



**2016 IUCN SSC Iguana Specialist Group Annual Meeting
Melanesian Iguanas Recovery Planning Workshop**

3 November 2016

- 9:00 am** **Welcome and self-introductions**
ISG Co-Chairs: Chuck Knapp and Stesha Pasachnik
- 9:10 am** **Local delegate introductions and logistics updates**
Robert Fisher and Kim Lovich
- 9:30 am** **Opening Address**
Robin Yarrow, The National Trust of Fiji
- 10:00 am** **The Melanesian Iguanas: Evolution, Discovery, and Conservation**
Harlow, Peter
- 10:20 am** **Biogeography and Conservation Systematics of Melanesian Iguanas (*Brachylophus* sp.)**
Fisher, Robert*, Jone Niukula, Kim Lovich, Heidi Davis, and Peter Harlow
- 10:40 am** ***BREAK***
- 11:00 am** **Genetic Diversity in the Fijian Iguanas: An Update**
Davis, Heidi A.*, Leona G. Chemnick, Robert Fisher, Peter Harlow, and Oliver A. Ryder
- 11:20 am** **Outreach Programs for Fijian Wildlife, Perspectives from Nature Fiji – Marequti Viti**
Tikoca, Siteri*, and Nunia Thomas-Moko
- 11:40 am** **Toward a Brighter Future: Distribution, Population Size, and Recovery Actions for the Malolo Island Crested Iguana**
Clause, Adam G.*, Robert Fisher, Kim Lovich, and Steve Anstey
- 12:00 am** ***LUNCH***
- 1:30 pm** **Investing in Capacity Building; Examples of Recent Collaborative Efforts for the Conservation of Critically Endangered Fijian Iguanas**
Lovich, Kim*, Jone Niukula, Eroni Matatia, and Carlton Rochester



- 1:50 pm** **Conservation of Fijian Crested Iguanas (*Brachylophus vitiensis*) on Yadua Taba and Monuriki Islands, Fiji**
Niukula, Jone*, Sialesi Rasalato, Robert Fisher, Ramesh Chand, Peter Harlow
- 2:10 pm** **Challenges Facing Eradication of Invasive Mammalian Predators in the Fiji Islands**
Rasalato, Sialisi
- 2:30 pm** **Dry Forest Habitat Within Fiji**
Tuiwawa, Marika
- 2:50 pm** **Managed Care Facilities for Iguanas: Review of Various Facilities with Specific Examples for Conservation of Critically Endangered Fijian Iguanas (*Brachylophus* sp.)**
Lovich, Kim*, and Steve Anstey
- 3:10 pm** ***BREAK***
- 3:30 pm** **2008-2012 Recovery Plan Overview** – Review of first recovery plan
Harlow, Peter
- 3:40 pm** **Revised Recovery Plan Overview** – Actionable sections identified
Fisher, Robert
- 4:00 pm** **Revised Recovery Plan Overview** – Objectives discussed
Niukula, Jone
- 4:10 pm** **Revised Recovery Plan Overview** – Break-out groups and process discussed for next day
Lovich, Kim
- 6:30 pm** **Gala Dinner Event with Entire Group on the Beach**
Pig Roast Buffet and Fiji Meke Traditional Dance Group

4 November 2016

- 9:00 am** **Daily agenda review**
Robert Fisher and Kim Lovich
- 9:15 am** **Revised Recovery Plan Break-out Sessions Overview**
Robert Fisher and Peter Harlow



- 9:20 am** **Recovery Plan Break-out Groups – Begin Work on Updated Draft Recovery Plan**
Biosecurity and action items continued from first Recovery Plan - Peter Harlow
New actionable sections discussed in detail and prioritized - Robert Fisher
Ranger Program progress and needs – Jone Niukula
Captive husbandry recommendations and requirements – Kim Lovich
Education and Outreach mini workshop – Peter Gilson
- 10:30 am** ***BREAK***
- 10:50 am** **Recovery Plan Break-out Groups (*continued*)**
- 12:00 pm** ***LUNCH***
- 1:30 pm** **Recovery Plan Break-out Groups (*continued*)**
- 2:30 pm** **Groups join back together and provide 5 minute debrief per group**
Biosecurity and action items continued from first Recovery Plan - Peter Harlow
New actionable sections discussed in detail and prioritized - Robert Fisher
Ranger Program progress and needs – Jone Niukula
Captive husbandry recommendations and requirements – Kim Lovich
Education and Outreach mini workshop – Peter Gilson
- 3:00 pm** ***BREAK***
- 3:20 pm** **Recovery Plan Implementation**
Overview of next steps, meeting summary, and thank you from Fiji Team

Dinner Options:

Dicks Place Bar and Bistro – poolside; a la carte or buffet with evening entertainment

Reservations are required for bookings of 6 or more

Trader Cafe – overlooking the Marina, healthy bistro cuisine including pizza, homemade pies, and smoothies. Take away available.

MCYC Island Bar and BBQ – cook your own BBQ (*must be booked before 4pm on the day of dining*).

Trader General Store – fresh fruit/vegetables from Musket’s organic farm, fresh baked breads, grocery/deli items.



IUCN SSC Iguana Specialist Group Annual Meeting

Melanesian Iguanas Recovery Planning Workshop

3–4 November 2016

ORAL PRESENTATION ABSTRACTS

In alphabetical order by submitter's last name, presenter denoted by *

Toward a Brighter Future: Distribution, Population Size, and Recovery Actions for the Malolo Levu Island Crested Iguana

Clause, Adam G.*¹, Robert Fisher², Kim Lovich³, and Steve Anstey⁴

¹University of Georgia, Athens, Georgia, USA; ²U.S. Geological Survey, San Diego, California, USA; ³San Diego Zoo Global, San Diego, California, USA; ⁴Ahura Resorts, Nadi, Fiji

Robust conservation decisions for at-risk species often necessitate an understanding of distribution and population size. However, initial stop-gap conservation actions can, in the absence of such data, be justified through inference and general biological knowledge. In Fiji, the Malolo Island Crested Iguana, *Brachylophus* cf. *vitiensis* represents an ideal case study. This little known, and as-yet undescribed, species of iguana was believed extinct for over 25 years. In 2010, it was rediscovered on Malolo Levu Island (hereafter, Malolo) in the Mamanuca group. Based on known biological responses in related congeners, we initiated two urgent recovery actions in 2011: localized control of feral cats and establishment of a captive assurance colony. Demographic data from 2016 shows that in one subpopulation, over half of the wild iguanas were born after cat control began, suggesting a rapid rebound in response to release from predation pressure. Recent surveys of 10 tropical dry forest fragments on Malolo revealed only four iguana subpopulations, cumulatively occupying just five hectares of forest. These surveys also revealed low but weather-dependent iguana detection rates, with many false negatives. Surveys on three neighboring islands did not detect iguanas. Although this failure to detect iguanas elsewhere must be interpreted with caution, it emphasizes the critical importance of Malolo for species recovery. Preliminary census data from the four known subpopulations on Malolo indicates a tiny total population size, with only 54 unique wild individuals known. Short-term recovery actions are three-fold: 1) ongoing feral cat control, 2) transition of the captive assurance colony to a captive breeding colony, and 3) initiation of a pilot tropical dry forest restoration program. We conclude with a discussion of long-term recovery goals, and emphasize our current shift from stop-gap conservation to data-driven conservation.

Genetic Diversity in the Fijian Iguanas: An Update

Davis, Heidi A.*¹, Leona G. Chemnick¹, Robert N. Fisher³, Peter Harlow², and Oliver A. Ryder¹

¹San Diego Zoo Institute for Conservation Research, Escondido, California, USA; ²Taronga Conservation Society Australia, New South Wales, Australia; ³U.S. Geological Survey, San Diego Field Station, San Diego, California, USA

The genetic and morphological diversity in Fijian iguanas in the genus *Brachylophus* only continues to grow as more islands are sampled. We provide an update on the current diversity of the genus based on the addition of 92 samples collected from ten new and ten previously sampled islands. Currently, we have sequenced at least 74 combined mitochondrial haplotypes in three species of Fijian iguanas from 40 islands. When taken with the great morphological diversity among Fijian iguanas in size, sexual dimorphism, color, banding pattern, and symmetry, our mitochondrial DNA results help clarify the species relationships within *Brachylophus*. Within species, new alleles from 17 microsatellite loci indicate the uniqueness of certain island populations and allow us to estimate relatedness in captive breeding facilities. The on-going discovery of genetic richness in this genus elucidates the need for continued sampling and the importance of a robust and detailed recovery plan for *Brachylophus*.

Biogeography and Conservation Systematics of Melanesian Iguanas (*Brachylophus* sp.)

Fisher, Robert*¹, Jone Niukula², Kim Lovich³, Heidi Davis³, and Peter Harlow⁴

¹U.S. Geological Survey, San Diego, California, USA; ²The National Trust of Fiji, Suva, Fiji; ³San Diego Zoo Global, San Diego, California, USA; ⁴Taronga Conservation Society Australia, New South Wales, Australia

Over fifteen years, we have surveyed for iguana populations on many of the islands in Fiji and collected genetic and morphological samples from many of these relict populations. Analysis of these data indicates that there is a much greater diversity of iguanas still extant in Fiji. Many of these are apparently now single island endemics, probably due to extirpations of nearby populations, and most or all would be considered Critically Endangered. Overall these data support that there was a much greater distribution and species diversity in the genus in the recent past and continued investigation of un-sampled islands is a critical priority. This information is vitally important to setting conservation goals and strategies, as the conservation focus from 1980 – 2015 was primarily on Crested Iguanas, whereas assumptions about “banded” iguanas was that their extinction risks were relatively low. Description of this new diversity is currently underway, but risks to this diversity remain great. We will summarize and review our current knowledge of these remaining populations.

The Melanesian Iguanas: Evolution, Discovery, and Conservation

Harlow, Peter*

Taronga Conservation Society Australia, New South Wales, Australia

Fiji and Tonga are volcanic, oceanic islands that have never been connected to any continental landmass. All flora and fauna have arrived via long distance, over-water dispersal. Most reptiles arrived from the west, traveling down the chain of islands from New Guinea –New Caledonia, and have relatives in the Australasia region. The Melanesian Iguanas are the only exception, presumably arriving from the New World in the east. Large flightless birds and reptiles were the dominant wildlife until the arrival of humans 3000 years ago. Today only the smaller, arboreal *Brachylophus* iguanas remain, however the details of their biogeography, systematics, and conservation status are still in the early stage of discovery.

Review of First Crested Iguana Species Recovery Plan: 2008-2012

Harlow, Peter*

Taronga Conservation Society Australia, New South Wales, Australia

Over half-a-million Fijian dollars have been spent on implementing the 2008-2012 Crested Iguana Recovery Plan, yet only 38% of the 38 actions outlined in the Recovery Plan have been completed. Sixty-eight percent of this funding came from a Critical Ecosystems Partnership Fund grant to the National Trust for Fiji. The partial implementation of the Recovery Plan has, however, greatly increased our knowledge of this species, produced six refereed publications and five reports (on diet, habitat preference, reproductive biology, population dynamics, and genetics), as well as the capture and successful captive breeding of 21 Crested Iguanas from the island of Monuriki at Kula Eco Park. In 2015, the first 32 captive-bred Monuriki iguanas were returned to the island, four years after goats and Pacific Rats were eradicated. A key component of the Recovery Plan was the translocation of Crested Iguanas to new islands, however this has not happened.

Managed Care Facilities for Iguanas – Review of Various Facilities with Specific Examples for Conservation of Critically Endangered Fijian Iguanas (*Brachylophus* spp.)

Lovich, Kim*¹, and Steve Anstey²

¹San Diego Zoo Global, San Diego, California, USA; ²Ahura Resorts, Fiji

Iguana species are kept throughout the world for various reasons, from pets in people's homes to specific in situ headstart facilities, to the gardens of resorts. The Fijian Banded and Crested Iguanas are similarly maintained by various stakeholders within Fiji. Here we will review the various facilities that exist where captive iguanas are kept in managed care. We will review the focus of these facilities and discuss other stakeholders' vested interest in displaying these

species as well as the need for standardized husbandry and care guidelines. This discussion is intended to provide the audience with background information for further review as part of our planned break-out session where we will have the opportunity to work together on the *Brachylophus* recovery plan for the region.

Investing in Capacity Building; Examples of Recent Collaborative Efforts for the Conservation of Critically Endangered Fijian Iguanas (*Brachylophus spp.*)

Lovich, Kim*¹, Jone Niukula², Eroni Matatia², and Carlton Rochester³

¹San Diego Zoo Global, San Diego, California, USA; ²The National Trust of Fiji, Suva, Fiji; ³U.S. Geological Survey, San Diego, California, USA

The Fijian Banded Iguana is maintained in American Association of Zoos and Aquariums (AZA) facilities in conjunction with the Species Survival Program (SSP). Here we will review the recent conservation initiatives for this rare and unique genus of iguana within Fiji, as a case study of SSP involvement in in situ conservation action. By growing our partnership with the IUCN SSC Iguana Specialist Group and its members actively working to protect this species in the wild, we help increase awareness and positively impact iguana conservation throughout Fiji. In particular, the SSP focuses on fundraising and driving education, capacity-building, and awareness programs for iguana conservation both in and ex situ. We present an overview of our fundraising strategy, the development of the Ranger Program within Fiji, and our collaboration with other stakeholders invested in this species' long-term survival, including organizations both locally, within Fiji, and globally. We hope our program can serve as a model for how to expand the connections between the international conservation community and local species conservation efforts.

Conservation of Fijian Crested Iguanas (*Brachylophus vitiensis*) on Yadua Tabu and Monuriki Islands, Fiji.

Niukula, Jone*¹, Sialesi Rasalato², Robert Fisher³, Ramesh Chand⁴, and Peter Harlow⁵

¹The National Trust of Fiji, Suva, Fiji; ²BirdLife International, Suva, Fiji; ³U.S. Geological Survey, San Diego, California, USA; ⁴Kula Eco Park, Korotogo, Fiji; ⁵Taronga Conservation Society Australia, New South Wales, Australia

Two islands in the Fiji Archipelago have undergone active conservation actions targeting *Brachylophus vitiensis* and other co-existing wildlife. Goat removal on Yadua Tabu Island began in 1981 with a volunteer ranger engaged to police the island. It took more than 20 years to completely remove the goats and during this period, visitation to the island by the local community, with its associated problems, decreased immensely. The island accommodated an estimated 500 iguanas in the 1980s when it was declared a sanctuary, and is one of the highest density of iguana populations in the world.

Conservation work on Monuriki Island, on the other hand, began in 2010. Remaining under native landowner management, various stakeholders came together to implement and achieve one of our most successful conservation projects within a 5-year period. Could similar actions work for the other twenty or so islands that accommodate their own unique genetic race of Fijian iguanas? When do we say that the Fijian Crested Iguana (*Brachylophus vitiensis*) is no longer Critically Endangered?

Challenges Facing Eradication of Invasive Predators in Fiji

Rasalato, Sialisi*¹, Steven Cranwell¹, Elenoa Seniloli², Tuverea Tuamoto³, and Miliana Ravuso¹
¹BirdLife International Pacific Secretariat, Suva, Fiji; ²NatureFiji-MareqetiViti, Suva, Fiji; ³PaCE-SD, University of the South Pacific, Suva, Fiji

Many islands in the Fiji group are alive with invasive predators such as rats, cats, and goats that tend to thrive on seabird eggs and chicks, and other endemic species. Invasives decrease these populations to a degree which at some point may finally drive them towards extinction. These invasive predators have been spread widely across Fiji's larger islands by man and are one of the greatest drivers of biodiversity loss. Local communities, government agencies, and conservation stakeholders have been teaming-up with BirdLife International in the Pacific to rid the smaller islands of these invasive predators for the benefit of birds, biodiversity, and people since 2006. To date, this joint conservation action has successfully eradicated invasive predators from 12 islands, creating 255 ha of predator-free island habitat, while protecting breeding colonies for 15 species of seabirds and many other native life forms including uncommon and threatened landbirds, reptiles, invertebrates, and plants. The main challenging factor is trying to advocate to local communities, stakeholders, and government agencies the importance of the project and steering perceptions towards the long-term security of restored seabird islands, notably through the establishment of effective island biosecurity and quarantine controls.

Dry Forest Habitats of Fiji

Tuiwawa, Marika

South Pacific Regional Herbarium, University of the South Pacific, Suva, Fiji

A small percentage of Fiji's forest is dry forest. These forests are restricted to the northern and westward side of the larger islands (Viti Levu and Vanua Levu) and their associated small islands. Such forests can also be found on small raised limestone islands in the Mamanuca, Yasawa, and Lau island groups. The aim of the presentation is to highlight where these dry forest systems are found and highlight the current status of this forest system. Also discussed are the results of numerous botanical and vegetation surveys carried out on such systems in the past decade, where both qualitative and quantitative derived data on the floristic, density, diversity and use of the natural resources therein are assessed. Two distinctive dry forest types

are recognized on: 1) lowland dry forest on large Islands, and 2) dry forest on raised limestone small islands. Key plant features/characteristics used that are associated with such systems include short bole, thick cuticles, narrow leaves, hairy leaf surface, deciduous, woody lianas, and buttress roots/base. Key species include *Cycas seemannii*, *Acacia* spp., *Podocarpus neriifolius*, *Fagraea gracilipes*, *Intsia bijuga*, *Casuarina equisetifolia*, *Gymnostoma vitiensis*, *Gnetum gnemon*, *Diospyros samoensis*, *Antirhea inconspiqua*, *Balanophora fungosa*, *Vavaea amicorum*, *Cynometra falcata*, *C. insularis*, *Koelreuteria elegans*, *Eugenia reinwardtiana*, *Amaroria soulameiodes* and *Kingiodendron platycarpum*.



**Melanesian Iguanas Recovery Planning Workshop
Musket Cove Island Resort and Marina,
Malolo Lailai, Fiji**

MINUTES

Day 3: 3 November 2016

Special thanks to note takers: Adam Clause, Flavia Diotallevi, Daisy Maryon, and Thijs van den Burg.

9:00 am **Welcome** – (Chuck Knapp, Stesha Pasachnik, Robert Fisher and Kim Lovich)

9:30 am **Opening Address** – (Robin Yarrow, The National Trust of Fiji)

1. The Melanesian Iguanas: Evolution, Discovery, and Conservation (Peter Harlow*)

- Question: In the small patches of forest, is there enough nesting availability? Answer: Yes, iguanas need only a few trees to have enough shade for nest sites.
- Question: How large could the Yadua Taba population become, what are densities? Answer: 15,000 is the estimate for Yadua Taba, with over 1,000 per hectare. It's the highest density for any iguana.

Smugglers are seeming to introduce themselves locally as ISG members or iguana researchers, to acquire more information on populations. For example, survey info was known by them before any presentation or publication. Anyone working on iguanas in Fiji that is approached for info should inform the National Trust.

2. Biogeography and Conservation Systematics of Melanesian Iguanas (*Brachylophus* sp.) (Robert Fisher*, Jone Niukula, Kim Lovich, Heidi Davis, and Peter Harlow)

- Question: Are the extinct species actually extinct? Answer: There are several small, really remote islands that have not been visited yet and could potentially find something unexpected.

Robert stressed the importance of removing sensitive information from photos or text posted to our personal social media pages.

3. Genetic Diversity in the Fijian Iguanas: An Update (Heidi A. Davis*, Leona G. Chemnick, Robert Fisher, Peter Harlow, and Oliver A. Ryder)

- Question: How do you name new species? Answer: For future described species, the names of the known island locales will be used.
- Question: Is inbreeding always bad? Answer: No, species can mitigate with inbreeding and combinations might lack deleterious alleles.

4. Outreach Programs for Fijian Wildlife, Perspectives from Nature Fiji – Marequti Viti (Siteri Tikoca* and Nunia Thomas-Moko)

- Question: How do you get children interested in nature conservation? What are the prospects for locals to work in this field? Answer: There are few local experts and few opportunities. There is no awareness or knowledge that they can become a scientist. We do train locals to educate visitors, such as rangers that take people up a mountain and now have more knowledge about local wildlife.

5. Toward a Brighter Future: Distribution, Population Size, and Recovery Actions for the Malolo Levu Island Crested Iguana (Adam G. Clause*, Robert Fisher, Kim Lovich, and Steve Anstey)

- Question: Has mammal removal from potentially good habitat sites already started? Answer: No, however, initial contacts have been made with other owners and long-term Mololo should become a cat-free island.
- Question: Are you managing genetic diversity? Answer: We are still adjusting protocols to be able to do that.
- Question: Is the island population protected? Answer: Forest patches of known iguana locations will be protected from resort development. Other potential good habitat sites might have close-by resorts within the recent future. However, efforts will be taken to prevent that.
- Question: Will the dry forest habitat between both resorts be linked? Answer: That is the long term goal; the forest is currently coming back. The Nokonoko trees (*Casuarina*) will be taken down after the young natives grow taller to facilitate this process.
- Question: Is continued deforestation a threat? Answer: There are varying degrees of risk, but it looks ok in the medium-term.

Not all forest found on our satellite map will be suitable iguana habitat. An aerial survey confirmed that some patches of forest are made up of non-native species and will therefore not be suitable iguana habitat and won't be among the sites of future survey work. Education training is planned for the future – to educate relevant people about native forest.

6. Investing in Capacity Building; Examples of Recent Collaborative Efforts for the Conservation of Critically Endangered Fijian Iguanas (Kim Lovich*, Jone Niukula, Eroni Matatia, and Carlton Rochester)

- Question: How (who from) do you get money into the Fiji Iguana fund? Answer: No specific requests for donations have been sent. Other institutions have iguanas for loan, so a financial compensation can be asked for.

7. Conservation of Fijian Crested Iguanas (*Brachylophus vitiensis*) on Yadua Taba and Monuriki Islands, Fiji (Jone Niukula*, Sialesi Rasalato, Robert Fisher, Ramesh Chand, and Peter Harlow)

- Question: What is the purpose of the bushfires? Answer: Clearing land for agricultural purposes, accidental fire starts, and burning of rubbish.
- Question: How often are the rangers on the islands? Answer: Yadau Taba is difficult to reach, it's far to get to, so the ranger isn't there every day. But also fishermen help and have an eye out for suspicious activity.
- Question: How many rangers are there throughout Fiji? Answer: There are three iguana rangers. And an additional 10 more general rangers.
- Question: What can the rangers do if they see trouble? Answer: The rangers have no real authority, but are just eyes on the ground and can report an issue.

8. Challenges Facing Eradication of Invasive Mammalian Predators in the Fiji Islands (Sialisi Rasalato*) No questions.

9. Dry Forest Habitat Within Fiji (Marika Tuiwawa*)

- Question: Are the last patches of dry forest assigned as protected areas? Answer: Yes, they should be. We need to inform the local community that owns the islands to protect these systems on their island.
- Question: Is there a regional seedbank? Answer: No.
- Question: Is there a reforestation plan? Answer: No, but there might be money available for conservation actions. The composition of plants in both early-inhabited and uninhabited is nearly equal, so the forest seems to have regenerated on its own.

10. Managed Care Facilities for Iguanas: Review of Various Facilities with Specific Examples for Conservation of Critically Endangered Fijian Iguanas (*Brachylophus* sp.) (Kim Lovich* and Steve Anstey)

No questions.

2008-2012 Recovery Plan Overview (Peter Harlow*)

- Most education actions started later than 2012, but are currently being implemented.
- There has been no annual get-together of all the parties to keep up with ongoing process of the action plan.
- We hope to get more hotels more involved, and let their customers pay for things, such as releasing juvenile iguanas to the wild. However, this might backfire as hotels could potentially look to harvest eggs from the wild in order to release more individuals and make a profit. This is something that happened in parts of Asia with turtles.