

LOST AND FOUND: HOPE FOR THE JAMAICAN IGUANA

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As researchers studying large endangered lizards, we were extremely excited to hear of the rediscovery of the Jamaican iguana, *Cyclura collei*. In June 1990, Edwin Duffus was hunting feral pigs in the limestone forests near his home outside of Kingston, Jamaica, when his dogs surrounded a large iguana. Edwin had heard stories from other hunters and forest users who claimed to have seen the legendary lizard but remembered from elementary school that they were believed to be extinct since the 1940's. By rescuing the lizard from his dogs, Edwin quickly became a local celebrity and brought the 115 km² area known as the Hellshire Hills into the conservation spotlight.

After Edwin brought the iguana to the Hope Zoo in Kingston, Zoo Director Rhema Kerr and Dr. Peter Vogel (University of the West Indies) formed the locally-based Jamaican Iguana Research and Conservation Group. Later, interest was rallied from a number of international zoos and individuals to participate in a Jamaican iguana Population and Habitat Viability Assessment meeting. Our involvement began when our supervisor, Dr. Allison Alberts, Head of the C.R.E.S. Comparative Physiology Division, Dr. John Phillips, and Jeff Lemm traveled to Kingston in 1993

to attend this conference. Among the many topics discussed, the delegates decided that hatchling iguanas and eggs should be collected from the wild and "headstarted" in safety at the Hope Zoo and later at zoos in the United States. The first importation of iguanas to the U.S. in 1994 brought twelve animals (6 males, 6 females) to three facilities: Gladys Porter (Texas), Fort Worth, and Indianapolis Zoos. To add to these founders, a second group of twelve juveniles were ready to leave Jamaica in April 1996, destined for Central Florida Zoo, Sedgwick County Zoo (Kansas), and the C.R.E.S. lizard research facility at the San Diego Zoo.

Endangered animals rarely travel without their human guardians and paperwork, so we packed our cameras and iguana crate and headed for Kingston. Fred Antonio, Curator at

Photograph: Jeff Lemm



Central Florida Zoo, and Rick Hudson, Assistant Curator at Fort Worth Zoo, met us at a hotel near the Hope Zoo. As Chair of the American Zoo and Aquarium Association's Lizard Advisory Group, Rick has been organizing funds and providing enormous support for both the Jamaican and Grand Cayman Island iguana conservation projects. The following day was spent touring the zoo, sampling the local cuisine, and meeting with Rhema Kerr and Peter Vogel to discuss recent project news and our importation permits, still pending. Dr. Vogel suggested we could hike into the Hellshire Hills to see the project site but that would mean we would have to stay an extra day and Jeff would miss a few more of his college classes at home. It wasn't a difficult decision.

Our adventure into the Hellshire Hills started at six the next morning. Already Jamaicans were busy crowding the bus stops, walking to work, and tending to rows of crops. An hour outside of Kingston, we stopped to pick up Edwin Duffus, who is no longer a pig hunter but a key field researcher for the conservation project. Since his initial discovery, he has spent countless hours studying the iguana's reproductive cycle, habits, and range. Edwin's fellowship with local forest users has been invaluable in persuading them to use only the northern edge of the forest and not penetrate south into the iguana's remaining habitat.

After loading up on bug repellent, sunscreen, snacks, and a gallon of water each, we were ready to head into the forest. Looking at our cameras, Edwin reminded us that it is extremely rare to see a wild iguana in the non-breeding season. Nevertheless, our cameras were kept busy as Dr. Vogel guided us along the trail and taught us about the

fascinating plants, birds, and reptiles inhabiting the area, many of which are Jamaican endemics. Hellshire comprises a peninsula of dense wooded hills fringed with wetlands and beaches. Unlike the rain forests in the mountains, it is among the driest areas of Jamaica with annual rainfall averaging below 100 centimeters. The limestone floor is rugged and honey-combed with hollows and crevices. We walked directly south through the area of the forest used by charcoal burners where the vegetation averaged only 3 meters in height with a few Gumbo Limbo trees rising high above like candles in a table decoration. At one of the many small blackened clearings, Dr. Vogel



The Hope Zoo in Kingston, Jamaica, where Edwin Duffus brought the first Jamaican iguana to be seen since the 1940's. Today the Hope Zoo is involved in extensive research on the Jamaican iguana. *Photograph: Tandora Grant*

explained how large trees and shrubs are gathered in a heap and partially burned to make charcoal, which is sold as fuel. Gumbo Limbo are spared because they are not useful charcoal producers. After four hours of walking, the forest abruptly rose to 9+ meters above us and the understory species changed and thinned. A kilometer later, the charcoal burner/pig hunter trail turned sharply ninety degrees west; a direct result of Edwin Duffus' educating prowess. We stepped off the trail to continue south along a narrow path that gave us a greater feeling of adventurous bushwhacking.



The Hope Zoo has been involved in educating the public about the Jamaican iguana since its rediscovery. Tandora Grant is pictured here next to a unique sign in front of the Jamaican iguana exhibit. Photograph: Jeff Lemm

Hot and sweaty, we reached the field base camp around one o'clock. Edwin was already waiting, had cooked a meal, and made coffee. We all sat for a long rest as hummingbirds and todies darted about and small Anolis lizards displayed their dewlaps denouncing our invasion of their territories. Eager to continue, Edwin took over guide duty to lead us to the iguana's nesting sites. Along the way our education continued about the habits of iguanas and their forest. Dispensing with scientific names, we learned to identify plants which we could eat, smoke, use to soothe rashes, or make tea from with names like 'hog doctor' and 'touch-me-not.' In about half an hour, we reached two red soil clearings, 6 and 13 meters in diameter, respectively. It was at these two sites in June of 1991 that six female Jamaican iguanas were observed laying the first-documented clutches of eggs. These clutches were collected and incubated at the University of the West Indies in Kingston where their survival was more assured.

The small iguana population faces many threats to its continued survival. Initial surveys estimate there are probably no more than 100 adult animals and a paucity of juveniles. Introduced Indian mongoose and feral cats prey heavily on eggs and juveniles and are believed to be the major factor contributing to the iguana's

decline and its top-heavy (aged) demographics. The Hellshire Hills also support a large population of feral pigs which destroy vegetation and have been documented eating *Cyclura* eggs on other Caribbean islands. These pigs are in turn hunted by humans whose tracking dogs are able to kill adult iguanas, as a number of such attacks have been confirmed in recent years. Habitat destruction by charcoal burning has already degraded as much as one-third of the northern region of the Hellshire Hills, while the eastern half is the target of a development proposal to build housing, resorts, and limestone quarries.

We poked around the brick red soil and found a few leathery eggshell remnants from previous years' clutches. There are at least nine female iguanas that have been observed laying their eggs in among three known sites. Because suitable nesting soil in Hellshire is comparatively rare, gravid females compete for space and aggressively defend their nests up to 16 days after laying. Most of the females begin laying an average



Young Jamaican iguana. Photograph: Jeff Lemm



The dry, limestone forest known as the Hellshire Hills is the last stronghold for the Jamaican iguana. Charcoal burning and development are major threats to this area and the existence of the Jamaican iguana.
Photographs: Jeff Lemm

of 17 eggs in early June which hatch after roughly 85 days. Edwin showed us the nets they are now using to cover the nests and capture emerging hatchlings so they can be raised in safety at the Hope Zoo. “Dem mongoose dey wait en wait by d’nest fer dem babies come up da wole en grab dem by

d’necks.” Edwin’s beautiful Jamaican sing-song accent is thick but we had no trouble understanding his meaning on this subject.

Climbing out of the valley floor, we headed for the most recently discovered nesting site on the mesa. We paused to check the cracks in the steep limestone cliff and found tail tracks at the entrances. At the last nest clearing, a blind had been set up for observation and probes placed at varying depths to record incubation temperatures. At the surface, the soil can reach temperatures above 130° F, while three feet below the eggs remain in the eighties. Edwin began to scoop the soil from an old burrow looking for eggshells and buried his arm to the shoulder. The cloying clay-



like soil clung to his skin and most of our clothes as well. The quality of the soil in Hellshire explains why Jamaican iguanas appear red. Underneath the persistent layer of dirt, adult iguanas are really dark brown or gray, while juveniles can have blue-gray, aqua, and yellow highlights. Throughout the forest Edwin pointed out red smears on the white limestone rocks where an iguana had passed, perhaps drinking from small pools of water.

Our imaginations were wild with visions of nesting iguanas as we hiked along the ridge back towards the base camp. Suddenly, Edwin turned and grabbed us by the shoulders, crouched into a huddle, and whispered, “guana!” Peering beyond

him, we searched the dense brush for several frantic moments whimpering, "where?" and "I don't see it!" Finally, twenty meters away, an adult Jamaican iguana close to a meter in length came into focus. In record time, Jeff and Fred switched lenses and snapped off a few pictures before the impressive animal slowly raised his head and chest and silently disappeared into the forest. We were chattering with excitement, floating on a high similar to any adrenaline-inducing sport. The normally exhausting hike back to the car now seemed easy with the memory of one of the earth's most endangered lizards powering our feet.

Back at the Hope Zoo, Rhema Kerr had spent most of the day securing our export permits from Jamaica's Natural Resources Conservation Authority. Rick Hudson was also busy capturing, identifying, and preparing twelve young iguanas for our flight in the morning. The previous night we had spent hours studying the genetic analyses from Dr. Scott Davis' lab at Texas A & M University. Based on gene markers at four different loci, we chose animals that would provide the

most allelic diversity for both the exported founder and Hope Zoo populations. Captive propagation of the iguanas is necessary to serve as a genetic reservoir safeguarding against catastrophic loss at any one site, provide progeny for repopulation in the wild, and generate data relevant to survival in captivity and the wild. Some of the participating zoos are also exhibiting the iguanas which increases public awareness and will hopefully stimulate donations of needed conservation dollars for the project.

In Jamaica, the iguana conservation project is moving forward with emergency recovery procedures. More than one hundred juveniles are being raised in enclosures built by a team from the Fort Worth and Hope Zoos. By raising the hatchlings to a larger size in captivity before reintroduction to the wild, it is hoped that more juveniles will reach adulthood. Attempts to reduce the mongoose population and other exotics in the area have also begun. Radio tracking has started for the juveniles released in Hellshire and will begin for mature females nesting next season. Finally,



An adult male Jamaican iguana, *Cyclura collei*, basks at the Hope Zoo in Kingston Jamaica. This species has not yet been bred in captivity as the Hope Zoo's 4-year-old animals are the oldest in captivity. Photograph: Jeff Lemm



Edwin Duffus and Jeff Lemm search for eggshell remnants at a Jamaican iguana nest site deep in the Hellshire Hills. Photograph: Tandora Grant


Edwin Duffus, Dr. Peter Vogel and biologist Richard Nelson from the University of West Indies continue to expand our knowledge of the iguana's biology.

The future for conservation in Jamaica is hopeful. Due in part to the educational efforts and media exposure made possible by the Hope Zoo, there have been recent increases in the public's environmental awareness. Upon our departure from Jamaica, we were pleased to learn that the receptionists for Air Jamaica knew all about the story of the rediscovery of their iguana. Environment shows are now regularly aired on radio and television. For the first time in Jamaican history,



The body color of young Jamaican iguanas is extremely variable. Colors may range from gray to blue-green. Photograph: Jeff Lemm

the government is working on implementing a national park system with Hellshire Hills among the first sites in line. The Jamaican iguana conservation project has the potential to be a flagship recovery program for other threatened Jamaican species, including the Jamaican boa (yellow snake) and Jamaican hutia (coney). The program incorporates all the elements necessary for success, including

both *in situ* and *ex situ* conservation schemes, educational outreach in the local community and abroad, habitat protection, and involvement with local forest users encouraging limited sustainable use. Though most species become endangered at the hand of man, with help from many concerned hands we are hopeful the Jamaican iguana will not join the list of extinct species. 

Further Reading:

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