

# An Update on the Ecology and Conservation of *Cyclura pinguis* on Anegada

Glenn Gerber

Center for Reproduction of Endangered Species  
Zoological Society of San Diego

All photographs by John Binns, unless otherwise indicated.

Adult Anegada Iguanas (*Cyclura pinguis*) can grow to be more than 1.3 m in length and 7 kg in weight, making them among the world's largest lizards. Unfortunately, with only a few hundred animals remaining in the wild, Anegada Iguanas also are among the world's most endangered lizards. Although remains of the species are known from Pleistocene cave deposits on Puerto Rico and Native American middens on Saint Thomas, the only population remaining at the time of European colonization of the West Indies was on the 39-square-kilometer island of Anegada in the British Virgin Islands (BVI). Since then, increasing pressures from people and their domestic animals have driven the iguana population on Anegada to the edge of extinction. Human developments destroy habitat, feral livestock (including cattle, donkeys, and goats) severely over-browse the native vegetation on which iguanas rely for food, and feral cats eat all but a few hatchlings each year. As a result, the iguana population on Anegada has been declining for decades, if not centuries, and now occupies only a small fraction of the island and is composed almost entirely of aging adults.

Fortunately, those iguanas lucky enough to reach maturity stand a good chance of living a long life, perhaps 40–60 years. This longevity may explain why the species has persisted as long as it has in the face of all these threats. Still, unless the number of juveniles that survive to produce young of their own can be dramatically increased, the iguana population on Anegada is doomed to extinction. To prevent this, habitat will have to be protected and restored, and feral mammals, particularly cats, will have to be controlled. Implementing such measures can be a difficult and lengthy process, even on a relatively small island. Until these long-term goals can be met, we have embarked on a conservation strategy called headstarting to bolster the population in the short-term. Headstarting involves collecting juveniles from the wild just after they hatch and raising them in a protected, captive environment until they are large enough to survive in the wild.

The Anegada headstarting program was initiated in 1997 as a collaborative effort between the British Virgin Islands National Parks Trust (BVINPT), the Fort Worth Zoo, and the Zoological Society of San Diego. In addition, ecological studies of the remaining wild population have been underway since 1998 to aid in the collection of juveniles for the headstarting program and to learn more about the population's status, distri-

bution, and reproduction. These studies have revealed that the population, although heavily skewed towards adults, has an even sex ratio and is still reproductively viable. Out of 33 adults captured and marked in 1998 and 1999, 16 were male and 17 were female. Nests have been found every June and July since 1998 and hatching success has been very high. Once located, nests are fenced off to exclude feral mammals and to facilitate the collection of hatchlings for headstarting when they emerge in September or October. Because of these efforts, over 80 juveniles are currently in the headstart facility, which has expanded over the years from a single cage to 13 enclosures. What follows is a summary of project activity for the past year.

## Release of Headstarted Iguanas

In 2003, many of the older juveniles in the headstart facility began reaching a size at which we felt they could survive in the wild with cats. As a result, the first release of headstarted iguanas on Anegada took place in early October 2003, funded by a grant from the International Iguana Foundation. Twenty-four iguanas were released: 12 males and 12 females ranging from 4–6 years in age, 0.8–2.5 kg in weight, and 235–300 mm in snout-vent length. The animals were released at two sites in the core iguana area that supports breeding adults. Half of the animals were released in a coastal area with sandy scrub and half were released in an inland area with rocky woodland. Prior to release, veterinary staff from the Fort Worth Zoo examined all of the animals to ensure that they were healthy and surgically implanted radio transmitters so that they could be monitored after release. Kelly Bradley of the Dallas Zoo is tracking and studying the released animals for her M.S. thesis research at the University of Texas–Arlington. All animals were located daily for the first three weeks following release, again for two weeks in late November and early December 2003, and most recently for two weeks in mid-January 2004. Two of the animals died of unknown causes soon after release: a medium sized female was found dead a few days after release with her incision reopened, and the transmitter belonging to a small male was found in late November near his last known location in October. The remaining 22 animals are all doing well, giving a 3-month post-release survival rate of 92%. This is excellent considering that all of these animals would likely have been killed by cats shortly after hatching had they not been taken into the headstart program. In late



1 Northwest road near Cow Wreck where iguanas were not found in 2003.



2 Glenn Gerber in Bones Bight, the core iguana area.



3 Habitat north of East End appears suitable, but no iguanas were found in 2001.



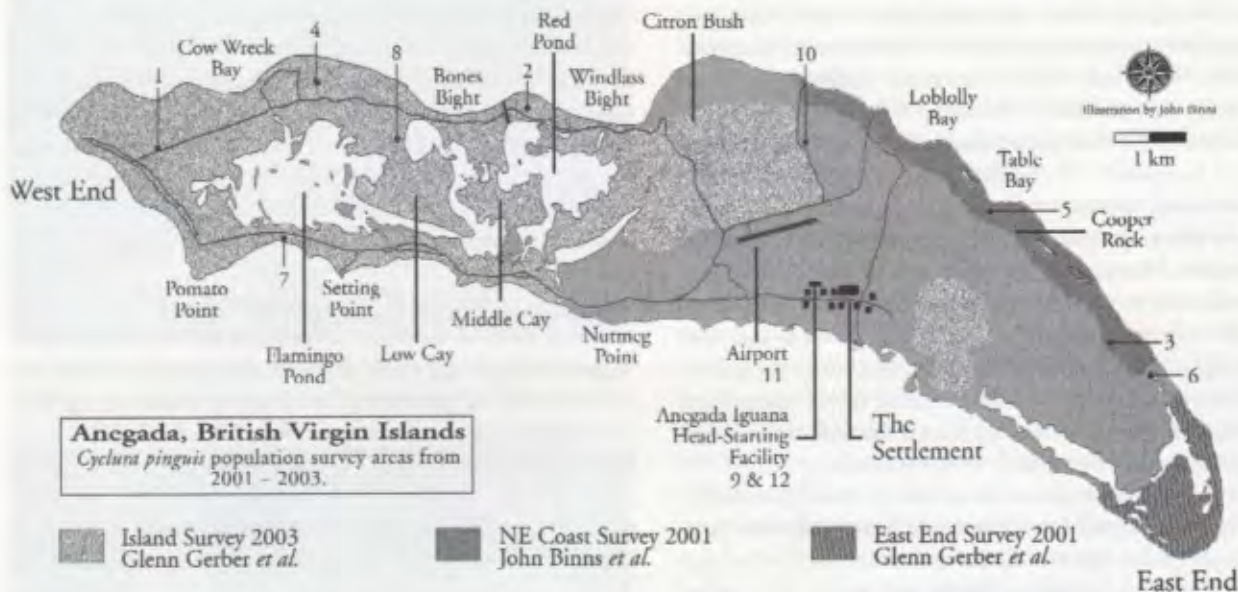
4 Joe Burgess and Roberto Maria during the 2003 survey east of Cow Wreck.



5 Sandy Binns at Table Bay during the 2001 survey of the northeastern coast.



6 The area southeast of Cooper Rock is replete with livestock but devoid of iguana signs.



7 Neptune's Treasure provides excellent accommodations for researchers while on Anegada.



8 Lee Vanterpool, Roberto Maria, Joe Burgess, George Waters, and Glenn Gerber in 2003.



9 The Anegada Iguana head-starting facility is located next to the fire and police stations.



10 Livestock is a common sight along all roads on Anegada.



11 Joel Friesch, Alberto Alvarez, Juliann Sweet, and Sandy Binns departing Anegada in 2001.



12 One of the older head-started *Cyclura pinguis* prior to release in October 2003.

November, approximately six weeks after release, all 22 animals were briefly recaptured so that they could be weighed and measured. All of the animals were healthy and robust, with an average weight gain of 100 g. To date, animals have dispersed 13–390 m from their respective release sites. All of the iguanas have established small home ranges and are exhibiting retreat site fidelity. Focal animal observations are being conducted to determine how the animals are behaving and adapting to living in the wild after spending the first 4–6 years of their lives in captivity. Data are being collected on diet, habitat use, activity periods, and interactions with wild adults and other released iguanas. These data will be used to construct energy budgets for the released iguanas. Future trips to Anegada to continue monitoring the released animals are planned for March, May, and July 2004, and in October another 24 headstarted animals will be released and monitored.

#### Population Survey

A team consisting of John Binns (IRCF), Kelly Bradley (Dallas Zoo), Joe Burgess (IIS), Glenn Gerber (San Diego Zoo), Roberto Maria (ZooDom), Tarren Wagener (Fort Worth Zoo), and George Waters (IIS) conducted a population survey of *Cyclura pinguis* on Anegada in 2003 in an effort to obtain an accurate population estimate for this critically endangered species. The survey was conducted in July to coincide with the nesting season,

and thus also provided a chance to locate active nests, adding to the reproductive database and aiding in the collection of juveniles for the headstarting program. Due to time constraints, efforts were concentrated on the western half of Anegada, which is believed to support the majority of the existing population. The survey consisted of walking line transects in groups of 2–4 people. Two types of line transects were conducted: simple transects, where meandering straight lines were walked and the number of iguana observations were recorded, and distance sampling transects, where straight lines were walked and the perpendicular distance of each iguana observation from the line was recorded. Distance sampling transects are more difficult and time consuming than simple transects, but allow for the computation of density estimates if a large enough sample can be obtained. Because time was limited, distance sampling transects were only walked in the core iguana area, which is located along the north-central coast of western Anegada, where iguana sightings were most likely. Simple transects were walked in all areas of western Anegada, including the core area. The intent behind this sampling strategy was to correlate relative abundance estimates obtained in the simple transects with density estimates from the distance sampling transects to arrive at an overall measure of iguana abundance for western Anegada. The location, path, and length of all transects walked were mapped using GPS, and all observations of iguanas and their retreats, tracks, and scat were



This *Cyclura pinguis* was returned to the wild in October 2003; he has been tracked by radio telemetry since his release. Photograph by Rick Hudson.

recorded. While walking simple transects, the team also recorded observations of feral mammals and their scat.

Unfortunately, only 13 observations of iguanas were made while walking distance sampling transects, too few to reliably estimate iguana density. Thus observations from both transect types are combined here and presented as a measure of relative abundance. Survey teams walked a total of 42.7 km of transects and observed a total of 24 iguanas, 63 iguana feces, 89 iguana retreats, and 172 iguana tail drags. With the exception of two iguana tail drags found near the southwestern shore, all of these observations were in the core area, which encompasses only 2.5–3 km<sup>2</sup>. On average, only one iguana was observed per km of transect walked. The density of iguanas is very low within the core area and approaches zero outside the core area. In comparison to iguanas, evidence of feral livestock was abundant in the core area and throughout western Anegada. In 35.2 km of simple transects walked, the survey team recorded in excess of 1500 cattle feces, 700 donkey feces, and 150 goat feces. Although eastern Anegada was not included in this survey, prior work there turned up little evidence of iguanas and feral livestock appear to be even more abundant than in the west. These findings, combined with recent habitat destruction in the core area caused by land clearing, suggest that the iguana population on Anegada is becoming increasingly restricted in area and size.

#### Nesting

During the July survey, four recently closed iguana nests were located. All of these were in sandy areas of Windlass Bight and



Glenn Gerber collecting a scat sample during a distance sampling transect in July 2003.



One of the very large adults observed on Middle Cay during the July 2003 survey. Photograph by Joe Burgess.

Bones Bight in the core iguana area. The nests were marked and later enclosed by BVINPT staff. Twenty-eight healthy hatchlings from these nests were collected and transferred to the headstart facility in October. Plans are underway to locate new nests in July 2004, so that the headstarting effort can be maintained as long as needed. This July, we also hope to observe nesting by some of the larger headstarted females released in 2003.

#### Education

Lee Pagni, a conservation education specialist, facilitated the initiation of an education program on Anegada in 2003. He surveyed approximately 30% of the adult residents of Anegada to determine their perceptions of, and support for, several important iguana conservation measures. Results of the survey are now being used to tailor a conservation education program for Anegada's citizens to increase public awareness and support for conservation initiatives. Plans for the coming year include production of a bi-annual iguana conservation newsletter for local distribution, development of interpretive materials for the headstart facility, and an educational program for local school children. Only with the long-term support and enthusiasm of the local community on Anegada will this unique iguana's future be secure.

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