iguana specialist group

NEWSLETTER

Volume 16 · Year 2016

Lesser Antillean Iguana
(Iguana delicatissima)
See page 17 for more on this species in the field

IUCN SSC Species Survival Commission

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ISG Updates

Updates from the Co-chairs and Program Officer

Structural changes for the Steering Committee. During the IUCN SSC ISG meeting in Fiji, the Steering Committee (SC) met to discuss a transition plan for SC members. The intent was to provide a transparent and accessible path for members interested in serving on the ISG SC. Starting in 2017, we will be enacting non-binding 3-year term limits for SC members. We will stagger the transition process to ensure that there are experienced members serving alongside new members during any given term. Every year, two SC members will rotate off the committee, allowing for new members to join. In the unlikely event that we do not have willing nominees, the existing SC members scheduled to rotate off the committee can choose to remain in their capacity.

The current SC members include Allison Alberts, Daniel Ariano-Sánchez, Glenn Gerber, Peter Harlow, Rick Hudson, John Iverson, and Catherine Malone. Allison Alberts and Rick Hudson have volunteered to rotate off the SC at the end of 2017. Their dedication to iguana conservation and intense efforts over the last three decades cannot be overstated. Rick and Allison were vital in the formation of the ISG and have served as either Chair, Co-chair, or SC member since its inception. We are forever grateful for their service and hope that they will continue to be available to offer their sage advice in the future.

New members for 2017–2020 term. Also during the Steering Committee meeting in Fiji, membership for the new IUCN term, 2017–2020, was discussed. New members were approved for invitation and current members were evaluated for their activity in the group during the previous term. During a four-year term, members are expected to contribute to the group either through (but not limited to) actively participating at group meetings, contributing to Red List assessments, organizing task teams, drafting group policies, serving on subcommittees, and/or contributing computer or artistic skills when needed. Invitations will be sent near the end of 2016 for the new term. We expect to have approximately 85 members from 18 countries, plus overseas territories.

Iguanas: Biology, Systematics, and Conservation published. The ISG published a monograph titled Iguanas: Biology, Systematics, and Conservation in the online journal Herpetological Conservation and Biology. This compilation represents the third time that iguana researchers from around the world collaborated to publish a diverse group of papers on the behavior, ecology, evolution, and conservation of this unique taxonomic group. The present volume complements and builds on the previous two compilations, expanding our knowledge of iguana systematics, distribution and habitat, ecology, population biology, and conservation, while highlighting areas where further research is still needed.

With each volume, the number of contributions from range country scientists has increased, reflecting a growing cadre of international researchers with an interest in iguana biology and conservation. The number of contributors more than doubled in the present volume, with 69 authors represented, compared to 31 and 42 in the two previous volumes. Additionally, the percentage of contributions from scientists based outside the United States and Europe grew from 16% in the first two volumes to 42% in the current volume, with ten countries represented in total. A major factor in bringing together this community was the ISG; not surprisingly, 29 (42%) of the 69 authors contributing to this volume were ISG members. The commitment to assembling this volume was solidified during our 2013 annual meeting in Kingston, Jamaica. At that time, we agreed to make this an online open access publication with the hope that it would be more immediately available and accessible to those interested in iguanas worldwide. We thank the authors and reviewers for their contributions to ensure that the monograph represented results of high-quality scientific investigations aimed at informing conservation. ISG members Chuck Knapp, Stesha Pasachnik, Tandora Grant, John Iverson, and Allison Alberts promoted the monograph in a Huffington Post blog post (http://www.huffingtonpost.com/charles-knapp-phd/a-coalition-of-hope-for-saving_b_10441630.html).

Invasive Iguana Position Statement published. Common Green Iguanas (*Iguana iguana*) and Spiny-tailed Iguanas (*Ctenosaura similis* and *C. pectinata*) are being moved around the world at an increasing rate, primarily for the pet trade and human consumption. The subsequent intentional and unintentional release of these iguanas has led to the establishment of uncontrolled invasive populations in more than 19 countries, with subtropical and tropical islands being most vulnerable. To date, no country has been able to eradicate these species once a breeding population has become established.

The Biosecurity Authority of Fiji has posted warning signs at ports regarding the invasive American Iguana. See the ISG Invasive Iguana Position Statement.

To address this situation, the ISG drafted a Position Statement during the 2015 annual ISG meeting in Florida. The statement succinctly explains the risks of non-native iguanas introduced to regions outside their native range, emphasizes the devastating environmental and economic impacts they can cause, documents the known regions of invasion, and provides recommendations for countries dealing with various stages of invasion.

The Position Statement was published in July 2016, and will be updated continuously as new information becomes available. Our intent is that the statement helps educate politicians, wildlife managers, and the general public on this critical topic, and serve as leverage to garner support for immediate mitigation action on islands experiencing an invasion. (http://www.iucn-isg.org/publications/general-publications/)

Goat Islands victory. From 2013–2016, the Government of Jamaica was negotiating with China Harbour Engineering Company (CHEC) to establish a large transshipment port in the Portland Bight Protected Area (PBPA), in the vicinity of the Goat Islands. The PBPA is considered of global importance because it is the Caribbean's largest contiguous swath of intact dry forest and is critical for the survival of many threatened species, including the Jamaican Iguana (*Cyclura collei*). ISG members worked alongside local and international organizations, providing science-based information that justified a location change for the port.

In September 2016, a Minister in the Government of Jamaica telephoned our colleague Diana McCaulay at Jamaican Environment Trust to relate that "the Goat Islands port is not going ahead", and that a public statement would be made soon. The following day, the Prime Minister was asked about the port at a town hall meeting in New York and he confirmed that "there are other locations that would do less environmental damage" and "we are going ahead with a logistics port but not at Goat Island". We are grateful to all ISG members and their colleagues who contributed to the effort to stop this destructive development proposal for the PBPA. *See press release on page 8.*

ISG media. The ISG Virtual Library (library.iucn-isg.org) is updated continually with iguana-specific articles, from peer-reviewed journals, grey literature, websites, and presentations from our ISG meetings. We now have over 2,300 records, viewed by 950 site users.

Visitors to the ISG website have decreased since last year by about the same percentage as the International Iguana Foundation (IIF) site has increased. The most visited pages are: the species information pages (both sites), meeting information and general publications (ISG), the year-end fundraising campaign (IIF), and grant application pages (IIF).

For the second year, the ISG Newsletter contains edited reports from International Iguana Foundation grant recipients. These reports are posted as they are submitted under the relevant species headers on the IIF website. At the end of each year, the reports will be compiled for publication in this Newsletter. We hope this will help the ISG community stay up-to-date on research and management actions for iguanas. Reports from non-IIF-funded projects will also be published in the Newsletter and on our website. Please send in your contributions!

All our best,
Chuck, Stesha, and Tandora

2016 ISG Meeting Summary

The 2016 annual Iguana Specialist Group meeting was held from 30 October – 5 November at the Musket Cove Island Resort and Marina, Malolo Lailai Island, off the west coast of Viti Levu, Fiji. On the first day we visited Ahura Resorts on Malolo Island to get acquainted with their on-going conservation project. Steve Anstey (Ahura Resorts) showed the group their habitat restoration program along with their iguana headstart and rescue facility. We conducted our annual working meeting during the following two days. This included 17 oral and three poster presentations by ISG members and collaborators working in Fiji. We also focused on ISG business and had several talks and vigorous conversations about the issue of invasive Green Iguanas, *Iguana iguana*. This is a pressing threat for Fiji and other island nations and we attempted to raise awareness about the serious nature of the

Attendees at the 2016 ISG meeting, Musket Cove Island Resort and Marina, Malolo Lailai Island, off the west coast of Viti Levu, Fiji. Photo by Thomas Wiewandt.

problem and underscore the need for immediate action. We also had an important and cautious discuss about the problems associated with iguana smuggling for the pet trade. For the first time, to our knowledge, we had a notorious reptile smuggler use the ISG meeting as an excuse for entering a host country and visiting several field sites. The exact actions of this group are unknown; however, they were later arrested.

The last two days of the meeting was devoted to a workshop focusing on a Melanesian Iguanas Recovery Plan. The workshop was organized by Robert Fisher (U.S. Geological Survey), Kim Lovich (San Diego Zoo Global), and the National Trust of Fiji. With ten oral presentations, the first day of the workshop provided an opportunity for members to gain insight about the natural history, evolution, genetics, and current conservation efforts for the Melanesian Iguanas. There was also the opportunity to review the original 2008–2012 Recovery Plan and be introduced to proposed revisions for the new recovery plan. On the second day, we worked in small break-out sessions with local stakeholders to discuss and prioritize actionable items concerning biosecurity, current ranger program, captive husbandry, and education and outreach activities. At the end of the day the groups reconvened to summarize their discussions with the collective group. The goal is to have a working, updated recovery plan for Melanesian Iguanas within the coming year. We are incredibly thankful to the National Trust of Fiji, Kula EcoPark, Jone Niukula, Robert Fisher, Kim Lovich, Peter Harlow, and Steve Anstey for their assistance and contribution to the meeting, without which the meeting would not have been possible.

Travel Fund. We also thank all members who contributed to the meeting travel fund. The ISG considers it a priority to provide access to students, and members from range countries who do not have the financial support to attend our annual meeting. Their participation is crucial for a realistic goal of conserving iguana species long-term. The 2016 awards were $700-750 each. Starting in 2017 we will have a three-tier awarding scheme, with the amounts being dependent on location. We congratulate the 2016 awardees including Adam Clause, Araceli Samaniego, Thijs van den Burg, Daisy Maryon, and Flavia Dioallevi. Daniel Ariano and Jen Moss were also offered an award but were still unable to attend the meeting due to funding constraints.

A list of meeting attendees, abstracts, and photographs can be found on our website: http://www.iucn-isg.org/about/isg-conferences.

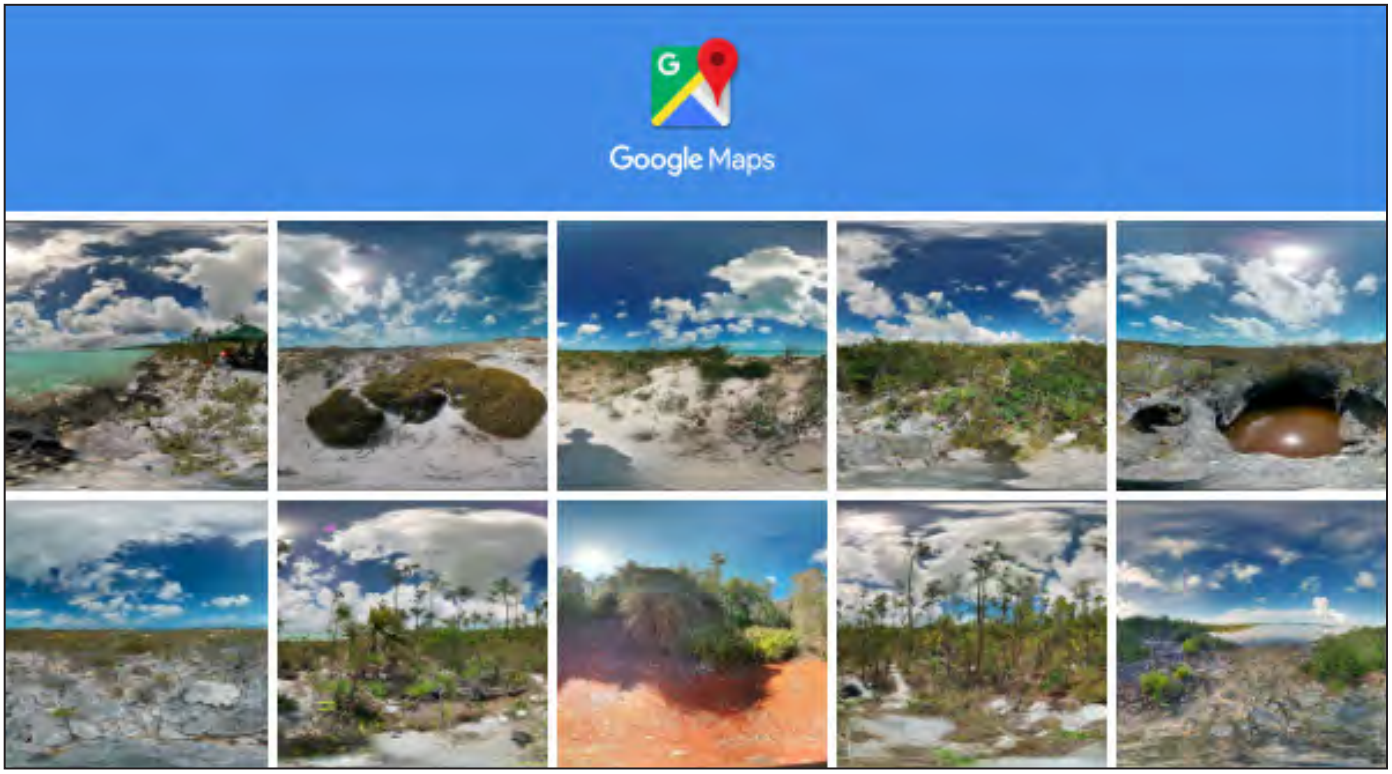
2017 Meeting. The 2017 meeting will be held 22-28 October in Meliá Hotel, Varadero, Cuba. This location is intended to facilitate added participation from the wide range of our members, and for members working on under-represented taxa. We thank Amnerys Gonzales in advance for organizing the meeting.

Male Cuban Rock Iguana on the Guantanamo coast, Cuba. Photo by Allison Alberts.

Iguana Habitats on Google Maps

Thanks to pic-snapping ISG researchers, we now have 23 "photospheres" from eight locations in the Caribbean uploaded to Google Maps. The images were taken using a special smartphone that stitches individual photos together to create a single, scrollable, 360 degree and three-dimensional image. As of mid-November, our images had been viewed 1,501,109 times!

Our collection can be viewed from our IUCN SSC Iguana Specialist Group Google+ page.



Iguana News

First-Ever Cross-breeding Detected Between Sister Isles Rock Iguanas and Invasive Green Iguanas

Press Release from the Cayman Islands Department of Environment – 22 September 2016

Three unusual hatchling iguanas from Little Cayman have just been examined by the Cayman Islands Department of Environment and found to be hybrids. They are apparently the offspring of an invading Green Iguana female which mated with a native Sister Isles Rock Iguana.

Genetic work is now being scheduled by Dr. Mark Welch, in his laboratory at Mississippi State University. This is expected to confirm the unexpected discovery. The strangely coloured and patterned hatchlings show intermediate characteristics for features that normally distinguish the two species. Cross breeding is the only credible interpretation.

Cross-breeding between Green Iguanas and Rock Iguanas has never been considered possible, because the genetic difference between the two was thought to be too profound. Now that it has occurred, perhaps for the first time, this must be considered a new and serious risk for Rock Iguanas throughout the West Indies, wherever the Green Iguanas have invaded.

The first of the hybrid hatchlings was recently caught in the wild by Mike Vallee, who with fellow volunteer Ed Houlcroft coordinates "Green Iguana B'Gonna", which is a programme of the National Trust for the Cayman Islands on Little Cayman.

Another two hybrid hatchlings were caught soon afterwards by Jeanette Moss, field assistant Tanja Laaser, and Dr. Mark Welch. Moss has been in Little Cayman leading the Mississippi State University research team studying the Sister Isles Rock Iguanas, in partnership with the Cayman Islands Department

of Environment and the San Diego Zoo Institute for Conservation Research.

The hatchlings are small, like Green Iguana hatchlings, with the same long striped tails but with different-shaped heads. The body shows classic rock iguana patterns of dark chevrons and spots. Under the Rock Iguana patterns shines a yellow base colour tinged with green.

It cannot be determined at this early age whether the hybrids will be fertile, or even if they will develop normally. Since their presence in the Cayman Islands is a serious risk to native Rock Iguanas, the hatchlings will be transferred to the San Diego Zoo Institute for Conservation Research, to rear and test for fertility over the next several years.

In searching for more of these hatchlings, the local volunteers were joined by the Mississippi research team. No more hybrid hatchlings have yet been found. It is unknown how many more may have hatched from the hybrid nest, and dispersed into the surrounding vegetation. Residents and visitors in Little Cayman are asked to keep an eye out, and contact Ed Houlcroft or Mike Vallee in person or on 929-5655 or 924-4991 respectively, or at greeniguanabgonna@gmail.com if anyone spots a bright yellow-green, striped, and unusually small iguana hatchling with a long, thin, banded tail.

Green Iguana hatchling (top) with hybrid (below). Photo by Cayman Islands Department of Environment.

Sister Islands Iguana hatchling (top) with hybrid (below). Photo Jeanette Moss / Tanja Laaser.

Nearly 260 Smuggled Reptiles Found at Dutch Airport

Reprinted from Agence France Presse
5 September 2016, Staff Reporter

Agents seized almost 260 reptiles, including protected lizards, crammed into suitcases at Amsterdam airport and arrested three Spaniards suspected of trafficking the creatures, Dutch authorities said Monday. The illegal stash of wildlife that arrived from Mexico was uncovered Saturday and is worth some 80,000 Euros ($89,000), according to the Dutch food and consumer watchdog NVWA.

Among the seized animals were 14 San Esteban Chuckwallas, which look similar to iguanas and are protected by the Convention on International Trade in Endangered Species (CITES).

"Of the 259 animals found, 10 were dead," Dutch health and customs authorities said in a statement. The three Spanish suspects were being held by police and are accused of trafficking and animal cruelty.

San Esteban Chuckwalla (Sauromalus varius)*. Photo by Bradford Hollingsworth.*

Mexican National Sentenced for Wildlife Crime

Reprinted from Galapagos Conservation Trust
15 February 2016, Staff Reporter

A Mexican man has been sentenced to 2 years in prison for attempting to smuggle protected species out of the Galápagos Islands.

The judge sentenced Gustavo Eduardo Toledo Albarran to two years in prison in Guayaquil Social Rehabilitation Centre, where he was being held.

Toledo was captured on September 6, 2015 in the town of Puerto Ayora on Santa Cruz island, with 11 endemic iguanas, 9 Marine Iguanas and 2 Land Iguanas, in his backpack. Marine Iguanas (*Amblyrhynchus cristatus*) and Land Iguanas (*Conolophus subcristatus*) are both endemic to the Galápagos Islands and are protected under Ecuadorian law. The iguanas, which were all juveniles, were assessed at the time and were released back in to the wild.

Galápagos Land Iguana (Conolophus subcristatus) *on Seymour Island. Photo by Paquita Hoeck.*

Breaking: Unprecedented Win For Conservation In Jamaica

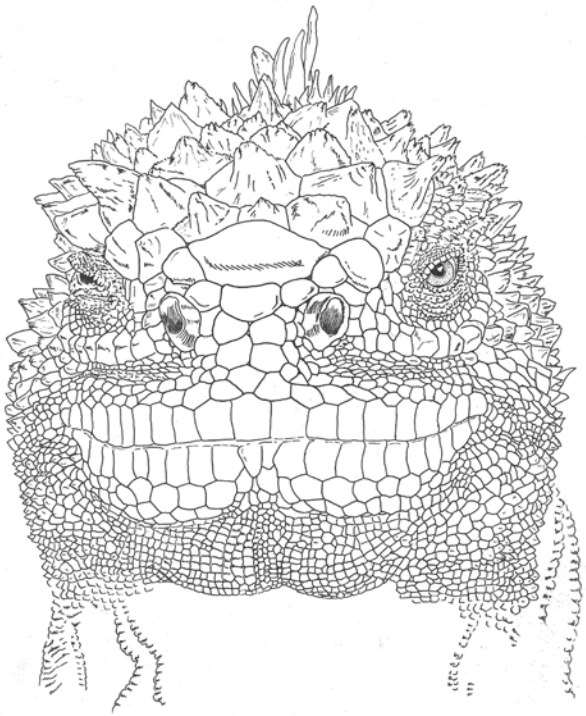
Press Release from Global Wildlife Conservation
28 September 2016

Global Wildlife Conservation and International Iguana Foundation Congratulate Jamaica Environment Trust and Government of Jamaica for Thwarting Environmental Catastrophe

Global Wildlife Conservation and International Iguana Foundation offer their sincere congratulations today, Sept. 28, to Jamaica Environment Trust after receiving the news that the Jamaican government will not be handing over the Goat Islands to China Harbour Engineering Company to build a proposed $1.5 billion transshipment port. By working with partners to bring transparency to the process and encourage the Jamaican government to abide by its national and international environmental commitments, JET has led the way in thwarting this ecological disaster in the heart of the Portland Bight Protected Area, the country's largest nature reserve.

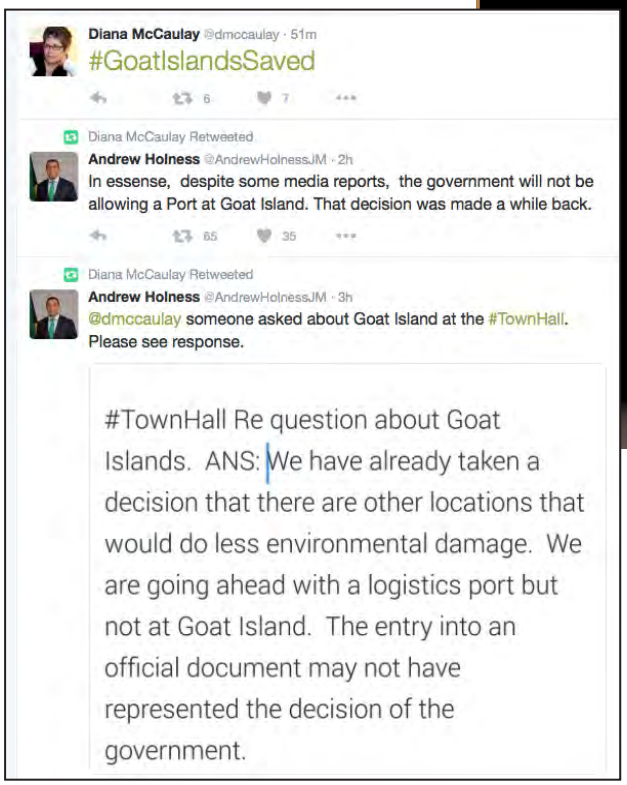
"The development would have jeopardized the last remaining habitat of the critically endangered Jamaican iguana in the Hellshire Hills on the mainland, sending more than 25 years of work in recovering the species up in smoke, and killed the vision of creating a haven free of introduced predators for the iguana on the Goat Islands," said Robin Moore, conservation biologist and GWC communications director. "Having spent so much time involved in this project, and for the most part feeling pretty discouraged about prospects for the area, the species, and all who have worked so hard to bring the iguana back, this news is like a powerful jolt of inspiration." (Read Moore's personal account and photos from his trips to the Goat Islands)

Under the leadership of Diana McCaulay, Jamaica Environment Trust has worked tirelessly to bring transparency to the process of deciding where else the new transshipment port and



Galápagos Land Iguana (Amblyrhynchus cristatus). *Drawing by John Bendon.*

Male Jamaican Iguana (right). Photo by Robin Moore. Below, the Twitter feed announcing the end to the proposed transshipment port on Goat Islands.



logistics hub could be placed, and giving voice to those living within the Portland Bight Protected Area–those who would be directly impacted by the development. JET has also raised concerns over the long-term repercussions of the development to both the health and productivity of the ecosystem and local communities.

News that the Jamaican government would not destroy the Goat Islands came at first in a tweet Sept. 22, relayed from a town hall meeting in New York City in which Jamaica's prime minister, Andrew Holness, was asked directly about the status of the islands. Holness elaborated by stating "there are other locations [for the port] that would do less environmental damage."

In April of 2014 and again in September of 2015, Moore traveled to Jamaica to work with JET and IIF partners to bring global attention to the ecological havoc the proposed project would wreak on the Goat Islands and surrounding habitats. The result was the Save Goat Islands documentary, featuring the Jamaican Iguana and highlighting how the transshipment port would likely condemn the endemic species to extinction. Together the partners also secured a number of international news stories and ran a social media campaign around SaveGoatIslands.org and #SaveGoatIslands (now #GoatIslandsSaved).

The Portland Bight Protected Area is home to numerous globally threatened plant and wildlife species. Found only in Jamaica, the Jamaican Iguana was presumed extinct for four decades. After a small population was re-discovered in the Hellshire Hills in 1990, an international consortium of conservationists mobilized to develop a program of headstarting, invasive predator control and re-introduction to boost recovery of the population.

Though the IUCN Red List of Threatened Species classifies the Jamaican Iguana as Critically Endangered, the IUCN highlights these conservation efforts as "one of the greatest success stories in conservation science." Recently researchers have observed an eight-fold increase in the number of female Jamaican Iguanas nesting in the wild, and the news this week keeps the vision of creating a second haven for the iguanas on the Goat Islands—free from introduced predators—alive.

"I think I speak on behalf of numerous passionate individuals and dedicated organizations who have invested blood, sweat and tears into this project over the past quarter century, in congratulating Prime Minister Holness and the Jamaican government in making a responsible decision and recognizing the long-term economic benefits of a healthy environment for Jamaicans and thereby keeping this vision alive," said Rick Hudson, executive director of the International Iguana Foundation, which has helped spearhead the recovery effort for the Jamaican Iguana. "The future for this species depends on preserving the tropical dry forest ecosystem, but the Goat Islands are really the lynchpin in ensuring their long-term survival."

Male Ctenosaura bakeri *ready to be released to mangrove habitat. Photo by Tom Brown.*

Útila Spiny-tailed Iguana (*Ctenosaura bakeri*)

A study of the reproductive and dispersal behavior of the Critically Endangered Útila Spiny-tailed Iguana (*Ctenosaura bakeri*) on the island of Útila, Honduras

IIF Grant Report submitted by Daisy Maryon, University of South Wales

For this project, we investigated the nesting ecology, reproductive and dispersal behavior, and population size of the Útila Spiny-tailed Iguana. We recorded clutch sizes, hatchling success rates, and the sex and biometric measurements of hatchlings at monitored nests. We determined the sex ratio of hatchlings to establish whether lower numbers of females recorded in the population is present from birth or develops post-hatching. We captured, tagged, and radio-tracked individual iguanas to determine movement of adults across the island, gathering information on home ranges and migration routes between breeding and nesting habitats. We employed a capture-mark-recapture method using tagged individuals to provide an estimate of population size. We collected biometric data for tagged iguanas to better understand the body condition and health of the population. There was an urgent need to update previous studies in light of increased degradation and loss of habitat, and poaching of iguanas.

Assessing the population size and demography of the iguana. A total of 22 transects (50–480 m long) were established in seven areas of Útila. In total, 145 *C. bakeri* were caught and marked. For each individual, we collected behavioral and habitat data. The same georeferenced data were recorded for any *C. similis* detected along transects to help identify any potential habitat overlap between the two species, and possible areas for hybridization. DNA samples were collected from all individuals caught for future investigation on the level of possible hybridization.

Iguanas were recorded in mangrove, coastal vegetation, urban habitats, and in some sites overlapping with the Common Spiny-tailed Iguana (*Ctenosaura similis*). This provides some insight into which areas may be more at risk from land development or hybridization. Some individuals of *C. bakeri* were found in dive shops on the island and reported inside human habitation. Some survey sites, especially close to town, were frequented by hunters. Through quantifying and monitoring the population, as well as the body condition of individual iguanas, we can compare populations in the potentially more threatened areas to undisturbed sites on the western side of the island and identify areas, and populations, most at risk.

Determining the migration and home ranges of iguanas across the island's habitats. A total of 37 iguanas were radio-tracked from two locations

Male Ctenosaura bakeri *basking on a white mangrove (Laguncularia racemose) in Útila. Photo by Daisy Maryon.*

in Útila. Some were gravid females, which we tracked to their nesting sites. Female iguanas were tracked near urban areas, and were recorded nesting and moving through human habitation to get to nesting sites, and frequently nesting in residential gardens. Iguana's tags were found in gardens and surrounding walls. We also discovered that some females had double-clutched during the breeding season. Through radio-telemetry, we were able to collect data on home range, habitat preference, activity patterns, and behavior of these individuals. These data provide us with a valuable understanding of the breeding migration routes and an insight into which routes may need more protection in other areas.

Collecting nesting and hatchling biometric and population data. Data were collected from 35 hatchlings, which were caught opportunistically or processed from two located nests. Egg shells were collected for future genetic analysis to see if an individual's sex can be determined non-invasively. Habitat surveys (10 m x 10 m plots) were carried out at 10 nest sites by a master's student from the University of South Wales. Nest sites were located in a range of habitats, which included scrubby vegetation with leaf litter.

Hatchlings were found in a variety of habitats including the center of Útila's town, further indicating iguanas are nesting in urban areas, and becoming at greater risk to habitat conversion. This highlights the need for more community awareness to protect the iguanas, especially as those individuals in more urban areas may be at greater risk of poaching.

We noted areas of mangrove were for sale for land development, even though this is illegal in Útila. Prime iguana nesting beach areas were also posted for sale.

Additional objectives for the project:

- The IUCN Red List reassessment for *C. bakeri* was carried out during the IIF workshop on Roatán and has been submitted for review.
- It is our intention to discuss the formation of a species action/recovery plan at the next ISG meeting.
- This project has supported an education program presented to five schools on Útila with the KURCF, the Bay Islands Conservation Association, and the Whale Shark and Oceanic Research Centre. This included lectures on *C. bakeri* and their habitats, and also engaged the local community by taking school students on population surveys in mangroves on the island.
- The population survey element of this project will continue next year with the help of the KURCF, with the view of this being sustained as a long-term monitoring project.
- A general project report will be publicly available on the KURCF website later this year (2016) http://www.kanahau.com/
- Over the next four months, we plan to draft scientific manuscripts on habitat selection, particularly regarding nesting sites, home range, and behavior. We feel these will be suitable for consideration in Herpetological Conservation and Biology, the Journal of Herpetology, or Salamandra. While population surveys were carried out during this period, we feel that western side of the island needs to be surveyed more intensively to get a robust global population estimate before publication.

Daisy Maryon radiotracking iguanas while crossing a channel in the mangroves of Útila. Photo by Andrea Albergoni.

"While out in the field radio tracking some iguanas in one of the more remote sites we came across two dogs (likely hunters' dogs) trying to attack a gravid C. bakeri on a nesting beach. We intervened, chasing the dogs away, and took the iguana back to the field center to allow her to recover. The following day we placed her back in some vegetation near the same beach with a radio tag on to monitor her nesting activity. While radio tracking her we came across a Boa constrictor (Boa constrictor) and joked that maybe it was eating the iguana as the signal seemed to be very near to the snake. On closer inspection, our suspicions were confirmed as, yes, the boa was indeed making a meal of our rescued iguana! A rather sad demise, but nature has its way!"

- A project report in Spanish will be prepared for the Honduran protected areas agency, El Instituto Nacional de Conservación Forestal Áreas Protegidas y Vida Silvestre.
- This IIF grant has co-supported the successful completion of the fieldwork required for the fulfillment of the author's Master of Research degree. The thesis will be submitted in January 2017.
- Collected field data has identified the potential for future research. A Ph.D. by the author is planned to continue to study the conservation ecology and genetics of *C. bakeri* and the threats it faces.

Future Directions. We would like to investigate the iguana population on the western side of the island which is largely inaccessible, except by boat. Our objective would be to gather conservation ecology data on the population and nesting sites from this undisturbed area. We will then be able to quantify the total population size and generate population estimates across a gradient of habitat degradation, as well as establish the area of occupancy for *C. bakeri* on Útila.

We propose to use camera traps to monitor nesting activity on beaches on both the western and eastern sides of the island. Camera traps can also be placed in some residential gardens of the expatriate community who are supportive of the project. This would enable nesting data to be gathered in more urban settings, while also helping to further engage with the local community regarding the conservation of the species. This work would also be supported by using endoscopes to better establish nest sites parameters.

We are also keen to make use of polymerase chain reaction (PCR) analysis for 'real-time' DNA sequencing and testing in the field. This has the potential to be a quick and cost-effective approach to support population monitoring and quantification. We plan to apply for IIF funding in the next funding cycle to support these activities.

A Ctenosaura bakeri *hatchling after emerging from a nest. Photo by Daisy Maryon.*

Fijian Banded Iguana (*Brachylophus bulabula*)

Assessment of epiphytic breeding site usage by Fijian Banded Iguanas (*Brachylophus* sp.)

IIF Grant Report submitted by Kim Lovich, Robert Fisher, Jone Niukula, Nunia Thomas, and Adam Clause

Fijian Iguanas (*Brachylophus* sp.) live in rain forests, mostly arboreal, and lay their eggs in small soil deposits in the forest. When they come to the ground during egg laying they are exposed to predation risk from invasive non-native mammals. The two largest islands in Fiji (Viti Levu and Vanua Levu) comprise about 85% of the land mass and iguanas are extremely difficult to detect on these islands. The few recent records for Viti Levu are from very good patches of primary forest, and observations have been tied to logging tracts, sometimes while logging is occurring. There were no recent records for Vanua Levu Island. How Fijian Iguanas persist with mongoose on these islands has been an important question. We hypothesized that perhaps iguanas can find suitable egg laying sites above ground and avoid predation risk. It's possible they

Kalisi Waga searching for iguana nests or egg shells within a Collospermum montanum *epiphyte high in the canopy, Nabukelevu, Viti Levu. Photo by Adam Clause.*

are utilizing soil that is captured in leaf baskets of the basket ferns (*Drynaria* sp.) high up in the tree canopy. The objectives of this project were: 1) to find any recent records for iguanas on Vanua Levu Island, and 2) to climb trees on Vanua Levu and Viti Levu Islands in forest patches were iguana detections were confirmed, to determine if they are utilizing any elevated soil habitats, particularly in these ferns.

During June and July 2015, we conducted a two-week expedition across Vanua Levu Island to identify the priority sites for attempting to find iguanas in trees. We drove across the island searching for good iguana habitat and interviewed villagers about the lizards. The island is about 170 km long, and we drove about 750 km over these two weeks. In 2014, we had previously surveyed the far western portion of Vanua Levu with IIF funding, so we did not revisit that section. The goal was to find recent reliable iguana sightings, as the only museum specimen from the island was from the 1800s. Once we found suitable habitats, we then conducted night surveys to search for iguanas and to further refine potential climbing locations.

One thing we saw in the canopy during our night surveys of Vanua Levu was an abundance of rats. This was surprising because on Viti Levu, and most other islands, you typically do not see so many rats in the canopy during night surveys. At the last survey area (Drawa Forest tract), we met with the village to discuss our goals and survey needs, as we did everywhere we travelled. We reviewed photos of various native reptile species to get a sense of how well the villagers knew the fauna. In Drawa, the locals showed us an amazing new species of skink (*Emoia sp.*; below) that was not in our field guide and occurred on trees around the village! We also found another skink

*New species of skink (*Emoia *sp.). Photo by Robert Fisher.*

*First record ever of a Fiji Barred Tree Skink (*Emoia trossula*) from Vanua Levu Island. They were assumed to be extinct due to mongoose since the 1880s. It was found 16 meters up a tree while searching for iguanas. Photo by Adam Clause.*

in this village which had not been seen in Vanua Levu since its discovery in 1996, living on some of these same trees.

For our interviews, we focused on villages around good forest patches and also visited logging camps. Our interviews identified several places where people had seen iguanas historically, and those sites were also independently verified by loggers. Unfortunately, all of those sightings were from the late 1980s to early 1990s, and none recently. Fortunately, one hunter we met had collected an iguana last year in the Nabou Forest area. He brought the iguana to his village and kept it as a pet for several months. This iguana was independently confirmed by several other people that saw it, but no photos exist. We consider this record to be highly reliable. Although we found areas that seemed like suitable habitat, we did not detect any iguanas.

During December 2015, we conducted a two-week expedition that focused on climbing trees in areas with the most reliable iguana records from our previous field visits and interviews — one week each on Vanua Levu and Viti Levu. We used a single-rope climbing technique on the RAD (Rapid Ascent and Descent) system to access the canopy. Trees were selected based on size and presence of 1–3 searchable large clumps of epiphytes. Additionally, we were able to search four large trees for any evidence of iguanas (adults, eggs, etc.) that were freshly felled by loggers. We were unable to detect any sign of iguanas, even though we searched the epiphytes extensively. Unfortunately, we also detected rats and their tunnels in the epiphytes. This was quite surprising as these forest patches were pretty isolated from villages and the epiphytes were high in the trees.

Between two forest patches on the two islands we detected 16 species of reptiles and amphibians, representing about 60% of the

known species from Fiji. This included a Fiji Barred Treeskink (*Emoia trossula*); a first record in at least 100 years for Vanua Levu as it was thought to be extinct on both large islands due to predation by mongoose. The skink we found was 16 meters high in an epiphytic fern, indicating this species is persisting as a canopy species in the presences of predators, whereas elsewhere it is commonly found low on trees or the ground. Overall, the canopy ferns did not contain the soil levels we had anticipated when we initiated this project, so we are still uncertain how to detect iguanas apparently still existing in small numbers in the mature canopy forest.

In summary, we have three places where we feel certain iguanas still persist in old growth forest on Viti Levu, but we were only able to find one place in Vanua Levu after an intensive 2-week expedition around the island (the pet noted above). We found no evidence of iguanas being reported in any areas that were exposed to wholesale logging, or in secondary forest. Only places that were "sustainably logged", using best management practices, were possibly occupied still. These areas still maintain some canopy trees even though others are selectively taken. To build in-country capacity, we trained 19 people from various government, NGO, and university positions in Fiji on the techniques for rope-aided canopy access. We helped the University of the South Pacific (USP) acquire a climbing equipment set, so that they can continue to work with us in Fiji to survey for iguanas and other species in the tree canopy.

Future. We intend to continue exploring ways to detect iguanas in the primary forest on the major islands. We are considering the possibility of training dogs to find iguana eggs and nests, and at least confirm their presence in forest patches. Dogs might be able to specifically determine where an iguana is, and we can then follow up with canopy climbing to locate them in the trees. Without some way to refine and localize our search efforts, determining presence in the larger forest landscape is untenable currently. If future epiphyte searches still do not result in finding iguanas, it is possible they are using tree holes to nest like monitor lizards. If not holes, we can only assume they are continuing to come down to the ground for egg laying. This ground exposure must be what is limiting their numbers, in addition to the presence of rats in the canopy which was unexpected. We are very confident from the work on Monuriki Island that rats are major predators on iguana hatchlings. Possibly recruiting a student from USP to really focus on this question will be the best way forward.

The trip to Vanua Levu was very informative, but also quite startling. The paved road across the top of the island was now almost completed — foreboding that trade, logging, and mining will greatly increase, and thus the search for the iguanas on this island becomes more urgent.

Relatively pristine forest in the interior of Vanua Levu where iguana surveys were conducted. Larger trees in nearby forest were climbed in December 2015 to search for evidence of tree nesting. Photo by Robert Fisher.

Sister Islands Rock Iguana (*Cyclura nubila caymanensis*)

IIF Grant Report submitted by Jeanette Moss, Mississippi State University

Little Cayman (LC) is a 28-square kilometer island of relatively undisturbed xeric forest supporting the most robust population of Sister Islands Rock Iguanas (SIRI; *Cyclura nubila caymanensis*). While a cursory census suggests good population health, mounting threats associated with human development are suspected to be driving a steady decline for this endemic reptile. Conservation planning continues to prioritize the protection of coastal nesting sites, however, because these do not constitute suitable year-round habitat for iguanas, the survival of future generations will likely depend on the maintenance of intact forest, shrubland, and other associated habitats in the island interior. Last year, the IIF supported fieldwork on LC to initiate long-term monitoring efforts and to investigate nesting ecology questions. Our chief objectives this year were: 1) continue to monitor population trends on LC via mark-recapture and nest site surveys; 2) assess the respective importance of site fidelity and site proximity in predicting nest site selection by

Female Sister Islands Rock Iguana. Photo by Mikey Kartje.

female SIRI; and 3) investigate the distribution of home territories among iguanas in the West End of LC by tracking a representative sample of nesting females and evaluating habitat associations.

Over the course of nine weeks, 62 nests were identified in the West End of LC, which is comparable to the 78 nests identified in 2015 but still far short of the 120 identified by Matt Goetz in 2010. Nearly 75% of observed nesting occurred over a three-week period between 25 May and 15 June. Preliminary trends indicate that seasonal precipitation may play an important role in the timing of nest closures on LC, however more long-term monitoring is needed to assess the extent to which environmental factors may affect nesting patterns. Mark-resight efforts thus far indicate a high degree of site fidelity among adults, as the majority of recorded long dispersal events were associated with nesting females or juveniles. Indeed, 34 of 72 adults tagged in roadside surveys in 2015 were re-sighted in 2016, and 73.5% of re-sights occurred within 0.5 km of their original capture location. Only three of the 228 hatchlings marked in 2015 were recaptured in 2016. The comparatively large number of new yearling captures (n = 38) suggests the cohort size was quite robust. Based on one-year growth data obtained from small samples of hatchlings and juveniles, we can deduce that SIRI reach sexual maturity in 2 to 3 years (SVL = 28-30 cm) and that the highest rate of growth occurs in the second year. Our preliminary data also suggests that juveniles disperse very long distances. Of particular note is one yearling that was recaptured 14.9 km from its natal site in 2016, and a hatchling that was observed to travel 2.96 km from its natal site in a single day. This year, a total of 118 new adults and subadults, and 423 hatchlings were tagged to continue long-term monitoring.

To investigate the respective roles of female philopatry and home range proximity in individual site selection, we employed a combination approach of surveying by mark-resight and direct radiotracking of individual nesters. Initial appraisal of the final locations of 18 tracked individuals suggests fairly random dispersal patterns by nesters. On average, females traveled just over 1.1 km to their home territories. Females sharing general home territories did not necessarily migrate to the same nest sites, but none migrated farther than 2.9 km. Since *Cyclura* are known to be capable of migrations up to 15 km, our data suggest that females likely select for site proximity when suitable nesting habitat is not scarce, as in the West End of LC. Of the 23 females captured and marked at nesting sites in 2015, at least 65% were found to exhibit site fidelity in 2016. This data, in combination with individual tracking datasets, suggests that intrinsic behavioral mechanisms also play a large role in driving selection of nesting habitat. In addition to recaptures, we captured and tagged an additional 20 unmarked nesters this year, which will facilitate greater resolution of return nesting events in following field seasons.

Left: Chris Savell triangulates an iguana home territory behind westerly ponds. Photo by Jeanette Moss. Above: Male Sister Islands Rock Iguana. Photo by Tanja Laaser.

Jen Moss and Tanja Laaser attach a radio transmitter to a female after egg laying. Photo by George Waters.

The movement paths of tracked individuals in our study indicate that females are fully utilizing their natural, intact habitat to move between sites during nesting season and that few barriers to dispersal exist on Little Cayman. However, point sampling reveals that only 32% of final tracking locations fall within undisturbed areas of dry shrubland, according to the habitat classification scheme laid out in the Cayman National Biodiversity Action Plan. Meanwhile, 53% of home territories fall within habitat classified as "man-modified" or "urban." If our sample of females is representative of the West End population, this observation suggests that over half of iguana home territories are concentrated around edge habitat.

Two years of field research on LC have thus far resulted in the tagging of over 900 adult and hatchling SIRI for long-term population monitoring. Recaptures in this year alone have provided much insight into dispersal and habitat use patterns. Chiefly, our data suggest that adults exhibit a high degree of fidelity to home territories and that juveniles tend to disperse unpredictably and often over long-distances. Moreover, our recapture data recapitulates important details of this taxon's natural history, including growth rates and age at sexual maturity. Continued monitoring over additional field seasons is expected to provide valuable insight into long-term population trends and recruitment rates.

Our finding that both philopatry and proximity are important predictors of nest site selection in the West End suggest that traditional communal sites will continue to be important over the long-term and that areas of coastline accessible to the densest populations of iguanas should recruit the highest number of first-time nesters. Unfortunately, downward trends in nest counts from year to year are consistent with a reduction in the adult breeding population as well as possibly the availability of quality nesting habitat. Therefore, long-term management plans may need to consider the preservation of more coastal shrubland in the West End.

While the protection of nesting habitat is critical to maintaining LC's SIRI population, the results of this study have also forewarned the dangers of over-developing the island's interior. Preference for disturbed edge habitat is expected to place iguanas at heightened day-to-day risk of road collisions and predation by feral cats and dogs. Fortunately, many of the iguanas tracked in this study returned to retreats in isolated, undisturbed tracts of dry shrubland. In order to curtail encroaching development and maintain these natural populations, it is increasingly critical that large protected areas be established in LC's interior while high-quality foraging habitat is still abundant.

Ongoing research on this population involves investigations of population genetic health. The Welch lab is in the process of scoring multilocus genotypes for over 500 adult and hatchling blood samples collected on Little Cayman in 2015 and 2016 to assess the degree of inbreeding depression and investigate whether genetic structuring is evident at any communal nesting site. As yet, there is no evidence for natal philopatry in a *Cyclura* species, however, analysis of genetic relatedness among nesters may provide some insight. Long-term monitoring of hatchlings marked during this three-year study should also directly address the question of natal philopatry. Future research efforts will include investigations of female dispersal and home territory distribution in the eastern side of the island, as well as patterns of natal dispersal and mortality rates. Continuation of mark-recapture and long-term monitoring efforts on the island are expected to provide much more insight into patterns of habitat use, turnover, and survivorship in the population.

Hybridization Threat (*see press release page 6*). While completing hatchling surveys in August 2016, our research team was involved in the capture of three putative SIRI/Green Iguana hybrids on the West End of LC. The discovery of these

Sister Isles Rock Iguana hatchling (top) and one of the hybrid hatchlings (below). Photo by Jeanette Moss / Tanja Laaser.

hybrids was only possible because of heightened community awareness of the island's green iguana invasion threat, for which the founders of a local program known as "Green Iguana B'Gonna" are largely responsible. Michael Vallee and Ed Houlcroft, two full-time dive instructors and Little Cayman National Trust members, have been volunteering their time to the eradication of invasive Green Iguanas since 2012 and have been extremely successful in getting the word out. With cooperation from the public, the team has been diligently removing all reported green iguanas in an attempt to prevent their establishment on LC. The first hybrid hatchling was seen by a fellow dive instructor, immediately reported to Mike and Ed, and captured by them within minutes of receiving the phone call. Alerted to the threat, our research team captured two more hatchlings near the capture site of the first hatchling a few days later. Our joint appraisal of the hatchlings in consultation with the Cayman Islands Department of Environment leads us to the preliminary conclusion that a cross-breeding event has occurred between SIRI and an invasive Iguana iguana, although this assertion is pending genetic analyses at Mississippi State University. Because the possibility of interbreeding between *Cyclura* and *Iguana* was not previously recognized, this discovery prompts new concerns over biosecurity in the Cayman Islands. The implication behind a cross-breeding event taking place on Little Cayman is that invasive iguanas are reaching breeding age and beginning to establish themselves on the island. If Grand Cayman is any example, once a population of Green Iguanas becomes established it is impossible to eradicate. This is why it is crucial that local governments invest in adequate biosecurity measures to protect islands where Green Iguanas are not yet established and where endemic iguana populations are still relatively healthy. While the struggle with Greens is ongoing, Little Cayman is setting the stage for invasive species management on the local level. Community involvement and awareness plays a key role in controlling the spread of invasives on the island. However, this discovery emphasizes the need for heightened biosecurity measures beginning at source populations. The Cayman Islands are mobilized on this front as well, with Grand Cayman significantly stepping up its Green Iguana culling efforts over the past couple of years. Because opportunities for human-mediated exchange between islands are only going to increase in the future, formulating a plan for long-term invasive species management will require a concerted effort by many Caribbean nations.

Female Iguana delicatissima. *Photo by Charles Knapp.*

Lesser Antillean Iguana (*Iguana delicatissima*)

Establishing baseline population and distribution data to inform population recovery of *Iguana delicatissima* on Anguilla, British West Indies

IIF Grant Report submitted by Farah Mukhida, Anguilla National Trust

The Anguilla National Trust (ANT) received project funds from the International Iguana Foundation in June 2015. Prior to receiving these funds, we began our work in earnest in February 2015. This project projected three major outcomes:

1) Increased understanding of current population levels and distributions of the Lesser Antillean Iguana (*Iguana delicatissima*) and the Common Green Iguana (*Iguana iguana*).

2) Potential for the establishment of an *Iguana delicatissima* satellite population on Dog Island.

3) Increased awareness of the value of *Iguana delicatissima* and Dog Island as a biodiversity haven.

Population Assessments. We completed 312 household surveys to establish the general range of *I. iguana* and *I. delicatissima* between February and March 2015. We mapped this distribution based on survey results. To follow, we then conducted in-field population assessments of *I. iguana* and *I. delicatissima* in May and June 2015. Herpetologist Mr. Rob Williams trained five ANT staff and Dr. Louise Soanes (University of Roehampton) in iguana population assessment techniques including: visual identification, quadrat and transect survey methodologies, capture methods, measurements, and data collection.

71 hours were spent in the field and 15 *I. delicatissima* were captured, beaded, and tagged. While we initially planned to release individuals after tagging/beading, after consultation with Anguilla's Department of Environment, it was agreed that any suspected *I. delicatissima* should be held until genetic testing has been completed. This would avoid needing to recapture the individual should results indicate that the individual is in fact pure *I. delicatissima* and not *I. iguana* x *I. delicatissima* hybrids. Genetic samples were taken of 16 suspected pure *I. delicatissima* (based on morphology) and 21 *I. iguana*. Genetic testing to confirm species is currently being completed by Dr. Keiran Pounder, a geneticist at the University of Liverpool (United Kingdom) and we are awaiting results. As individuals were not released after capture, tracking work has not been possible. Instead, we aim to trial the use of IGOTU loggers on *I. iguana* in November–December 2015.

With funding provided by the Department of Environment and with support from the Department of Agriculture, an enclosure large enough to hold 11 iguanas was constructed. Two other cages constructed by the Department of Agriculture were donated for use for this project. Currently, 13 suspected pure *I. delicatissima* are being held on the grounds of the Department of Agriculture. Mr. Williams, Mr. Dan Lay (Department of Herpetology Supervisor), and Mr. Matt Goetz (Herpetology Department Head, Durrell Wildlife Conservation Trust) provided (and continue to provide) training and assistance with animal husbandry. *I. delicatissima* that are currently being housed at the Department of Agriculture will be released onto Prickly Pear East offshore cay (see description below).

Based on field surveys and encounter rates, we estimate the *I. delicatissima* population on the Anguilla mainland to be 242 individuals (0.84/acre), although this estimate should be treated with caution as iguanas are unlikely to be using all available habitat uniformly. This density estimate, however, is comparable to the *I. delicatissima* population on neighboring St. Eustatius, where the density has been reported to be 0.53 iguanas per acre in its preferred habitats. In contrast, surveys of *I. iguana* found localized densities equating to 31.94 individuals/acre. Surveys also suggest (with results reported for the first time) that *I. iguana* are not only present within the range of *I. delicatissima*, but are also occurring alongside them within well-known *I. delicatissima* locations. The threat of hybridization between the two species is high. Individuals were captured with morphological features intermediate between the two species, suggesting hybridization may already be occurring.

Results of fieldwork conducted between May and June 2015 are compiled/presented within the report below. This report will also be adapted to make it suitable for submission to a scientific journal in November/December 2015

Williams, R., D. Carter, T. Fleming, G. Hughes, L. Soanes, F. Mukhida. 2015. Conservation Plan for Anguilla's Lesser Antillean Iguana (*I. delicatissima*): Report on Initial Field Research of May–June 2015. Anguilla National Trust, British West Indies. Unpublished report.

Re-Introduction Feasibility Study. In June 2015, ANT staff, Dr. Soanes, and Mr. Williams, assisted local botanist Mr. Oliver Hodge, in assessing the feasibility of a reintroduction of *I. delicatissima* onto three of Anguilla's offshore cays: Dog Island, Prickly Pear East, and Prickly Pear West. The cays' topography, vegetative cover, vegetation structure, and potential natural and anthropogenic threats were assessed. Results of the study indicate that both Dog Island and Prickly Pear East could support a population of the native iguana. The study found that there was a high level of support from the owners of the Prickly Pear cays for a reintroduction while the Dog Island landowner is not as enthusiastic. The ANT and project partners are therefore working towards a reintroduction onto Prickly Pear East.

*Green Iguana (*Iguana iguana*) on Curacao. Photo by Bruce Sellmeijer.*

The results of the study are compiled/presented within the report:

Mukhida, F., L.M. Soanes, and R. Williams. 2015. Conservation Plan for Anguilla's Lesser Antillean Iguana (*Iguana delicatissima*) Feasibility and Operational Plan for the Translocation of Iguana delicatissima to Anguilla's Offshore Cays. Anguilla National Trust, British West Indies.

Public Awareness. We conducted a multi-media public awareness campaign to raise the profile of Anguilla's *I. delicatissima* population.

- Two press releases (15 January 2015; 13 May 2015).
- Two radio shows on the ANT's weekly radio program: Protecting Anguilla's Natural Environment, on KoolFM 103.3 (19 May 2015; 1 September 2015).
- Regular posts and updates on the Twitter account (@axatrust), Instagram account (axatrust), and ANT Facebook page (www.facebook.com/axanationaltrust). Training in iguana identification and survey methodologies within our ANT Environment. Research. Action. Program (an afterschool environmental program for high school students).
- Summer camp ("Where The Wild Things Are" – a week-long summer camp for three- to seven-year-olds) field trip the Department of Agriculture grounds to learn about iguana husbandry.

Due to our public outreach, individuals now regularly contact the ANT to report sightings of iguanas, as well as to request removal of iguanas from their properties. The Cuisinart Resort, Golf Course, and Spa is currently working with us to control the *I. iguana* population on their golf course.

Future activities planned:

- Tracking of *I. iguana* using IGOTU technology (November 2015).
- Iguana Fest Day (end of November/beginning of December).
- Project update radio program (mid-November 2015).
- End of project press release and radio program (December 2015).

Adult female Ctenosaura palearis *(SVL 221 mm; 157.8 gm) at the Heloderma Natural Reserve. Photo by Johana Gil.*

Motagua Spiny-tailed Iguana (*Ctenosaura palearis*)

Education for conservation of the Endangered Motagua Spiny-tailed Iguana (*Ctenosaura palearis*) as a key seed disperser in the seasonally dry forests surrounding four rural communities in eastern Guatemala

IIF Grant Report submitted by Daniel Ariano and Johana Gil

The Motagua Spiny-tailed Iguana (*Ctenosaura palearis*) is an endemic species of Guatemala. Research completed in 2015 with IIF support had shown that hunting pressure on this iguana still exists, making the implementation of an education program relevant in the rural communities surrounding the Heloderma Natural Reserve (HNR). The objective was to increase awareness of the role of the iguana as a key seed disperser in the dry forests. We targeted the children and teachers in elementary schools from 4 rural communities surrounding the HNR (639 children and 50 teachers). We also implemented a camera trap program to follow the activity of four iguanas. Each school "adopted" one of the monitored iguanas and was shown videos of their iguana's activities. We also conducted field trips to the HNR with the children, to explain in situ the camera trap process, the natural history of the iguanas, and their role in seed dispersal. Lastly, all the school children were given a *Ctenosaura palearis* conservation awareness t-shirt.

Education program. This year we implemented a conservation education program for children of elementary schools in four rural communities surrounding the HNR. We also included a fifth private school that was not originally considered at the request of the principal of the school to be part of the program. Altogether we reached a

total of 639 children and 50 teachers. As part of the program, we carried out eight environmental education workshops, which included group dynamics, songs, animated videos, and questionnaires at each school. During the month of May, all the children and their teachers were given a t-shirt with a *C. palearis* conservation awareness slogan (689 t-shirts distributed).

Education program workshop: a school teacher holds the iguana "Shero" for her students at Cabañas School, Cabañas, Zacapa. Photo by Erik López. Above: some of the output from the drawing contest held with all elementary school children in the area. Photo by Johana Gil.

We also promoted a drawing contest entitled "The Guatemalan Black Iguana, a Friend from my Forest". We received very nice drawings with conservation messages showing the children's interest and commitment to protect iguanas. Additionally, the students and teachers learned to distinguish them from other species of iguanas that live within the same area (*Iguana iguana*) and *Ctenosaura similis*). The contest was carried out at each grade level and prizes were given to the best drawing from each grade. The prizes were soccer balls, which were bought thanks to a donation from a group of students from the Universidad del Valle de Guatemala.

Starting in September, we took the students to the HNR for a field workshop allowing them to experience the ecology of the dry forest first-hand. We taught them how camera traps function, the relevance of iguanas to forest conservation, and more about the natural history of the iguanas. By the time of this report, four groups of students and their teachers had visited the Reserve from Cabañas, El Arenal, San Vicente, and San Sebastian elementary schools (Table 1). Eight more student groups will visit the reserve in the next several weeks from El Rosario, a second group from San Vicente, and the second and third group from Cabañas.

During the months of October and November, environmental education workshops were held for the villagers of El Arenal, who are very important to reach since they are in direct contact with the iguana. All the participants said they eat *C. palearis*, but some commented and praised the work being done with their children in schools. They told us that their children have asked them not to eat the iguanas because they are being extinguished. The objectives of this workshop were to show the adults in the community the threats this iguana faces, why it is important to preserve it, learn how to distinguish it from other iguanas, and gradually to also be involved in the conservation of this species. As part of the workshop activities, villagers were shown videos of *C. palearis* taken with camera traps and learned how important these traps are for conservation studies.

Our environmental education program for elementary schools had a very good acceptance among children and their teachers. We documented the great impact or our education program on the students and their teachers through the questionnaire. At the beginning of the program many children stated they killed iguanas just for fun (20%, n=128) and also the vast majority of students told us they ate *C. palearis* meat (70%, n=447). After the workshops had passed, which included showing videos of iguanas in the wild, the drawing contest, receiving conservation awareness t-shirts, and the field trip to the reserve, we completely changed the minds of children and their teachers. They now have an appreciation of the iguanas and changed their consumption to other kinds of meat (such as *Ctenosaura similis* which is not threatened and very abundant in the area). They now understand their role in forest conservation and many want to get involved in their care and conservation. Less than 1% of the students (n=4) reported they still kill iguanas for fun and only 5% (n=32) said their families still eat *C. palearis* meat. We expect that the students, and especially the teachers, may spread the message of iguana conservation within their families and community.

Because of the great success we had with schools that were initially part of the education program, we have had many requests from school principals in towns that were not encompassed by the project to consider them for 2017. The Local Coordinator of the Education Ministry said that the program has changed the lives of many children in those impoverished rural communities. For us, there is nothing more soul-fulfilling than the smiles of children that gave their best efforts in drawing the iguana friends they learned to protect.

Camera trap monitoring. Beginning in the last week of April, we implemented a camera trapping program to follow shelter activity of four iguanas that were radiotracked in 2015. These iguanas were monitored with eight Stealth-Cam camera traps. This video data was shared in the school workshops and allowed the children to learn about iguana behavior in the wild. With the camera traps we also documented that adult *C. palearis* actively search and hunt for ants (Formicidae) and velvet ants (Mutillidae). The daily activity patterns obtained to date show that *C. palearis* usually emerges from their shelters at approximately 9:00 AM and returns to them at 4:00 PM. We now have a better understanding of *C. palearis* wild behavior and ecology by documenting daily activity, shelter use, and behavior. We also documented other species visiting iguana shelters, such as the Southern Spotted Skunk (*Spilogale angustifrons*), Margay (*Leopardus wiedii*), and the Central American Lyre Snake (*Trimorphodon quadruplex*).

Future. In response to requests from school principals in neighboring towns, we intend to expand the conservation education program in 2017. We will next visit the elementary schools in San Luis, Cerco Piedra, Quebrada Honda, and Puente. We also need to continue camera trap monitoring of iguana daily activity patterns and continue microchip marking for long-term population monitoring. We also need research to determine the genetic structure of the population and identify possible evolutionary significant units throughout the valley. Additionally, we intend to assess basic health parameters such as hemogram and parasite testing, and also determine the gut microbiota that may affect germination of gut-passed seeds. Finally, we need to radiotrack iguanas in the dry season (January through June) to get a better understanding of mating behavior and complement our data from the wet season (July–December 2015).

We will seek additional IIF funding to achieve these goals, which will cover lab reagents, transportation costs, education materials, microchips, and an education program coordinator's salary.

During October an environmental education workshop was held for the villagers, who are very important since they are in direct contact with iguanas. Photo by Daniel Ariano

Elementary School	1st grade	2nd grade	3rd grade	4th grade	5th grade	6th grade	Total Children	Teachers
Cabañas	47	40	48	35	46	38	254	16
El Arenal	35	13	15	12	8	10	93	9
El Rosario	20	15	13	12	10	4	74	8
San Vicente	39	25	31	30	33	26	184	12
San Sebastian (Private)	8	5	6	4	6	5	34	5
TOTAL	149	98	113	93	103	83	639	50

Table 1. Number of students in the five elementary schools encompassed by the education program in 2016. Above: Ctenosaura palearis *conservation awareness t-shirts were given to all primary school children in the environmental education program; students from El Rosario School, Cabañas, Zacapa. Photo by Daniel Ariano.*

Large male Cyclura pinguis *on Middle Cay.*

Anegada Rock Iguana (*Cyclura pinguis*)

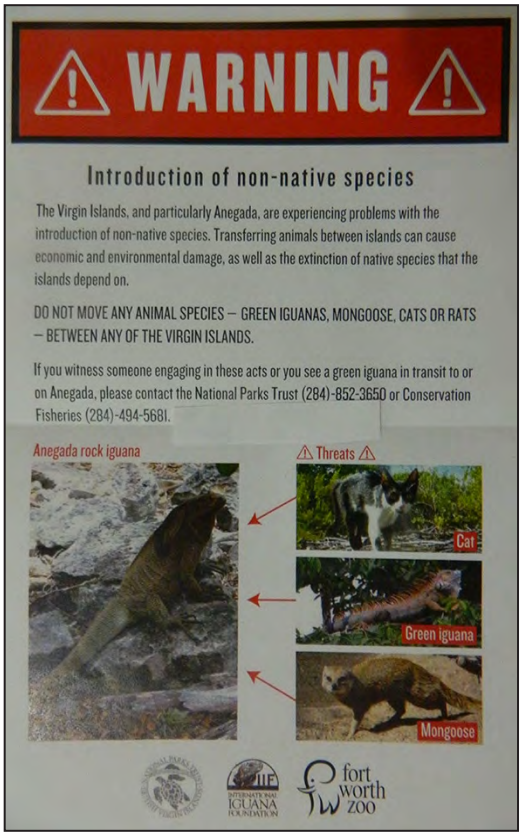
Conservation, applied research, and recovery of the Anegada Iguana, *Cyclura pinguis*, 2016

IIF Grant Report submitted by Kelly A. Bradley, Fort Worth Zoo. *Photos by Kelly Bradley.*

The Critically Endangered Anegada Iguana has been the subject of a long-term headstart program, designed to offset high juvenile mortality resulting from the feral cat population on island. Each year hatchlings are brought into a captive facility, reared in safety, and released back to the wild at a larger, less vulnerable size. As of October 2015, over 200 animals have been returned back to the wild, almost a 50% increase in population since the program began in 1997. Project actions fell into three categories: fieldwork, captive facility work, and education. Fieldwork included camera trapping on Anegada to monitor wild/released iguanas, nesting/hatchling activities, and a new initiative to determine if invasive mammals were present on Fallen Jerusalem Island. Researchers supported headstart work by locating nests, collecting hatchlings, and releasing size-appropriate iguanas back to the wild. In addition to monitoring the health of captive animals and working with local animal staff on husbandry, Fort Worth Zoo (FWZ) staff also renovated all the pre-existing wooden cages at the facility. The educational components included generating an informative poster to help the public prevent the introduction of Common Green Iguanas to Anegada, updating graphics at the headstart facility, and conducting the 5th annual Iguana Fest.

Green Iguana invasion education campaign. The FWZ and National Parks Trust of the Virgin Islands (NPTVI) designed a poster informing the public about the existence of two distinct iguana species found in the Virgin Islands, and the dangers of moving wildlife (iguanas, mongoose, snakes, and cats) between islands (see image below). The poster will be distributed this fall and winter to ferry docks/operators and sailboat charter companies. The poster addresses the greatest problem about Common Green Iguanas — that is the general public is unaware that there are two separate iguana species in the Virgin Islands and the consequences of a Common Green Iguana introduction to Anegada.

A potential Common Green Iguana invasion is a previously unaddressed threat. By distributing education materials to the ferries and sailboat charter companies, we ensured the persons most likely to move iguanas were informed.



Nest location and protection / release of headstarted iguanas. A total of four nests were identified in Windlass Bight, the Faulkner site, and Bones Bight. The perimeter of each nest was fenced off with metal flashing to facilitate the collection of hatchlings upon emergence. The first nest hatched on 25 September and the last one hatched 31 October. A total of 23 hatchlings were brought into the headstart facility this year.

In October 2016, five animals were selected for release. The selected animals were released in Bones Bight as part of a publicized public release involving school children from the Claudia Creque Education Centre (grades 5–12). Researcher's work helped the headstart facility release a maximum number of

Large female Cyclura pinguis *on Low Cay.*

animals by collecting hatchlings, providing husbandry training, monitoring health, and conducting the releases of iguanas back to the wild. To date, the program has released 211 animals, representing at least a 52% increase in population if the 1997 estimated population of 200–400 is considered.

Camera trapping program. K. Bradley conducted three distinct types of camera surveys: burrow/retreat surveys, nesting/hatching surveys, and systematic grid surveys. The camera units were programmed to take photographs 24 hours-a-day. Camera surveys were conducted in Windlass Bight, the Faulkner site, Low Cay, Bumper Well Cay, and at all identified nests. An additional camera survey was conducted on Fallen Jerusalem Island to determine the presence/absence of invasive mammal predators.

Research time spent on the ground allowed examiners to monitor the success of repatriated iguanas and to accurately track trends in the wild population for both iguanas and invasive species. The long-term camera trapping program has documented distribution, population size, demography, and ecology of the wild/repatriated iguanas and invasive species. Systematic grid surveys enabled continuous monitoring for months at a time in strategic locations. Camera surveys decrease labor and travel expenses as well as documenting behaviors that would be impossible to observe by researchers. Ultimately, detailed population data of the core iguana area will lend support to the designation of a proposed National Park.

Fifth annual Iguana Fest. This year's Iguana Fest took place on 21 October 2016, and had a record attendance of nearly 250 people. Students and parents played numerous iguana ecology games that engaged participants by creating a very hands-on learning experience. Participants learned about the ecosystems of Anegada, the role of iguanas in these ecosystems, the threats to the iguana's survival, and what they can do to help save iguanas. Attendees received an official festival t-shirt promoting the Anegada Iguana. A large school group (70 students plus parent chaperones) from Virgin Gorda attended the event and participated in the annual iguana art contest for the first time.

The Iguana Festival increases local awareness and ownership by highlighting local ecological processes, the pressures threating these processes, and the connections between the island's ecosystems, the local economy, and jobs. It also strengthens relationships between researchers, residents, NPTVI, and local business owners. The festival t-shirts also help keep the program visible year-round and create opportunities for conversations between researchers and residents.

Captive facility improvements. The existing eight information panels installed at the headstart facility were faded due to the high UV exposure on island, and some of the information needed updating (for example, the number of animals released). The graphics have been updated with current information and K. Bradley will install the new graphics on the existing sign structure this winter.

In 2015, with funding from the Disney Conservation Fund, the IIF, and the FWZ, the program purchased and installed 54 individual wire cages to use specifically for new hatchlings. These cages enabled the facility to house all newly collected hatchlings singularly. This was needed because the harsh elements in Anegada had degraded all of the pre-existing wooden cages which no longer securely held animals.

In July 2016, two persons from the FWZ traveled to Anegada and refurbished all of the 44 individual wooden cages and the six large walk-in cages. This work resulted in a total of 104 secure and functioning cages at the headstart facility and has created a three-tier system that animals

Student volunteers painting new wood on refurbished wooden cages.

will be moved through as they grow to release size (20 cm SVL, 400 grams). Now each animal can be housed separately during the sensitive growth period of the first two years. This helps ensure the greatest growth rates and that the highest numbers of individuals are released in the shortest time possible.

Field vehicle maintenance. The FWZ donated a used KIA Sportage to be used as the project's field vehicle. IIF funds were used to pay fees for inspection, registration, and insurance. By maintaining a dedicated field car, the program saves over $4,000 USD that would be needed to rent a field car. The car has a large picture of an iguana on both sides which creates opportunities for researchers to speak with international tourists about the Anegada conservation program.

Future. Anegada is home to at least five very rare Virgin Island- or Anegada-endemic plant species. As a seed disperser, the iguana could have enormous impacts on plant populations and community compositions. The FWZ and Royal Botanic Gardens Kew have been investigating the relationship between the iguana and the plant species that make up its habitat, with particular focus on threatened plant species like Varronia rupicola and the cactus Letocereus quadricostatus. Researchers are investigating the effects of saurochory (seed dispersal by reptiles) on Anegada's plant community through seed gut-passage and seed germination studies. In addition, field observations demonstrate that where iguanas are present there are also high densities of rare plants. We hope to determine if high densities of specific rare plants are predictive of iguana presence in previously unstudied areas.

The long-term survival of this species will ultimately depend on the attitudes and actions of local Anegada residents. Specifically, there needs to be a major shift toward broadening the overall conservation plan from strictly headstarting on Anegada to a meta-population approach. Public education and outreach activities will be more important than ever to ensure we continue to increase the probability of the iguana's survival long-term.

T-shirt design for the 5th Annual Iguana Fest 2016.

Ricord´s Iguana – southern shore of Lake Enriquillo.

Ricord's Rock Iguana (*Cyclura ricordii*)

Strengthening conservation activities of Ricord´s Iguana (*Cyclura ricordii*)

IIF Grant Report submitted by Ernst Rupp. *Photos by Ernst Rupp.*

Ricord´s Iguana (*Cyclura ricordii*) is considered Critically Endangered by the IUCN Red List of Threatened Species. Three subpopulations are found within the Jaragua-Bahoruco-Enriquillo Biosphere Reserve in the Dominican Republic. Since 2003, Grupo Jaragua has been involved in Ricord´s Iguana conservation and has monitored the two most vulnerable populations: one in the Pedernales area and the other on the southern shore of Lake Enriquillo. The main goal of this project is to ensure the long-term survival of *C. ricordii* throughout its natural range by protecting, maintaining, restoring a diversity of high quality native habitats, and establishing community-based management for wild *C. ricordii* populations with the key components described below.

Nest monitoring activities within key habitats in Pedernales. Nesting locations of *Cyclura ricordii* around Pedernales are concentrated in so-called "fondos", which are depressions filled with soil within the limestone rocks. Fondos are a very limited vital resource for the species and the reproduction and survival of the population

Place			Nest Statistics							
	Fondo Area (ha)	Transect Area (ha)	Nests Marked	Nests not Found	Emergence Hole not Found	Marked and Hatched	% Nests Hatched	Non-Marked Hatched	Total Nests Hatched	Nests Hatched per ha
Fondo de la Tierra	10.3	–	79	–	–	79	100	63	142	13.8
Fondo de la Malagueta	47.1	4.2	102	4	3	95	93.1	45	140	33.3
Fondo de Robenson	25.1	4.3	20	–	–	20	100	14	34	7.9
Fondo de la Jinagosa	0.6	–	6	–	–	6	100	2	8	13.3
Total	–	–	207	4	3	200	96.6	124	324	16.5

Table 1 (left). Nests of Cyclura ricordii *in 2016 in Pedernales.*

Table 2 (below). Total nesting results of Cyclura ricordii *for a 13-year period in Pedernales.*

Area: 19.4 ha	Nest Statistics							
Year	Nests Marked	Nests not Found	Emergence Hole not Found	Marked and Hatched	% Nests Hatched	Non-Marked Hatched	Total Nests Hatched	Nests Hatched per ha
2004	208	5	20	183	88	15	198	10.2
2005	166	1	14	151	91	27	178	9.2
2006	214	5	23	186	86.9	51	227	11.7
2007	194	3	13	178	92.4	41	219	11.3
2008	251	7	34	210	83.6	9	219	11.3
2009	183	3	6	174	95.1	56	230	11.9
2010	167	2	5	160	95.8	138	298	15.4
2011	290	1	6	283	97.6	66	349	18
2012*	250	–	5	245	98	78	323	16,4
2013**	236	3	–	233	98.7	23	246	12.7
2014***	188	2	3	183	97.3	43	226	11,6
2015****	282	2	7	273	96.8	35	308	15.9
2016+	207	4	3	200	96.6	124	324	16.5

* 16 dead gravid females encountered in 2012

** 12 dead gravid females encountered in 2013

*** 12 dead gravid females encountered in 2014

**** 14 dead gravid females encountered in 2015

+ 0 dead gravid females encountered in 2016

in Pedernales depends on them completely. Constant monitoring, especially during the reproductive season, is therefore necessary.

Nest monitoring activity consists of weekly visits by the monitoring team to register nests and nesting success to acquire long-term data on reproductive trends of the Ricord's population in the Perdernales area. Additionally, the fondos are inspected to avert major cattle concentration, detect and prevent poaching activities, prevent illegal land invasion, or appearance of exotic predators (see below on invasives control).

Nest and hatching monitoring has continued every year since 2004. The local team, Jose Luis Castillo and Jairo Isaa Matos, were in charge of this important activity in 2016 and marked 207 nests, taking GPS coordinates. Of these nests, only four were not found again during follow-up, and no emergence holes were found for an additional three. The remaining 200 marked nests showed emergence holes by the end of the hatching season, indicating total hatching success at 96.6%. During the hatching season, an additional 124 non-marked emergence holes were found, bringing the total number of nests hatched in 2016 up to 324 — representing an increase of 16 nests over 2015 (Table 1).

From 2012–2014, we saw significant decreases in the number of hatched nests every year, reflecting the impact of feral dogs. In 2015, we applied intensive dog control measures during the nesting season and saw a turnaround, with 308 nests hatched in 2015 and 324 nests in 2016 (Table 2). These control measures halted the massacre gravid female iguanas and allowed nesting activity without major disturbance. For 2017, we are planning to repeat dog control measures.

To supplement the existing fondo nesting sites, 6.3 hectares of agricultural land directly adjacent to Fondo La Tierra was bought in 2012 (Mayin property). A restoration process was initiated to plant Alpargata cactus (*Consolea moniliformis*), a major food item for Ricord´s Iguana. Within the property limits, eight Ricord's nests were found in 2012, 12 in 2013, 13 in 2014, 16 in 2015, and 19 this year (plus an additional *C. cornuta* nest). This upward trend of nests in Mayin´s property is likely attributed to invasive control measures — our original land investment is paying off with more iguanas nesting every year.

Jose Luis Castillo and Jairo Isaa Matos looking for marked nests by taking a reading with GPS.

Monitoring for illegal activities in Pedernales and the southern shore of Lake Enriquillo. Two teams, one in Pedernales and the other on the southern shore of Lake Enriquillo, are monitoring to detect illegal activities like slash and burn agriculture, land occupation, charcoal production, charcoal trafficking, iguana poaching, as well as any other disturbance that might affect the iguana population. The teams report directly to the local Ministry´s office (Pedernales and Jimani) to initiate, coordinate, and follow-up on corrective measures.

The southern shore of Lake Enriquillo holds the biggest and most important population of *C. ricordii* and has been plagued by charcoal burning. Anibal Volquez and Jelbin Volquez have worked for several years now revising the zone to detect charcoal production onslaughts, and their effort is paying off. Whereas 2011 and 2012 the whole area was mined by charcoal kilns, 2016 was very quiet. Only two kilns were detected and reported. In Pedernales, agricultural encroachment had been a major threat. Land purchase and monitoring over the last few years has been an effective barrier preventing conversion of iguana land to agricultural use. Monitoring by Jose Luis Castillo and Jairo Isaa Matos did not reveal any disturbance in 2016.

Restoring degraded Ricord's habitat in Pedernales and the south shore of Lake Enriquillo. Large areas of iguana habitat on the southern shore of Lake Enriquillo and in Pedernales have been destroyed by charcoal production and agricultural activities. The cactus Alpargata (*Consolea moniliformis*) has been particularly decimated by these activities. Iguanas rely heavily on this cactus for food, especially during the dry season when they can be seen climbing the spiny trunks to eat the juicy fruits growing on the cladodes of the plant. These fruits not only constitute nourishment, but are the only source of water when the rest of the vegetation is withered and dry. Iguanas seem to be the only native animal that eats these fruits and therefore are the sole seed distributor for *C. moniliformis*. Since the cactus is no longer present in degraded areas, only with human help can this cactus be re-established by harvesting and planting cladodes.

In 2016, we continued restoration of degraded areas in Pedernales and the south shore of Lake Enriquillo by planting cladodes of *C. monoliformis*. After a drought-stricken 2015, weather conditions were more favorable in 2016 and establishing new Alpargata plantations was successful. We planted 6,740 cladodes in Pedernales and 4,220 on the southern shore of Lake Enriquillo. About 70% of the planted cladodes have survived to date. Based on studies of preferred iguana food by Dr. Stesha Pasachnik, we are looking at additional plant species to add to the restoration to achieve higher diversity. This is challenging because only a few seedlings may survive in the extreme dry climate and young plants are vulnerable to hungry free-roaming ungulates like horses, cows, and goats. We have started to experiment with seeds of Lignum Vitae or Guayacán (*Guayacaum officinalis*) since our observations show that ungulates avoid eating leaves of this species. 9,400 seeds were sown in different plots on the southern shore in April and July, but despite some rain in April and May, no germination has been detected so far.

Nesting female in Malagueta.

Jose Luis with Rene and Tinio from Anse-à-Pitres putting up the solar cooker to prepare a meal while monitoring nests.

Investigation of the Common Green Iguana (*Iguana iguana*) wild population in the Bani area and work on control measures with the Dominican Wildlife Department. Common Green Iguanas were first imported into the Dominican Republic in the 1990s as pets. Being aware of a possible threat to the island´s biodiversity by this invasive species, the Dominican Ministry of the Environment issued a resolution in 2010 that prohibited the importation, commercialization, and breeding of this iguana species. However, no control measures were taken. Pasachnik et al. 2012, gave evidence of the installations of "iguanarios", ongoing breeding, and escapes as well as planned releases of Common Green Iguanas into the wild. Establishing a monitoring program on Green Iguanas was recommended.

In 2015, we were able to prove the existence of a Green Iguana wild population around the town of Bani and drew a map based on encounters and reports. We calculated that Green Iguanas occupy an area of about 200 to 400 km^2 around Bani. During March, April, and May 2016, we worked to find Green Iguana nesting areas with the help of iguaneros (iguana hunters) and students. We found many nests concentrated along the beach, west of the town of Paya, and at some distance inland within open sandy areas. Nests were even found within the town of Paya in open, sandy terrain. Control measures must be planned and initiated to avoid a major disaster. Paya also seems to be a hotspot for trade with Green Iguanas. We heard from iguaneros that they are receiving orders from animal traders as far as Santiago; they are also selling directly to travelers at rest stops in Paya.

We have approached the Wildlife Department of the Ministry of Environment to seek cooperation in this matter. Both entities agreed to join forces and work on this problem in order to develop a control program, or if still possible to eradicate the species from the island. Additional measures involve educating the general public to understand the problem posed by this dangerous invasive species. A detailed program is being developed and will be made public shortly.

Control of feral dogs, cats, and mongooses in the Pedernales area. During the 2012–2014 nesting seasons, feral dogs had a strong negative impact on nesting females, reducing their numbers significantly (Table 2). In 2015, we contracted four local hunters who placed 50 units of steel wire snares, as well as 10 Tomahawk cage traps within Ricord´s nesting areas. After five weeks of intensive hunting and trapping, a total of 21 dogs had been eliminated. However, dog tracks were still seen after this period, so we decided to continue with control measures in 2016. With less funds available for this activity, we hired only three hunters who worked for a total of 23 days (April 1–11 and May 3–14). Thirty snares and 10 Tomahawk cage traps were opened. The hunters were also equipped with three shotguns (two 16 gauge and one 20 gauge). A total of nine dogs were eliminated: six adult males, one juvenile male, and two adult females. Four of the animals were shot while five of them were trapped in the snares.

During the 2015 hatching season, Dr. Stesha Pasachnik had used Tomahawk cage traps to eliminate feral cats and mongooses from her study site. We repeated this activity in 2016 using a variety of baits: salami, butter, smoked herring, fresh fish, and sardines in oil. From July 5 to August 4, ten traps were placed in the Fondo de la Tierra and four in Malagueta. Traps were checked daily, early in the morning and evening. One cat was caught using salami as bait, while the smoked herring lured two Rhinoceros Iguanas into the traps. Fresh fish trapped one cat, one mongoose, and one Rhinoceros Iguana. Sardines in oil were most attractive to Ricord´s Iguanas, catching four. The butter did not attract any animal at all. All iguanas were released unharmed; the cats and mongoose were euthanized. Cats are eaten in Pedernales, especially for Haitian citizens, so this meat was not wasted.

Control measures on feral cats and mongooses cannot be directly correlated to iguana conservation since at present we have no measure to estimate survival rates of hatchlings on a

large scale. We hope to note an increase of young adult females, as they reach nesting age in three to four years' time.

Support community of Baitoa in establishing alternative income sources. The small rural town of Baitoa has been the community most highly involved in charcoal production and trafficking in the past, due to high levels of poverty and little opportunities for other income. For several years, Grupo Jaragua has been trying to develop alternative incomes in this community. Last year, we were able to establish bee colonies for five families, and the hives are working well. Technical follow-up for the bee project is led by the NGO Lemba, an organization run by the Catholic Church.

We also have been working on getting people interested in agroforestry. One focus is on Caribbean Oregano (*Lippia micromera*), a highly-priced product collected from the wild. Last year we initiated the first demonstration plot, and this year added a second one with more to follow. The first plot has been harvested three times already and the second plot harvested for the first time last month. Oregano plants can produce for several years if well managed. The original investment is low, maintenance is not very complicated, and it is well-adapted to dry climates. Interest in planting this species is growing in the community and we hope to establish more plots. We are also integrating other native dry climate-adapted plants into the existing plots to diversify the systems. We are now also growing Anón (*Anona squamosa*), a native fruit, and Canelilla (*Pimenta haitiensis*), an endemic which produces aromatic leaves with high demand in the local markets. Canelilla grows naturally only within a small area inside the Jaragua National Park close to Pedernales, and is presently illegally harvested and sold. Our efforts to establish ex-situ plantations of this species may take pressure off the wild plants, which have dwindled heavily over the years.

For the future, we envision the following activities:

- Continue nest monitoring in Pedernales
- Continue general monitoring in Pedernales and Southern Shore of Lake Enriquillo
- Continue control of feral dogs, cats, and mongooses in Pedernales
- Purchase of land suitable for nesting in Pedernales
- Continue restoration of degraded lands with more diversified vegetation
- Initiate translocation of hatchlings within Southern Shore of Lake Enriquillo to repopulate restored areas formerly inhabited by *C. ricordii*
- Intensify community outreach in Baitoa and other communities which are affecting populations of Ricord´s Iguana
- Execute control measures (extermination, if possible) of Common Green Iguanas, in cooperation with the Ministry of Environment
- Work in Haiti to conserve small Ricord´s population in Anse-à-Pitres.

Jairo Isaa Matos and Jose Luis Castillo are proud of a wonderfully grown Alpargata *cactus they had planted some years previously.*

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Reminder: Next ISG Meeting Dates!

Annual ISG Meeting 2017
22-28 October
Held at the Meliá Hotel, Varadero, Cuba
Check the website for details!

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