iguana specialist group

# NEWSLETTER

*Volume 14 · Winter 2014*

*Jamaican Iguana* (Cyclura collei)*: See page 9 for an update on the serious threats this species is facing in the Portland Bight Protected Area in Jamaica*

IUCN SSC Species Survival Commission

# In This Issue

***The mission of the IUCN SSC Iguana Specialist Group is to prioritize and facilitate conservation, science, and awareness programs that help ensure the survival of wild iguanas and their habitats.***

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# ISG Updates

## A Message from the Co-chairs and Program Officer

The ISG expanded our group with the inclusion of five new members in 2014. We welcome Giuliano Colosimo, Jeffrey Corneil, David Hedrick, Jill Jollay, and Kimberly Rainwater for the remainder of the 2013–2016 term. As a group, we now have 91 members from 25 countries, including Puerto Rico. ISG members have broad skillsets that can advance iguana conservation. During their four-year terms, 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. The ISG is such an impactful and successful working group because of contributions from its members. We thank you and look forward to continually improving the efficacy of the ISG as a conservation group and an integral part of the IUCN Species Survival Commission.

Early in 2014 we officially announced that we would be publishing an iguana monograph entitled: Advances in Systematics, Ecology, and Conservation of Iguanas. Besides us, John Iverson has been serving as a co-editor to the monograph. We are extremely grateful for his selfless contributions to the ISG. Finally, we look forward to redoubling our efforts to make Red List assessments a priority for our group in 2015, especially given our renewed pledge to be part of the IUCN's effort to more than double the number of assessments on the Red List by 2020. Continue reading below for more information about the iguana monograph and Red List.

All our best,
Chuck, Stesha, and Tandora

## Advances in Systematics, Ecology, and Conservation of Iguanas Monograph

For several years, the IUCN SSC ISG has been discussing publishing an updated compilation on the advances in iguana biology. In 2013, at our annual meeting in Jamaica, the decision was made to move forward with this effort, marking the third time iguana researchers have undertaken such a task. The group agreed that an online publication was preferred as it would be more immediately accessible to the rapidly increasing number of people worldwide with an interest in iguanas. This collation complements and builds on the previous two volumes, expanding our knowledge of iguana systematics, distribution and habitat, ecology and population biology, and conservation, and highlighting areas where further research is needed. An updated taxonomy including 44 living species will be presented. *Ctenosaura*, a species-rich genus only touched on in the first two volumes, will be heavily emphasized. New information will be presented that will be critical in guiding future conservation management decisions.

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. Although the number of chapters is similar in each volume (20, 23, and now 19, respectively), the number of contributors has more than doubled in the present volume, and authors from 12 countries including Puerto Rico are represented. Fourteen authors in the present volume also contributed to one or both of the previous two volumes, reflecting their long-term commitment to iguana research. For example, Gordon Burghardt and John Iverson, who contributed to all three volumes, have dedicated much of their careers to furthering our understanding of iguana behavior and ecology. They have trained a multitude of students, many of whom are authors in the current volume, who continue to expand our collective knowledge and bring new perspectives to a thriving field.

Though the threats faced by iguanas are growing, the papers in this volume will attest that there is no shortage of passion and commitment within the iguana conservation community in seeking new and innovative ways to combat these challenges. As a group, we could not be more thrilled by increasing our membership and gaining perspective from new collaborators. We look forward to continuing this trend in the future and welcome those interested in iguana conservation and biology to contact us. We expect that the third volume, **Advances in Systematics, Ecology, and Conservation of Iguanas**, will be available in 2015 through the journal Herpetological Conservation and Biology.

## Fifty-Year Anniversary of the IUCN Red List of Threatened Species

Throughout 2014, the IUCN celebrated the 50th anniversary of the contribution of the Red List in guiding conservation action and policy decisions, by holding special events and fundraising campaigns. ISG officers Stesha Pasachnik and Tandora Grant traveled to the Los Angeles area to attend a gala photography exhibition and fundraiser highlighting assessed threatened species. We were delighted to see an interactive iPad display among the exhibits, with a rotating view of threatened iguana species. Another highlight was to meet the (now outgoing) Director General Julia Marton-Lefèvre and discuss the recent advocacy letters she had signed on behalf of the ISG in disapproval of threatened and real habitat destruction in Jamaica (home of *Cyclura collei*) and the Dominican Republic (home to *Cyclura cornuta* and *C. ricordii*).

Using criteria from the IUCN Red List of Threatened Species™ is widely recognized as the most comprehensive and objective approach for evaluating the conservation status of plant and animal species. The goal of the Red List is to provide information and analyses on the status, population trends, and threats to species in order to inform and catalyze action for biodiversity conservation. The IUCN Species Survival Commission (SSC) relies on expertise within individual specialist groups to evaluate species for the list. As a group, the ISG is mandated to evaluate all 45 iguana species (including one extinct species) for the Red List.

Red Lists can be updated as often as new information becomes available. Once the data is entered into the back-end of the database system it is a much easier process to have them refreshed with updates. Ideally, assessments should be reviewed at least every five years to confirm their accuracy and update the assessment date, even if no changes are necessary. Because the Red List is meant to be an ongoing and living system, it is essential that we complete accounts for species with the information that is current today, for those with no existing assessment, as well as revise those that are approaching 10+ years old. The IUCN requests that specialist groups complete their assessments as soon as possible, regardless of any in-progress or future research that we surmise might create a change to the status, threat, taxonomy, or other information. To this aim, the category Data Deficient (DD) was created for species where very little is known, but can be used to establish a Red List history for the species and outline where research is needed or threats that are suspected.

The IUCN has set a goal to assess 160,000 species by the year 2020 to make the Red List a more complete "Barometer of Life" (view and share the IUCN Red List promotional video here and a 50 year highlights page). To date, the Red List contains assessments on 76,000 species. At our 2009 working meeting in Dominica, we made a collective commitment to update the information for existing, but out-of-date accounts, as well as generate new assessments for those not yet listed. Although the work is ongoing and several members have made critical contributions to fulfill our goal, we have yet to reach a 50% current assessment mark for species in the subfamily Iguaninae. By the end of 2015, our specialist group aims to submit 15 more species assessments to the IUCN Red List, bringing our total species assessed to 32, and leaving only a dozen to be finalized in 2016. We've pledged to complete our task – Let's Do This!

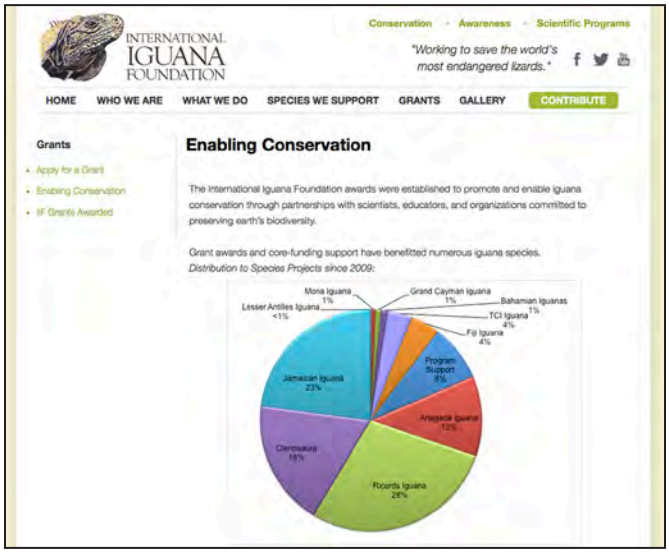
## Redesign of the International Iguana Foundation Website

In order to attract donors and generate increased awareness for the International Iguana Foundation (IIF), Tandora Grant and ISG website developer Taylor Tay agreed to completely redesign the IIF's website (http://iguanafoundation.org). Many iguana projects conducted by ISG members have directly benefited from funds raised by the IIF. All of us benefit from an increase in global exposure for iguana conservation efforts by energizing the IIF's website and its associated Facebook and Twitter feeds (see David's article on social media below).

Design and construction of the website developed slowly as time allowed during the weekends, but most was completed for the initial launch in late summer 2014, in coordination with the annual Request for Proposals. Information on how to apply for a grant, application guidelines and requirements, and an example proposal are now clearly available under the Grants menu. There are also sections to view what species and projects have received IIF funds to date.

Overall, the IIF website was designed to be donor focused, with condensed content that is organized and easy to find information on what/who the foundation is, its central conservation strategies, and moderate details on the species it supports. All IIF-funded projects have a representative species page that outlines the iguana's status and threats, and includes reports

submitted from field researchers and project managers. A photo gallery also accompanies each species. Contributions by donors are streamlined via PayPal.




*Financial breakdown of species and projects supported by the IIF can be found under the Grants menu.*

Like the ISG website, the content management system can be easily modified and updated using a browser, photo editor, and word editing software. The home page is also designed to be regularly updated with rotating "blog posts" and fresh photos in the slide deck – including the whimsical one used for the End of the Year campaign benefiting Fijian Iguanas (see photo). Suggestions and volunteers wishing to help develop the sites are welcomed! Contact Tandora Grant (http://www.iucn-isg.org/contact-us).


*One of the rotating slide deck photographs used to draw attention to the End of the Year fundraising campaign to support tree canopy surveys for* Brachylophus *on Viti Levu.*

## IIF Social Media

Hello Iguana Specialist Group! By way of introduction, my name is David Hedrick and I am the new social media manager for the IIF. I have met several ISG members through my other job as Lead Ectotherm Keeper at the Chattanooga Zoo, Tennessee. I'm really excited to be a part of ISG and its efforts!

I began helping the IIF in April 2014 after the Association of Zoos and Aquariums' annual Herpetological Taxon Advisory Group meeting, and officially took over management of IIF social media last June. There was a huge amount of activity and growth in our social media world in 2014, launching with the "Save Goat Islands" initiative (see "Update on the Threat of a Trans-shipment Port Development Proposal in Jamaica" in *Iguana News* below for details). We linked in to Ziggy Marley's Facebook support (a connection made possible by the Jamaica Environment Trust) and solicited additional support from Marley Coffee. Ziggy's post grew to over 26,000 Likes and Shares! We are still plugged into Jamaica news and have been building social media networks with Jamaican stakeholder organizations and individuals through both Facebook and Twitter.


*Annoucement (above) originally posted on the savegoatislands.org website advertising a community outreach event hosted by Jamaica Environment Trust (JET) and Caribbean Coastal Area Management Foundation (C-CAM). This event was posted on the IIF Facebook and Twitter feeds and then re-Tweeted by Marley Coffee (below), spreading the word to 26,000 more followers!*

All year long we shared "Notes From the Field" from Anegada, Ecuador, Fiji, Grand Cayman, Haiti and the Dominican Republic, Honduras, Jamaica, and México. These posts were hugely popular with our followers and allowed us to work on building a greater following and network connections in iguana range countries. Our demographics saw major growth, particularly in México, Puerto Rico, Dominican Republic, Honduras, Ecuador, and Fiji. These reports from iguana researchers are very important and help residents and people around the world learn and take pride in their iguanas! Travel companies have been very receptive as well, sharing our stories and understanding the value that preserving and restoring ecosystems bring to their business. We periodically do "Know Your Iguanas" posts that are meant to raise awareness and pride in-country as well. There was even a friendly #ShowUsYourIguanas competition on Twitter between tourism companies and conservation organizations in Guadeloupe, Puerto Rico, and the Dominican Republic!

| Country | Your Fans | City | Your Fans |
|---|---|---|---|
| United States of America | 3,425 | México City, Distrito Federal | 86 |
| United Kingdom | 400 | Bangkok, Thailand | 64 |
| Brazil | 296 | San Diego, CA | 60 |
| México | 257 | Chicago, IL | 50 |
| Canada | 178 | Las Vegas, NV | 46 |
| Indonesia | 170 | Jakarta, Indonesia | 43 |
| Australia | 157 | Santo Domingo, Distrito Nacional | 41 |
| Philippines | 126 | São Paulo, Brazil | 40 |
| Germany | 124 | Miami, FL | 39 |
| Thailand | 109 | New York, NY | 37 |
| France | 108 | San Juan, Puerto Rico | 36 |
| India | 106 | Houston, TX | 36 |
| Malaysia | 103 | Phoenix, AZ | 33 |
| Spain | 100 | London, England, UK | 33 |
| Puerto Rico | 83 | Chattanooga, TN | 32 |
| Taiwan | 82 | Taipei, Taiwan | 32 |
| Italy | 75 | Los Angeles, CA | 29 |
| Netherlands | 70 | Dallas, TX | 28 |
| Dominican Republic | 57 | Sydney, NSW, Australia | 25 |
| Argentina | 55 | Hong Kong, Hong Kong | 24 |

*A breakdown of the top IIF Facebook page follower numbers by country and city.*

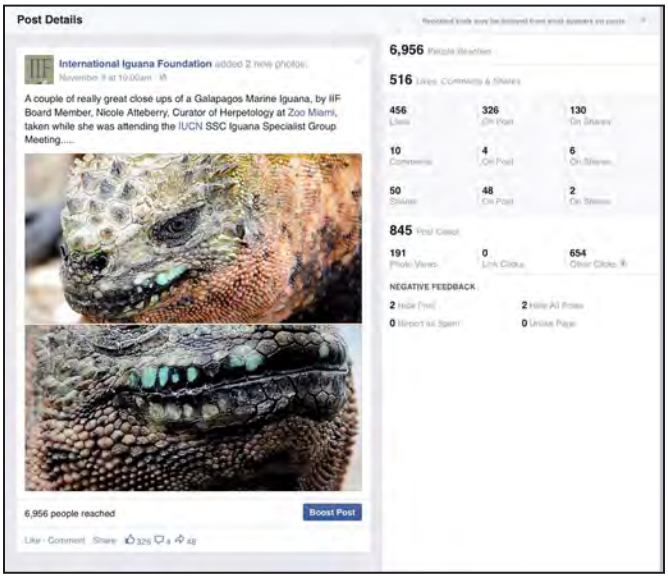
We also worked to increase awareness of the IIF and ISG in the social media spheres of zoo and zookeeper organizations. For example, in August, Nate Nelson, IIF Board Member and Curator of Herpetology at Sedgwick County Zoo, Kansas, worked with his social media department to provide us with content announcing their second consecutive year of hatching Jamaican Iguanas. We put together the post, which was then shared by Sedgwick County Zoo, and as a result, it became the single-most viewed post by the IIF to date. Over 27,000 people saw this post, and the people who follow Sedgwick County Zoo were very excited about this accomplishment and proud to have their zoo receive lots of great compliments. Properly coordinated, there are endless opportunities like this for mutually beneficial social media exposure with businesses, organizations, universities, and zoos.

As of November 2014, the IIF Facebook page had grown to over 2,400 followers from the 850 in April when I started. At that time, we kicked off a campaign entitled "Ty's Challenge". Florida reptile breeder and previous IIF supporter, Ty Park, pledged to match donations to the IIF for new Page Likes and cash contributions. This was definitely the time to engage the reptile enthusiast sector to give them a connection to on-the-ground conservation and research, and we certainly engaged! Followers increased by the hundreds.....including over 1,000 new people following the IIF Facebook page in one day!

At the beginning of December, we kicked off an "End of Year" campaign to support Central Fijian Banded Iguanas (*Brachylophus bulabula*). We continued Ty's Challenge and applied contributions to that campaign. A population of *bulabula* has been found persisting on Viti Levu, where they had been considered extirpated. It is thought that they have escaped mongoose predation by nesting arboreally in epiphytic ferns high up in the forest canopy. The race is on to survey Fiji's two largest islands and develop a conservation strategy for the remaining iguanas and mitigate the threat to them from logging. ISG members, Robert Fisher and Peter Harlow, are leading the survey effort, and we are excited to say that the contributions received totals $31,304 USD! With major contributions from Ty Park, San Diego Zoo, Los Angeles Zoo, ISG member Jill Jollay, Aaron Zelnik, the Detroit chapter of the American Association of Zookeepers, and lots more individual donors!

As of this writing, the following of the IIF Facebook page has grown to over 7,200! This jump correlates to the increased exposure from "Ty's Challenge" and the "End of Year" campaigns. The Twitter following has grown from 300 to nearly 600. We are dabbling a bit with Instagram as well, with a small but enthusiastic following. These social media tools are here for you, and YOU can help us by Liking and Sharing our Facebook and Twitter accounts (facebook.com/InternationalIguanaFoundation; on Twitter: @iguanafndn) Please Like, Share, and Re-Tweet our posts as often as possible — doing so gets our mission out to the maximum number of people, and you can connect us with

organizations, businesses, artisans, tourism companies, stakeholders, etc., that you want to promote, so that the benefits of iguana conservation can become tangible to all of us. Additionally, we always need great photographs. Great pictures go further than just about anything else, and that includes more than just iguana photos! We want to highlight you, the work you do, and anyone else whose actions have positive impacts on our mission! People love putting human faces and names with conservation efforts.




*A popular Facebook post uploaded after the annual ISG meeting, with the final statistics decsribing readers, Likes, Comments, and Shares.*

Something special we are working on for 2015 – we need your help to gather photos of all the iguana species – in particular those that really make you think of dinosaurs. Please send us photographs showing mouths open, displays, combat, and perspectives that make iguanas look large and impressive! We will build on a theme of ancient reptiles that live on remote islands or in isolated forests, and the breeding and conservation programs that scientists use to "bring them back from the brink of extinction". Sound like a familiar theme from novels and movies? With the impending release of the movie "Jurassic World" on June 12th, we thought we would take the opportunity to highlight the living lizards we love so much, emphasizing their appearance, exotic locations, status, and ancient stories. There will be an increased interest in reptiles as a result of this movie and we want to use the opportunity to educate! These posts will be a great way to share the "iguana world" with young people who have an innate fascination with dinosaurs!

Please feel free to contact me anytime at: d.hedrick@hotmail.com. I am excited about our plans for 2015, and everything that we can accomplish for iguana conservation!

Dave

## ISG Google Plus Page and Photospheres

The ISG continued to leverage new technologies to reach a larger audience. In 2014, members Lee Pagni and Tandora Grant created a Google Plus page for the group and populated it with relevant posts during the year. The page allows for members to receive and post updates about iguana conservation (similar to Facebook). Building on this, the ISG started using another Google technology called photospheres to allow users to immerse themselves into iguana habitat. A photosphere is a 360-degree image that users can rotate themselves. The effect is a sort of virtual reality, letting users get a complete view as if they were standing at a point within iguana habitat and looking all around them. Using mobile devices borrowed from the Google Earth Outreach team, several ISG members created photospheres in their study sites that Lee uploaded to the ISG's site. The habitat of several species is now available via these photospheres. Our site, which has received over 23,000 views in just a few months, is also connected to Google's world map of contributed photospheres.

Big thanks to all the 2014 contributors of the ISG Iguana Habitat Photospheres:

Kelly Bradley – Anegada, British Virgin Islands, *Cyclura pinguis*

Cielo Figuerola – Mona Island, Puerto Rico, *Cyclura stejnegeri*

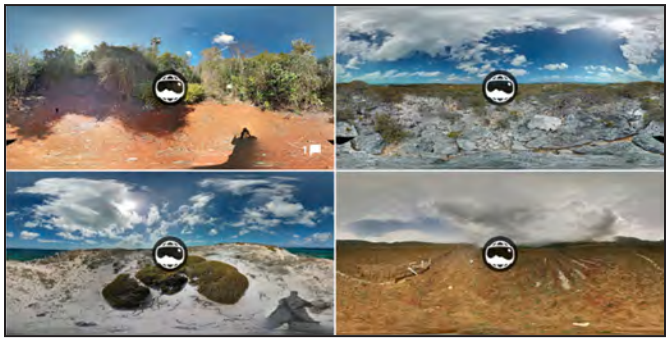
Glenn Gerber – Turks and Caicos Islands, *Cyclura carinata*

Tandora Grant – Jamaica, *Cyclura collei*

Stesha Pasachnik – Dominican Republic, *Cyclura cornuta* and *Cyclura ricordii*

Thanks also to the Google Earth Outreach team for the loan of a Nexus 5 and Nexus 7 mobile devices to create most of these photospheres.

If you are interested in contributing a photosphere of iguana habitat, please contact ISG member Lee Pagni (lee@studiomundo.com).



*Examples of available photospheres, clockwise starting upper left: Jamaican Iguana nesting area, Hellshire; Big Ambergris Cay, Turks & Caicos; habitat loss in Dominican Republic (see DR update);* Cyclura carinata *nesting area, Turks & Caicos.*

## 2014 ISG Meeting Summary

The 2014 annual Iguana Specialist Group meeting was held from 26–31 October at the Charles Darwin Research Station in Puerto Ayora, Santa Cruz, Galápagos. The annual working meeting was our focus of the first two days, with 15 oral and five poster presentations by ISG members, and collaborators working in the Galápagos. We also focused on group business and had a vigorous conversation about the problems associated with iguana smuggling for the pet trade. During the following two days we had a workshop focusing on Galápagos iguanas. The workshop was organized by Gabriele Gentile (Tor Vergata University) and the first day provided an opportunity to learn more about the ecology of Galápagos iguanas. On the second day, we had group discussions with local stakeholders, staff from the Galápagos National Park and Charles Darwin Foundation, and researchers to address conservation challenges and discuss management strategies for Galápagos land and marine iguanas. The last two days of the meeting were devoted to exploring the islands. On the first field day the group split and visited one of three sites (Santa Fe Island, Seymour Norte, or Plaza Sur). The second field day was spent exploring Santa Cruz (Los Gemelos, El Chato 2, Rancho el Manzanillo, and El Garrapatero beach). We are incredibly thankful to the Galápagos National Park Service and the Charles Darwin Foundation for their assistance and contribution to the meeting. The meeting would not have been possible without their gracious assistance.

We also thank all members who contributed to the travel fund. The extra donations from members were especially beneficial given the costs associated with travel to the Galápagos. 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 2014 awards were $1,000 each due to the high travel costs for the Galápagos and are subject to change for future years depending on the meeting location. We congratulate the 2014 awardees including Jeffrey Corneil, Carmina Martínez-González, Amnerys González Rossell, and Eugenia Zarza.

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

The 2015 meeting will be held in November at the Guana Tolomato Matanzas National Estuarine Research Reserve south of St. Augustine, Florida. The location within the United States is intended to facilitate added participation from the wide range of our members, and for members working on under-represented taxa. We thank Joe Burgess in advance for organizing the meeting.

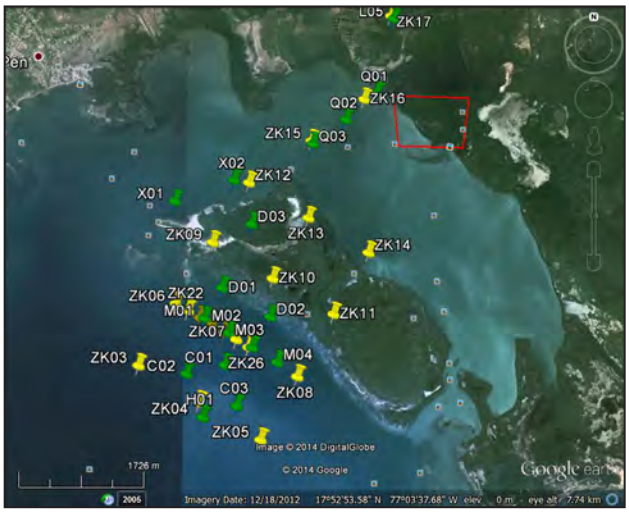
*Attendees at the 2014 ISG meeting in Puerto Ayora, Santa Cruz, Galápagos. Photo by Charles Knapp.*

# Iguana News

## Update on the Threat of a Transshipment Port Development Proposal in Jamaica

Since late 2013, several ISG members have been working to support the fight against the proposed development of a massive transshipment port in the Portland Bight Protected Area (PBPA) in Jamaica, home to *Cyclura collei*. The PBPA is globally recognized as one of the last and greatest remaining examples of tropical dry forest in the Caribbean, a habitat that is among the world's most threatened ecosystems. Full details for the port have still not been disclosed to the public, and there have been allegations of government corruption (see the International Corruption Perception Index). It is known that the proposal by state-owned China Harbour Engineering Company (CHEC) would involve leveling the Goat Islands, dredging in the bight, and will include a causeway and infrastructure development on the mainland as well, opening up the Hellshire Hills to human impacts on the western side, close to the core forest where the iguana persists. Even a coal-fired electricity generating plant has been included in the proposal, which would be a disappointing first for Jamaica.

In January 2014, the ISG drafted a Letter of Concern to be submitted from the IUCN Director General, Julia Marton-Lefèvre, and SSC Chair, Simon Stuart. The letter was entitled [Concern] "Re: Proposed development of a trans-shipment port on the Goat Islands and Portland Bight Protected Area" and was later publicized in large detail by the local newspapers. (PDF download of the letter here). Among the many stated concerns, the IUCN letter made note of the government's recent withdrawal of its application (prepared over 15 years by several governmental and NGO agencies) to include the PBPA in the UNESCO Man and the Biosphere program. Clearly the Jamaican government realized its interest in accepting a shipping port proposal to be built in one of the nation's largest reserves did not align with UNESCO guidelines of "Man in Harmony with Nature". NEPA (the gov't agency for environmental planning) granted a license to CHEC allowing "a geotechnical survey on and around the Goat Islands," meaning exploratory drilling for geo-sampling in the region (see figure/map from the beach license). The government continued its push for public support of the proposal with newspaper commentary, hosting conferences/seminars, touting unsubstantiated promise of jobs, and confusing the topic of the CHEC shipping port proposal with the government's development plan for a "logistics hub" in the PBPA that does not yet have a financial backer.




*Locations of exploratory geotechincal borehole drilling sites outlined in CHEC's amended beach license as a preparatory first phase for the proposed transshipment port. Goat Islands are in the center; yellow pins were designated in the original license granted by Jamaica's environmental authority and later amended to new locations in June 2014.*

Our in-country collaborators, Jamaica Environment Trust (JET), worked to disseminate the truth about this ecosystem damaging proposal and who really stands to gain and lose. They hosted several town hall meetings in and near Old Harbour Bay and seminars/events in Kingston. JET, and ISG members Byron Wilson and Tandora Grant, participated in numerous radio and television interviews. JET produced a public-service video for television and a charming animated short (see all videos here). We organized a postcard campaign to the Jamaican Prime Minister and sent 1,400 cards from signatories all over the world, and several hundred from within Jamaica.


*1,400 postcard petitions (pictured above) were signed by Jamaican Iguana supporters from all over the world, flooding the mailbox of the Jamaican Prime Minister.*

In April, thanks to funding from the IIF, we organized a trip to Jamaica for the International League of Conservation Photographers' Robin Moore whose stunning photographs and story were published online in National Geographic and the Huffington Post Green. Follow-up articles from other reporters, including noted science writer Richard Conniff, appeared in Mother Nature Network, ARKive, The Guardian, and an editorial in CNN (by Wendy Townsend, a member of our "iguana friends" network), among others (see savegoatislands.org for a complete list of press releases). Robin created a video called Guardian of the Reptiles that was well publicized and was even projected on the wall of the Jamaican Embassy in Washington, D.C. one evening! The IIF and JET kept up a steady stream of Facebook and Twitter posts around these publications and events which were supported and shared by Ziggy Marley, Marley Coffee, and others (see the "IIF Social Media" article above). The press and awareness generated from Robin's trip were invaluable (see Robin Moore's Jamaica photos).


*The video "Guardians of the Reptiles" created by Robin Moore and featuring Hellshire field assistant Kenroy "Booms" Williams, was projected on the wall of the Jamaican Embassy in Washington, D.C., one evening to prompt discussion of the Goat Islands development issue among social media followers and random pedestrians.*


*Ziggy Marley took a short break to pose with photographer Robin Moore during his concert tour.*

Two journal articles were published summarizing the successes of the Jamaican Iguana recovery program and outlining the threat it faces from this proposed development (see article citations below). A third research paper that also mentions the threat of this port, will be included in the Herpetological Conservation and Biology volume to be published in 2015 (see "Advances in Systematics, Ecology, and Conservation of Iguanas Monograph" article above).

Van Veen, R., Wilson, B.S., Grant, T. and Hudson, R. 2014. Where to now? An uncertain future for Jamaica's largest endemic vertebrate. *Oryx* 48(2): 169-170.

Grant, T.D. 2014. Biosphere reserve to transshipment port: travesty for Jamaica's Goat Islands. *IRCF Reptiles and Amphibians Conservation and Natural History* 21(2): 37–43.

Jamaica's Caribbean Coastal Area Management Foundation commissioned an analysis by the international group, Conservation Strategy Fund, to assess the cost-effectiveness of alternative sites proposed for the transshipment port. The study concluded emphatically that there are substantially cheaper and less environmentally damaging alternative sites for the proposed port and accompanying industrial complex. The full report entitled "Economic Comparison of Alternatives to Building a Port on Goat Islands: Does Jamaica Need to Sacrifice a World Class Conservation Site in Order to Build a World Class Port?" can be downloaded here.

JET has a lawsuit filed against the Jamaican government to uphold the Access to Information Act and provide details of its negotiations with CHEC. Once this information is made public, JET can launch a second suit against the government to uphold the Jamaican Charter of Rights and Freedoms, which states that all Jamaicans have "the right to enjoy a healthy and productive environment free from the threat of injury or damage from environmental abuse and degradation of the ecological heritage." Destruction of the fish sanctuaries, mangroves, dry tropical forests, and constructing a toxic coal-fired electricity generating plant are counter to citizen's rights in this charter. The government has purposefully stalled in providing details of the proposal to delay our ability to react legally. In January and May 2014, the Minister of Finance and Planning had issued "Certificates of Exemption" denying JET's demands for access to information regarding the negotiations with CHEC. In October, in a rare moment of partial victory for this cause, the Jamaican Supreme Court heard submissions from JET concerning the issuance of these certificates and declared that particular

government ministry had no authority to issue the certificates. The Judicial Review Court then ordered the government to pay half of the legal costs incurred by JET, following the filing of an application against the Portia Simpson Miller-Administration on the proposed Goat Islands project. The case in relation to the Port Authority's refusal to provide information will be heard by the Supreme Court on 3-4 June 2015.

Finally, the ISG is again working with the IUCN SSC office to draft a letter of concern addressed to the Regional Director of CHEC. Included in this letter will be reference to a recent joint statement by China's Ministry of Commerce and Ministry of Environmental Protection entitled "Environmental Guidelines on Foreign Investment and Cooperation" that directs Chinese companies to further regulate their environmental behaviors in foreign investment and cooperation. See news on this statement here.

## Update on the Critical Situation in the Dominican Republic

In 2013, the Iguana Specialist Group learned that one of the four main locations where *Cyclura ricordii* can be found and a stronghold for *C. cornuta*, south of Lago Enriquillo, was under threat. The area was in the process of being developed, to make way for a farming project, administered by the Dominican Agrarian Institute (IAD). This called for vast forest clearings and irrigation development, in some instances falling within protected areas. This is a complicated situation as this lake is a land-locked basin that experiences natural periodic flooding. When flooding occurs, affected farmers demand to be compensated for their flooded land by the government, prompting the government to expand agrarian projects. Even though some clearing projects fell within the Loma Charco Azul Biological Reserve, part of the Jaragua-Bahoruco-Enriquillo UNESCO Biosphere Reserve, they were still authorized by the Ministry of the Environment. Given the high biodiversity value of the area, a local NGO, Grupo Jaragua, exposed this issue through conventional and social media, followed by a letter of concern from the IUCN Species Survival Committee (written by the ISG and can be found here). These actions generated considerable public outcry and are believed to have prompted the IAD director to meet and negotiate with Grupo Jaragua to form a compromise that would leave the most sensitive of the sites untouched (due to documented high presence of *C. ricordii*).


*Even at the entrance to Sierra de Bahoruco National Park the destruction is clear. You can see remnant trees demonstrating the beauty that the park once held in this area (above). Below you can see a section of the park that has been cleared for avocado cultivation. The majority of these avocados are thought to be exported to the United States to meet the growing demand. Photos by Yolanda Leon.*

Though destruction of this particular area has been halted for the moment, the long-term future is unknown and additional destructive acts have been surfacing to the south, in Jaragua National Park, also within the Jaragua-Bahoruco-Enriquillo UNESCO Biosphere Reserve. In late 2014, the Pedernales Provincial Director of the Environment, Leovigildo Méndez, authorized the deforestation of over 25 acres of National Park land for a private agrarian project. Most of this clearing occurred in the corridor that connects this park to Sierra de Bahoruco National Park, the largest protected area in the Dominican Republic (DR). Both areas are also named as an Important Bird Area (IBA) by BirdLife International, a Key Biodiversity Area (KBA) by the Critical Ecosystems Partnership Fund, and are Specially Protected Areas under the SPAW Protocol of UNEP's Cartagena Convention. In addition, Bahoruco is also an Alliance for Zero Extinction site. This is another of four areas where *Cyclura ricordii* can be found, along with a variety of other threatened flora and fauna. Sadly, this destruction is not new to this area. Over the past two years,

Grupo Jaragua has documented the destruction of 35 km² of forest within the Sierra de Bahoruco National Park, equivalent to 30% of the original extent of the southern slope forests of the park. Following formal complaints by the NGO and a press trip with investigative journalists, the Ministry of the Environment commission confirmed the destruction and even found evidence that the Provincial Director was profiting from the destruction. Fortunately, Mr. Méndez has been fired as a result from this, but the underlying agrarian production systems inside the park continue unabated. Without intervention from the highest powers in the DR and continued international pressure, these destructive activities will continue and the endangered and endemic species in this area will face extirpation.

For more information please see: http://www.grupojaragua.org.do/Bahoruco_english.html

## Smuggled Bahamian Iguanas Found in UK

*Three press releases surrounding this event are reprinted below in chronological order.*

**13 Rare Iguanas Cruelly Stuffed into Socks by Smugglers are Seized by Customs Officers at Heathrow**
The Daily Mail – 4 February 2014
By Martin Robinson

- Two Romanians arrived from Bahamas and were arrested by border police.
- The iguanas were found stuffed in a suitcase and one of the 13 had died.
- Species is 'critically endangered' and worth £150 each on black market.

Thirteen 'incredibly rare' iguanas stuffed into socks by smugglers have been seized by customs officials at Heathrow Airport. The endangered lizards were found in a suitcase at Terminal Five of the London airport when officers stopped two Romanian women who had arrived from the Bahamas. They were carrying 13 San Salvador rock iguanas each wrapped in a sock but sadly only 12 survived the journey from the Caribbean.

The species is considered 'critically endangered' and so rare they can cost around £150 each on the black market. The two travellers were due to take the reptiles – which are native to the Bahamas and classed as being under threat of extinction – on to Dusseldorf in Germany.


*Cruel: Smugglers have been caught trying to take 13 rare iguanas through Heathrow in socks. Sadly one died on the journey.*


*Contraband: The San Salvador Rock Iguanas are native to The Bahamas and classed as being under threat of extinction.*

Grant Miller, from the Border Force's endangered species team said: "This particular species of iguana is incredibly rare – only a few hundred are believed to be left in existence – so this was a remarkable and very important seizure. Given the circumstances we found them in it seems incredible that all but one survived such a long flight. The surviving animals were dehydrated and are now under the supervision of a specialist vet. We are also working with experts to find the best way to protect and safeguard these endangered creatures longer term."

The two women, aged 24 and 26, were arrested on suspicion of importation offenses.

San Salvador iguanas grow up to around 20 cm (8 inches) when mature, with the male slightly larger than the female. The iguanas have become increasingly endangered since The Bahamas were first colonized in the 16th century from non-native predators including cats and dogs and the loss of the natural habitats which they live in. They are now confined to just a handful of 'cays', the small sandy islands which make up The Bahamas. Their diet is almost exclusively made up of plants and fruit from species native to the island, as well as some insect larvae and slugs and crabs, as they live close to the water.

The most comprehensive study, in the late 1990s, put their numbers at between 426 and 639 and conservationists fear numbers have fallen since then.

The Bahamas government forbids all exports, and attempts have been made at a captive breeding program to arrest their decline.

*Healthy: Although the reptiles were badly dehydrated after their journey across the Atlantic a dozen survived.*

*Arrested: Two Romanian women had arrived from The Bahamas with this suitcase and were held on suspicion of importation offenses.*

**Stuffed in Socks: 13 Iguanas Smuggled into UK in a Suitcase**

Border Agency Found 13 'Critically Endangered' San Salvador Rock Iguanas Stuffed into a Suitcase for Eight-Hour Flight, with 12 Surviving

The Telegraph – 3 Apr 2014
By Keith Perry

Two "highly-intelligent, well-travelled young women" caught smuggling 13 critically-endangered iguanas, with a potential black market value of £260,000, were each jailed for 12 months.

The Romanian degree students were caught at Heathrow Airport after stepping off a BA fight from The Bahamas with the San Salvador iguanas, one of which had died, stuffed inside socks and wrapped in a blue towel in their suitcase. Mechanical engineering student Angla-Alina Bita, 26, who was working as an au pair in Switzerland, and finance student Vitora-Oliva Bucsa, 24, both pleaded guilty to the unlawful importation of the animals on February 3 at Terminal Five.

They were caught after their nine-day trip, which had been financed by a wealthy Swiss gentleman identified only as 'Thomas', before they could catch their onward flight to Dusseldorf, Germany, where the animals were to be collected. The animals are unique to The Bahamas, where laws have been passed to prevent their export and it is believed the species now only amounts to a few hundred.

Prosecutor Pamela Reiss told Isleworth Crown Court the women arrived in the early hours from Nassau, claiming they had spent an innocent holiday in the Caribbean, which they had financed themselves. All their clothes had been stuffed into one suitcase and Border Agency officers checked the second one they had.

"In the other suitcase the 13 iguanas, one of which was dead, were found. Each had been wrapped inside a sock and then wrapped in a blue towel. They had been in the hold in the suitcase during the eight-hour flight. They come from a hot country and were in the cold hold all that time and must have suffered. Bita said she did not know what they were and was given them by a man called 'Robert' in a beach bar and was not paid."

It is unknown what the final destination was for the reptiles, but Miss Reiss added: "They are valued at £10,000 each and that's a minimum, they could be sold illegally for up to £20,000 each." It is difficult to place an accurate figure on the value because the trade is cloaked in secrecy, but the prosecutor added: "Maybe wealthy people keep them as status symbols because they are endangered."

The court heard that Bita lied when quizzed and Bucsa said nothing, but now both women claim 'Thomas' financed the whole trip and arranged for them to carry the iguanas. Their lawyer Miss Brinder Soora said: "They recognise the particularly devastating effect their actions have had and it is fortunate only one iguana passed away. These two defendants were naive in their actions and they did not know the iguanas were of such value and rarity."

Judge Phillip Matthews told the first-time offenders, who have been locked up in HMP

Holloway since their arrest: "You are two highly-intelligent, well travelled young women who chose to act in the way you did free of pressure. There is a market for such creatures and for as long as people such as yourselves perpetrate the facility for them to be smuggled out of the Bahamas, that trade will continue."

Grant Miller from the Border Force's endangered species team said: "This particular species of iguana is incredibly rare – only a few hundred are believed to be left in existence – so this was a remarkable and very important seizure. Given the circumstances we found them in, it seems incredible that all but one survived such a long flight."

The animals were dehydrated and placed into the care of a specialist vet where they remain. Mr. Miller said they are working with experts to find the best way to protect and safeguard the endangered creatures longer term.

**Smuggled Iguanas Returned Home by Border Force**

Twelve critically endangered iguanas seized by Border Force at Heathrow have been returned to their native Bahamas.

UK Government Border Force and Home Office –11 July 2014

UK Government Press Release Site

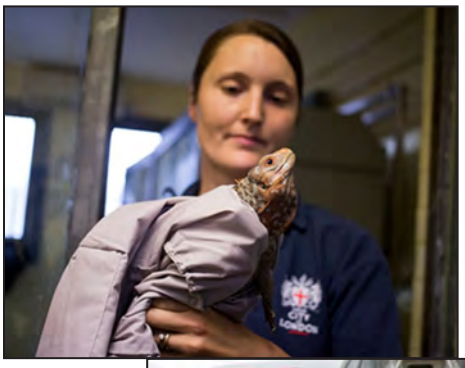
Twelve critically endangered iguanas seized from smugglers by Border Force officers at London's Heathrow Airport have been returned home to their native Bahamas.

The reptiles were discovered in the baggage of Romanian nationals Angla-Alina Bita, and Vitora-Oliva Bucsa on 3 February 2014 by staff carrying out customs checks. The iguanas were each wrapped in an individual sock and had been stuffed into suitcases. Twelve survived their journey but one died in transit.

They were identified as San Salvador rock iguanas, a species so rare that only a few hundred are known to be in existence. As such they are controlled under the Convention on International Trade in Endangered Species (CITES).

Jailed – The women were later sentenced to 12 months in prison for smuggling, after an investigation by the UK's National Crime Agency (NCA). Following the seizure, officers from Border Force's specialist CITES team worked with the Bahamas High Commission in London to arrange their return to their native islands.

On Wednesday 9 July the iguanas were taken from the City of London Corporation's Animal Reception Centre at Heathrow to board a British Airways flight to Nassau, accompanied by two Border Force officers, for their journey. They were then transported to a government research station on the island of San Salvador where they will be monitored by experts, with the eventual aim of returning them to the wild.



*Left: The iguanas were housed at the Heathrow Animal Reception Centre.*


*Right: The iguanas arrive for their flight.*

Bahamas – Grant Miller, head of the Border Force CITES team, said:

"We were in contact with the Bahamas High Commission in London from an early stage and straight away it became clear that getting them back to their natural habitat was going to be really important. Arranging the repatriation of such rare animals is complex and sensitive, but I'm delighted that through our close work with the Bahamian authorities, British Airways, the City of London Corporation and other partners we have succeeded. Not only has Border Force made sure that the criminals responsible for smuggling these animals are behind bars, we're also proud to have been able to play a part in safeguarding the future of this species."

Wildlife crime – The Bahamas Minister of The Environment, The Honourable Kenred Dorsett, said:

"Wildlife crime is a global problem, which only collectively we can address. This crime plagues animals and plants particularly, like the case of the Bahamian iguanas, species which are extremely rare and from remote places. We thank the government of the UK for their excellent cooperation as they have gone to extraordinary lengths to ensure the successful repatriation of

these animals and we look forward to working with other countries as well as local, regional and international NGOs to address the challenge."

The iguanas were flown in the cabin of a British Airways flight to Nassau. Pilot Captain Al Matthews said:

"Naturally, all of our customers are special, but despite having flown Prime Ministers and members of the Royal Family, these iguanas are by far the most unusual. You don't expect to share your cabin with incredibly rare reptiles. However, I can confirm all the iguanas were securely stored throughout the flight and had the most comfortable journey possible."

*The iguanas were given special dispensation to fly in the cabin.*

Endangered – Robbie Marsland, UK Director of International Fund for Animal Welfare (IFAW), said:

"With wildlife crime having such a devastating impact on many endangered animals, this is an excellent demonstration of successful enforcement work by Border Force and the NCA. We are pleased that the criminals involved have been brought to justice and that these critically endangered animals have been returned home to live out their lives in their natural habitat. Wildlife belongs in the wild."

Border Force is responsible for frontline detection and seizure duties on the illegal trade in endangered animals and plants which is covered by the CITES convention. The convention covers more than 35,000 species of animals and plants, whether they are traded as live specimens or as derivatives.

# Taxon Reports

## Lesser Antillean Iguana (*Iguana delicatissima*)

**First Assessment of the *Iguana delicatissima* Population of La Désirade Island (Guadeloupe Archipelago, French West Indies).** In terms of the conservation of *Iguana delicatissima*, La Désirade Island plays a key role. It is one of the last places of the Guadeloupian Archipelago where *Iguana delicatissima* remains. The population is healthy, self-sustaining, and iguanas are numerous, which makes it one of the priority populations to focus on. Unfortunately, La Désirade is inhabited and shuttles between the mainland, sheltering the invasive Green Iguana (*Iguana iguana*), and La Désirade happen daily and there is no control of what comes in or out of the island. Also, numerous herds of goats graze freely on the island, damaging the habitat (Figure 1).

*Figure 1. Goats grazing on La Désirade. Photo by ONCFS.*

We spent six days (May 27 to June 1, 2012) attempting to partially survey La Désirade, helped by a team of professional field technicians and volunteers (Figure 2). The objective was to locate the populations, check if the population is healthy, estimate the size, and verify the absence of Green Iguana and hybrids. We found out that on lower elevations of the island, iguanas seemed mostly concentrated on the eastern and western ends of the island.

We chose to estimate and survey the population of a 16 ha zone that appeared highly promising on our first day (Pointe Colibris, western end), using a traditional mark-recapture method (Figure 3). In the meantime, other members of

the team assessed iguana use in the newly created Natural Reserve of La Désirade, situated on the eastern end, where the other big population was located.

*Figure 2.* Iguana delicatissima *survey team, La Désirade. Photo by Gregory Moulard.*

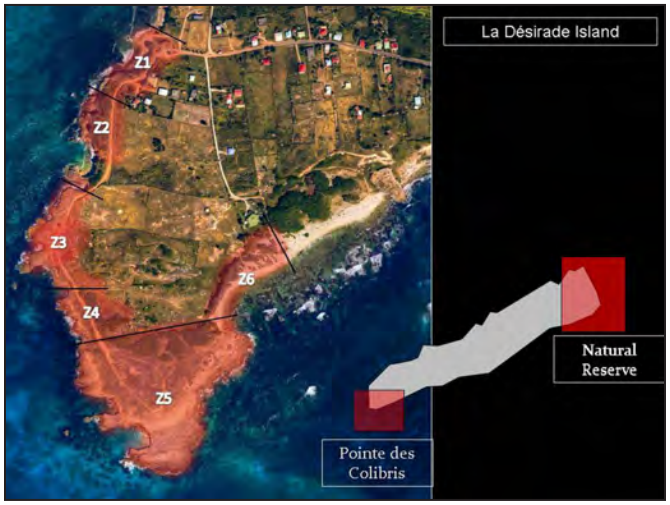



*Figure 3. Close-up of Pointe Colibris, La Désirade.*

On Pointe Colibris we captured 269 individuals. One day was excluded from the abundance analysis for the 16 ha zone due to a heavy rainfall and therefore only partially worked. We estimated the population using the data collected on the four other days. Adult female population abundance was estimated to be 298 (SE = 20.3; 95% confidence interval = 263-342) and adult male population abundance was 108 (SE = 20.3; 95% confidence interval = 91-141) in this single 16 ha zone. The density of breeding adults is therefore 25.4 iguanas/ha. 16% of the captured individuals were juveniles; 30 of them were considered big enough to be PIT-tagged (Figure 4). From this data set (collected during nesting period) the calculated sex ratio was 2.88:1 (F:M), which seems normal after the breeding period and while females are laying eggs.

*Figure 4.* Iguana delicatissima *juvenile (top) and adult (bottom). Photos by Gregory Moulard.*

Mean body mass and snout-vent length (SVL) for females were 1097 ± 329 gm and 28.5 ± 2.9 cm respectively. At least 65 females were pregnant out of 148 females with a SVL > 22 cm. The smallest female found pregnant had a SVL = 23 cm. Mean body mass and SVL for males were 1206 ± 331 gm and 30.0 ± 3.3 cm respectively.

99% (n = 266 out of 269) of captured individuals were considered as being in a good health state and 1% (n = 3) showed a moderate health condition, according to usual criteria used by clinical veterinarians. External parasite load was low.

No evidence of hybridization with its congener *Iguana iguana* was found nor individual Green Iguana discovered, either in the Pointe Colibris population or in the eastern population. However, two witnesses from La Désirade assured us they had seen an inhabitant entering with a pet Green Iguana, highlighting how urgent it is to raise public awareness on the threat the presence of the Green Iguana poses to *Iguana delicatissima* conservation.

The Natural Reserve has poor tree cover and most iguanas inside the reserve were observed using the south-western part that contains the highest concentration of trees that

are part of their normal diet. In the rest of the reserve, vegetation is harvested by the many uncontrolled herds of goats. Few iguanas have been observed basking on the sharp rocks covering the coast. Another group has been spotted in the northern part of the Natural Reserve (Figure 5).


*Figure 5. Abundance of* Iguana delicatissima *found inside and outside of the Natural Reserve of La Désirade.*

These observations suggest the reserve may be important for the eastern population, to conduct some of their normal behaviors and as a source of food. Rehabilitating the tree cover of the reserve's adjacent zones by restricting access from grazing goats might improve the eastern population, and enhance the biological value of the Natural Reserve.

We identified four potential threats to the conservation of this population (in order of significance):

1) Invasion by Green Iguana – many boats transporting food, other merchandise, and people travel between mainland Guadeloupe and La Désirade on a daily basis.

2) Road Casualties – the coastal road was found to be an obstacle for iguanas: three females were found dead in five days near the Natural Reserve and Pointe Colibris, and two iguanas were observed dangerously basking on these same roads.

3) Grazing Goats – numerous goats are left by owners close to or in the Natural Reserve zone, leading to overgrazing. Goats compete with iguanas for foraging and induce a change in the vegetation. Resultant changes to the soil cover also lead to a reduction in the attractiveness of available nesting spots.

4) Human Conflict – iguanas feeding in residential gardens are considered pests by some island inhabitants. The nets used to protect crops have been observed catching iguanas, and once trapped they cannot free themselves leading to subsequent death, either by dehydration, prolonged exposure to heat, or strangulation.

Our conclusion is that at least two main populations exist on La Désirade Island, with a very high density on the western side. Considering the estimate in the single 16 ha zone and our observation on the eastern side, we think that La Désirade and its satellite islet Petite Terre, play a key role in the survival of the remaining global population. Along with the Dominica population, this population must be considered as a priority for conservation efforts. The population is healthy and numerous, and currently seems viable without human intervention.

However, without controls on the merchandise and people entering La Désirade, the probability is high for invasion by Green Iguana and the subsequent loss of the *delicatissima* population. We also noticed that people are mostly unaware that two species exist and the difference between them. Other threats seem to be much less significant at this time.

We therefore recommend:

1) To implement a systematic control program of merchandise and people entering La Désirade. Trained officers should be hired or municipal officers trained and dedicated to this program.

2) To start a wide-ranging education program for the inhabitants of La Désirade as well as mainland Guadeloupe, as many exchanges happen between these areas.

3) To post signs in the port describing the threat posed by the Green Iguana to the conservation

of the Lesser Antillean Iguana. The signs should explain how to recognize species differences and emphasize that it is forbidden to transport Green Iguanas in Guadeloupe.

4) To stress the key role of La Désirade in the overall conservation of *I. delicatissima*, and develop the identity of this iguana as a flagship species with high local value.

5) To identify the owners of goat herds grazing in the Natural Reserve territory and work with them for a solution that prevents goats feeding in this area.

6) To create a buffer area along the Natural Reserve that restricts access to domesticated herds in order to allow recovery of the tree cover.

Chloé Rodrigues[1], David Laffitte[1], and Baptiste Angin[2]

[1]Office National de la Chasse et de la Faune Sauvage
[2]Association Le GAÏAC

## Bahamian Iguanas (*Cyclura cychlura* spp.)

**Research Update. Andros.** From 31 March to 5 April 2013, Dr. Chuck Knapp returned to Andros Island in The Bahamas onboard the research vessel, the Coral Reef II, with a team of citizen scientists, the past president of the Bahamas National Trust (BNT), Sandra Buckner, two BNT staff members, Scott Johnson and David Clare (Figure 1), and Giuliano Colosimo, a graduate student from Mississippi State University. Our goals included revisiting iguana populations that we have studied for over a decade to monitor their health and collect data on long-term growth and survival. We explored a rarely visited region to search for iguanas on small cays so we can better understand iguana distribution across Andros. We also continued our efforts to collect DNA samples throughout their range to better understand gene flow across the fragmented island landscape. On Andros, gene flow depends on the ability of iguanas to swim across water barriers and survive in their new localities. Isolated populations can potentially experience reduced genetic variability and subsequent inbreeding complications. It is also important to identify isolated iguana populations with high levels of genetic variability, since these individuals may be good candidates for potential relocation efforts. Ultimately, this information will help determine whether to manage the Andros Iguana as a single large population or many smaller populations.

*Figure 1. Two Bahamas National Trust staff, David Clare and Scott Johnson, working with an Andros Iguana on Shedd's citizen science research expedition.*

We captured and processed 46 (25 males, 20 females, 1 unknown) iguanas including 17 recaptures from 11 locations (Figure 2). The low recapture rate reflects our refocused efforts to survey new locations. At the two long-term study locations visited this trip – Sandy Cay and Mangrove Cay – 11 of 12 iguanas and 5 of 8 were recaptures from as far back as 2002. We collected 41 blood samples for genetic analyses.

*Figure 2. Group after a successful iguana capture on Andros Island.*

The mean body size for iguanas captured was 35.3 centimeters snout-vent length (SVL) and 2598 grams in body mass (BM). The smallest iguana captured was 10.5 cm SVL and 39 gm. This was an unusually small animal for the time of year. It most likely hatched in September 2012 and experienced very little growth. The largest animal captured was 53.2 cm SVL, but the heaviest was 6030 gm BM (different animals).

We visited a hunting camp on Alcorine Cay at the mouth of Honeycut Creek (in Lisbon Creek). This camp is visited each research trip to check for use since iguana poachers from North Andros are known to visit the site. The camp did not look used within the previous two months.

**Exuma Islands**. A second research excursion was in May 2013 and concentrated on Pasture, Bitter Guana, and Gaulin Cays. Work was completed primarily by a team of three researchers in addition to four working days with university students from the Chicago area. We continued our long-term mark-recapture study and are beginning to evaluate trends in the data.

Pasture Cay – On 12 May 2013 we visited Pasture Cay in the Exuma Cays Land and Sea Park. Sixteen iguanas were translocated to this cay in 2002 and an additional four in 2006. We observed six iguanas and captured three (2 males, 1 female). The island looked the same as in past years. I am still uncertain why the population is not growing at a faster rate. In April 2014, we will partner with Island Conservation to evaluate the possibility to remove rats from the island. In addition, we may request to move four additional animals from the source population (Leaf Cay north of Lee Stocking Pond).

Bitter Guana Cay – A total of 45 iguanas was captured (31 males, 14 females). Mean body size was 34.2 cm SVL (range 9.4–51.5) and 1982 gm BM (43–4760). Unauthorized feeding by tourists is causing behavioral and demographic shifts in this iguana population. The skewed male captures reflect more males congregating by the main landing beach to feed from tourists. Capture data between 2007 and beyond 2008 demonstrate the increased ease of capture after a tourism operator from Great Exuma began feeding iguanas for tourists.

Gaulin Cay – A total of 109 iguanas was captured (54 males, 55 females). Mean body size was 23.8 cm SVL (range 10.2–38.5) and 657 gm BM (range 50–2845). While conducting research, we partnered with the Bahamas National Trust and the island manager from Bell Island to bring 19 students and four teachers from the all-ages schools at Black Point and Staniel Cay (Figure 3). Our team spent the morning with students explaining the extent of the research and why it is important for the survival of the species. The students assisted with iguana processing and some (not all) were excited to hold one. As always, we stressed that they were the ultimate protectors of the iguanas and that the animals need their help. The event was publicized by the Bahamas National Trust in a Nassau newspaper (Nassau Tribune). For a larger audience, including locals and tourists, Shedd Aquarium printed educational brochures for distribution at schools, local establishments, and the headquarters of the Exuma Cays Land and Sea Park.

*Figure 3. Dr. Knapp speaking to a school group about Shedd's iguana conservation program (above). Bottom: Group of students and teachers in the Exumas, The Bahamas (below).*

**Tourism and Food Provisioning Study Published.** Our research team published a study titled "Physiological effects of tourism and associated food provisioning on an endangered iguana" by C.R. Knapp, K.N. Hines,

T.T. Zachariah, C. Perez-Heydrich, J.B. Iverson, S.D. Buckner, S.C. Hallach, C.R. Lattin, and M. Romero (see the Virtual Library on the ISG website). We compared a variety of blood chemistry parameters of iguanas subject to supplemental feeding at popular tourist destinations, with iguanas occurring on islands where supplemental feeding does not occur. We demonstrated that male and female iguanas inhabiting tourist-visited islands where supplemental feeding occurs do not differ in body condition or baseline stress and stress response (determined by corticosterone levels) compared to iguanas from non-visited islands. Both males and females from tourist-visited sites experienced a greater incidence of endoparasitic infection and atypical loose feces. Indicators of dietary nutrition, including glucose, potassium, and uric acid values, also differed for both sexes from tourist-visited and unvisited islands. Only male iguanas from visited islands differed significantly in calcium, cholesterol, cobalt, copper, magnesium, packed cell volume, selenium, and triglyceride concentrations from non-visited islands; and female iguanas from visited islands differed significantly in ionized calcium. Although interpreting these differences is challenging, chronic biochemical stressors could compromise individual health over time or decrease survivorship during periods of environmental stress.

The study was disseminated by various outlets including:

Huffington Post
Scientific American
Strange Behaviors
Science Daily
International Science Times
Conservation Weekly Dispatch
Bahamas Islands info

(Click the outlet title to view online.)

2013 Web-based publications pertaining to Bahamas iguana research:

Knapp, C.R. 2013. To feed or not to feed wildlife. Huffington Post, December 10, 2013.

Knapp, C. 2013. Commitment to conservation creates lasting memories. National Geographic News Watch, June 11, 2013.

Knapp, C. 2013. Can iguanas swim, and what would it mean for conservation? National Geographic News Watch, June 19, 2013.

Charles Knapp
Conservation and Research Department
John G. Shedd Aquarium
USA

## Rhinoceros Iguana (*Cyclura cornuta*)

**The Iguanarios of the Dominican Republic.** The Dominican Republic (DR) has an extensive and complicated history of "iguanarios" (iguana breeding facilities). The first one was established in 1997 at the tourist attraction known as Manati Park in the southeast portion of the DR. Given the success of this initial facility in bringing in tourists, they have now spread across most of the country (Figure 1). The original purpose for these establishments was to help conserve the endemic rock iguana, *Cyclura cornuta*, by creating breeding groups that would be able to supplement the diminishing wild populations, and aid in research and education efforts (Figure 2). As this species remains in its natural habitat within the iguanarios, breeding is extensive with very little human influence. The original stock for the Manati Park iguanario and many others was the National Zoo in Santo Domingo (ZooDom). Unfortunately the real origin, or capture site in the wild, is unknown for most individuals and once they are in ZooDom they may reproduce randomly, thus diluting any genetic signature of their capture site. In most cases iguanas end up at ZooDom because they have been confiscated from local traders, no locality data is ever recorded for these individuals, and they are not given a unique mark so that they can be tracked. Thus, there are no records associated with them when they are sent out to various iguanarios, where they again breed randomly, which again dilutes a locality signature. Further they are also traded between iguanarios at times, and hatchlings are not managed and often escape. In short, the observable situation at present is very chaotic; being nearly impossible to know what path these individuals took to get to where they are now. Though the creation of these establishments may have been initially well meaning, the result is far from that. At this point many of the iguanarios are overflowing and there is little to no plan as to what should be done with these individual animals.

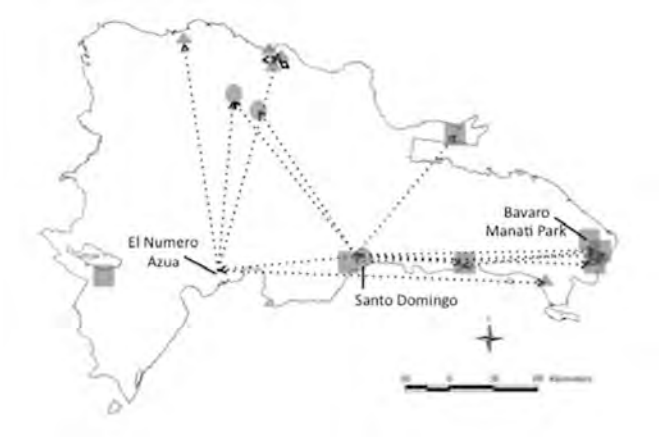



*Figure 1. Captive* Cyclura cornuta *locations throughout the Dominican Republic as of 2013. Arrows indicate trafficking or movement patterns of captive individuals to the best of our knowledge. Circles indicate zoos, squares are large-scale facilities, and triangles are small-scale facilities.*


*Figure 2. Sign pointing to the iguanario located in Los Tocones, Samana. Photo by Victor Hugo Reynoso.*

There are two main areas of concern in this situation. The first focuses on the health of these iguanas. It is often the case that iguanas within a captive situation encounter diseases. Moving them from one captive location to another only increases this possibility, and increases the spread of disease. In addition, the now common overcrowding causes individuals to fight and injure one another often (Figure 3). The diets provided in many places are also very poor and the basic enclosures need restoring. In short, husbandry efforts need to be vastly improved. The second main concern is more complicated, revolving around the concept of outbreeding depression. Outbreeding depression is defined as a reduction in reproductive fitness due to the crossing of individuals from different populations. Outbreeding depression is most common when there has been a significant amount of time since contact between populations such that local adaptations have arisen. This often occurs when there are substantial barriers to migration, such as mountain ranges and bodies of water. Within the Dominican Republic there are several such barriers that have proven to affect dispersal. Thus moving and mixing individuals of any species across these barriers could have substantial negative effects on the health of the species.

*Figure 3. Overcrowded adult Rhinoceros Iguana (*Cyclura cornuta*) pen at Manati Park. Photo by Victor Hugo Reynoso.*

Many studies have demonstrated the effect of dispersal barriers in the DR. Gifford *et al.* (2004) conducted an extensive evaluation of *Ameiva chrysolaema*, which demonstrated the isolating effects that the Cordillera Central and Sierra de Bahoruco can have. In their study, a 14% genetic differentiation was found, demonstrating that the northwest population has been separated from the rest for approximately 10 million years. Another example can be seen within the Hispaniolan Boa, *Chilabothrus striatus*, where a deep divergence is seen across the Enriquillo and Azua Basins (Reynolds and Pasachnik, in prep). *Cyclura ricordii* follows a similar pattern where a 23% differentiation is observed across the Bahoruco mountain range (Carreras De Leon *et al.*, in prep). The Hutia (*Plagiodontia aedium*) also demonstrates differentiation of around 3% between populations (Brace *et al.* 2012), and Townsend *et al.* (2007) demonstrated a clear structure between the north and south populations of *Calyptophilus* species, presenting 21.9-25.7% differentiation between these populations. The central theme throughout all of the studies is that the unique geographic history of Hispaniola being formed from two paleo-islands has had a significant effect on many species, and can be predicted to have a similar effect on any species that are found throughout a substantial part of the island. In an effort to better understand the population structure of *C. cornuta* across the

DR we have collected samples from numerous populations (Figure 4). These data will elucidate the levels of differentiation between populations such that we can develop a strategy for proper conservation of this species.

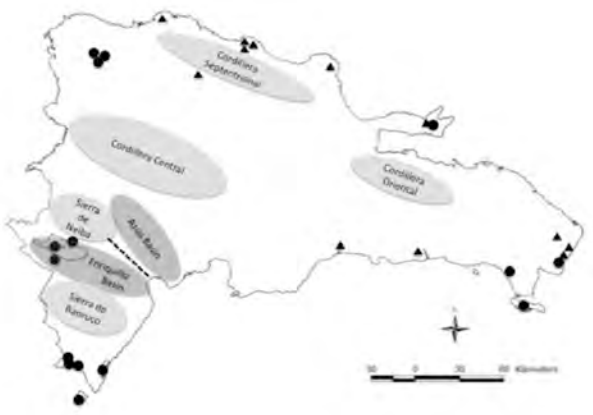



*Figure 4. Geographic barriers present in the Dominican Republic. Lighter circles represent mountain ranges, darker circles are basins. The dotted line represents the juncture of the paleo-islands.* Cyclura cornuta *sampling locations from the spring of 2012 and 2013 are depicted with circles indicating natural populations and triangles indicate captive samples taken from zoos and iguanarios.*

The goal of any conservation strategy needs to be to minimize the risk of extinction. In allowing and even planning for outbreeding or the crossing of individuals from distant populations (i.e. advocating translocations), that conservation goal is jeopardized. Given what we know about the distribution of *Cyclura cornuta* and the potential dispersal barriers, the cautious action is to allow these populations to remain in isolation and protect them as such, in order to conserve the species as a whole. Captive breeding and translocations programs should only be used as a last resort scenario and we are simply not at that point yet with *C. cornuta*. Though this species is threatened, there are still decent populations in certain areas and moving individuals from one location to another without a proper understanding of the genetic structure of the species could do more harm than good. Management actions to prevent trade and poaching of iguanas should be the target at this time, along with the conservation and protection of the natural habitat.

In an effort to aid iguanarios, ZooDom, and the Ministry of the Environment with this very complicated and serious problem, the International Iguana Foundation and San Diego Zoo Institute for Conservation Research held a workshop in June 2014 and will hold a second in June 2015 in which we will hope to bring all stakeholders and researchers together to develop a proper plan of action moving forward.

To learn more about this situation, please see the full-length article available online from the International Reptile Conservation Foundation in March 2014.

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Stesha A. Pasachnik
San Diego Zoo Institute for Conservation Research
USA

Rosanna Carreras De León
Mississippi State University and Grupo Jaragua
Dominican Republic

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***Reminder: Next ISG Meeting Dates!***

***Annual ISG Meeting 2015***
***10-13 November***
***Held at the Guana Tolomato Matanzas National Estuarine Research Reserve, near St. Augustine, Florida, USA***

***Check the website for details!***

## ISG Contact Information

Chuck Knapp, Co-chair
John G. Shedd Aquarium
Email: cknapp@sheddaquarium.org

Stesha Pasachnik, Co-chair
San Diego Zoo Institute for Conservation Research
Email: sapasachnik@gmail.com

Tandora Grant, Program Officer
San Diego Zoo Institute for Conservation Research
Email: tandora@sandiegozoo.org

Check out the ISG Website at:
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Editor:
Mary Gryzbek

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