



A very thin *Cyclura ricordii* on the southern slope. *Photograph by Joe Ehrenberger.*



Rhinoceros Iguana (*Cyclura cornuta*). *Photograph by Joe Ehrenberger.*



Day's end on Isla Cabritos. *Photograph by Jennifer Niederlander.*



Isla Cabritos lies in Lago Enriqueillo, which is in the valley formed by the former marine channel that separated the North and South paleoislands that joined to form Hispaniola. *Illustration by John Birns.*

A Survey of Ricord's Iguanas (*Cyclura ricordii*) and Rhinoceros Iguanas (*Cyclura cornuta cornuta*) in Isla Cabritos National Park, Dominican Republic 2003: A Preliminary Report

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Introduction

West Indian Rock Iguanas of the genus *Cyclura* are the largest living land vertebrates endemic to the Caribbean islands. As a group, they are considered to be among the most endangered lizards in the world. Hispaniola is the only West Indian island on

which two species of *Cyclura* are sympatric. Ricord's Iguanas (*Cyclura ricordii*) are critically endangered according to the International Union for the Conservation of Nature (IUCN) Red List. Only two or three populations, which inhabit xeric lowlands



Isla Cabritos, terrain along the northern slope. *Photograph by Kacie Ehrenberger.*



Slope approaching the central limestone plateau. *Photograph by Joe Ehrenberger.*



On the limestone plateau. *Photograph by Joe Ehrenberger.*

of the southwestern Dominican Republic, remain. Rhinoceros Iguanas (*Cyclura cornuta cornuta*) have a much larger range throughout the Dominican Republic than Ricord's Iguanas, and are listed as threatened on the IUCN Red List.^{1,3,4}

Isla Cabritos National Park is situated on an island in Lago Enriquillo, a hypersaline lake that represents a remnant of the marine channel that once separated the North and South paleo-islands that joined to form Hispaniola. The park is home to one of the two or three known populations of wild Ricord's Iguanas in the Dominican Republic. Rhinoceros Iguanas are sympatric



American Crocodile (*Crocodylus acutus*) along the southern shore of Isla Cabritos. Photograph by Joe Ehrenberger.



The "landbridge" exposed during periods of low water level connects the west end of Isla Cabritos to the main island shore. Photograph by Joe Ehrenberger.



Feral donkeys along the southern shore. Photograph by Joe Ehrenberger.

with Ricord's Iguanas throughout their range on Isla Cabritos. The island is roughly 4 km wide and 12 km long, with dry, sandy shores and a central plateau of fossilized coralline limestone.³

Technically, the island has been protected as a National Park since 1974. It also is somewhat protected by virtue of the fact that it is an island. Unfortunately, in approximately 10-year cycles, the water level of the lake falls enough for the formation of a land bridge on the western end of the island, allowing feral cows, horses, donkeys, and cats to cross to the National Park. These introduced domestic animals compete with the iguanas for resources or, in the case of cats, prey on young iguanas. Collectively, they constitute a direct threat to the survival of these endangered animals. The island also is home to several native raptors (e.g., American Kestrels, Burrowing Owls) that prey on hatchling iguanas. The iguanas of Isla Cabritos were well-studied in the 1980s by José Ottenwalder, and Sixto Incháustegui, and, in 2000, Gloria Santana surveyed the west end of the island.

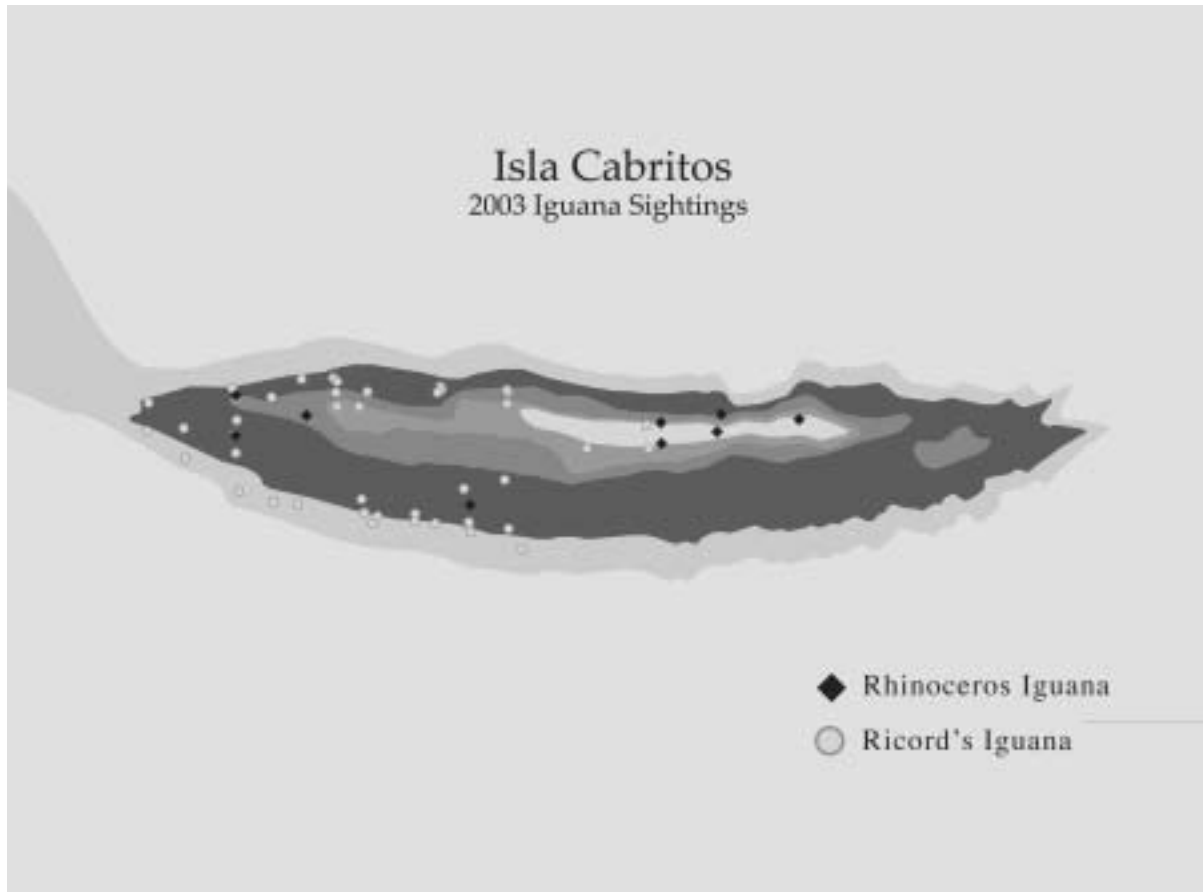
In late 2002, the IUCN Iguana Specialist Group held a workshop in Santo Domingo, Dominican Republic to develop a Species Recovery Plan for Ricord's Iguanas. In fulfillment of one of the objectives of this plan, the Indianapolis Zoo (IZS) and Parque Zoológico Nacional (ZooDom) conducted a census of Ricord's Iguanas and Rhinoceros Iguanas on Isla Cabritos. This preliminary report is a summary of that work.

Methods

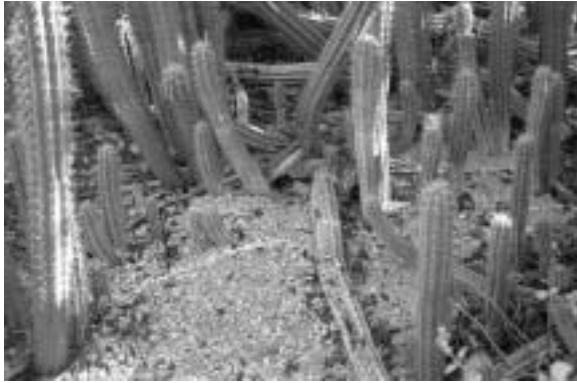
Research groups visited Isla Cabritos on three different occasions in 2003, corresponding roughly to Ricord's Iguana breeding, nesting, and hatching seasons. The first group worked on Isla Cabritos in late April through early May 2003 and was composed of personnel from ZooDom and IZS, along with Isla Cabritos National Park rangers. Using Global Positioning Service units, 15 transects were set with an average length of 2 km and a sightline width of roughly 40 m in either direction, depending on density of vegetation. Each transect ran the width of the island every 500 m. Each transect was walked once, and the position of every Ricord's and Rhinoceros iguana was recorded, including gender and age, if these could be determined. If species could not be positively identified visually, the sighting was marked simply



Seeking shade after working a transect; from left to right: Francisco Alberto Paredes, Leandro Delacruz, Kacie Ehrenberger. Photograph by Joe Ehrenberger.



Isla Cabritos showing the transects marked during the iguana surveys (bottom) and locations where iguanas were sighted during the June survey (top).



Typical *Cyclura ricordii* burrow in a dense cactus stand. Photograph by Joe Ehrenberger.



Vegetation around the opening of a *Cyclura ricordii* burrow. Photograph by Joe Ehrenberger.



A common cactus (*Harrisia nashii*) bears yellow fruits eaten by iguanas. Photograph by Kacie Ehrenberger.

as “iguana.” Iguana dens and scat also were recorded. Three adult Ricord’s Iguanas were captured, affixed with microchips, given complete physical examinations, and released. All domestic animals (burros, cattle, horses, and cats) were recorded, as were any other significant observations.

The second group consisted of personnel from ZooDom, IZS, and the Fort Worth Zoo, and Isla Cabritos National Park



Typical *Cyclura cornuta cornuta* burrow, large and in an open area. Photograph by Joe Ehrenberger.

rangers. This group worked on Isla Cabritos in late June through early July 2004. This group set five additional transects and walked each transect once using the methods established in April. A horticulturist from the Indianapolis Zoo began cataloging plant species during this visit.

The last group worked on Isla Cabritos just after the hatching season, in late September 2004. Zoodom and IZS personnel, along with Isla Cabritos National Park rangers walked each transect using the same methods as the first two groups. Unsuccessful attempts were made at capturing hatchling Ricord’s Iguanas for collection of biological data. Three adult Ricord’s Iguanas were captured, affixed with microchips, and released.

Results

In April, researchers sighted a total of 31 Ricord’s Iguanas, including 11 males, 12 females, five adults of unknown gender, and three juveniles of unknown gender. In contrast, only seven Rhinoceros Iguanas were seen, including one male, five females, and one adult of unknown gender. Rhinoceros Iguanas were seen on transects nearest the tourist trail and at the far eastern end of the island, but the majority of sightings on the interior of the island were Ricord’s Iguanas. Six donkeys and one horse were sighted while walking transects in April, but herds of up to 12 horses were noted at other times. A total of 32 active dens were found while walking transects; one known to be inhabited by a Rhinoceros Iguana and five known to be inhabited by Ricord’s Iguanas. These dens were found primarily on either slope of the island throughout its length. Few den or iguana sightings occurred on the rocky plateau.

In June, the team arrived just after the nesting season because the rains came early and nesting had occurred earlier than expected. A total of 16 Ricord's Iguanas (10.6) and three Rhinoceros Iguanas (2.1) were sighted on transects. The pattern of sightings was consistent with the April trip. Many active dens were noted, including those of 34 Rhinoceros Iguanas and 39 Ricord's Iguanas. Dens were designated as being inhabited by Ricord's or Rhinoceros Iguanas either by sighting an animal entering the den, or by the shape and location of the den. Ricord's Iguana dens tend to have openings with a greater soil spread of a finer size and are commonly associated with areas of thorny vegetation consisting mainly of *Cylindropuntia caribaea*. In contrast, Rhinoceros Iguana dens often have openings with larger size soil particles that fan out less widely and tend to be in more open areas. Ernst Rupp reported in his survey of the Barahona Peninsula (see IGUANA 11(1): 8–14) that Ricord's Iguana tail drags are much smoother in fine sand, and therefore notably different than Rhinoceros Iguana tail drags.² However, this was not the case on Isla Cabritos, possibly due to differences in substrate consistency. One nest was seen, but the species was unknown. Far more domestic animals were seen in June; these included eight donkeys, four cows, two horses, and two sets of cat tracks.

Plant communities found on the island during the June trip varied according to the different microclimates and substrates. Certain plants such as *Calotropis procera* were widespread, but tended to be most common in the sandier soils found near the beaches. The limestone plateau supported less plant life. However, *Melocactus* sp., the fruits of which are known to be eaten by iguanas, was only found growing in the limestone and nowhere else on the island. Many other cacti, including *Cylindropuntia caribaea*, *Harrisia nashii*, and *Pilosocereus polygonus*, were fairly widespread, although they were absent from the limestone plateau. The most prevalent cactus found near the limestone was *Consolea moniliformis*. Scrubby vegetation, such as *Guaiacum officinale*, *Guapira brevipetiolata*, *Prosopis* sp., and *Ziziphus rignonii*, was found throughout the island as well, but seemed to be in higher concentrations near the limestone outcroppings.

Fewer iguanas were seen in September, but the areas in which they were seen corresponded well to the first two trips. Ten Ricord's Iguanas (3.5.2) were seen and only two female Rhinoceros Iguanas were seen on transects. Recent scat and tail drags were evident in many areas. Forty-two active Ricord's Iguana dens and 27 active Rhinoceros Iguana dens were noted. Donkeys (4) and cows (1) were seen while walking transects. Horses, cows, and donkeys also were observed around camp, and larger numbers of these animals were reported by Park rangers. Two hatchling Ricord's Iguanas were seen on this trip, but could not be caught for measuring and microchip placement.

Discussion and Recommendations

Using the April data of 31 Ricord's iguana sightings on the 15 transects walked, crude population estimates are calculated at 0.13 Ricord's iguanas and 0.03 Rhinoceros iguanas per hectare surveyed. Curiously, Rhinoceros Iguanas were found only along the edges of the island on the central and eastern end, and near the

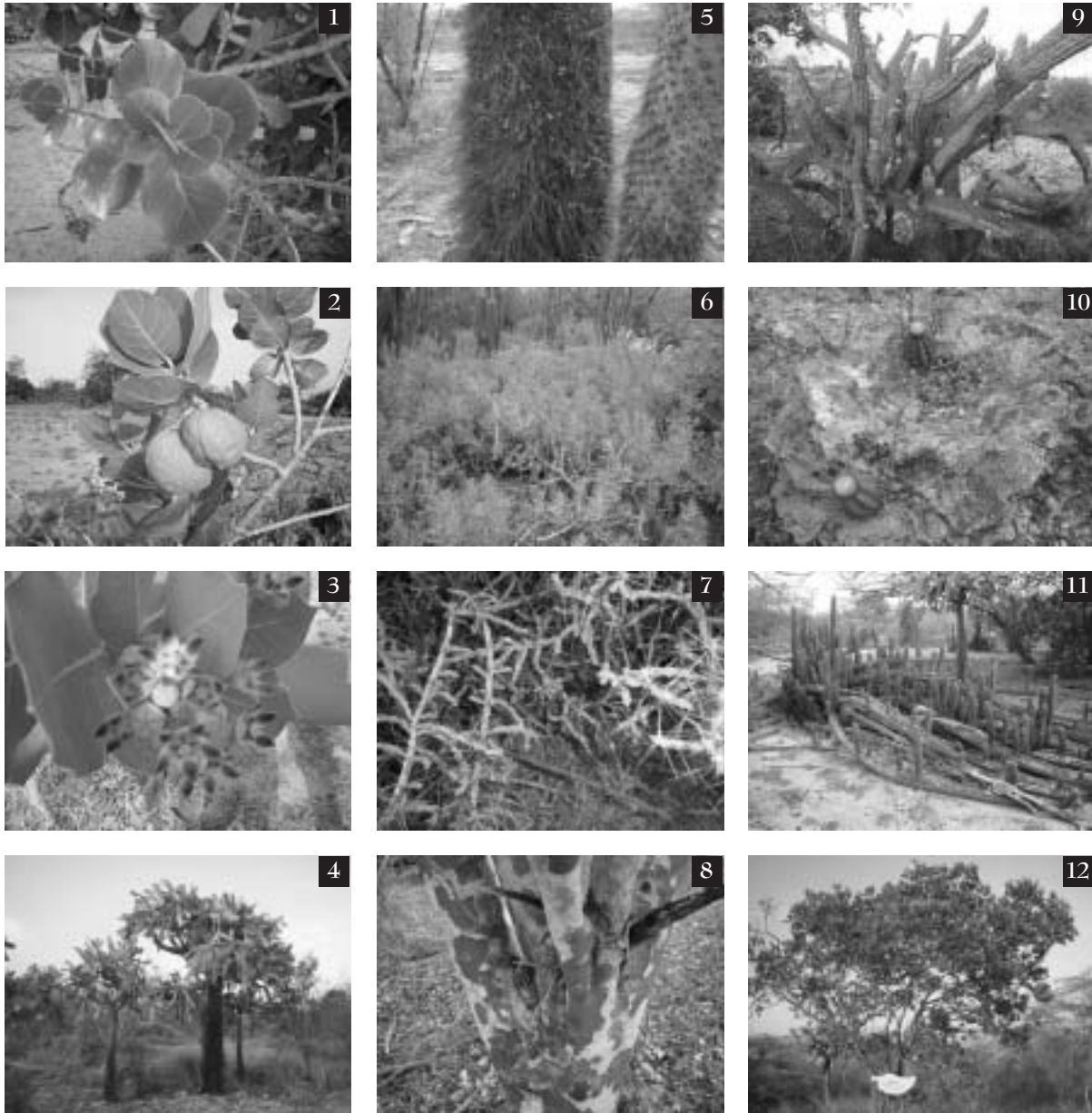
tourist trail on the west end of the island. The sighting of 43 active Ricord's Iguana dens on the 20 transects walked in June also is encouraging, and, if one assumes one adult animal/den, a crude estimate of population density remains around 0.13 Ricord's Iguanas per hectare surveyed. These estimates are considerably lower than densities calculated by Incháustegui, who reported 8 iguanas/hectare on Isla Cabritos in 1985.⁵ In her survey of the west end of Isla Cabritos in 2000, Gloria Santana estimated the density of Ricord's Iguanas to be 1.8 individuals/hectare and Rhinoceros Iguanas to be 1.75 individuals/hectare.⁵ Population densities quite possibly are lower now than in 2000, but another explanation is that the current survey covered the whole island, including habitat that is not necessarily suitable iguana habitat. The nearly 1:1 ratio of Ricord's:Rhinoceros iguanas in Santana's work is consistent with current observations of larger numbers of Rhinoceros Iguanas near the tourist trail and west end than in the central region and the eastern end of the island.

The only other Ricord's Iguana habitat that has been actively surveyed on Hispaniola in recent years is the work of Ernst Rupp et al. in 2003. He estimated roughly 32 iguanas per hectare in the Los Alivares area of Pedernales Province based on number of active dens sited along one transect.² While these data appear to suggest that populations on Isla Cabritos may be very depleted, the estimates in Los Alivares were based on work in areas known to support iguanas. Also, population estimates based on the very low number of sightings made in the current survey are extremely crude and are almost guaranteed to provide low estimates. More detailed analyses of the data are in progress, and continued annual surveys and more detailed behavioral observations are needed to better understand the biology of these animals.

The large number of domestic livestock noted on all three trips is troublesome. Not only do they directly compete with iguanas for forage, they also cave in dens and trample nests. The water level was considerably lower in September than in April, making the land bridge very wide and easily crossed by livestock and predators. Ideally, the land bridge should be fenced, and livestock should be driven off the island. Very few signs of feral cats were noted during this survey; however, no attempts were made to survey for cats at dusk or night. The fact that cat sign was seen at all indicates that a program to reduce the number of cats is needed, and this could include night trapping or shooting of animals.

These data will be presented at a meeting of the Ricord's Iguana Recovery Group in Santo Domingo this summer, and, based on this work and the work of Rupp et al., the nature of future conservation efforts for Ricord's Iguanas will be determined at that meeting. The Isla Cabritos population remains very important to the conservation of this critically endangered species, and further work there could include the following:

- Continued annual surveys (easily accomplished by park rangers if proper equipment and training were available).
- Additional transponder and telemetry studies (also by park rangers in many instances).
- Perform mark/recapture studies to more clearly establish population densities in different parts of the island.
- Track hatchlings (longer-term studies to identify relationships between animals of all ages and vegetation and substrate patterns on the island).



Vegetation of Isla Cabritos: 1–3. *Caloptropis procera* leaves, fruits, and flowers, all of which are eaten by iguanas; 4–5. *Consoulea moniliformis* stand and close-up of the trunk; 6–7. *Cylindropuntia caribaea* forms impenetrable forests; 8. *Guaiacum officinale* bark; 9. *Harrisia nashii* grow very large and often provide shelter for *C. ricordii* burrows; 10. *Melocactus* sp. are scattered across most areas of the island; 11. *C. ricordii* burrows are frequently associated with *Pilosocereus polygonus*, another abundant cactus; 12. *Ziziphus rignonii* seeds germinate more rapidly after passing through the digestive tracts of iguanas. Photographs by Lori Johnson-Roedell.

Participants

APRIL: Roberto Maria, Senior Veterinarian, ZooDom; Melvin D'Oleo, Isla Cabritos National Park Ranger; Adriano Menier, Senior Keeper, ZooDom; Jan Ramer, Associate Veterinarian, Indianapolis Zoo; John Wyatt, Deserts Senior Keeper, Indianapolis Zoo.

JUNE: Francisco Alberto Paredes, Senior Keeper, ZooDom; Jennifer Niederlander, Veterinary Technician, Indianapolis Zoo; Leandro DelaCruz, Veterinary Student, ZooDom; Lori Johnson-Roedell Curator of Horticulture, Indianapolis Zoo; Meg Bommarito, Conservation Department, Fort Worth Zoo; Melvin D'Oleo, Isla Cabritos National Park Ranger; Adriano Menier,



The September surveying team (from left to right): Melvin D'Oleo, the author, Alice Wright, Adriano Menier, Francisco Alberto Paredes, Joe Ehrenberger, Leandro DelaCruz, Kacie Ehrenberger, and Emily Hansen.

Senior Keeper, ZooDom; Richard Searcy, Deserts Keeper, Indianapolis Zoo.

SEPTEMBER: Francisco Alberto Paredes, Senior Keeper, ZooDom; Leandro DelaCruz, veterinary student, ZooDom; Joe Ehrenberger, Deserts Keeper, Indianapolis Zoo; Kacie Ehrenberger, Wildlife Biologist and Indianapolis Zoo Volunteer; Emily Hansen, Educator, Indianapolis Zoo; Melvin D'Oleo, Isla Cabritos National Park Ranger; Adriano Menier, Senior Keeper, ZooDom; Jan Ramer, Associate Veterinarian, Indianapolis Zoo, Alice Wright, veterinary student, Edinburgh, Scotland.

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Seeking shade after working a transect; from left to right: Leandro DelaCruz, Emily Hanson, Kacie Ehrenberger, Jan Ramer, Alice Wright. *Photograph by Joe Ehrenberger.*

tion; thank you, John. And finally thanks go to all of the survey participants for their hard work under considerably less than comfortable conditions.

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Male Ricord's Iguana on Isla Cabritos (November 2002). *Photograph by John Binns.*