Útila spiny-tailed iguana
(*Ctenosaura bakeri*)
Conservation action plan 2020–2025

Edited by Daisy Maryon, Stesha A. Pasachnik, Charles R. Knapp, Tom W. Brown and Tandora D. Grant
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Edited by Daisy Maryon, Stesha A. Pasachnik, Charles R. Knapp, Tom W. Brown and Tandora D. Grant
# Table of Contents

**Endorsement**

**Foreword**

**Executive Summary**

**Acknowledgements**

**Acronyms**

1 **Introduction**

2 **Species Assessment**
   2.1 **Taxonomy**
   2.2 **Status**
   2.3 **Description**
   2.4 **Natural History**
   2.5 **Conservation Issues**
   2.6 **Conservation Actions Implemented**
   2.7 **Research Conducted**
   2.8 **Strategic Planning SWOT Analysis**

3 **Goals, Objectives, and Action Steps**
   **Goal 1:** Make Útila spiny-tailed iguanas a flagship species
   **Goal 2:** Monitor iguana populations over the long-term
   **Goal 3:** Create protected areas for wildlife
   **Goal 4:** Ensure the protection of Útila spiny-tailed iguanas
   **Goal 5:** Create a network of local landowners/managers
   **Goal 6:** Implement biosecurity and invasive species control
   **Action Plan Overview**

**Bibliography**

**Participants**
ENDORSEMENT

18 June 2020
Útila, Bay Islands

The Bay Island Conservation Association (BICA) was founded in 1990 by residents of the Bay Islands, Honduras, to initiate and coordinate efforts to protect the fragile and natural resources of the islands. BICA is a collaborating agency with the Honduran Government, mandated to implement enforcement of environmental protection and management laws through active monitoring and litigative measures with the Bay Islands. BICA has three regional chapters, representing each of the three main Bay Islands. The Útila chapter is especially concerned with the health and well-being of Útila spiny-tailed iguanas (Ctenosaura bakeri) as it is facing substantial and ever-growing pressure on the island and represents one of the most threatened endemic species on Útila.

BICA is pleased to support the Útila spiny-tailed iguana (C. bakeri) conservation action plan 2020–2025. This plan was developed in close collaboration with numerous local and regional stakeholders and international experts in November 2019. Their collective expertise on iguana biology, conservation, and local abilities and obstacles makes this plan a significant and achievable goal. Many of the actions outlined within this plan are top priority conservation measures for Útila and can complement and enhance existing programmes on Útila. Several members of BICA contributed to this plan and have reviewed the final product. We are willing and eager to make every effort to see the actions outlined within the plan through to fruition.

BICA is hopeful that this plan will be used to help guide conservation, management, and education initiatives and serves as the framework to ensure the long-term survival of this species, making it an icon for the natural wonders of Útila.

Edoardo E. Antúnez
Executive Director
Bay Islands Conservation Association Útila
FOREWORD

Honduras is rich in fauna and flora and is located within the Mesoamerican biodiversity hotspot. Three hundred and twenty-five species of reptiles are found in Honduras, including 107 endemic species. Forty-three reptile species found in Honduras are placed in a Threatened category (Vulnerable, Endangered or Critically Endangered) according to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™ criteria. This includes four narrow-range endemic iguana species of the genus *Ctenosaura*, three of which occur separately on the Bay Islands of Útila, Roatán, and the Cayos Cochinos archipelago.

The herpetofauna of the Bay Islands is highly diverse for a relatively small area. Sixty-five species are recorded within this archipelago, 46 of which are present on Útila. Útila has the greatest species diversity of the major Bay Islands (Útila, Roatán and Guanaja), despite being the smallest in size. The Bay Islands archipelago contains nearly 19% (eight species) of all the Endangered species in Honduras, including three endemic *Ctenosaura* species. Many of these Bay Islands species are threatened by destruction of natural habitat for agriculture or tourism-related development.

*Ctenosaura bakeri* (Stejneger, 1901), the Útila spiny-tail iguana, is a Critically Endangered species, endemic to the island of Útila (41 km²). These iguanas are restricted to mangrove and adjacent coastal areas with an area of occupancy of approximately 6.5 km², giving it one of smallest ranges of any iguana species. Due to the iguana’s predominate habitat niche of mangrove forests, it is known locally as the swamper. The total population is estimated at less than 8,000 individuals, and although populations of *Ctenosaura bakeri* remain presently connected, increasing development and fragmentation across the island may cause declines, and/or restrict migration corridors through regions of appropriate habitat.

The IUCN Species Survival Commission (SSC) Iguana Specialist Group (ISG) held their annual meeting on Roatán, Bay Islands, Honduras, in November 2019. This meeting included an overnight field trip to Útila to meet with experts, non-governmental organisations (NGOs), local stakeholders and members of the community. The field trip was followed by a two-day workshop on Roatán to develop this Útila spiny-tailed iguana conservation action plan. The goals of this plan are to highlight the actions needed to protect the iguanas and their habitat, while promoting the iguana as a symbol of conservation and pride for the people of Útila. Presented in this plan are education and outreach activities, long-term monitoring actions, nature reserve and protection designation needs, and invasive species control efforts. This plan is designed to inform management and focus funding efforts on priority actions, while also raising awareness and increasing protection for Útila spiny-tailed iguanas. Such an initiative can only be implemented successfully with the support and participation of all stakeholders working together with the common goal to save this unique Honduran species.

Daisy F. Maryon
Project Coordinator
Kanahau Wildlife and Conservation Organisation
EXECUTIVE SUMMARY

The Útila spiny-tailed iguana, *Ctenosaura bakeri* (Stejneger, 1901), is a Critically Endangered iguana endemic to the island of Útila, in the Bay Islands archipelago of Honduras. The species occurs almost exclusively in the highly dynamic mangrove habitat on Útila (Gutsche, 2005), and is threatened by the encroachment of anthropogenic activities, as habitat destruction and development continue across the island. *Ctenosaura bakeri* has been protected by Honduran national law since 1994 and is included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 2010. Yet, despite these preventive measures, poaching of this species and destruction of its natural environment is ongoing.

Following federal protection granted in 1994, natural history and long-term monitoring was initiated. In 1997, a captive breeding and headstart programme was developed on Útila. More recently, research on conservation genetics, reproduction, habitat selection, population density and body condition has been undertaken; however, further research is required to understand in-depth aspects of the biology and natural history of the species, as well as the consequences of various emerging threats. Environmental education programmes and community events have been established on the island, and these small-scale efforts have been considered successful in raising local awareness for the plight of *Ctenosaura bakeri* on the island. Community support needs to be maintained through continued outreach and campaigns by local institutions and stakeholders.

Bringing together local and international expertise, this 5-year action plan communicates a series of steps and goals designed to facilitate the conservation management of Útila spiny-tailed iguanas. We intend to secure long-term funding to implement this plan from a variety of international grants, supplemented with contributions from local organisations and donors. Experts and members of the IUCN SSC Iguana Specialist Group will provide advice and guidance and support efforts to obtain funding and implement the plan; however, ultimately, the long-term conservation of the iconic swamper iguana relies on the active involvement and collaboration of the local community, island NGOs, local municipal authorities and law enforcement.

To ensure the development of appropriate and the most likely effective management strategies, local stakeholders received open invitations to be involved in the development of this management plan. Community involvement was essential to decipher the most realistic and effective species management strategies, that can be socially adopted readily among the local community, with the indefinite goal of ensuring continued conservation of this species and minimising anthropic impacts.
ACKNOWLEDGEMENTS

This conservation action plan was developed during a workshop held from 7–8 November 2019, on Roatán, Honduras, in conjunction with the IUCN SSC Iguana Specialist Group annual meeting. The plan was previously discussed with local stakeholders on Útila on 6 November 2019. We thank all the individuals and organisations involved for their contributions to this plan, as well as the grants actively funding our research and intended goals.

Workshop facilitators: Karen Goodrowe and Charles R. Knapp
Workshop documentation: Daisy F. Maryon, Tom W. Brown and Andrea M. Martínez
Coordinators for publication: Stesha A. Pasachnik and Tandora D. Grant

Instituto de Conservación Forestal
IUCN SSC Iguana Specialist Group
Kanahau Wildlife Conservation Organisation
Bay Islands Foundation
Bay Islands Conservation Association
Municipalidad de Útila
Grupo de Investigación de Reptiles y Anfibios de Honduras
John G. Shedd Aquarium
Fort Worth Zoo
San Diego Zoo Wildlife Alliance
Jacksonville Zoo and Gardens
International Iguana Foundation
Red Mesoamericana y del Caribe para la Conservación de Anfibios y Reptiles
IUCN SSC Conservation Planning Specialist Group
**ACRONYMS**

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1 INTRODUCTION

The overall goal of this action plan is to “Protect the Útila spiny-tailed iguana and its habitat, utilize the iguana as a flagship species for conservation, and promote the iguana as a symbol of pride for the people of Útila.” To realise this, education and outreach must be strengthened, and the people of Útila encouraged to become ambassadors for the iguana’s survival. An effective management plan should be implemented with the collaboration of local and international conservation groups, citizens, government bodies, and stakeholders on Útila.

Útila spiny-tailed iguanas (Ctenosaura bakeri) are endemic to the island of Útila, located in the Bay Island archipelago off the Caribbean coast of Honduras. Útila is the smallest and westernmost of the three major Honduran Bay Islands (Útila, Roatán, and Guanaja), adjacent to the Cayos Cochinos archipelago. Of the three major islands, Útila is positioned closest to the mainland, located approximately 32 km NNW from the city of La Ceiba in the Honduran department of Atlántida (Figure 1).

Figure 1. Map of Honduras, highlighting the island of Útila in the Bay Islands archipelago. Adapted from http://d-maps.com

Ctenosaura bakeri is associated primarily with heterogeneous strands of fringing mangrove habitat and to a lesser extent coastal and hardwood forests. Based on spatial land cover analysis (using 2017 Landsat8), approximately 6.5 km² (16%) of Útila is classified as mangrove habitat. While Ctenosaura bakeri spend the majority of their lives in mangrove swamps, females migrate to beaches or other available sandy areas to nest. Consequently, this species requires both habitats, and connectivity between them to sustain a viable population.

Útila spiny-tailed iguanas are listed as Critically Endangered on the IUCN Red List. They are threatened due to habitat degradation, hunting and predation by invasive species. Habitat loss and degradation are the primary threats to Ctenosaura bakeri, as its preferred mangrove and beach habitats are prime areas for development. These areas are also inundated with plastic pollution. Domestic, feral, and invasive mammals pose a significant risk to all life stages of Ctenosaura bakeri throughout its range. Although Ctenosaura bakeri
has been federally protected since 1994, hunting remains a common threat to this species, as enforcement is rare.

Two local organisations that actively study and educate the public on *Ctenosaura bakeri* include the Iguana Breeding and Research Station (managed by the Bay Islands Foundation) and the Kanahau Útila Research and Conservation Facility (managed by Kanahau Wildlife Conservation Organisation). Vital natural history and demographic data have been collected since 1994 and demonstrate a decreasing population trend as well as a reduction in the number of females and suitable habitat. In addition to research, conservation measures include a headstart facility at BIF and a joint education and outreach programme.

Although education and outreach activities have been in effect over the last 22 years, these should be improved to strengthen an understanding of the importance of biodiversity conservation in the community. In addition, there is the potential for ecotourism to play a key role in protecting this species. Nature tours currently exist, focusing on whale sharks and other marine animals. Leveraging this existing platform would help expand nature tours to showcase the terrestrial wildlife and landscapes of the island (e.g., Knapp, 2007). These tours would provide education incentives to the local community, increase international support for the species, and provide alternative income for former hunters. Further, creating a reserve specifically for the iguanas and ecotourism ventures could further support alternative livelihoods for the community in the form of rangers and guards.

The opportunity to make Útila spiny-tailed iguanas a flagship species for conservation exists on Útila (Brown & Maryon, 2019, and it is the hope that this plan will help to cultivate this idea. Given the presence of two NGOs actively working to protect this species through research, education, and community participation, there is a strong base from which to expand. Targeting increased education and community awareness efforts, exploring habitat protection by land purchase, strengthening collaborative research and monitoring programmes, and ensuring rigorous law enforcement are key to developing a successful conservation action plan for this species.
2 SPECIES ASSESSMENT

2.1 TAXONOMY

*Ctenosaura bakeri* (Figure 2) was first described in 1901 (Stejneger). This species is part of the *Ctenosaura palearis* genetic clade (Pasachnik et al., 2010). It is sometimes referred to in the literature as *Enyaliosaura bakeri*. The common names for this species include: Útila spiny-tailed iguanas, Baker’s spiny-tailed iguanas, swamper, wishiwilly, garrobo (Spanish), and Útila leguan (German).

![Figure 2](image-url)
2.2 Status

*Ctenosaura bakeri* is listed as Critically Endangered on the IUCN Red List (Maryon et al., 2018). The species is endemic to Útila with an extent of occurrence of 41 km². They are restricted to mangrove and adjacent coastal areas estimated at 6.5 km² (D. Maryon unpublished data 2019). Recent analyses suggest the population size is between 4,500 and 7,700 individuals (D. Maryon unpublished data 2019). *Ctenosaura bakeri* is included in CITES Appendix II and protected under Honduran national law. However, national regulations have delivered very little protection, due to a lack of enforcement. The population has been severely affected by harvesting for human consumption (Köhler, 1994; Gutsche, 2006; Pasachnik, 2006; Gustche & Streich, 2009; Pasachnik et al., 2012; Maryon et al., 2018). Effects of this practice are exacerbated by hunters specifically targeting gravid females, and thus dramatically impacting annual reproduction (Pasachnik et al., 2012).

2.3 Description

Útila spiny-tailed iguanas are grey, black, and blue in colour, with a bright turquoise colouration exhibited in males during the breeding season. The species is sexually dimorphic with males having large dorsal spines that they can erect during territorial displays (Figure 2c). Females have dorsal spines which are generally much smaller. Males reach up to 400 mm in snout-vent length (SVL) and weigh up to 1 kg. Females reach a maximum SVL of 225 mm and a maximum weight of 450 g (Pasachnik et al., 2012; D. Maryon unpublished data).

2.4 Natural History

Útila spiny-tailed iguanas are found primarily in mangrove forests and vegetated sandy shores, though occasionally they can be found in disturbed areas such as coastal/beachfront developments and gardens. They are typically most active during the morning, when adults can be seen basking up to 15 m above ground in black (*Avicennia germinans*), white (*Laguncularia racemose*), and red (*Rhizophora mangle*) mangrove trees, as well as on the ground. Individuals are commonly observed hiding in the hollows of black and white mangrove trees, which they use as retreats. Juveniles occur in both small and large mangrove trees, on the mangrove forest floor, and within coastal beach vegetation shortly after hatching (Schulte & Köhler, 2010; Maryon et al., 2018). Natural predators of juveniles and adults include numerous birds (e.g., *Quiscalus mexicanus*) and snakes (e.g., *Boa imperator*) (Gutsche, 2005; Maryon et al., 2020b), as well as the larger congener *C. similis* (Maryon et al., 2020a). Where possible, *Ctenosaura bakeri* will make special use of mangrove roots and lagoons by diving into them and swimming or submerging themselves to avoid predation (Maryon et al., 2018).

The main breeding season occurs from January to late July and mating occurs on or near the ground in the mangrove forests. Females then migrate from the mangroves to beachfronts to nest in a variety of areas, including those with full sun exposure, under piles of leaf litter and oceanic plastic, beneath large beachfront trees, and within short shrub vegetation (Maryon et al., 2018). Nesting takes place from February to August. Female clutch sizes range between 11 to 16 eggs in nests that can be up to 1.25 m long and 60 cm deep (Gutsche, 2006; Maryon et al., 2018). Double-clutching has been observed in some individuals (Maryon et al., 2018). The incubation period is approximately 85 days and hatching occurs from April through October. Upon emerging, hatchlings seem to spend several days inhabiting coastal vegetation before dispersing into the mangrove forests, where they are often found in volcanic coralline rocks and on the branches of larger trees (Maryon et al., 2018).
2.5 Conservation issues

The primary threat to Útila spiny-tailed iguanas is habitat loss due to mangrove degradation, deforestation, and fragmentation attributable to infrastructure development for the tourism industry, and more recently for access to plantations, and shrimp and fish farms (Figure 3a). Mangrove forest habitats are used as garbage dumping sites, and there is a potential risk posed by water contamination from terrestrial landfills and agricultural chemicals (fertilisers and pesticides). Oceanic and local pollution (plastics, polystyrene, etc.) cover sandy beaches, affecting prime nesting sites by obscuring laying sites and potentially affecting incubation temperatures. Mangroves near developed areas and roads are also becoming isolated from their water sources, causing the trees to die and leaving large patches of dead mangrove in dry lagoons (Figure 3b). Natural beach habitat is being lost through the removal of vegetation in preparation for development (Figure 3c), and remote nesting sites are littered heavily by oceanic plastic debris (Figure 3e). This, coupled with the introduction of invasive alien plants, is making beach habitat increasingly unsuitable for egg laying (Maryon et al., 2018). In addition, as mangrove habitat is lost across the island, hybridisation with Ctenosaura similis may increase as the range of the two species progressively overlap, increasing the likelihood of congeneric encounters and genetic swamping by C. similis (Maryon et al., 2020a).

Invasive alien predators such as rats, free-roaming dogs, and cats threaten this species due to predation of adults, hatchlings, and eggs. Cattle have been observed trampling over nests and may become more prevalent in the future pending agricultural expansions (Maryon et al., 2018). Northern raccoons (Procyon lotor) are present and have dispersed across the entire island. They are responsible for nest, juvenile, and possibly adult predation (Maryon et al., 2018; Figure 3d).

The iguana population has also been severely affected by hunting for human consumption. Females containing eggs are a preferred traditional delicacy, especially throughout the Easter period. From 2006 to 2011, the sex ratio of iguanas became increasingly more male-biased, which may be indicative of increasing hunting pressure on adult females (Pasachnik et al., 2012). Iguanas are sought year-round and are sold both locally and on the adjacent mainland (Pasachnik et al., 2012).

Iguana is a common food source on Útila, being considered a cultural and traditional meal, especially during Easter. During this time, it is customary to capture and cook gravid females of all iguana species present on the island (i.e., Iguana iguana, Ctenosaura similis, and Ctenosaura bakeri); however, Ctenosaura bakeri is considered a local delicacy and are notably easier to catch than the alternative species due to their tendency to rely on camouflage rather than a flight response. Hunting is widespread and even takes place within the federally protected Turtle Harbour Wildlife Refuge.
2.6 Conservation actions implemented

*Ctenosaura bakeri* was first listed on the IUCN Red List in 2004 (Zoerner & Köhler) as Critically Endangered due to its small range. The latest assessment (Maryon et al., 2018) confirms this Critically Endangered status due to the small range, increasing habitat destruction, and inferred decreasing population size. The species has been included in Appendix II of CITES since 2010 and they have been protected by Honduran national law since 1994. Unfortunately, enforcement of the local laws is inadequate.

One protected area, Turtle Harbour Wildlife Refuge, is currently designated on Útila. The reserve consists primarily of neotropical savannah and contains only 1.6 km² of habitat suitable for *Ctenosaura bakeri*. The protected area is managed in part by NGOs (i.e., BICA, BIF) on the Bay Islands which make up the Co-managers of the Bay Islands Marine Park. Due to lack of funding, the refuge interior receives little patrolling by rangers. Two local NGOs, Kanahau and BIF, work to protect the iguanas by conducting research and raising...
awareness in the local community. Education and outreach efforts (Figure 4), include an environmental education school programme facilitated by BICA, training of ex-poachers as field guides, outdoor nature clubs (e.g., Kanahau School of Nature, BIF Ecoleaders, small-scale ecotours), community outreach events, and documentary films. There is also a breeding and headstart programme implemented by BIF since 1997.

![Figure 4. A) Iguana survey outreach activity with Kanahau School of Nature students. B) “Iggy” the recycling swamper float from Útila Carnival (see Brown & Maryon, 2019). Photographs © Daisy Maryon](image)

### 2.7 Research Conducted

Quantitative information on population ecology and natural history began in 1994, while more intensive research programmes started in the mid-2000s. Research has focused on population assessments using a combination of line transects and capture-mark-recapture, parasite documentation, hybridisation, phylogenetics, nesting behaviour, home range, and habitat utilisation.
**Table 1.** Research conducted on *Ctenosaura bakeri* since the establishment of long-term research projects in 1994. Time period refers to when the work was conducted, not published, if known.

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2.8 STRATEGIC PLANNING SWOT ANALYSIS

Factors are assessed here for Útila spiny-tailed iguanas as of June 2020.

2.8.1 STRENGTHS
- Tourism on Útila is already nature-based
- Established research and monitoring programme; stakeholders possess natural history and distribution data
- Captive breeding and headstart programmes exist, with an opportunity to expand
- Mangrove habitat protected by law
- Wildlife refuge containing some suitable habitat exists
- Some private landowners willing to protect wildlife
- Laws protecting the iguanas are in place

2.8.2 WEAKNESSES
- Iguanas are restricted to a small portion of the island and specific habitats
- Lots of private land, with disputes over ownership in some cases
- Destruction of mangrove and beach habitat prevalent
- Species protection laws not enforced
- Lack of funding for consistent patrolling of protected area results in no truly protected areas

2.8.3 OPPORTUNITIES
- Ecotourism by local tour operators
- Existing education programmes
- Invested, local NGOs working to conserve Ctenosaura bakeri
- Potential for privately protected reserves

2.8.4 THREATS
- Invasive mammals (racoons, cats, dogs, cattle, rats)
- Opportunistic and dedicated hunting, focusing on females and eggs during the breeding season
- Commercial sale of iguana meat locally and for export to mainland Honduras
- Habitat loss and modification of vital areas
- Pollution of optimal habitat: mangroves and nesting beaches
- Hybridisation with the congener, common spiny-tailed iguana
3 GOALS, OBJECTIVES, AND ACTION STEPS

The overall goal is to “Protect the Útila spiny-tailed iguana and its habitat, utilise the iguana as a flagship species for conservation, and promote the iguana as a symbol of pride for the people of Útila.”

**GOAL 1.** Convert Útila spiny-tailed iguanas into a flagship species for biodiversity conservation and influence behavioural changes in the community to increase a sense of pride for the iguana.

**OBJECTIVE 1.1.** Increase local awareness of Útila spiny-tailed iguanas and the importance of biodiversity through educational materials, community outreach in local sectors, and integration into existing community activities.

**Action 1.1.1.** Develop and produce novel educational materials, such as videos and posters to be used in schools, and use the newly-published iguana identification booklets.

**Point person/organisation:** Ana D. Sansur (Kanahau), Edoardo E. Antúñez (BICA), Geyvy Delarca Zavala (BIF), Escarleth Godyo (BIF), Jimmy Andino (BIF), Guliano Colosimo (SDZWA), Tandora Grant (SDZWA)

**Funding:** Minimum USD 1,500/year; apply for grants from IIF, MBZ, MAR Fund and other international funding bodies

**Timeline:** 2020

**Action 1.1.2.** Obtain funding to expand the existing iguana outdoor excursion education programme (Kanahau School of Nature, BIF Ecoleaders).

**Point person/organisation:** Ana D. Sansur (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF)

**Funding:** USD 100/trip (bi-monthly), total = USD 2,600; apply for grants from IIF, MBZ, The Nature Conservancy, and other international funding bodies

**Timeline:** 2020
**Action 1.1.3.** Develop community events focused on iguanas and environmental conservation for all ages to include environmental education, beach clean-ups, iguana awareness day, biodiversity day, and community meetings that create island unity.

**Point person/organisation:** Ana D. Sansur (Kanahau), Geyvy Delarca Zavala (BIF), Escarleth Godoy (BIF), Jimmy Andino (BIF), UMA

**Funding:** USD 400 for each outreach event (e.g. Iguana Awareness Day / World Lizard Day) 2 events/year = USD 800/year. USD 350 for boat trips to take groups during C. bakeri surveys for education. USD 100 for transportation at 12 beach clean-up events/year, plus USD 350 for boat rental to reach inaccessible beaches = USD 1,500/year. International funding bodies as well as canvassing of hoteliers, local businesses, and zoos with interest in iguanas to aid in funding

**Timeline:** 2020

**Action 1.1.4.** Establish annual funding for a local sports team using an iguana theme.

**Point person/organisation:** Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF), UMA, Kanahau

**Funding:** USD 500–800/year depending on how many team members and uniforms needed. Canvas local businesses or individuals and other international funding bodies for support

**Timeline:** 2021, annually thereafter

**Action 1.1.5.** Acquire funding for high school interns interested in conservation to work at BIF / Kanahau / BICA.

**Point person/organisation:** Ana D. Sansur (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF), Edoardo Antúnez (BICA)

**Funding:** USD 2,000/student includes transportation, accommodation, and food at Kanahau. USD 980/student includes accommodation at BIF. Funding to come from international funding bodies, zoos with an interest in the conservation of C. bakeri as well as on-island fundraising events

**Timeline:** 2020

**Action 1.1.6.** Acquire funding for students to have an opportunity to participate in the Iguanas and Conservation Workshop in Roatán.

**Point person/organisation:** Daisy Maryon (Kanahau)

**Funding:** USD 1,000/student. Canvas local businesses or individuals and other international funding bodies for support

**Timeline:** 2021 (annual scholarship)

**Action 1.1.7.** Engage international conservation organisations to develop and implement iguana pride campaigns for the swamper.

**Point person/organisation:** Daisy Maryon (Kanahau), Jimmy Andino (BIF), UMA

**Funding:** N/A

**Timeline:** 2021

**OBJECTIVE 1.2.** Increase tourist awareness of Útila spiny-tailed iguanas and their importance to the island to prevent unsustainable tourism activities.

**Action 1.2.1.** Develop and produce educational materials to be distributed to tourists, including iguana booklets (authored by Elaine Powers and already...
distributed), leaflets, stickers, and brochures. These materials should be
distributed to airlines, ferries, and island accommodations, etc.

**Point person/organisation:** Ana D. Sansur (Kanahau), Geyvy Delarca Zavala
(BIF), Jimmy Andino (BIF)

**Funding:** TBD depending on materials developed. Funding to come from
international funding bodies and local businesses with interest in
conserving iguanas

**Timeline:** 2020

**Action 1.2.2.** Identify locations where materials (booklets, leaflets, posters)
can be distributed and ensure materials are readily available.

**Point person/organisation:** UMA

**Funding:** N/A

**Timeline:** 2020

**Action 1.2.3.** Expand marketing of ecotourism activities surrounding iguanas
and terrestrial biodiversity.

**Point person/organisation:** Junior Williams (local tour operators), Daisy
Maryon (Kanahau), Tom W. Brown (Kanahau), UMA, Office of Tourism

**Funding:** N/A

**Timeline:** 2020

**Action 1.2.4.** Develop additional iguana-themed souvenirs at the Útila
Handmade Cooperative, including hats, carved wood, etc.

**Point person/organisation:** UH Cooperative, Útila women’s artisan group

**Funding:** Crowdfunding, raffle, auctions for seed money

**Timeline:** 2020

**Action 1.2.5.** Write a conservation story about Útila wildlife focusing on
Ctenosaura bakeri to post in an airline magazine.

**Point person/organisation:** Daisy Maryon (Kanahau)

**Funding:** N/A

**Timeline:** 2021

**Action 1.2.6.** Build capacity for tours through training nature guides to lead
nature and conservation tours across the island. Training to include species
identification, basic survey skills, and customer service to work with local
tour operators and NGOs.

**Point person/organisation:** Tom W. Brown (Kanahau)

**Funding:** N/A

**Timeline:** 2021

**Action 1.2.7.** Find, recruit, and establish a national influencer to speak on
behalf of iguanas in order influence politicians and community stakeholders.

**Point person/organisation:** Edoardo E. Antúnez (BICA), José Mario Solis
(GIRAH)

**Funding:** N/A

**Timeline:** 2020
GOAL 2. Continue to research and monitor long-term population trends and life history as well as explore precautions for population decline.

OBJECTIVE 2.1. Continue systematic surveys across the range of the species to document population density, fluctuations and habitat loss, and to identify important nesting locations to aid in decision-making for protected habitats.

Action 2.1.1. Monitor *Ctenosaura bakeri* populations across Útila.
*Point person/organisation:* Kanahau and BIF collaboration
*Funding:* Apply for grants from IIF, MBZ, CMF, FFI, MAR Fund, and other international funding bodies
*Timeline:* 2020

Action 2.1.2. Search for new *Ctenosaura bakeri* populations and suitable habitat across west and central Útila.
*Point person/organisation:* Kanahau and BIF
*Funding:* Apply for grants from IIF, MBZ, FFI, and other international bodies
*Timeline:* 2020

Action 2.1.3. Gain a better understanding of reproductive timing and behaviour of *Ctenosaura bakeri*.
*Point person/organisation:* Daisy Maryon (Kanahau), Tom W. Brown (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF)
*Funding:* Apply for grants from IIF, FFI, and other international funding bodies; funding amount TBD per actions needed
*Timeline:* 2020

Action 2.1.4. Explore systematic captive breeding with a pedigree studbook.
*Point person/organisation:* BIF to collaborate with Tandora Grant (SDZWA)
*Funding:* N/A
*Timeline:* 2020

OBJECTIVE 2.2. Monitor emerging threats to the survival of *Ctenosaura bakeri* and explore how those threats can be extinguished.

Action 2.2.1. Continue to investigate how invasive predators are affecting *Ctenosaura bakeri* populations and determine if there is a human health issue (rabies from other species). Continue raccoon removal discussions and planning with Island Conservation and local NGOs.
*Point person/organisation:* Daisy Maryon (Kanahau), Tom W. Brown (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF)
*Funding:* Volunteer work from graduate students, in-country and international universities, UNAH. Funding for research permits and equipment to come from international funding bodies
*Timeline:* 2020

Action 2.2.2. Monitor habitat destruction and assess the impacts on *Ctenosaura bakeri*.
*Point person/organisation:* Daisy Maryon (Kanahau), Tom W. Brown (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF)
*Funding:* TBD depending on expenses and equipment needed. Funding can be applied for from ZOLITUR and international funding bodies
*Timeline:* 2020
**Action 2.2.3.** Investigate the importance of *Ctenosaura bakeri* consumption for the locals.

**Point person/organisation:** Daisy Maryon (Kanahau), Tom W. Brown (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF)

**Funding:** Volunteer work from graduate students, universities, ISG members. Funding to come from international funding bodies

**Timeline:** 2020

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**GOAL 3. Create protected areas for wildlife.**

**OBJECTIVE 3.1.** Locate areas of interest with suitable habitat and nesting grounds for protection of habitat.

**Action 3.1.1.** Identify landowners of Gibson’s Bay, Aljah’s Channel, Don Quickset, and other areas of interest to gauge interest in selling, leasing, or donating land for conservation; to include formal or informal protected areas designations for wildlife and habitats.

**Point person/organisation:** Daisy Maryon (Kanahau), UMA

**Funding:** N/A

**Timeline:** 2020

**Action 3.1.2.** Identify owners of high conservation value land; encourage and inspire them to protect parts of their properties for the conservation of iguanas. Provide a certificate of good conservation practice signed by local NGOs to participating parties.

**Point person/organisation:** Kanahau

**Funding:** N/A

**Timeline:** 2021

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**OBJECTIVE 3.2.** Acquire funding to create and manage a protected area that will become self-sustaining after five years.

**Action 3.2.1.** Investigate and secure funding for land purchase.

**Point person/organisation:** Daisy Maryon (Kanahau)

**Funding:** USD 419,000 to buy land at Gibson’s Bay (e.g.). Contact and work with Rainforest Trust (in progress), Honduran Conservation Coalition, and other international funding bodies to acquire funds

**Timeline:** 2020

**Action 3.2.2.** Investigate and secure funding for ranger patrols.

**Point person/organisation:** Daisy Maryon (Kanahau)

**Funding:** USD 5,000/year/ranger. Apply to international funding bodies for support

**Timeline:** 2021 (5-year plan to begin within one year of reserve creation)

**Action 3.2.3.** Investigate and secure funding for boat patrols and boat maintenance.

**Point person/organisation:** Daisy Maryon (Kanahau) and Edoardo E. Antúnez (BICA)

**Funding:** Secure boat funding from international funding bodies

**Timeline:** 2023 (1–2 years after creation of reserve)
OBJECTIVE 3.3. Submit declaration of a site of importance for wildlife in need of protection to ICF, either as a private forest reserve or a site of wildlife importance.

Action 3.3.1. Determine the origin of potential reserve (privately-owned or national land) and determine assessment requirements.

Point person/organisation: Kanahau, ICF
Funding: N/A
Timeline: 2021

Action 3.3.2. Present declaration request to ICF, to officially recognise land as private forest reserve or site of wildlife importance.

Point person/organisation: Daisy Maryon (Kanahau). If land is private, owner to submit. If land is national, UMA to submit
Funding: N/A
Timeline: 2021

GOAL 4. Ensure that current laws protecting Útila spiny-tailed iguanas are enforced.

OBJECTIVE 4.1. Ensure transparency and accountability of environmental laws.

Action 4.1.1. Review announcements for environmental licence requests in newspapers to ensure projects on Útila are being developed according to the environmental licencing process of “MiAmbiente” and proceed to obtain an environmental licence.

Point person/organisation: Kanahau
Funding: USD 500. Apply to international funding bodies for support
Timeline: 2020

Action 4.1.2. Investigate and coordinate with international environmental NGO Law and Policy divisions to determine opportunities for legal action.

Point person/organisation: Damion Whyte (UDC Jamaica), Ana D. Sansur (Kanahau), Jimmy Andino (BIF)
Funding: N/A
Timeline: 2020

OBJECTIVE 4.2. Work with federal and local officials to demonstrate the need and importance of enforcement.

Action 4.2.1. Identify the federal and local individuals in charge of enforcement.

Point person/organisation: UMA
Funding: N/A
Timeline: 2020

Action 4.2.2. Create a training video and associated short quiz used when new authorities (e.g., police officers, navy personnel, government officials) are stationed on Útila to ensure that they understand current laws and importance of enforcing the laws.

Point person/organisation: Edoardo E. Antúnez (BICA), Ana D. Sansur (Kanahau), Jimmy Andino (BIF)
Funding: USD 800. Apply to international funding bodies for support
Timeline: 2021
**Action 4.2.3.** Provide structured and mandatory training sessions to continually educate law officials regarding species identification, their ecological importance, and other environmental issues.

**Point person/organisation:** Edoardo E. Antúnez (BICA), Ana D. Sansur (Kanahau), Jimmy Andino (BIF), UMA

**Funding:** USD 2,400 at 5 sessions/year, total = USD 12,000. Apply to international funding bodies for support

**Timeline:** 2021

**OBJECTIVE 4.3.** Ensure the means to execute existing environmental laws.

**Action 4.3.1.** Increase police presence in mangroves and beach areas during nesting season.

**Point person/organisation:** Útila Municipality police, UMA

**Funding:** USD 2,400. Apply to international funding bodies for support

**Timeline:** 2021

**Action 4.3.2.** Establish anonymous fund to prosecute poachers.

**Point person/organisation:** Edoardo E. Antúnez (BICA), Ana D. Sansur (Kanahau), UMA

**Funding:** USD 900 twice/year, total = USD 1,800. Apply to international funding bodies for support

**Timeline:** 2021

**Action 4.3.3.** Promote existing, anonymous means to report illegal activity via telephone.

**Point person/organisation:** Edoardo E Antúnez (BICA), Ana D. Sansur (Kanahau)

**Funding:** N/A

**Timeline:** 2020

**Action 4.3.4.** Develop an anonymous cell phone application (“app”) for reporting illegal activities.

**Point person/organisation:** Cayle Pearson (Jacksonville Zoo), Edoardo E. Antúnez (BICA), Ana D. Sansur (Kanahau)

**Funding:** USD 3,000. Apply to international funding bodies for support

**Timeline:** 2023

**Action 4.3.5.** Ensure the firefighter tax rate is used for conservation officers to provide extra support for wildlife patrols.

**Point person/organisation:** UMA

**Funding:** N/A

**Timeline:** 2021

**Action 4.3.6.** Allow a provision of community service with local NGOs (e.g., habitat restoration, beach cleaning, recycling), instead of paying a fine for breaking environmental laws.

**Point person/organisation:** UMA

**Funding:** N/A

**Timeline:** 2021
Action 4.3.7. Investigate the potential to acquire an on-island prosecutor for Útila to prosecute those committing environmental and other crimes on the island.

**Point person/organisation:** Edoardo E. Antünez (BICA), Jimmy Andino (BIF), UMA, Ana D. Sansur (Kanahau)

**Funding:** N/A

**Timeline:** 2021

Action 4.3.8. Increase fines for hunting iguanas in breeding season.

**Point person/organisation:** UMA

**Funding:** N/A

**Timeline:** 2021

Action 4.3.9. Implement fines for anyone caught with iguana meat to include restaurants and social media posts.

**Point person/organisation:** UMA

**Funding:** N/A

**Timeline:** 2021

**GOAL 5.** Formalize a network of NGOs, government organisations, and local community stakeholders (landowners, government, and business owners) that work together to protect local wildlife.

**OBJECTIVE 5.1.** Formalize a network of existing organisations involved in *Ctenosaura bakeri* protection.

Action 5.1.1. Create a communication platform for information sharing across the Bay Islands, including expanding existing communication platforms, to share information and acknowledge accomplishments. Examples are WhatsApp groups and email listservs.

**Point person/organisation:** Ana D. Sansur (Kanahau), Jimmy Andino (BIF)

**Funding:** N/A

**Timeline:** 2020

Action 5.1.2. Ensure efforts are not duplicated between groups and that data collection schemes are followed collaboratively by creating a memorandum of understanding between Kanahau and BIF.

**Point person/organisation:** Daisy Maryon (Kanahau), Ana D. Sansur (Kanahau), Geyvy Delarca Zavala (BIF), Jimmy Andino (BIF)

**Funding:** N/A

**Timeline:** 2020

Action 5.1.3. Identify external experts to join the Útila Environment Committee to provide guidance as needed in supporting *Ctenosaura bakeri* programmes.

**Point person/organisation:** Ana D. Sansur (Kanahau)

**Funding:** N/A

**Timeline:** 2020

Action 5.1.4. Promote reciprocal acknowledgement of shared goals and efforts of NGOs and government towards developing deeper collaboration and unity among Útila stakeholders for iguana conservation. For example,
GOAL 6. Develop and implement biosecurity and invasive species control protocols for Útila towards eradicating invasive species and mitigating threats of new introductions.

OBJECTIVE 6.1. Develop and implement a long-term plan to eradicate invasive raccoons and other predatory invasive species on Útila, using a science-based management approach.

Action 6.1.1. Continue to investigate and adapt eradication protocols for non-native species with Municipal and National protocols, specifically targeting raccoons. Prepare the eradication protocol in a written document and submit to the ICF branch of government for their approval and modification.

Point person/organisaton: Edoardo E. Antúnez (BICA), Geyvy Delarca Zavala (BIF), Ana D. Sansur (Kanahau), Daisy Maryon (Kanahau), Tom W. Brown (Kanahau), ICF, UMA, Charles Knapp (Shedd), Glenn Gerber (SDZWA), Sophie O’Hehir (DOE)

Funding: N/A
Timeline: 2020

OBJECTIVE 6.2. Prevent threats of new, non-native and invasive species introductions.

Action 6.2.1. Investigate and adapt existing biosecurity protocols from Island States and the IUCN SSC Invasive Species Specialist Group. Prepare a written document and submit to the government.

Point person/organisation: Edoardo E. Antúnez (BICA), Jimmy Andino (BIF), Geyvy Delarca Zavala (BIF), Ana D. Sansur (Kanahau), Iris Acosta (ICF), UMA, Glenn Gerber (SDZWA), Charles Knapp (Shedd), Sophie O’Hehir (DOE), Útila Crab Committee

Funding: N/A
Timeline: 2020
<table>
<thead>
<tr>
<th>Action</th>
<th>Project Steps</th>
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<tbody>
<tr>
<td>1</td>
<td>Make Útila spiny-tailed iguanas a flagship species.</td>
</tr>
<tr>
<td>1.1.1</td>
<td>Develop and produce educational materials for local schools.</td>
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<tr>
<td>1.1.2</td>
<td>Obtain funding to expand current education programme.</td>
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<td>Develop community events focused on iguanas and biodiversity conservation.</td>
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<td>Obtain funding for local sports teams using an iguana theme.</td>
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<td>Acquire funding for high school interns interested in conservation to work.</td>
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<td>1.1.6</td>
<td>Acquire funding for participants in the iguana conservation workshop on Roatán.</td>
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<td>1.1.7</td>
<td>Develop and implement iguana pride campaigns for swamper.</td>
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<tr>
<td>1.2.1</td>
<td>Develop and produce educational materials to be distributed to tourists.</td>
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<td>1.2.2</td>
<td>Identify locations to distribute and ensure materials are readily available.</td>
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<td>1.2.3</td>
<td>Create ecotourism surrounding iguanas and terrestrial biodiversity.</td>
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<td>1.2.4</td>
<td>Develop additional iguana-themed souvenirs at Útila Handmade Cooperative.</td>
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<td>Build capacity for tours through training nature guides.</td>
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<td>Find, recruit, and establish a national influencer to speak on behalf of iguanas.</td>
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<tr>
<td>2</td>
<td>Monitor iguana populations over the long-term.</td>
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<tr>
<td>2.1.1</td>
<td>Monitor population across Útila.</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Search for new populations.</td>
</tr>
<tr>
<td>2.1.3</td>
<td>Better understand reproductive timing and behaviour.</td>
</tr>
<tr>
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<td>Explore systematic captive breeding with pedigree studbook.</td>
</tr>
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<td>Investigate how invasive predators are affecting <em>Ctenosaura bakeri</em>.</td>
</tr>
<tr>
<td>2.2.2</td>
<td>Monitor habitat destruction and assess impacts.</td>
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<td>2.2.3</td>
<td>Investigate the effects of harvesting for human consumption.</td>
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<td>3</td>
<td>Create protected areas for wildlife.</td>
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<td>Identify landowners with interest in selling, leasing, or donating land for conservation.</td>
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<td>Inspire landowners to protect parts of their property for the conservation of iguanas, provide a certificate of good conservation practice.</td>
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<td>3.2.1</td>
<td>Investigate and secure funding for land purchase.</td>
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<td>3.2.2</td>
<td>Investigate and secure funding for ranger patrols.</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Investigate and secure funding for boat patrols.</td>
</tr>
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<td>4</td>
<td>Ensure the protection of Útila spiny-tailed iguanas.</td>
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<td>4.1.1</td>
<td>Review announcements for environmental licence requests in newspapers.</td>
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<td>Develop a training video to ensure authorities understand the current laws.</td>
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<td>4.2.3</td>
<td>Provide continuous training to law officials.</td>
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<td>4.3.1</td>
<td>Increase police presence in mangroves and beach areas during nesting season.</td>
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BIBLIOGRAPHY

Full text references available here where possible:
https://www.dropbox.com/sh/llj8a1f2syew74u/AADAcb8Bjm7m_z4cZAdBcxGka?dl=0


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Tom W. Brown – Kanahau Wildlife Conservation Organisation, Honduras & Red Mesoamericana y del Caribe para la Conservación de Anfibios y Reptiles

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Giuliano Colosimo – San Diego Zoo Wildlife Alliance, USA

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