchlings were abundant. Although the population is still in its infancy, during the October 2002 population on Necker, founding stock, young adults, and hatchlings were recorded.



A Stout Iguana hatchling on Necker Island basking on the light sand walkway that leads to the beach. Small tail drags were numerous along these walkways.

Today

Long after these second and third populations were established, their existence is not commonly acknowledged, little pertinent information is available, and some controversy remains regarding the



Dr. James Lazell on Guana Island, 2002.

circumstances under which they were established. In 2002, I was invited to participate in an assessment of the Guana and Necker populations. That survey, directed by Lazell and Mitchell, was conducted during “Scientists Month” from 4–29 October (each year, Guana hosts a large contingent of scientists who conduct research on the island).

After 14 hours of travel and delays, Guana was a little piece of paradise. At the dock, my gear was loaded into the Club’s pickup and we proceeded up the steep, twisting road to the clubhouse. The Club overlooks the dense tropical vegetation of the island’s southern end, the salt pond — home to the six flamingos, and the white beach of a little cove that merges imperceptibly with the crystalline waters of the Caribbean.



A southerly view of Guana Island from the Club. The salt pond with the six flamingos is located in the lower left and the beach and docking area in the center.

When I arrived at the patio, which overlooks the equally picturesque northern end of the island, it was alive with more scientific dialog than I could begin to imagine — scientists, some 20 of them, at lunch. After brief introductions, focus quickly returned to the population survey that was already in progress.

That same afternoon, we were issued several 2-oz syringe barrels loaded with white latex paint and began a survey of the Club’s wooded perimeter and nearby support structures. Many Stout Iguanas, including the founders, live in close proximity to the Club. The weather was cloudy and damp from the morning’s rain, which kept iguanas from venturing far to bask or forage.

The first sighting was somewhat unusual. We came upon four workmen digging a ditch next to a small structure while talking loudly to be heard over the radio playing in the background. Above them on a rock ledge, a large iguana lay casually, as if supervising their work. We marked the animal with paint, which did not appear to disturb it, and it remained nearby, seemingly unaffected by the intrusion. The remainder of the day included marking or sightings of younger adults and juveniles, but the weather was clearly hampering our efforts. The founding iguanas and other older adults were nowhere to be found.

The next day, Mitchell and I explored the area west of the main facility, accessed from the "Iguana Trail," while another team surveyed the southern area. The weather had improved, but remained partly cloudy and cool compared to typ-



This subadult Stout Iguana was foraging casually along the hillside near the Iguana Trail and allowed us to approach within 3 m. This animal was marked after the photograph was taken.



A hatchling Stout Iguana on Guana Island seeks refuge among the branches of a bush, reducing the likelihood of falling prey to a Racer, but increasing the chances of being spotted by a Kestrel.



Iguana Trail: a path originating at the lower Guana Club level and leading leisurely to the salt pond and beach below.



Guana Island's North Trail was created to minimize impact on the habitat, yet it provides hikers with fabulous views of the surrounding natural features. About 300 m beyond this point, an adult Stout Iguana was sighted thundering off into a cactus thicket.

ical conditions. Our first marking was a subadult on a steep wooded slope not 50 m from the trail's entry point. Like our first iguana on the previous afternoon, it was rather nonchalant about our presence.

That afternoon, we focused our attention on the northern section of the island where iguanas were not known to occur. Tail drags are common on trails in the area south of North Beach, but they abruptly disappear to the north of a line roughly parallel with Crab Cove. The trail eventually splits into two routes, and Mitchell and I separated to cover more ground. About halfway between Crab Cove and Chicken Rock Steps, I observed one large, unmarked adult, who, unlike others we had observed, responded to the intrusion by quickly thundering off into a cactus



A southerly view from the north side of Necker Island reveals habitat more typical of the region, with rocky terrain and small clusters of hardy trees, low shrubs, and dense stands of cacti.



A southwesterly view of Necker Island showing the Balinese Great House (upper right) and the retreat quarters in the pagoda styled structure (foreground). Stout Iguanas were sighted within this area.

thicket. We saw no other iguanas or tail drags, but did see some scat.

The survey continued and the weather improved each day, as did the frequency of iguana sightings. In addition to the population size estimate (see "Assessment" on p. 49), we recorded three incidents of predation on juvenile Stout Iguanas, two by Racers (*Alsophis portoricensis*) and the other by a female Kestrel (*Falco sparverius*).

Early on the morning of 14 October, ten of us left Guana by boat for Necker Island to assess the third population of Stout Iguanas, only seven years after the initial four hatchlings were released. The survey was limited to two days, and the team members quickly dispersed upon arrival.

Mitchell and I began our survey at a location near the main facilities where iguanas are fed twice a day. The ground and trails showed many signs of tail drags clearly produced by individuals of vastly different sizes. We saw several iguanas in the thick shrubs around this area. From there, I worked the very dry northern section of the island and saw

only one drag and one scat. Mitchell sighted a few animals as she worked an area near where the iguanas are fed.

Others on the survey team successfully marked several individuals and recorded sightings of hatchlings along the pathways around the maintenance and support facilities. Two Racers also were observed in the same area.



Racers on Necker Island commonly feed on juvenile Stout Iguanas.

The next day, starting where the iguanas are offered food, we saw two of the founding iguanas. A conservative estimate placed these animals at about 47 cm SVL and well over 5 kg. Both appeared in excellent health, alert, and with coloration of rich brown above blending into turquoise flanks. We spent our remaining time around the nursery and beach facilities and saw several iguanas, including a subadult and hatchlings. As on Guana, the Necker iguanas appeared to concentrate near the developed areas.

In stark contrast to the boisterous excitement that characterized the boat ride to Necker, we quietly sought a comfortable spot for the return trip. Although tired from the day's hard work in blaz-



One of the four founding Stout Iguanas on Necker Island (shown near the feeding area) was hiding behind a clump of debris, straining to see if his morning serving had arrived.

ing sun, we had time to reflect on events that had led us to this point in time and space.

The absence of committed, long-term funding continues to impede efforts to secure the species' survival on Anegada. Compounding loss of habitat is ongoing development. Consequently, Stout Iguanas are fighting for survival, suffering simultaneously from habitat degradation and predation on juveniles. Some fear that the upcoming assessment will determine that the Anegada population has declined to critically low numbers and may be functionally extinct in the wild. However, I believe we all shared a warm feeling knowing that the outlook for Stout Iguanas had improved considerably through the efforts of a few very special people.



This lightly wooded area near a salt pond on Anegada shows vegetation heavily damaged by feral animals seeking shelter from the sun or areas to rest. Habitat such as this has no chance of recovery while feral animals are allowed to roam free.



Acknowledgements

I thank James Lazell and Numi Mitchell for the invitation to participate in the Guana and Necker island population assessments, and Henry and Gloria Jarecki and Richard Branson for their hospitality and enduring commitment to ensuring the survival of Stout Iguanas. Allison Alberts, Rick Hudson, and Glenn Gerber have been instrumental in all my conservation efforts, and my wife Sandy has her sleeves rolled up right beside me. This article has benefited from comments by Gad Perry and Robert Powell.



References

- Binns, J. 2001.** Taxon report: Anegada Iguana (*Cyclura pinguis*). *IUCN/SSC Iguana Specialist Group Newsletter* 4(2):12–13.
- Carey, W.M. 1975.** The Rock-iguana, *Cyclura pinguis*, on Anegada, British Virgin Islands, with notes on *Cyclura ricordii* and *Cyclura cornuta* on Hispaniola. *Bulletin of the Florida State Museum* 19:189–234.
- Gerber, G.P. 2000.** Conservation of the Anegada Iguana, *Cyclura pinguis*. Field Research Report, prepared for the BVI National Parks Trust, Fauna and Flora International, and the Zoological Society of San Diego. Zoological Society of San Diego, San Diego, California.
- Goodyear, N.C. 1992.** Flamingos return to Anegada: status update. *National Parks Trust News*, British Virgin Islands, August 1992:1.
- Goodyear, N.C. and J. Lazell. 1994.** Status of a relocated population of endangered *Iguana pinguis* on Guana Island, British Virgin Islands. *Restoration Ecology* 2:43–50.
- Grant, C. 1932.** Herpetology of Tortola: notes on Anegada and Virgin Gorda. *Journal of the Department of Agriculture of Puerto Rico* 16:339–346.
- Hudson, R. 2001.** ISG 2000 Meeting Minutes: Anegada, Headstarting Program. *IUCN/SSC Iguana Specialist Group Newsletter* 4(1):4.
- Lazell, J. 1995.** Natural Necker. *The Conservation Agency Occasional Paper* (2):1–2.
- Lazell, J. 1997.** The Stout Iguana of the British Virgin Islands. *Iguana Times* 6:75–80.
- Lazell, J. 2002.** Restoring vertebrate animals in the British Virgin Islands. *Ecological Restoration* 20:179–185.
- LeVering, K. and G. Perry. 2003.** *Cyclura pinguis* (Stout Iguana, Anegada Rock Iguana). Juvenile predation. *Herpetological Review*: in press.
- Mitchell, N.C. 1999.** Effect of introduced ungulates on density, dietary preferences, home range, and physical condition of the iguana (*Cyclura pinguis*) on Anegada. *Herpetologica* 55:7–17.
- Mitchell, N.C. 1999.** Anegada Island Iguana, *Cyclura pinguis*, pp. 45–70. In: A. Alberts (comp. and ed.), *West Indian Iguanas: Status Survey and Conservation Action Plan*. IUCN/SSC West Indian Iguana Specialist Group, IUCN, Gland, Switzerland and Cambridge, UK.
- Mitchell, N.C. 2000.** Anegada Iguana, pp 22–27. In: P. Reading and B. Miller (eds.), *Endangered Animals: A Reference Guide to Conflicting Issues*. Greenwood Press, Westport, Connecticut.
- Schomburgk, R.H. 1832.** Remarks on Anegada. *Journal of the Royal Geographical Society* 2:152–170.

Guana and Necker Island Population Assessments 2002

*Gad Perry and Numi Mitchell
The Conservation Agency*

Only rarely is a population so thoroughly known that every member is individually recognized and a full census possible. Because of this, a variety of statistical methods, some of them extremely sophisticated, are normally employed to estimate population sizes. As with all statistical methods, population estimates have limitations. The amount of available data is one crucial factor: the more, the better. In addition, certain assumptions, some of them unique to one set of estimators or another, apply.

Unfortunately, studies on critically endangered species tend to run afoul of one or both issues, making reliable population estimates difficult. This is the case with Stout Iguanas. Not only are the populations small, they are unreliable subjects (a captured adult iguana may retreat into its burrow for up to three weeks in response to the stress), hard to spot in the field (the terrain is rough and the animals are cryptically colored), and often not accessible (work on Guana normally can be conducted only during the month of October). These limitations render any estimate of population size less reliable than one would like and therefore much less satisfying to a wildlife manager. Nonetheless, work with endangered species requires that their population sizes be estimated, so that one can determine if the population is stable, growing, or — in a worst-case scenario — declining. A preliminary estimate, known to be imperfect, is better than none, as long as the limitations of the estimate are kept firmly in mind when management decisions are being made.

Several attempts to monitor the Guana iguana population were made over the years. Combined with the evidently growing numbers of hatchlings every year, they suggested that the population was doing well and growing at a steady pace. In October 2002, a more concerted effort was made by marking several individuals with water-based, white, exterior latex paint (which quickly dries and is waterproof) squirted from a two-ounce (60 cc) syringe barrel. Marking began on 4 October and continued until 13 October. Twenty-three individuals were marked, but on most days some sighted iguanas escaped unmarked. Beginning on 15 October, we did six

“round-up” counts of marked and unmarked individuals, finishing on 29 October. These provided six population estimates, based on the Petersen Index: 69, 115, 138, 138, 138, and 207. The numbers are relatively close to one another, suggesting that they probably represent a fairly robust estimate. A calculated mean (134) is probably not too far from the real number. A calculated standard deviation (45 in this case) allows us to say that we are 95% confident that the true population size is between 44 and 224: two standard deviations from the mean in each direction. Unfortunately, this method does not meet all of the assumptions of the test, which renders the numbers uncertain.

A second method for calculating population sizes was proposed by Z.E. Schnabel in 1938. Using this method, we can add to the six Petersen Index tallies the data from 4–13 October. This method generates remarkably similar numbers, estimating the population size at 95 individuals and the 95% confidence interval at 58–185. Once again, not all of the assumptions are met, but the fact that two very different methods with different assumptions led to similar estimates gives us more confidence that the population size really is about 100 individuals.

We arrived on Necker Island on the afternoon of 14 October 2002 and quickly marked five Stout Iguanas. The next day before our departure, we saw six iguanas, only one of which was marked. The implication is that one-sixth of the population was marked; so five times six is 30. No statistics can be done on a single estimate, but this observation conforms remarkably well with the opinion of resident naturalist and caretaker, Brian Andrews, who believes that about 20 individuals are present, not counting the current year's hatchlings.

References

- Ricker, W.E. 1975.** Computation and interpretation of biological statistics of fish populations. *Fisheries Research Board of Canada Bulletin No. 191.*
- Schnabel, Z.E. 1938.** The estimation of the total fish population of a lake. *American Mathematical Monthly* 45:348–352.

HUSBANDRY

Green Iguana Communication

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Green Iguanas (*Iguana iguana*) have highly developed and very complex social behavior, using both chemical (scent) and visual (body language) signals to establish and maintain social relationships within the species. Although iguanas are capable of hearing noises, sound production is limited to hissing, which they do when threatened.

Head-bobbing, flattening of the body, and scratching movements are important elements of body language. One study differentiated five forms of head-bobbing which vary in duration and function: a single vertical bob (head-jerk), a vibrating bob (shudder), a roll or assertion bob (roll), a transitional roll with shaking (roll-shudder), and an identity or signature bob. However, this categorization is an oversimplification that only begins to provide an understanding of the very complex bobbing behavior in *I. iguana*.

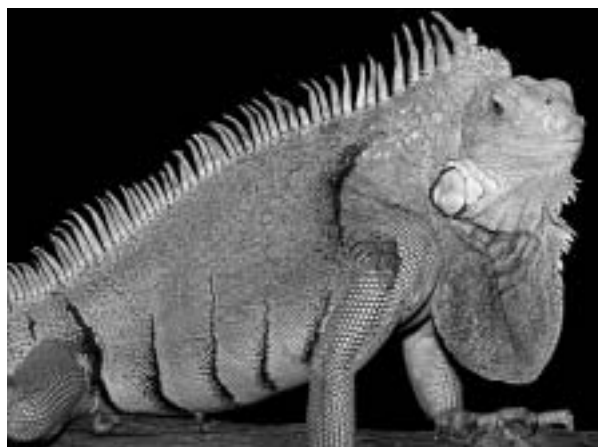
The vertical bob is characterized by rapid vertical head movements. This is not a social signal but rather a visual aid. Iguanas will use this movement while basking or ovipositioning (particularly females exiting their nesting burrows) before entering unprotected or open territory to help them identify any potential danger. The vibrating bob (shudder) is a rapid, jerky, but flat head-bob

with the dewlap extended to the maximum. Sometimes, an iguana will accompany this by lifting its head and swinging it from side to side. This shudder can be observed during close contact between males and females. However, this is not mating behavior. The rolling head-bob, in contrast, is clearly linked to mating and territorial behavior, and is most frequently seen during the mating season. An iguana will lift its head towards one corner at a 45° angle and rotate it along the longitudinal axis. The roll is also performed with the dewlap fully extended. The roll-shudder lies between the shudder and the roll in both form and function. The identity or signature bob is characterized by strong vertical head movement, followed by another head movement during which the head is held aloft for a longer time (plateau). This is followed by a series of smaller nodding movements. The signature bob is always associated with an activity, such as aggression, mating, territorial behavior, changing basking logs, or other types of movement. Researchers have suggested that this motion is connected with species identification, and also may serve to identify individuals or members of the same population.

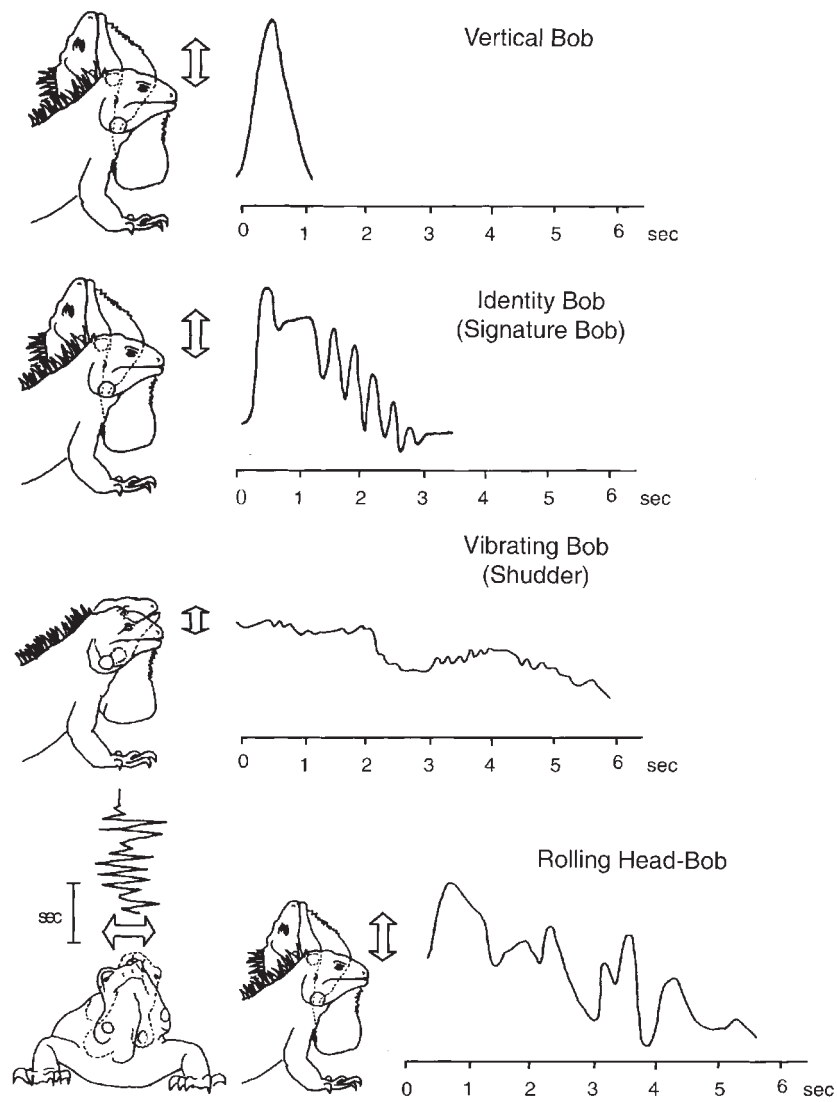
From **G. Köhler**. 1998. *Der Grüne Leguan: Biologie, Pflege, Zucht, Erkrankungen*. Herpeton Verlag, Offenbach, Germany. Translated from German by AJ Gutman.



Head-bobbing is a critically important component of iguana communication.



An adult male assuming an aggressive posture; notice the lateral compression, erect crest, and extended dewlap, all designed to make him appear larger.



Diagrammatic representations of different types of head-bobbing behavior.

Threat Behavior

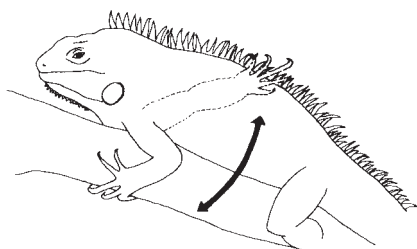
Green Iguanas display a wide range of threat behaviors. When they wish to intimidate a potential predator or rival, they will flatten themselves laterally, displaying their ventral stripes, and fully extend their dorsal crests and dewlaps in order to appear larger. This often is accompanied by a wriggling of the tail in a snake-like fashion. If approached more closely, the iguana will gape with mouth wide open, hiss loudly by expelling air, and whip his tail towards the source of disruption. With its sharp teeth and powerful jaws, an adult iguana can inflict a painful bite.



Adult males readily revert to biting and fighting if communication breaks down.

Refusal and Submissive Behavior

Scratching upward with the forelimbs towards the rear is clear refusal behavior. This motion is often observed in females being approached from behind by a male who is interested in mating and when one individual is climbing over another. Green Iguanas will close their eyes as a sign of submission, for example, in reaction to a threat from a dominant male. Very shy iguanas will also close their eyes when they are picked up to indicate that they are “resigned to their fate” (pers. obs). When stroked by their handlers, iguanas will often close their eyes. Contrary to the widely held belief that the iguana (like a cat) is indicating a sense of well-being, this indicates refusal and is an expression of indisposition. Unlike in mammals, tenderness in the form of stroking is not part of the behavioral repertoire of lizards.




A female scratching herself with a forelimb indicates that she is rejecting the overtures of a male.



Closed eyes are a sign of submission.

Chemical Signals

Excretions from the femoral pores consist of large, non-volatile proteins and various smaller volatile and non-volatile fats. To collect scent molecules from objects or from the air, iguanas will extend and retract their tongues, passing scent molecules to the so-called Jacobson's organ, a sensitive scent detection organ located in the roof of the mouth. If a Green Iguana is placed into an unfamiliar environment, it will explore intensively with its tongue. Even new objects placed into a familiar environment will elicit a thorough tongue examination.

Due to individual differences in the composition of femoral pore secretions, iguanas can distinguish between familiar and unfamiliar members of their species. In the dense foliage of a tropical rainforest, an unknown iguana can easily intrude unseen into the territory of a dominant male. Under these circumstances, the ability to distinguish between the scent of a familiar and an unfamiliar individual is useful in determining the presence of a rival. 

Pertinent Literature

- Alberts, A.C., N.C. Pratt, and J.A. Phillips. 1992.** Seasonal productivity of lizard femoral pore glands: Relationship to social dominance and androgen levels. *Physiology and Behavior* 51:729-733.
- Alberts, A.C., T.R. Sharp, D.I. Werner, and P.J. Weldon. 1992.** Seasonal variation of lipids in femoral gland secretions of male Green Iguanas (*Iguana iguana*). *Journal of Chemical Ecology* 18:703-712.
- Alberts, A.C., L.A. Jackintell, and J.A. Phillips. 1994.** Effects of chemical and visual exposure to adults on growth, hormones, and behavior of juvenile Green Iguanas. *Physiology and Behavior* 55:987-992.
- Alberts, A.C. and D.I. Werner. 1993.** Chemical recognition of unfamiliar conspecifics by Green Iguanas: functional significance of different signal components. *Animal Behavior* 46:197-199.
- Distel, H. and J. Veazey. 1982.** The behavioral inventory of the Green Iguana, *Iguana iguana*, pp. 252-270. In: G.M. Burghardt and A.S. Rand (eds.), *Iguanas of the World, Their Behavior, Ecology, and Conservation*. Noyes Publications, Park Ridge, New Jersey.
- Dugan, B.A. 1982.** A field study of the head bob displays of male Green Iguanas, *Iguana iguana*: variations in form and context. *Animal Behavior* 30:327-338.
- Hazlett, B.A. 1980.** Temporal pattern of the assertion display of the lizard *Iguana iguana*. *Herpetologica* 36:221-224.
- Rodda, G.H. 1992.** The mating behavior of *Iguana iguana*. *Smithsonian Contributions to Zoology* 534:1-40.
- Weldon, P.J., B.S. Dunn, C.A. McDaniel, and D.I. Werner. 1990.** Lipids in the femoral gland secretions of the Green Iguana, *Iguana iguana*. *Biochemical Physiology* 95B:541-543.

PROFILE

Fred Burton: The Man Behind the Blue Iguana Recovery Plan

Sandy Echternacht
University of Tennessee

Conserving endangered species is a task fraught with scientific, economic, political, logistic, and sometimes cultural and even religious impediments that can make the undertaking difficult at best. Such efforts ultimately involve many people — but the impetus and success of each is quite often dependent on the dedication and perseverance of a single individual. In their book, *Last Chance to See* (Harmony Books, 1990), Douglas Adams, better known for his *Hitchhiker's Guide to the Galaxy*, and co-author Mark Carwardine documented the heroic efforts of a few of these dedicated individuals to save some of the rarest animals on Earth. This is the first in a series of articles in which we will profile a few of the dedicated individuals who are devoting a significant part of their lives, and sometimes their bank accounts, to the study and conservation of some of the most endangered of the world's iguanid lizards.

The Grand Cayman Blue Iguana, *Cyclura lewisi*, is the largest native land animal on Grand Cayman Island and one of the most highly endangered vertebrates in the world. A census conducted in 1992 estimated the wild population to be 175–200 individuals — but, by 2002, a follow-up survey reduced that number to fewer than 25. Fortunately for the iguanas, Caymanians have a strong conservation ethic, and fortunately, they also have Fred Burton.

Fred was born in England's Lake District, but spent much of his early life in Kuwait, where his father was employed by the Kuwait Oil Company. There he developed a keen interest in reptiles and other animals of the Arabian desert. He eventually enrolled in Gonville and Caius College of Cambridge University where he graduated with an honors degree, and subsequently a Master's degree in Natural Sciences. Although he was encouraged to apply for the Ph.D. program at Cambridge,



In a thoughtful moment, Fred Burton discusses captive management at the Blue Iguana breeding facility during the ISG meeting on Grand Cayman, November 2002. Photograph by John Binns.

Fred was not attracted to the academic life nor to the research he would have had to pursue. Instead, he was hoping to have a more direct impact on the world around him. His attention was drawn to an advertisement that appeared on the biology department notice board about a position for a Graduate Research Assistant with the Mosquito Research and Control Unit (MRCU) in the Cayman Islands. Neither Fred nor his friends knew where the Cayman Islands were, but more-or-less as a joke, Fred applied anyway. Things took a serious turn, however, when he received a telegram from the MRCU and, in 1979, he began what he assumed would be a two-year sojourn in the Caribbean.

Beginning as a Research Assistant at the MRCU, Fred conducted field studies of mosquitoes in mangrove swamps, monitored oil pollution, and was, for a while, the sole staff member of the MRCU Natural Resources Study, which eventually evolved into the Cayman Department of Environment. He was subsequently promoted to Deputy Director of the MRCU and served as Acting Director when the Director became seriously ill. While working in the mangroves, Fred became fascinated by the ecosystem but disturbed



A very young-looking Fred Burton at his desk in the old MRCU facility adjacent to the hospital in George Town, Grand Cayman, in May 1990. Photograph by Sandy Echternacht.

by the fact that his study sites kept being torn up, dredged, and filled for real estate developments. When the National Trust for the Cayman Islands (roughly equivalent to the Nature Conservancy in the U.S.) was founded, Fred was often asked for technical information on the environment and ended up volunteering for all sorts of conservation-related activities. Eventually, he was “loaned” by the MRCU to the Trust and became a regular, full-time member of the Trust staff in 1993. As Director of Science, and later Environmental Programmes Director, his major emphasis was on establishing a system of protected areas in the Cayman Islands equivalent to an existing system of marine areas, and he initiated the Trust’s environmental programs. These programs grew out of ideas developed by Fred and other members of a group of environmentalists, notably Gina Ebanks-Petrie, who also had been on the MRCU staff and currently is Director of the Department of Environment in the government of the Cayman Islands.

In 1990, while still a volunteer at the Trust, Fred founded the Blue Iguana breeding program with a breeding pair received from a private collector in Florida. The animals were initially housed in two cages at the old MRCU facility behind the hospital in George Town. The breeding program was immediately successful and the facility at the hospital had to be expanded. At the same time,



Fred (second from right) showing visitors the latest addition to the Blue Iguana facility at the Mosquito Research and Control Unit facility at the hospital in George Town, Grand Cayman (May 1990). Photograph by Sandy Echternacht.

international interest was picking up. With funding and research assistance from the (U.S.) National Zoo, facilitated by its then Curator of Reptiles, Dale Marcellini, field studies of wild iguanas were initiated. Additional assistance and funding has come from the zoo community, particularly from the Ft. Worth Zoo and its Curator of Reptiles, Rick Hudson, and the Center for Reproduction of Endangered Species of the San Diego Zoological Society and Allison Alberts, who is the Society's Head of Applied Conservation. In 1995, with funding from the Milwaukee Zoo and the Foundation for Wildlife Conservation, a much larger breeding facility was established at Queen Elizabeth II Botanic Park (QEIBP) and the release of two-year-old iguanas into the Park began shortly thereafter. The QEIBP facility is currently undergoing a major expansion and additional release sites are being sought. The latter is a definite problem since Grand Cayman is undergoing explosive development.

The Blue Iguana program has been a resounding success and Fred has been the driving force behind that success, but Fred's activities have not been limited to the iguana program. He has been heavily involved in conservation efforts directed toward native plants of the Cayman Islands and to



Fred Burton holding a Blue Iguana named "Santa" at the Queen Elizabeth II Botanic Garden on Grand Cayman in 2002. Photograph by Rachel Goodman.



Fred Burton and Rachel Goodman, University of Tennessee graduate student, built enclosures in 2001 to catch hatchlings as they emerged from nests of released female iguanas in QEIBP. Photograph by Sandy Echternacht.

the two subspecies of parrots endemic to the Cayman Islands (*Amazona leucophala caymanensis* and *A. l. hesternus*). He has mapped vegetation in the Cayman and Turks & Caicos islands and conducted floristic surveys and other botanical studies in the Caymans. He has authored a field guide to the wild trees of the Cayman Islands. In 2001, he left the Trust to spend more time as a private citizen pursuing conservation initiatives in the Cayman Islands and elsewhere. He continues to lead the Blue Iguana Recovery Programme (<http://www.BlueIguana.ky>) and hopes to see the day when Blue Iguanas have recovered to the point that they can be removed from the list of endangered species. In whatever spare time he has, and it obviously isn't much, he handcrafts hardwood sea-going kayaks and plays classical violin. Fred is clearly a dedicated conservationist and environmentalist and a consummate naturalist in the best sense of that word. The Blue Iguanas of Grand Cayman are fortunate indeed that he ultimately took the job opening with the MRCU as something of a joke!



HISTORICAL PERSPECTIVES

The Black Iguana*

Franz Werner

The Spiny-tailed Iguanas (*Ctenosaura* Wgm. [translator's note: "Wgm." Refers to A.F.A. Wiegmann, a German zoologist who described many saurian genera in *Herpetologia Mexicana*, which was published in 1834]) are restricted to Middle America. They can be distinguished from *Cyclura* by the short rows of femoral pores. They are imposing animals that are primarily terrestrial or, at the most, seek shelter in the hollow trunks of trees. They have laterally compressed bodies, a relatively low middorsal crest, and tails equipped with whorls of spiny scales. The best known species is the Mexican Black Iguana, *Ctenosaura*

acanthura Shaw [an English naturalist who applied proper Latin names to many "amphibians," which, around the turn of the 19th century, included reptiles]. This proud creature can reach a total length of over 1.20 m and is either uniformly graphite-black in color or bears black crossbands

* excerpted and translated from Franz Werner (1913). Die Lurche und Kriechtiere von Alfred Brehm. Zweiter Band: Kriechtiere (Schuppenkriechtiere). In: O. z. Strassen (ed.), *Brehms Tierleben. Allgemeine Kunde des Tierreichs*. 4th ed. Bibliographisches Institut, Leipzig and Wien). Translated by R. Powell.



Black Iguana, *Ctenosaura acanthura* Shaw 1/6 natural size.

HISTORICAL PERSPECTIVES



Black Iguana, *Ctenosaura acanthura* Shaw. 1/9 natural size. Photograph by W.S. Berridge, F.Z.S. – London.

on its rump and decorative black rings around its tail, both over a light ground color (light olive-brown, yellow-gray, or green). In captivity, these lizards readily consume both plant and animal matter. According to Sumichrast [François Sumichrast, a 19th century Swiss naturalist], several female Spiny-tailed Iguanas, like Common Iguanas, lay their eggs in a communal chamber; however, females do not appear as a rule to gather in large numbers during the nesting season, as one rarely finds more than 6–7 dozen eggs in a single nest. Ruthven [Alexander G. Ruthven, a famous American herpetologist] observed the subspecies *completa* Boc. [*completa* is now considered to be a synonym of *Ctenosaura similis*; “Boc.” refers to M.-F. Bocourt, a French naturalist, who collected extensively in Middle America during the second half of the 19th century] primarily in the savannas of Mexico where trees form isolated clusters. In fact, each individual is true to the tree which it has staked out as its own, so that Ruthven almost always saw these animals on the trunks of their trees as he approached a given clump, often remaining in one place for hours at a time. Their diet consists largely of leaves.

The Black Iguana is considered especially tasty and, as a consequence, according to Sumichrast, is commonly hunted, particularly prior to festivals. Hunters seek these animals in burrows or split tree trunks, particularly those that are in the vicinity of temporary pools that hold water only during the rainy season. Should a lizard be caught, it is secured in the typical fashion. Even more favored than the meat, which is considered a delicacy, are the eggs. Quatrefages [an unknown source] tells a relevant tale of the traveler Sallé. As the latter entered a humble hut one evening in Middle America, he found only soup to quench his con-

siderable appetite. To his surprise, however, his host, who had already apologized for the sparse meal, knew just how to spice it up in a most peculiar fashion. At the host’s command, several small boys ran off to the woods and returned shortly thereafter with a large lizard that seemed destined for the traveler’s plate. Instead of killing and broiling the animal, the host merely made a small incision in its side, reached in with his fingers, and carefully pulled out two strings of eggs. Subsequently, the host cleanly stitched the cut, rubbed a few hot ashes on the edges of the wound, and released the lizard. The eggs were placed in front of Sallé, who queried his host and was told that it was common practice to treat these animals in such a fashion, since one could therefore count on harvesting another batch of eggs in the following year.



Distribution of the genus *Ctenosaura*. The question mark indicates uncertainty regarding the presence of iguanas in southern Baja California and the arrow denotes the introduction of Spiny-tailed Iguanas into southern Florida. Modified from Gunther Köhler (2002. *Schwarzleguane*. Herpeton Verlag Elke Köhler, Offenbach, Germany).

IGUANA NEWSBRIEFS

The IIS Contributes to Conservation

Contributions from International Iguana Society members have made it possible for the IIS to provide assistance to several ongoing projects. Within the past year, the Society has made contributions to: (1) the Blue Iguana Recovery Program on Grand Cayman Island (with special thanks to the Pacific Northwest Herpetological Society for their generous donation), (2) graduate student Rachel Goodman to support her Blue Iguana (*Cyclura lewisi*) research, (3) new cages for headstarting *Ctenosaura bakeri* at the Iguana Research and Breeding Station on Utila, Honduras, and (4) shipping mongoose traps to Jamaica, where they will be used to trap mongooses that prey on Jamaican Iguanas, *Cyclura collei*.

The IIS plans to continue support for the implementation of the Blue Iguana Recovery Plan (see www.Cyclura.com) and is actively engaged in fundraising to help purchase critical *Ctenosaura bakeri* nesting habitat on Utila (see Letter from the President, p. 59). Your membership dues and contributions help the IIS make a difference for endangered iguanas in the wild. We appreciate your continuing support.



The Grand Cayman Blue Iguana (*Cyclura lewisi*) is functionally extinct in the wild. The IIS is promoting and supporting the Blue Iguana Recovery Program (see Profile, p. 53).

A New Fossil Iguana from Fiji

Gregory K. Pregill and Trevor H. Worthy (2003, *Herpetologica* 59:57–67) described *Lapitiguana impensa* based on fossil remains found in late Quaternary sediments on Viti Levu, the main island of Fiji. The differences between this spectacularly large (SVL ca. 500 mm) iguana and extant Fiji iguanas in the genus *Brachylophus* were sufficiently substantive that the authors placed this new discovery in a separate genus. Like *Brachylophus*, however, this iguana appears to be basal among the Iguanidae, although exact relationships cannot be resolved with the available evidence. This giant form probably became extinct soon after humans first colonized the islands about 3000 years ago.

The new generic name derives from *Lapita*, a proper name given to the distinctive pottery associated with the first human settlers of Fiji, who disappeared from the archaeological record soon thereafter, and *iguana*, an aboriginal Amerindian name apparently designating a kind of lizard. The species name is from the Latin *impensa* (= ample or large), in reference to the large body size of this lizard.

Although the data are sparse, they do not seem to support a sister-taxon relationship between *Lapitiguana* and *Brachylophus*, suggesting that Fiji might have been colonized twice by iguanid lizards. The authors also suggest that *Brachylophus* was able to coexist with humans primarily due to its cryptic, arboreal lifestyle. In contrast, *Lapitiguana*, which was most certainly a conspicuous, terrestrial form, became extinct as a direct result of human agency soon after the Lapita people arrived in Fiji.

IIS Member Wins Science Fair

IIS member Nicholas Jones of Little Rock, Arkansas recently won first place in zoology at his school Science Fair for research on the use of color vision in food selection by Green Iguanas. In further competition, Nicholas's research paper again placed first at both the Central Arkansas Regional Science Fair and the Arkansas Junior Academy of Sciences.

In an earlier experiment, in which the same foods were presented to a Green Iguana on different colored plates, Nicholas's iguana, Frank, had selected food presented on a red plate four times as frequently as that presented on a black plate. In the current experiment, Frank was presented with hibiscus flowers in two different colors. Both a red blossom and a pale yellow or white blossom were offered to the iguana 23 separate times and records kept of which blossom he chose to eat first. At each feeding, the placement of the blossoms was switched to eliminate the possibility that the iguana was just eating on the same side of the cage. Frank chose to eat the red blossoms first in 18 of the



23 trials, leading Nicholas to conclude that his iguana was indeed using color vision in selecting food.

Nicholas now goes on to compete in the national Discovery Channel Science Challenge. We wish him the best of luck and hope he continues his scientific pursuits!

CHS Works to Help Iguanas

The Chicago Herpetological Society conservation booth at the annual CHS Reptile Fest (April 5–6) was a huge success. IIS members Lori King and Betsy Davis were on hand to educate people about Grand Cayman Blue Iguanas and Utila Iguanas, as well as Massasauga Rattlesnakes. Lori's juvenile *Ctenosaura bakeri*, Nagual, made his first public appearance and proved to be the star of the show. A variety of general merchandise such as Utila Iguana T-shirts, Christmas ornaments, bookplates, and stuffed animals worked like magnets to draw every child to the table — with parent in tow, begging for a stuffed animal. Altogether, the effort raised \$1,505 for the Utila Iguana nesting property fund. Of incalculable value, however, was the opportunity to explain the plight of these exquisite animals to every visitor to the table.

LETTER FROM THE PRESIDENT

What a great week we had at the IIS conference on Utila, Honduras. Seventeen IIS members joined Gunther and Elke Köhler, Alex Gutsche, Karsten Gees, and the rest of the staff and volunteers of the Iguana Research and Breeding Station. Our schedule was quite full and included lectures and discussions almost every evening during the week.

The Iguana Station staff arranged several daily field trips of varying degrees of difficulty. Most of the trips involved efforts to find and see the elusive *Ctenosaura bakeri* in its natural habitat. This iguana, unlike the other sixteen varieties of *Ctenosaura*, justly deserves the nickname, "Swamper." On the first trip into the swamps, many of our group members sank past their knees in the mud as they ventured into the Swampers' home range.

In a sense, these animals' comfort with a swampy environment helps preserve the species. The mangrove wetlands that this animal calls home are unattractive to developers, and could well be the last vestige of property remaining on the rapidly developing island of Utila.



A large male Swamper basks next to his tree hole in the vicinity of Rock Harbor. This animal had toe-clips indicating it had been released from the Utila Iguana Research and Breeding Station a number of years ago. It was likely one of the original animals adopted through the Utila Iguana Adoption Program. *Photograph by John Binns.*

However, all is not well in the world of *Ctenosaura bakeri*. Although some local people still hunt iguanas for food, the work of Gunther and his colleagues over the years has had a positive impact and the ban on hunting is commonly observed. Signs throughout the island inform both locals and visitors of the protected status of this endemic species.

By far the greatest threat to the continued survival of *Ctenosaur bakeri* is the rapid loss of nesting habitat to tourist-related development. For example, the group was taken to a 3½ acre beachfront property that has been a nesting site for up to 500 female iguanas. We were later informed that this was one of only two remaining beachfront properties not yet sold, and the other was not part of the Swamper's range! Without a place for the females to lay their eggs, the species would rapidly dwindle and become extinct. As a conservation-minded group, we cannot allow this to happen. The IIS is now concerned with raising part of the \$165,000 for purchasing and preserving this remaining vestige of nesting habitat. This is a tangible goal. Already, donations are approaching \$5000 and fundraising is ongoing.

If you are interested in donating or assisting in raising money for this notable cause, contact the International Reptile Conservation Foundation (IRCF c/o John or Sandy Binns, 3010 Magnum Drive, San Jose, CA 95135) for more information. All donations are tax-deductible.

You should think about joining the group on our next adventure.



Joe Wasilewski

Joe Wasilewski



Cydura pinguis (Stout Iguana or Anegada Iguana) on Guana Island, BVI, October 2002. Photograph by John Binns.