**16th Annual Meeting of the IUCN Iguana Specialist Group**
**Huatulco, Oaxaca, Mexico**
**11-14 November 2012**

MEETING PROGRAM

Sunday - 11 November

Members arrive
Evening icebreaker at Flamboyant Huatulco

Monday - 12 November

**Session 1: Presentations (9:00 – 12:00)**

Local organizers & ISG Co-chairs – Welcome, opening remarks, and introductions

Peter Harlow - Recovery Plan update for the Fijian Crested Iguana

Robert Fisher - Reassessment of the distribution and conservation priorities of Fijian iguanas based on recent field work

Heidi Davis - Fijian Iguana (*Brachylophus* spp.) Systematics and Population Genetics Inform Conservation Management

Giuliano Colosimo - A genetic assessment of conservation management for the Andros Rock Iguana, an island endemic in a heavily fragmented landscape

Andrea Aplasca - Conservation and Genetics of the Allen Cays Iguana (*Cyclura cychlura inornata*)

Eugenia Zarza Franco - Splitting and Lumping in *Ctenosaura pectinata*: defining genetic clusters within the Black Spiny tailed iguana

Jean A. Paré - The *Chrysosporium anamorph* of *Nannizziopsis vriesii*, an emerging fungal pathogen of captive and wild squamate reptiles

Lunch: approximately 12:00 – 13:30

**Session 2: Presentations (14:00 – 18:00)**

Erick Manríquez Martínez - Iguanas as Priority Species for Conservation

Gabriela Díaz-Juárez - Study population dynamics the la Iguana Nguio (*Ctenosaura oaxacana*)

Ashley Campbell - Population Viability Analysis of Roatán's Spiny-Tailed Iguana (*Ctenosuara oedirhina*)

Chloé Rodrigues - Creation of a Network for Iguana delicatissima conservation in the French West Indies

Wilfredo Falcón - Invasive Green Iguanas (*Iguana iguana*) on the march: Vulnerability of tropical islands in the Caribbean and the Pacific

John Iverson (for Bill Hayes) – Update on the San Salvador iguana (*Cyclura rileyi rileyi*): Invasive Species Control, Translocation, and Headstarting

John Iverson - Efforts to Eradicate Mice from Allen Cay in the northern Bahamas

Kirsty Swinnerton - Development of a Caribbean Regional Strategy for Iguana Conservation through Invasive Species Removal.

Stesha Pasachnik - Conserving Hispaniola's endangered rock iguanas, *Cyclura ricordii* and *C. cornuta,* through ecology and genetics.

Byron Wilson - Jamaican Iguana taxon report

Tuesday - 13 November

**Session 3: ISG Business, Updates, and Discussions (9:00 – 12:00)**

Iguana Taxonomy Working Group update

Red List update

Program Officer update (will lead into some of the topics below)

ISG Web Site

IUCN Chairs Meeting

ISG elections (Chairs & Steering Committee) and membership for new quadrennium (2013-16)

ISG & IIF relationship

Travel Awards

7th World Congress of Herpetology

Future Meetings and Symposia

Publication of Species Recovery Plans

Blanket USFWS/CITES import permit update

Group grants

Other topics?

Lunch: approximately 12:00 – 13:30

**Session 4: ISG Discussions Continued (14:00 – 17:00)**

Toe clipping iguanas

Iguanas as invasive species

Island restoration and the use of ecological surrogates

Island Conservation and the development of an alien invasive species eradication program in the Caribbean to benefit endemic iguana species

Regional workshop for Caribbean iguana conservation – April 2012

Wednesday – 14 November

Field trip to the Unit of Wildlife Management (UMA) Rio Seco, a privately owned extension of the UMA near Huatulco that specializes in iguanas

Evening beach celebration and close of meeting


## SEDE

**Salón Casa Reyes, Blvd. Bahía Manzana 5, Lote 44, Sector T, La Crucecita, Bahías de Huatulco, Oaxaca.**

# PROGRAMA

## Día jueves 15

### Bienvenida e inauguración

9:00. Registro de asistentes
10:00. Inauguración
10:30. Receso/café/acceso a información turística

### Panel de ponencias internacionales

Moderador Víctor Hugo Reynoso

11:00. **El Subcomité Técnico Consultivo para la Conservación, Manejo y Aprovechamiento Sustentable de las Iguanas en México**. T. Morales Salud
11:30. **Historia natural y estado de conservación de la iguana de órgano, *Ctenosaura palearis*, en el bosque seco del Valle del Motagua, Guatemala.** D. Ariano Sánchez
12:00. **Conservando las especies en peligro de iguanas de las rocas de la Española, *Cyclura ricordii* y *C. cornuta*, mediante estudios ecológicos y genéticos.** R. Carreras de León, S. Pasachnik, G. Gerber, E. Rupp, M. Welch
12:30. **Iguanas verdes (*Iguana iguana*) como especies invasoras: Distribución potencial, repercusiones en el hábitat invadido y posibles colaboraciones.** W. Falcón, J. D. Ackerman, W. Recart, C. C. Daehler
13:00. **Creación de una red para la conservación de *Iguana delicatissima* en las Antillas Francesas.** C. Rodrigues, D. Laffitte

### Ponencia Especial

13:30. **Herpetoculture and conservation in genera *Iguana*, *Cyclura* and *Ctenosaura*: Friends or foe?.** Ty Park

Carteles

**Fallos en los intentos de erradicación de la iguana verde en el Pacífico Sur.** R. Van Veen, P. Harlow, N. Thomas

**Tamaño del cuerpo, demografía, y condición corporal en *Ctenosaura bakeri*.** S. A. Pasachnik, C. E. Montgomery, A. Martinez, S. Clayson, N. Belal, S. Faulkner

14:00. Receso/Comida.

### Panel de ponencias de Investigación

Moderador Jorge Morales Mávil

15:00. **Variabilidad genética de tres especies de *Ctenosaura* en el sur del istmo de Tehuantepec.** G. Santos Hernández, T. Rioja Paradela, A. Carrillo Reyes, E. Espinoza Medinilla, G. Castañeda Gaytán
15:20. **Estudios preliminares de la actividad de enzimas digestivas en cuatro etapas de desarrollo de iguana negra (*Ctenosaura pectinata*).** G. Ruvalcaba-Gómez, R. López-Pozos, J. L. Arcos-García, Gamboa J. G. Alvarado, L. Vélez Hernández
15:40. **Eficiencia metabólica en la iguana verde (*Iguana iguana* l.) ante dietas con diferente calidad nutricional**. L. T. Hernández-Salazar, N. Mora-Collado, J. E. Morales-Mávil, E. A. Suárez-Domínguez, F. C. Espinosa-Gómez
16:00. **Consideraciones metodológicas sobre la respuesta de iguanas a dos tipos de maniquies en época no-reproductiva.** J. L. Contreras Montiel, L. G. Contreras Ferrat, M. Arteaga Silva, M. A. Zapata López; A. Salame Méndez, M. Rosas Cabrera, J. M. Lavana

16:20. Receso/café

16:40. **Tamaño de camada de *Ctenosaura alfredschmidti* (Squamata: Iguanidae).** E. A. Bello-Sánchez, C. R. Corona-López , J. E. Morales-Mávil
17:00. **Biometria de *Ctenosaura oaxacana* silvestres en el C.B.T.A. No 252, en Coyul, San Pedro Huamelula, Oaxaca.** A. Zarate Fernandez, E. Calderón Ramírez, J. Elorza Vázquez, R. Pinacho Vásquez, E. C. Orozco Sánchez
17:20. **Modelado del crecimiento de la iguana negra (*Ctenosaura pectinata*) con ecuaciones polinomiales.** J. Núñez Ordaz, J. L. Arcos García, S. Machorro Sámano, R. López Pozos, L. Vélez Hernández, G. D. Mendoza Martínez, O. A. Villarreal Espino-Barros
17:40. **Estudio de la dinámica poblacional de la iguana nguio (*Ctenosaura oaxacana)*.** Gabriela Díaz Juárez, Víctor Hugo Reynoso
18:00. Preguntas y respuestas/Fin de la sesión

20:00. Brindis de Bienvenida

## Día viernes 16

### Panel de ponencias de Manejo en Cautiverio

Moderador Víctor Hernández García

10:00. **Preferencia alimenticia de la iguana verde (*Iguana iguana*) en etapa juvenil en cautiverio.** P. Mendoza Nazar, A. K. Zavala Huchin, B. Ruiz Sesma, P. G. Macías Farrera, A. Yamasaki Maza, F. Guevara Hernández, R. Pinto Ruíz
10:20. **Efecto de la adición de lisina sobre el crecimiento y digestibilidad del alimento en crías de iguana negra (*Ctenosaura pectinata)* en cautiverio.** J. L. Luis Arcos-García, G. D. Mendoza Martínez, R. López Pozos, B. Pinacho Santana, M. Treviño Chapa, J. G. Gamboa Alvarado, F. X. Plata Pérez
10:40. **Experiencia original estudiantil 273 en el manejo de *Ctenosaura oaxacana* en el C.B.T.A. No 252, en Coyul, San Pedro Huamelula, Oaxaca.** Zarate Fernández, E. Calderón Ramírez, J. Elorza Vázquez, R. Pinacho Vásquez, E. C. Orozco Sánchez
11:00. **UMASs de iguana en Oaxaca, conservacion y aprovechamiento.** A. Sánchez Pérez
11:20. Receso/café
11:40. **Modelo de negocio de mascotas de iguanas verdes.** M. Ángel Zapata L.
12:00. **Resultados preliminares del consumo de carne de iguana y su diversidad de platillos gastronómicos en dos comunidades de la costa de Oaxaca.** J. G. Gamboa Alvarado, R. López Pozos, J. L. Arcos García
12:20. Preguntas y respuestas/Fin de la sesión; Receso/café

### Ponencias Especiales

Moderador Gerardo Olmos

13:00. **Plan de Manejo Tipo para Iguana Verde**. Dirección General de Vida Silvestre
13:30. **Fomento a la Conservación y Aprovechamiento Sustentable de la Vida Silvestre**. Dirección General de Vida Silvestre

14:30. Receso/Comida.

17:00. **Taller: Plan estratégico para la conservación de las iguanas del Istmo de Tehuantepec.** Coordinador: Tizoc Morales Salud
20:00. **Noche social-Cena de Gala, Festejando 15 años de Trabajo.**

## Día sábado 17

### Salida al campo

Visita a la UMA Piedra de Moros, Santa María Huatulco
Comida de clausura

## Organizadores

M. en C. Luis Manuel Ortíz M.,
COORDINADOR. FONDO OAXAQUEÑO PARA LA CONSERVACIÓN DE LA NATURALEZA

M. en C. Virginia Hernández Viera,
Gerente Operativo del Comité de Playas Limpias de Santa María Huatulco

ATL Tania Montejo,
BIOAMIGABLES DE HUATULCO S.A. DE C.V.

Biól. Omar G. Gordillo Solís
DIRECTOR DEL PARQUE NACIONAL HUATULCO
CONANP

y

**por parte del Subcomité de Iguanas**

Tizoc Morales Salud
Víctor Hugo Reynoso
Nancy Anahí Armenta Miranda
Carmina Martínez González
Gabriela Díaz Juárez

**- o -**

**Edición de la memoria y programa**

Víctor Hugo Reynoso
Carmina Martínez González
COLECCIÓN NACIONAL DE ANFIBIOS Y REPTILES
INSTITUTO DE BIOLOGÍA, UNAM

**Diseño gráfico:** Hugo Morales Salud


SUBCOMITÉ TÉCNICO CONSULTIVO PARA LA CONSERVACIÓN, MANEJO Y APROVECHAMIENTO SUSTENTABLE DE LAS IGUANAS EN MÉXICO

Presidente
TIZOC MORALES SALUD

Secretario
JORGE MORALES MÁVIL

Tesorero
SILVIA ELVIRA ABDALÁ ROMERO

Vocal de Investigación
VÍCTOR HUGO REYNOSO ROSALES

Vocal de Educación, Difusión y Capacitación
LAURA BRISEÑO CAZARES

Vocal de Aprovechamiento, Inspección, Vigilancia y Legislación
VÍCTOR HERNÁNDEZ GARCÍA

Vocal de Financiamiento
MANUEL ANZALDO MENESES

Vocal Región Pacífico Norte
LUIS ADEL LEYVA RAMÍREZ

Vocal Región Pacífico Sur
MIGUEL ÁNGEL ZAPATA LÓPEZ

Vocal Región Golfo
JOSÉ GARCÍA JIMÉNEZ

Vocal Región Centro
JOSÉ LUIS CONTRERAS MONTIEL

Vocal Región Occidente
GERARDO OLMOS BERNAL

16th Annual Meeting of the IUCN SSC Iguana Specialist Group
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PRESENTATION ABSTRACTS
In alphabetical order by submitter's last name, presenter denoted by *

**Conservation and Genetics of the Allen Cays Iguana (*Cyclura cychlura inornata*)**

Aplasca, Andrea C.*[1], John B. Iverson[2], Mark Welch[3], Giuliano Colosimo[3] and Evon R. Hekkala[1]

[1]Fordham University, New York; [2]Earlham College, Indiana; [3]Mississippi State University, Mississippi.

The Allen Cays Iguana (*Cyclura cychlura inornata*) is endemic to the Allen Cays, a small chain of islands in the Bahamas. This iguana is classified as endangered by the International Union for the Conservation of Nature. Naturally occurring populations exist on only two small cays, however, individuals of unknown origin were recently discovered on six additional cays. A restricted range, small population size of approximately 1,000 individuals, and the persistent threat of human disturbance put the species at continued risk. Maintaining genetic diversity is critical to successful conservation strategies, however, despite over thirty years of life history research, little is known about the population genetics of this species. To investigate patterns of genetic variation, we analyzed blood and tissue samples from over 300 individuals. Our data from mitochondrial DNA sequences and nuclear microsatellites elucidates the relationships among the populations on different cays. This information can be directly utilized to optimize population management strategies. Our genetic analyses will provide the basis for selection of individuals best suited for future iguana reintroduction and translocation projects. Our research improves our ability to develop conservation strategies that maximize genetic diversity in order to preserve this endangered species.

**Population Viability Analysis of Roatán's Spiny-Tailed Iguana (*Ctenosuara oedirhina*)**

Campbell, Ashley*[1], Stesha Pasachnik[2] and Steven Hudman[3]

[1]Florida Atlantic University, Florida; [2]San Diego Zoo Institute for Conservation Research, California; [3]Truman State University, Missouri

*Ctenosaura oedirhina* is endemic to the island of Roatán, Honduras and is listed as Endangered by the IUCN. Like other insular endemic species, this lizard has a limited range and is threatened with habitat loss by human encroachment and development, as well as over-harvesting and possible hybridization with a related species. Estimates put the population at less than 5,000 individuals. Since the population is small, isolated, and likely in decline, steps need to be taken to preserve the species and the habitats it utilizes. One way to determine population growth patterns and identify potential threats to the population is through a population viability analysis (PVA). Using VORTEX (a PVA modeling program) and life history, geographic, and genetic data one can estimate the "time to extinction" of a population or species. This information is useful for policy and management decisions, and can signal how urgently action is needed (i.e. if time to extinction is a few years versus a few decades). While the

program makes many assumptions, there is substantial room for input if the data is available. Models are not perfect representations of reality, but they are useful for guiding future research and policy.

**A Genetic Assessment of Conservation Management for the Andros Rock Iguana, an Island Endemic in a Heavily Fragmented Landscape**

Colosimo, Giuliano*[1], George Stoner[3], Charles Knapp[2] and Mark Welch[1]

[1]Mississippi State University, Mississippi; [2]Shedd Aquarium, Illinois; [3]Mississippi University for Women, Mississippi

The Andros Iguana *Cyclura cychlura cychlura* is the largest terrestrial vertebrate in the Bahamas. The species is listed as "Endangered" on the IUCN Red List of Threatened Species. Currently, conservation planners are working in the absence of genetic data. These data are critical because it is extremely difficult to estimate migration rates between isolated populations without it. Population genetic data also allows for the identification of sink populations. Microsatellites were used to assess the compatibility of current conservation management with the naturally occurring genetic structure of this taxon. We genotyped 160 animals at twelve microsatellite loci originally developed for congeners. Our data suggest that populations on Andros are significantly isolated from one another ($Fst > 0.10$, $P < 0.01$). These findings indicate low gene flow and suggest that water channels could represent major barriers to gene flow among populations. Average Fis was negative ($Fis = -0.033$), indicating an excess of heterozygous individuals. This may be indicative of inbreeding depression although HFCs correlate poorly with individual fitness ($r2=0.0025$). Fortunately, “Alcorine Cay”, the population showing the highest degree of genetic diversity, is located within the recent expansion of a national park by the Bahamian government.

**Fijian Iguana (*Brachylophus* spp.) Systematics and Population Genetics Inform Conservation Management**

Davis, Heidi A.*[1], Leona G. Chemnick[1], Peter Harlow[2], Robert N. Fisher[3] and Oliver A. Ryder[1]

[1]San Diego Zoo Institute for Conservation Research, California; [2]Taronga Zoo, New South Wales, Australia; [3]U.S. Geological Survey, California

Recent description of a new species of Fijian Iguana (*Brachylophus*) and discovery of unique mitochondrial haplotypes from most Fijian islands sampled raises questions about appropriate conservation units for this genus. We examined previously unsampled wild populations of *B. fasciatus*, *B. vitiensis*, and *B. bulabula* to confirm species boundaries and analyze genetic variation. We sequenced 1462 bp of mitochondrial NADH4 and cytochrome b and analyzed 20 microsatellite loci in 132 wild and 57 captive Fijian Iguanas. Mitochondrial results show four well-supported monophyletic groups: the three named species and a group from Gau Island, possibly a new species. Our study yields 14 new mitochondrial haplotypes from previously unsampled islands. Several iguanas identified by morphology and location as *B. bulabula* are more closely related to *B. fasciatus* or *B. vitiensis* based on haplotype. While most *B. bulabula* and *B. vitiensis* show unique haplotypes by island, *B. fasciatus* from the Lau group from Tuvuca south to Fulaga and Ogea share haplotypes with each other and the introduced iguanas of

Tonga. Population genetic analyses based on 15 highly polymorphic microsatellite loci reveal partitioning between existing *Brachylophus* species, but not between those and the Gau group, perhaps reflecting the difference in evolutionary rates between mitochondrial and nuclear DNA.

**Study of Population Dynamics in the la Iguana Nguio (*Ctenosaura oaxacana*)**

Díaz-Juárez, Gabriela* and Víctor H. Reynoso

Universidad Nacional Autónoma de México

At the present, increasingly common to become more vulnerable, species and their populations decline due to the destruction and fragmentation of their habitat and stochastic changes that occur in the environment. The study of population dynamics allows us to evaluate the actual decline of populations and provide us information on the parameters that define the life history of individuals. As a concrete example, we present the case of iguana *Ctenosaura oaxacana* inhabiting Nizanda region in the state of Oaxaca (Mexico). This paper describes some parameters of the life history of Nguio Iguana (*C. oaxacana*). The demographic parameters were estimated based on the quantitative study of capture records, marking, release and recapture of individuals of *C. oaxacana* for 9 sampling occasions Nizanda in the region in the State of Oaxaca. The capture-recapture method was established for the Nguio Iguana was negative method of Jackson, which states that the capture, marking, release and recapture of individuals were made repeatedly. This method assumes a constant survival rate, which estimates the total number of animals that are marked and present in the population (Lemus Espinal, et al. 2005). Capture histories of all marked individuals were analyzed with the software MARK 6.0 (White & Burnham, 1999), in order to obtain survival rates and recapture by the maximum likelihood method and model of Cormack-Jolly-Seber (Lebreton, et al. 1992). The survival rate was estimated recapture generally with model {(_(time) p(time)}. To establish differences in survival rates between sexes recapture consider the general model: {(_(sex * time) p (sex * time)}. To recognize differences in survival and recapture rates between age classes model was applied {(_(LHC * time) p (LHC * time)}. Population growth rate was assessed by means of simulations using the information collected using the Software Life-Table Determinstic VORTEX Model. Results showed that the population could be considered stable, but it is highly vulnerable to changes brought anthropogenic activity, so it is essential to design conservation and management strategies to ensure the viability of their populations.

**Invasive Green Iguanas (*Iguana iguana*) on the March: Vulnerability of Tropical Islands in the Caribbean and the Pacific**

Falcón, Wilfredo[1]*, James D. Ackerman[1], Wilnelia Recart[1] and Curtis C. Daehler[2]

[1]University of Puerto Rico; [2]University of Hawai'i, Honolulu

Green Iguanas have been introduced outside their native range and some populations have become invasive. Of special concern are the Caribbean and Pacific regions, were several exotic populations of Green Iguanas are causing negative impacts, and may threaten the conservation of several native species. We assessed the risk of spread and invasion by Green Iguanas using the maximum entropy niche-modeling algorithm (MaxEnt) to predict it's potential distribution. We used a total of 187 location points from both the native and the invasive range,

coupled with environmental data as predictor variables. Our model had average training and test AUC values of 0.90 and 0.87 respectively, indicating a high predictive ability. The model predicts suitable conditions for *I. iguana* in south and central Florida (mainly along the coast), and in regions of all the islands in the Caribbean. Moreover, the model predicts suitable climatic conditions in Hawai'i, Fiji, Japan, and many other islands in the Pacific. Given the known negative impacts of Green Iguanas and their dispersal capabilities, governments in both regions should manage non-native populations to prevent further spread, and revise and enact laws that allow management agencies to respond quickly in the case of new Green Iguana incursions.

**Reassessment of the Distribution and Conservation Priorities of Fijian Iguanas Based on Recent Fieldwork**

Fisher, Robert[1], Jone Niukula[2], Nunia Thomas[3] and Peter Harlow*[4]

[1]U.S. Geological Survey, California; [2]The National Trust of Fiji Islands; [3]NatureFiji-Mareqeti Viti; [4]Taronga Conservation Society, New South Wales, Australia

The enigmatic monotypic iguanid genus *Brachylophus* was known monotypically from the South Pacific for 170 years before there was suggestion of diversification in the genus. Over the last 40 years several species were described and currently the iguanids from the South Pacific are now represented by two genera and a total of five species, although two of the species are extinct. Recent published analysis of a molecular and morphological dataset indicated that there were three clear species units within the *Brachylophus* populations sampled, but many island populations were not represented in that study. The living three endemic species of *Brachylophus* iguanas described from Fiji have been listed under CITES, the U.S. Endangered Species Act, and IUCN Red List for a very long time. Additionally one invasive iguana species (*Iguana iguana*) has become a threat in northern Fiji, on islands occupied by native iguanas. Work has been initiated to control and/or eradicate that invasive from Fiji. For much of the last decade conservation actions have generally focused on only one of these three species (*vitiensis*), and the other two species (*bulabula, fasciatus*) remained poorly known. Field research on over 40 islands over the last two years has greatly increased our knowledge base for these other two species and now conservation priorities can be discussed. This research has also shown that additional undescribed species of iguanas still persist in Fiji and their descriptions are now a priority so that they are properly recognized and conserved. We also found that many islands are now unsuitable for iguanas and the populations are restricted to a smaller list then we expected. Additionally, significant new gaps in knowledge of the distribution of all of these iguanas have been identified and are targeted for future studies. This program is a model of how an international governmental collaboration, with an in-country NGO has made great knowledge strides over a relatively short period of time, with limited resources on a priority taxa for conservation.

**Recovery Plan Update for the Fijian Crested Iguana**

Peter Harlow*[1], Elizabeth Erasito[2] and Ramesh Chand[3]

[1]Taronga Conservation Society Australia, New South Wales, Australia; [2] The National Trust of Fiji, Suva, Fiji; [3]Kula Eco Park, Sigatoka, Fiji.

In 2004, the Iguana Specialist Group meeting and workshop was held in Fiji, and produced a Species Recovery Plan for the Critically Endangered Fijian Crested Iguana (*Brachylophus vitiensis*). In 2008, the Fijian wildlife agency (National Trust for Fiji Islands) received funding from the Critical Ecosystems Partnership Fund to co-ordinate the implementation of the recovery plan. This program has now finished, with 40% of the 38 required actions successfully completed. More than 50% of the research and management actions were completed, however only 30% of policy actions and 13% of education actions were completed. The implementation of the recovery plan has greatly increased our knowledge of this species, and produced six refereed publications and five reports on diet, reproductive biology, population dynamics and genetics, as well as the successful capture and captive breeding of the last 20 iguanas from the island of Monuriki. Goats and rats have recently been eradicated from Monuriki, and vegetation regeneration is rapidly occurring: we envisage that captive bred Monuriki iguanas will be returned to the island in the next few years. A key component of the program was the translocation of crested iguanas to new islands, however this was not implemented, and is unlikely to be in the near future.

**Update on the San Salvador Iguana (*Cyclura rileyi rileyi*): Invasive Species Control, Translocation, and Headstarting**

Hayes, William K.[1], Tom Crutchfield[2], Joseph A. Wasilewski[3], Thomas A. Rothfus[4] and John B. Iverson*[5]

[1]Loma Linda University, California; [2]Tom Crutchfield Reptiles, Florida; [3]Natural Selections of South Florida, Florida; [4]Gerace Research Centre, San Salvador, The Bahamas; [5]Earlham College, Indiana

Surveys conducted during 1993–2005 suggest a fairly stable population of 441–654 iguanas on four offshore cays and two inland lake islets of San Salvador Island, The Bahamas. To control invasive species on Low Cay, we eradicated rats (*Rattus rattus*) in 2000 and Australian Pine (*Casuarina* sp.) saplings in 2005, with no subsequent increase in iguana population size. *Opuntia* cactus destruction by invasive *Cactoblastis* moths has reduced carrying capacity on this and other cays, probably limiting population recovery. After live trapping suggested absence of rats, we translocated 14 adult iguanas (4 males, 10 females including gravid individuals) to Cut Cay during 2005–2007 to establish a new population. When surveyed in 2012, we sighted 12 adults, no young, and one live rat, suggesting translocation failure due to rats. An illegal translocation to Club Med in the 1990s also failed. Further translocation remains problematic due to landowner refusal and rats on unpopulated cays. With support from Seacology, we opened a small headstarting facility at the Gerace Research Centre in 2012. In addition to its role in reintroducing iguanas to select areas on the main island, the facility will offer educational value and promote habitat protection within a proposed national park.

**Efforts to Eradicate Mice from Allen Cay in the Northern Bahamas**

Iverson, John*

Earlham College, Indiana

The Allen Cays Iguana (*Cyclura cychlura inornata*) occurs primarily on only three small islands in the Allen Cays (Leaf, U, and Allen Cay) in the Exuma Islands of the Bahamas. Unfortunately, house mice were introduced to Allen Cay at least a decade ago, and they attracted non-native barn owls that are decimating the Audubon Shearwater population on the cay, as well as potentially impacting the iguana population. With grants from National Fish and Wildlife Foundation, the International Iguana Foundation, and ZooAtlanta we translocated most of the iguanas from Allen Cay to nearby Flat Rock Reef Cay (August 2011, May 2012), so that Island Conservation and the Bahamas National Trust could apply rodenticide to the entire island in May 2012. We also manually filled three sinkholes with sand and removed all vegetation from another to create the first significant nest sites for iguanas on the cay. Once the extirpation of the rodents is confirmed, we will return in May 2013 to return the iguanas to Allen Cay, assess the use of the new nest sites during 2012, and create additional nesting habitat on Allen Cay.

**The *Chrysosporium* Anamorph of *Nannizziopsis vriesii*, an Emerging Fungal Pathogen of Captive and Wild Squamate Reptiles**

Paré, Jean A.*

Wildlife Conservation Society, New York

A group of fungal isolates morphologically indistinguishable from, but molecularly closely related to the *Chrysosporium* anamorph of *Nannizziopsis vriesii* (CANV) are now known to cause severe disease in a variety of squamate reptiles. Infection is contagious and typically presents as an often fatal, progressive, deep necrotic dermatitis. The ecology of this group of fungi remains largely unknown, but disease has been diagnosed in North America, Europe, Asia, and Australia in arboreal, terrestrial, and aquatic reptiles. The CANV has recently been incriminated as the agent of disfiguring facial granulomatous mycosis in wild snakes in the United States. Because CANV infection was documented in captive Green Iguanas in Spain and in North Korea, the potential exists for this fungus to spill into populations of wild iguanids. Awareness among wildlife professionals of this fungus and the clinical presentation of CANV mycosis in reptiles is therefore essential to achieve early detection of outbreaks and maximize the odds of successful disease management in wild iguana populations.

**Conserving Hispaniola's Endangered Rock Iguanas, *Cyclura ricordii* and *C. cornuta*, through Ecology and Genetics**

Pasachnik, Stesha*[1], Rosanna Carreras De Leon[2,3], Glenn Gerber[1], Mark Welch[2] and Ernst Rupp[3]

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Hispaniola is one of the largest and most diverse islands in the Caribbean and is unique in being the only Caribbean island with two native iguana species, *Cyclura cornuta* and *C. ricordii*. These endemic iguanas are the largest native terrestrial vertebrates and are dominant herbivores, however they are both highly threatened. *Cyclura cornuta* is considered Vulnerable according to the IUCN Red List, whereas *C. ricordii* is considered Critically Endangered. Both species are protected from international trade by the Convention on International Trade in Endangered Species of Wild Fauna and Flora. However, attempts to capture and export still occur. By using a combination of genetic, ecological, and interview techniques we elucidate the current distribution of these species, assess the genetic health, and define the environmental factors that limit and define their distributions, both on a large scale across the island and on a small scale in areas of sympatry between the species. This work is intended to guide future conservation measures by identifying sources of genetic variation and ESUs, key environmental characteristics vital to these species, and assessing threats faced by these species throughout the current distributions. These data are vital in constructing proper management plans for both of these species throughout their respective ranges.

**Creation of a Network for *Iguana delicatissima* Conservation in the French West Indies**

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*Iguana delicatissima* is protected in France by Ministerial order since 1989. On the French territories, the study of this unique species really started with Prof. M. Breuil in 1993. However no proper population survey occurred in the FWI before 2009 and no proactive action has been taken before 1998. Since 2011, the NHWA which coordinate the *Iguana delicatissima* National Action Plan has worked on the creation of a network, including agencies and associations of the FWI already working on *I. delicatissima*, in order to improve the efficiency of the conservation program. The aim of this network is to create common tools for homogeneity of scientific studies and educational programs, to improve the consistency of the conservation program. It will also facilitate decision making, and fund raising. This presentation aims to present the essential actions that occurred in the French West Indies, with a special focus on the changes that occurred in the last two years: definition of common methodologies for population studies and surveys, updates on the Guadeloupean Green Iguana status and running conservation actions.

**Development of a Caribbean Regional Strategy for Iguana Conservation through Invasive Species Removal**

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The Caribbean Rock Iguana (*Cyclura* spp.) is one of the most threatened taxa in the world, with 14 of the 16 IUCN-listed extant species and subspecies reported as Critically Endangered and Endangered. In the Insular Caribbean, 86 discrete small island subpopulations of 13 *Cyclura* species and subspecies breed in six Caribbean Nations. Of these, feral cats are known or suspected to be on 28 islands, invasive rats on 40 islands, and feral ungulates on 19 islands; the presence of invasive vertebrates on many islands in the region is still uncertain. Invasive species eradication has been a well-used conservation tool in the Caribbean Region, and between 1940-2010 seven invasive vertebrate species have been successfully removed from 51 islands; rats from 34 islands, feral goats from eight islands, and feral cats from two islands. Many projects were undertaken to protect *Cyclura* iguanas. Here, we propose to build on previous successes and develop an initiative to improve the conservation status of *Cyclura* iguanas through a strategic regional approach to invasive vertebrate removal. Using the Threatened Island Biodiversity database developed by Island Conservation, the University of California at Santa Cruz, Birdlife International, and the IUCN Invasive Species Specialist Group, we have identified islands and island clusters ('eradication units') from which invasive vertebrates could be potentially removed, either to protect an existing *Cyclura* population or which could be suitable for iguana translocation. To develop this concept further, input from Caribbean biologists and iguana specialists will be needed to evaluate and prioritize islands and island-groups for iguana conservation, invasive vertebrate eradication, and translocation. This regional initiative could result in the down-listing of some *Cyclura* species, a redundancy of some head-starting programs, and provide sustainable iguana populations free from invasive species impacts.

**Jamaican Iguana Taxon Report**

Wilson, Byron* and Rick van Veen

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The Jamaican Iguana Recovery Group had a successful 2012 field program. Besides the usual conservation and monitoring activities, several new initiatives were implemented, including more extensive nest site monitoring, the addition of a new 'artificial' nest site, radiotracking of "old wild" iguanas, and a large expansion of the exotic predator trapping program. Nesting began early in 2012, with 8 nests completed at the monitored nest areas before 1st June, and at least 40 gravid females were recorded at monitored nesting areas - an increase from the 33 females observed in 2011. Nests were monitored using 25 'new' camera traps. The camera traps were set at iguana nests both inside and outside of our 'predator control' area. Those outside the 'protected area' revealed high rates of nest predation by mongoose; all 15 of these nests showed extensive and systematic visitation by mongoose. The current exotic predator control trapping capacity was greatly expanded with the addition of 180 single door collapsible cat traps, 20 double door cat traps and a dozen larger traps to target pigs and dogs. The two new traps

loops (currently under construction) will increase the area under exotic predator control approximately 4 fold, and will encompass what is thought to be >80% of the remaining population of wild Jamaican Iguanas. Radiotracking data was collected from at least 6 'original' wild individuals and the quantity and quality of the data from this study was also greatly improved with the use of camera trapping.

**Splitting and Lumping in *Ctenosaura pectinata*: Defining Genetic Clusters within the Black Spiny-tailed Iguana**

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Species delimitation and genetic cluster identification are important for better elucidation and understanding of evolutionary patterns and processes. Here we show the advantages of a multilocus approach and multiple individual sampling in defining genetic clusters along the distribution of the Mexican Black Iguana, known as *Ctenosaura pectinata*. A total of 341 individuals from 48 localities were genotyped with eight microsatellite loci. Using Bayesian clustering algorithms, six genetic clusters were identified. Geographic discordance between the distribution of previously described mtDNA and nuclear groups is evident in some areas. However genetic concordance is observed between northerly distributed mtDNA and nuclear DNA. Thus, we suggest the resurrection of the name *C. brachylopha* for populations inhabiting north western Mexico. Iguanas described as *C. acanthura* also form a coherent genetic cluster that is concordant with an mtDNA clade. Thus the name *C. acanthura* should continue being applied to populations of black iguanas on the coast of the Gulf of Mexico. We propose that iguanas forming a genetic cluster that is almost entirely geographical concordant with the South mtDNA clade should have its own new name. Three genetic clusters are geographical discordant with the distribution of mtDNA clades in central Mexico (North B-D, Colima, Balsas, Guerrero). Given that the holotype locality is labelled as "Colima", we suggest that these genetic clusters keep the name *C. pectinata*. Our results have profound implications in wildlife management and forensics. Furthermore, this system offers the possibility to study the processes leading to the pattern of geographic discordance between mtDNA and nDNA markers.

**ISG Meeting Minutes – Business, Updates, and Discussion**
12 November 2012

Red List Assessment Update – Tandora Grant (presented by Stesha Pasachnik)

- Most comprehensive inventory of status of biological diversity, identifies species needing conservation action, provides index of decline, baseline for future monitoring, informative for guiding local conservation priorities.
- Influences national and international policies and agreements (e.g., CITES).
- 120 Specialist Groups, >65,000 species assessed.
- We have agreed to write a peer-reviewed journal paper reviewing the conservation status of the world's iguanas when all assessments complete (published Science and Biological Conservation papers as the example).
- Assessments include info on natural history, research, threats, human use, conservation needs and actions, etc.
- Red List home page has links to a photo gallery, the Amazing Species sub-section where we have increased exposure (many of ours are highlighted), and a few newsy posts/links. Currently the press release for downlisting of the Grand Cayman Blue Iguana is highlighted on home page. Amazing Species are preformatted synopses of the published assessments which are easy to write after an assessment is completed.
- Assessments ideally completed/refreshed every 5 years, maximum every 10 years.
- We have 57 assessments plus 5 species level summaries mandated for Iguanidae. We completed 5 in 2010, 5 in 2011, and 7 in 2012.
- February and Fall 2013 are next upload opportunities.

Program Officer's Year in Review – Tandora Grant (presented by Stesha Pasachnik) & discussion

- SSC Chairs' Meeting held in Abu Dhabi was attended by Glenn, Miguel, and Tandora. Highlights included a Program Officers working group, Red List database and minimum documentation standards working group, and a sub-group for reptile specialists groups, including 4 new groups: Anoles, Chameleons, Python & Boas, and Vipers.
- Attended World Congress of Herpetology held in Vancouver. Several talks and posters given on iguanas. Gave a short presentation to the newly-formed Anoline Specialist Group – our history, successes, and challenges. Several of our members are now ALSG members, and Allison is on their steering committee.
- Tapping in to IUCN's high profile and publicity presence with contributions:
  - Species Volume 54 - SSC quadrennial overview including our profile with success stories, challenges, future goals. Iguana delicatissima photo on cover.
  - Amazing Species – 12 synopses of published RL assessments
  - Photo Gallery – 6 species so far and collecting more from members
  - Numerous press releases and wide exposure for downlisting of Grand Cayman Blue Iguana in most recent Red List assessment. Also highlighted in IUCN's poster at ESRI User conference.
  - Jamaican Iguana included in high profile IUCN-published book Priceless or Worthless? The 100 World's Most Threatened Species. Highlighted the progress made in increasing population size through predator control and headstarting, but government action to prevent illegal charcoal burning is pivotal, as well as moving forward to restore Goat Islands.

- Outreach activities within the ISG and public:
  - ListServe emailing of press releases, news, and new manuscripts distributed. Lists maintained for members and non-member "iguana friends".
  - Responded to numerous emails requesting information, action, or putting people in touch with each other.
  - Contact Us button on website receives ~1 email a month with legitimate to non-legitimate questions. Pet iguana owner questions are now directed to Evert, our official "captive husbandry go-to person". A few inquiries from potential new members.
  - IIF Website revision in progress and editing for consistency. Relate news tidbits to Cassandra for IIF Facebook page.
- Update on Website: Version 2 developed by Capstone and launched in Nov 2011. New design and content created with the help of George Waters and Tina Bouse, and built on ideas that were brainstormed first at Dominica meeting in 2009. Content Management System used was not editable except by Capstone such that feedback, new updates, and additional elements have not been possible since initial launch. Tandora made the decision to change web developers to a San Diego-based friend and will completely redesign the site in Word Press software for launch of Version 3. Revisions will include a more dynamic HTML-formatted Recent Field Reports section (rather than as downloads as they are currently). A citation library with downloadable pdfs. A Members Login area where we can post things like non-public photos or Powerpoint presentations. Meeting information such as: location, flight info, attendees, abstracts, and travel award info. Potential for a web forum space (wiki). With help from the membership, we want to add Species Accounts such as those demonstrated by John Iverson from the Turtle Specialist Group.

- Discussion Topics
  - Membership renewal for term 2013-2016. Steering Committee will review our current members and discuss if we want to invite new folks and/or let some members lapse. Tandora will send "official" invitations to members, revise non-member list, and coordinate database with IUCN.
  - Membership definition – suggestion to discuss what it means to be an Iguana Specialist Group Member and create a "definition" of sorts, one that we can use to approach new members. Not intended to make our group more exclusionary, but only to guide our decisions on current and future members and be democratic and transparent.
  - Election for new term Chairs and Steering Committee will be held after this meeting. Period is now open for self-nominations. Suggestion to have SC members define a contributory role for themselves, which could be highlighted on the website. For example, John Iverson's role for the group is to chair the Taxon Advisory Group and produce the Checklist.
  - Help from the membership is needed for:
    Contributions for Re-introduction Specialist Group Global Reintroduction Prospectives (case studies); coordinate with Invasive Species Specialist Group Web-interface searchable database project; and ISG Website Team - Newsletter compilation, species accounts, photo management.

Chairs' Meeting in Abu Dhabi – SSC & Specialist Groups (Glenn Gerber)

- IUCN imposes few guidelines for the structure and function of specialist groups
- Seeking outside sponsorship for our group may be a possibility
  - Support a paid Program Officer position
  - Tandora Grant has been allowed half-time dedicated to ISG – but needs to be officially recognized, San Diego sponsorship
  - other possibilities/institutions to sponsor?

USFWS – Blanket CITES permit

- Currently: *Cyclura* samples only, blood (400 samples), toe clips, femoral pores, carcasses. Expires in February 2013.
- Future: want to amend permit to include more different types of samples such as egg shells/membranes, fecal swabs, and other tissue types. If we amend our renewal proposal there may be a lapse in Spring 2013 while being processed.
- To add a name to the permit requires 2-page CV (must be ISG member). Contact Tarren Wagner contact for more info, twagener@fortworthzoo.org
- San Diego Zoo has long had a completely unique USFWS CITES permit allowing importation of any animal part worldwide. May be an option to have our samples go through them rather than renewing our ISG permit. Glenn to investigate.

ISG & IIF Relationship

- Sub-group meeting in Guatemala 2011 outcomes:
  - Board members are appointed from institutions that donate to IIF (1 each). The IIF is a U.S. nonprofit organization based in Texas. Ensures tax-free donations are explicit to prospective donors.
  - Depending on amount of money contributed in any given year to IIF, ISG will get 10%, not to exceed $5000/year for travel awards and other uses.
    - money can be used however ISG SC group decides
    - money can be rolled over every year
    - report of spending due each year before IIF meeting
    - donations specific to ISG can be via IIF – donors can earmark specific destination/use

Travel Grants

- This year ISG received 4 applications and 3 were funded: Ashley Campbell, Rosanna Carreras, and Giuliano Colosimo.
- The grant is aimed to be for those with financial need; priority given for those working in area of conference. Award is open to everyone, not just students.
- Currently the award is $500 each. A vote was taken to continue the maximum grant awarded remain at $500.
- Based on our total amount in reserve with IIF we expect to award 5 grants next year.

Iguana Taxonomy Working Group (John Iverson)

- Goal is to have the checklist on the website and be updated annually.
- Publications – explicit recommendations made by original author for taxonomy changes would be helpful in TWG discussions and assessments. Author can work with the TWG to publish new species designations/descriptions in the Checklist.

Future Meeting Venues

- Ideally choose a location to bring additional attention to a local conservation action
- Next year possible for Jamaica - 20 year anniversary of PHVA meeting in 1993
- Other suggestions:
  - Fiji – Peter Harlow contact
  - Galapagos – Gabriele Gentile and Howard Snell contact
  - Dominican Republic – few years away? Last meeting in DR was 2002
  - Martinique or Guadeloupe – maybe 2014 or 2015
  - U.S. location – possibility to expand attendance
  - Suggestion made by Kim Lovich to combine with SWPARC (Southwest Partners in Amphibian and Reptile Conservation) in Albuquerque in July 2013
  - Fort Worth, Texas – easy to get to and home of IIF, etc.

Publication of Species Recovery Plans (Lee Pagni presented by Glenn Gerber)

- Recently published: Andros and Turks and Caicos plans
  - Successful consequence – creation of Andros National Park is confirmed and management plan is moving forward. Will be a multi-use park.
- Jamaican Iguana is nearly ready and will be published online through IUCN (and ISG)
- On track to be completed in 2013: *Iguana delicatissima, Cyclura pinguis*
- Future plans – considering shorter time frames and more focused goals

Group Grants

- Discussed potential for collaborative projects to access larger funding opportunities. Example of seabird & iguana collaboration.

ISG Elections and Membership – next term 2013-2016

- 2 elections will be held: 1) Co-chairs; 2) Steering Committee
  - To nominate yourself, send Tandora an email asap
    wk of 11/19 – election for Co-chairs
    wk of 11/26 – election for Steering Committee
- Possibility of expanding Steering Committee to 9 total members
  - Roles of the Steering Committee discussed: defined roles and/or general group decision making
- Role of the Chairs: see email previously sent by Glenn and IUCN website for guidelines
- Membership
  - Member 'definition' discussed
  - New and continuing members must respond to invitation at start of each quadrennium
  - Members should ideally have some level of participation at least

Toe Clipping Topics (John Iverson and Stesha Pasachnik)

- Review 2011 – toe clipping reptiles and amphibians, meeting legal and ethical expectations
- Comparison of toe clipping versus PIT tags or tagging with colored beads
- Literature suggests toe clipping is sound practice for research
- Not very much literature is available on the impact of PIT tags and colored beads
- Method chosen perhaps system specific – redundant identifications may be good
- Compare survivorship in iguanas PIT tagged, beaded, and toe clipped

Invasive Iguana Species Issues (Robert Fisher and Chloé Rodrigues)

- Increasing need to work with local governmental agencies to restrict movement of *Iguana iguana* and *Ctenosaura similis*
- Green Iguana is not currently accounted for by the Invasive Species Specialist Group
- Need to assess: outline impacts on biodiversity, monetary loss for humans, literature review
- ISG should create an "official position statement" (short version) on invasive iguanas
  - Address governing bodies to stop permits
  - Create a "species extirpation plan" (expanded version)
- Puerto Rico's offshore Magueyes Island
  - Cuban Iguana is introduced invasive, may serve as an island test case for Brodifacoum poisoning. Ethical concern raised over the painful death.
- Invasive Iguanas Working Group
  Lead: Peter Harlow, Rob Fisher
  Group: Chloé Rodrigues, Stesha Pasachnik, Wilfredo Falcon, Kirsty Swinnerton

Ecological Surrogates for Island Restoration

- Consideration of "Conservation Introductions" in island restoration to replace a species that has been extirpated or safeguard another.
- Re-introduction Specialist Group Guidelines (available from IUCN) consider topic.
- Choice for introduction can be based on: genetically next closest species to extinct species, fulfills the same ecological niche, species to be introduced is of high conservation priority.

Eradication of Invasives in Caribbean (Kirsty Swinnerton, Island Conservation)

- Building an online database – ISG asked for feedback and verify existing information.
- Need for field data from ISG to assess presence or absence of invasives, contact Island conservation for support.
- Survey will be sent on ISG Listserve.
- Requesting more information from ISG on priority of potential islands for eradication projects, as well as potential translocations.
- Introduced concept of Eradication Unit – clusters of islands where similar eradications can be done at the same time. Input needed from ISG to identify potential clusters.
- Interested in knowledge of raccoons as an invasive – please send info if available.

Regional Workshop for Caribbean Iguanas – Spring 2012

- Creation of a centralized headstarting facility off shore in Puerto Rico not funded by USFWS, but is supporting a regional workshop, likely to be 3 days.
- Target audience for workshop is in-country range participants. Need to generate a shortlist of invites – institutions and individuals.
- Landscape Conservation Cooperatives (A U.S. Department of the Interior and USFWS-led collaborative for conservation planning and design):
  - http://www.doi.gov/lcc/index.cfm
  - http://www.fws.gov/landscape-conservation/lcc.html
  - Recently added Caribbean site
  - Iguanas may serve as flagship species
- Richard Branson is possible keynote speaker
- Suggested discussion topic – risk assessment of invasive snakes (boas and pythons)

Membership Review

- 84 current members. General discussion and consensus gathering to determine which members should be re-invited, removed to "friends" list, and suggestions taken for new members to add.

Other Brief Topics

- House Mouse (*Mus musculus*) eradication scheduled for November 15 using aerial broadcast of Brodifacoum on Plaza Sur, Galapagos (12 hectares). 40 *Conolophus* iguanas are being held temporarily captive in case of non-predicted primary or secondary poison effects.
- ISG is considering hosting a conference-associated symposium or developing a published work from a group of contributors, e.g. a third 'Iguanas of the World'. General consensus that these ideas are good and should continue to be pursued, but no decisions were made.
- Introduction of new meeting attendees: Jill Jollay (a long-time Shedd Aquarium volunteer) and Ann-Elizabeth Nash (a Ph.D. student focusing on iguana behavior). Both have been working on *C. nubila caymanensis* population surveys on Cayman Brac and Little Cayman. Toe clips were collected from captures and DNA will be processed in Mark Welch's lab at Mississippi State University. Open call for volunteers on the next survey trips in June 2013.