



## **The Grand Cayman Blue Iguana**

*Cyclura nubila lewisi*

**Species Recovery Plan 2001 – 2006**

Developed in a workshop held on 11<sup>th</sup>-13<sup>th</sup> November 2001, in Grand Cayman, supported by a grant from the British Government - Foreign & Commonwealth Office, Environment Fund for the Overseas Territories.

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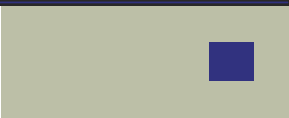


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IUCN-SSC Iguana Specialist Group



International Iguana Foundation



National Trust for the Cayman Islands



Cayman Islands Government

- Department of Environment
- Department of Agriculture
- Department of Environmental Health



Durrell Wildlife Conservation Trust



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## Foreword

The rock iguanas of the West Indies are among the most endangered lizards in the world. Because they are important seed dispersers for native plants, their loss has serious consequences for the health of Caribbean dry tropical forest ecosystems.

The Grand Cayman Blue Iguana, *Cyclura nubila lewisi*, is among the most critically endangered of the group, with no more than a few hundred individuals remaining. For this reason, support for conservation efforts aimed toward recovery of this unique animal have been a high priority of the IUCN Iguana Specialist Group (ISG) since its inception.

In November, 2001, members of the ISG met with local biologists and government officials on Grand Cayman to draft this recovery plan, the purpose of which is to identify and prioritize the activities needed to ensure the long-term survival of the Grand Cayman blue iguana in its natural habitat. With implementation of the steps outlined here, the chances that blue iguanas will remain to delight and inspire future generations of Caymanians and visitors alike look bright indeed.

It is my hope that this carefully formulated strategy will inspire funding agencies and the international conservation community to maintain the support this programme clearly deserves.

**Dr. Allison Alberts**  
**Chair, IUCN Iguana Specialist Group**

## Executive Summary

The critically endangered Blue Iguana is globally unique to Grand Cayman. Urgent wide ranging conservation measures are vital if this Caymanian flagship animal is to be saved from extinction. This document is a detailed plan for such measures, developed by the IUCN Iguana Specialist Group in consultation with the Cayman Islands Government and the National Trust for the Cayman Islands. It covers the period 2001 to 2006, and will be implemented by the National Trust in collaboration with local and international partners.

For the long term survival of the Blue Iguana, a protected area sufficient to support a wild population of 1,000 animals is considered essential. A work plan is detailed to survey the surviving wild Blue Iguana population, and to define a sufficient protected area configuration centered on this population. A planning team will develop a proposed management plan for the area, focusing particularly on its ecotourism potential, and thence seek resources and community support sufficient to establish the protected area.

Enhancements are planned to increase breeding and survival of the small wild Blue Iguana population which has been restored in the QE II Botanic Park. Plans are also specified for the possible introduction of Blue Iguanas to the Barkers Peninsula, in the event that Government declares this a National Park.

Expanded captive breeding and rearing facilities in the QE II Botanic Park are called for, together with improvements in diet and health monitoring. By these means the annual production of Blue Iguana hatchlings will be greatly increased. The expanded facility will be operated by a part time Facility Manager. The facility will be in public view with extensive interpretation, and should serve to enhance visitor interest and satisfaction.

Breeding loan exchanges with carefully selected zoos overseas will be managed to gradually build an overseas captive population, with breeding managed through an international studbook. This ex-situ population will in time become sufficient to safeguard the Blue Iguana in event of a major catastrophe affecting the captive and wild iguanas on Grand Cayman.

A conservation awareness campaign for the Blue Iguana will be conducted throughout Grand Cayman during 2003, and resource materials linked to the National Curriculum will be distributed to schools.

Funding to carry out this wide ranging work will be secured from international grants, sale of Blue Iguana retail products, and private donations including revenue from a sponsor-an-iguana programme. Technical and fund-raising assistance has been pledged by many of the institutions which participated in creation of this plan.



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## Contents

Foreword.....	3
Executive Summary.....	4
Contents.....	5
Species Recovery Plan	
1.1 Current assessment.....	6
1.2 Conservation actions up to 2001.....	7
1.3 Strengths, weaknesses, opportunities & threats.....	7
Overall goal.....	9
Objectives, Specific Results & Action Steps	
3.1 Protected area plan.....	10
3.2 Reintroduction to the Barkers peninsula.....	12
3.3 Reintroduced population in the QE II Botanic Park.....	13
3.4 In situ captive breeding and head-starting.....	15
3.5 Ex-situ captive breeding.....	18
3.6 Education & awareness.....	20
3.7 Plan resources.....	21
Appendix	
4.1 List of workshop participants.....	24
4.2 Contacts.....	25
4.2 Donors.....	27

## Species Recovery Plan 2001 - 2006 for the Grand Cayman Blue Iguana, *Cyclura nubila lewisi*

### 1. Current assessment.

#### 1.1 The Grand Cayman Blue Iguana

1.1.1 Taxonomy. The Grand Cayman Blue Iguana is currently classified as a subspecies of the Cuban Iguana, *Cyclura nubila lewisi* Grant. However genetic studies indicate a species-level divergence between *C. n. lewisi* and *C. n. nubila* on Cuba, opening a debate that the Blue Iguana should be elevated to species status, as *Cyclura lewisi*. The taxon is endemic to the island of Grand Cayman. It is distinct from *Cyclura nubila caymanensis*, a subspecies much closer to *C. n. nubila*, occurring on Little Cayman and Cayman Brac.

1.1.2 Status. The Blue Iguana is critically endangered according to the current IUCN Red List. The population is restricted to the east interior of Grand Cayman, where it was reduced to a critically low density prior to the first survey in 1938. The most recent surveys in 1992-3 indicate a total population in the range 100 to 200 individuals. The range has contracted significantly over the last 20 years, with several sites once populated now showing no signs of wild iguanas.

1.1.3 Natural history. While it is likely that the original population included many animals living in coastal environments, the Blue Iguana now only occurs inland, in natural xerophytic shrubland, and along the interfaces between farm clearings and closed canopy dry forest. The iguanas occupy rock hole retreats, and as adults are primarily terrestrial. Younger individuals tend to be more arboreal.

Like all *Cyclura* species the Blue Iguana is primarily herbivorous, consuming leaves, flowers and fruits from at least 45 different plant species in 24 different families. This diet is rarely supplemented with insects, crabs, slugs and fungi.

Mating occurs in May, and eggs are usually laid in June or July, in nests excavated in pockets of red earth exposed to the sun. Individuals are aggressively territorial at all times of year from the age of about 3 months. The age of sexual maturity is not known in the wild: in captivity breeding usually commences at 4 years.

Hatchlings are preyed upon by the snake *Alsophis cantherigerus*. The adults have no natural predators.

1.1.4 Conservation issues. Habitat destruction is the main factor threatening imminent extinction for this iguana. Land clearance within remnant habitat is occurring both for agricultural purposes, and for real estate development and speculation.

Predation and injury to hatchlings by rats, to hatchlings and sub-adults by feral and semi-domestic cats, and killing of adults by roaming dogs are all placing severe pressure on the remaining wild population. Road kills are an increasing cause of mortality. Trapping and shooting is a comparatively minor concern, but continues despite legal protection and sustained efforts in public awareness.

The Common Iguana, *Iguana iguana*, has become naturalized in Grand Cayman and far outnumbers the endemic Blue Iguana. No direct negative consequences affecting the Blue Iguana are known, but the situation confuses public attitudes and understanding.

## 1.2 Conservation actions implemented up to 2001.

The National Trust for the Cayman Islands commenced a conservation programme for the Blue Iguana in 1990, operating under an Exemption Order to provisions in the Animals Law which otherwise make it illegal to kill, capture or hold iguanas in captivity. The programme has included efforts in public education and awareness, habitat protection, field research, captive breeding, and restocking populations in protected areas.

By November 2001 this programme has achieved:

- a) Sufficient knowledge of the status, biology and ecology of the Blue Iguana to guide initial conservation actions
- b) A substantial level of public awareness about the Blue Iguana
- c) Successful captive breeding sustained over 12 years, with a captive stock maintained around 30 – 40 individuals.
- d) A small restocked population within the Queen Elizabeth II Botanic Park, which began breeding in the wild in 1999 (confirmed in 2001).

## 1.3 Strengths, Weaknesses, Opportunities and Threats.

These factors are assessed here for the Blue Iguana and the current conservation programme, as of late 2001.

### 1.3.1 Strengths

- a) High level of success in captive breeding sustained over years
- b) Substantial breeding / head-starting facility in place
- c) Restocking in the QE II Botanic Park now well advanced, with some wild breeding occurring
- d) Information & experience available from 11 years of field research, habitat restocking and monitoring efforts to date (diet, territorial ranges, habitat requirements, nesting ecology etc)
- e) Closely comparable data available from detailed study of *C. n. caymanensis* on Little Cayman.
- f) High level of international interest leading to substantial funding and technical support
- g) Stable local NGO managing project as a long term, integrated programme including research, captive breeding, restocking, habitat protection and public awareness
- h) Legal protection for the iguana is in place
- i) The Blue Iguana is a popular conservation symbol in the Cayman Islands



### 1.3.2 Weaknesses

- a) Absence of cost-effective techniques for eradication or continuous high-level control of introduced predators
- b) Private ownership and high cost of land affecting habitat protection initiatives
- c) Limited human resources available for management of captive population and wild habitats
- d) Public interest and concern fades easily and requires constant effort in education and awareness
- e) Public attitudes are being confused by proliferation (and localized consumption) of introduced Common Iguanas (*Iguana iguana*) in populated areas.
- f) Nutritional issues remain with captive and possibly with restocked animals
- g) Habitat conversion for iguanas is expensive, and to date largely untried
- h) 60% nest failure rate in restocked population at QE II Botanic Park (2001)
- i) Captive facility is relatively distant from main schools and most volunteers
- j) Poor knowledge of the remnant un-managed wild population
- k) Much of the field research to date remains unpublished

### 1.3.3 Opportunities

- a) The Blue Iguana appears to be adaptable to man-modified habitats
- b) High tourist appeal involving passive interactions which appear harmless to iguanas, can generate incentives to support iguana conservation
- c) Disturbed habitats with potential for conversion to iguana habitat, are available in existing protected areas
- d) The proposed National Park in Barkers may offer coastal habitat highly suitable for restocking, if enacted with appropriate management
- e) Intensively managed large artificial habitats may offer potential as habitats to restock
- f) Large population of *C. n. caymanensis* on Little Cayman offers opportunities for comparative (and “surrogate”) studies to elucidate problems with *lewisii*.
- g) International support for *Cyclura* conservation (zoos, conservation foundations etc) seems likely to be sustained for the near future at least
- h) Restocked population in QE II Botanic Park provides research opportunities linking to involvement and support from academia
- i) New environmental legislation may soon provide stronger legal protection
- j) Possible formal elevation to species endemic (“*Cyclura lewisii*”) may raise conservation ranking

### 1.3.4 Threats

- a) Road kills – both on public highways and within managed habitats
- b) Feral and semi-domesticated predators (rats, cats, dogs)
- c) Ongoing habitat loss stemming from urbanization and associated displacement of agricultural land
- d) Population fragmentation and low iguana population density, leading to stochastic sub-population extinction
- e) Deliberate capture to protect crops, and for illegal trade including international smuggling
- f) Widening of Common Iguana consumption by Central American immigrants, to Blue Iguana consumption (this is a threat which has not yet been realized)



## 2. Overall Goal

“To restore a wild population of the Grand Cayman Blue Iguana sufficient to remain viable in the long term”



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### 3. The Recovery Plan:

#### Objectives, Specific Results & Action Steps

##### 3.1 OBJECTIVE: To establish a protected area in the current range of wild lewisi sufficient to provide for a population of ca. 1,000 individuals

- 3.1.1 Assess East interior xerophytic shrublands for the presence of wild lewisi, its predators and suitable habitat for restocking – by July 2002
- a) Conduct preliminary survey of habitat by end of December 2001.  
Action: F. Burton.  
Funding: reallocated EF-OT funds (NTCI).
  - b) Plan field survey by mid February 2002.  
Action: F. Burton.
  - c) Conduct field survey in April - June 2002.  
Action: F. Burton with ISG volunteers.  
Funding: reallocated EF-OT funds (NTCI).
  - d) Report findings to NTCI, Department of Environment, ISG by late July 2002.  
Action: F. Burton.  
Funding: reallocated EF-OT funds (NTCI).
- 3.1.2 Reassess the relic wild populations in locations identified in 1993-5 – by July 2002
- a) Conduct field surveys in combination with 3.1.1.c.  
Action: F. Burton with ISG volunteers.  
Funding: reallocated EF-OT funds (NTCI)
  - b) Report findings with 3.1.1.d (late July 2002)
- 3.1.3 Define the area of occupied and potential habitats identified in 3.1.1 needed to support the target population of ca. 1,000 individuals – by August 2002
- a) Estimate the carrying capacity of the xerophytic shrubland by end of August 2002.  
Action: F. Burton & G. Gerber.
  - b) Estimate the acreage needed to support target population by end of August 2002.  
Action: F. Burton & G. Gerber.
- 3.1.4 Plan the protected area – by June 2003
- a) Determine the status of Crown land in the area of interest, and private land ownership within the area, by December 2001.  
Action: Department of Environment.

- b) Establish the protected area planning team by July 2002.  
Action: Department of Environment, National Trust, Department of Tourism.
- c) Define land parcels and/or protected area boundaries for the iguana reserve by July 2002.  
Action: PAPT.
- d) Political outreach, ongoing from December 2001 to June 2002.  
Action: Department of Environment, National Trust, PAPT members.
- e) Define legal means of protection; institutions responsible for land ownership and management of the proposed iguana reserve, by January 2003.  
Action: PAPT
- f) Complete iguana reserve nature tourism plan by March 2003.  
Action: PAPT with co-opted and/or contracted expertise.  
Funding: need & source to be assessed.
- g) Business and community outreach in April-May 2003.  
Action: PAPT members.  
Funding: need & source to be assessed.

3.1.5 Establish the iguana reserve – from September 2003 through 2004/5

- a) Legal protection of Crown land in the iguana reserve, by passage of legislative acts or by transfer to NTCI ownership (cf. 3.1.4.e), by September 2003.  
Action: Legislative Assembly through Minister responsible for Environment and/or Lands, initiated by Department of Environment.
- b) Secure formal valuation of properties to be acquired by September 2003.  
Action: NTCI to request from BCQS
- c) Secure PAPT and partners' commitment to a fund raising plan by September 2003.  
Action: PAPT initiated by January 2003.
- d) Secure purchase agreements for at least one parcel of privately owned land in the proposed reserve by October 2003.  
Action: PAPT members depending on 3.1.4.e
- e) Commence international fund raising and/or application for CIG environmental protection funds in October 2003.  
Action: responsible parties to be specified through 3.1.5.c.
- f) Acquire and protect privately owned parcels for the iguana reserve commencing by October 2004 and progressing through 2005 if needed.  
Action: responsibility dependent on 3.1.4.e.

- 3.1.6 Adopt a formal management plan for the iguana reserve – by 2005
- a) Complete draft management plan by December 2004.  
Action: PAPT
  - b) Present plan for adoption by management authority(ies) by March 2005.  
Action: PAPT
- 3.1.7 Complete habitat enhancements (if needed) - by 2006  
Action steps to be determined in 3.1.1.c and 3.1.6 (e.g. enhanced and additional nest sites, anti-predator fencing, nest site irrigation etc)
- 3.1.8 Initiate nature tourism activity - by 2006  
Action steps to be determined in 3.1.4.f. and 3.1.6
- 3.1.9 Commence restocking and/or head-starting lewisi within the iguana reserve – by 2006  
Action steps to be planned in 2004 by NTCI (will be subject to status of captive breeding and other sub-populations)

**3.2 OBJECTIVE: To reintroduce lewisi into its former range in the proposed Barkers National Park – by 2006 subject to establishment of the Park by The Cayman Islands Government.**

- 3.2.1 Assess habitat potential within the Barkers Peninsula for reintroduction of lewisi, by December 2001.
- a) Survey availability of food plants, retreats, predators and other threats throughout the proposed Park area, in November 2001.  
Action: F. Burton, Q. Bloxam, K. Graham (completed)
  - b) Report to Department of Environment by December 2001.  
Action: F. Burton (completed)
- 3.2.2 Advise Department of Environment on Park management requirements necessary to enable restoration of wild iguanas in the Barkers Peninsula, by December 2001
- a) Advise DofE on proposed boundaries of park using NTCI biodiversity survey data and results of 3.2.1.  
Action: F. Burton (completed)
  - b) Advise DofE on issues of human use relevant to public awareness and protection of iguanas – trails, iguana refuge areas, viewing opportunities, public education, etc.  
Action: F. Burton, Q. Bloxam (completed)

- 3.2.3 Implement habitat restoration measures commencing when the Park is officially established.
- a) Plan habitat restoration needs and actions (including predator control) within one year of approval of Park concept.  
Action: to be assigned by Park's designated Management Authority.
  - b) Implement habitat restoration commencing when the Park is officially declared.  
Action: to be assigned in Park Management Plan.
  - c) Estimate the carrying capacity of the restored habitat for wild lewisi.  
Action: ISG volunteer / consultant to be assigned.
- 3.2.4 Reintroduce iguanas to the Barkers National Park within 2 years of formal protection for the area
- a) Submit a reintroduction proposal to the IUCN Reintroduction Specialist Group.
  - b) Trial release with 5 genetically over-represented test individuals, to be monitored with radiotelemetry for 1 year, within one year of establishment of Park
  - c) If trial release is successful, proceed with gradual reintroduction to establish a population of mixed age classes and maximum attainable genetic diversity. Continue until carrying capacity has been reached.
- 3.2.5 Commence metapopulation management once population is considered close to carrying capacity – Note: experts in metapopulation genetics should be consulted before this stage and this statement may be revised.
- a) Exchange key individuals between this reintroduced population, the wild population, the captive group at QEIIBP, and other restocked/reintroduced populations in order to maximize genetic diversity within each subpopulation.  
Action: NTCI staff/consultant, guided by AZA SPMAG analyses and studbook advisor.

### **3.3 OBJECTIVE: Establish a self sustaining sub-population of lewisi in the QE II Botanic Park by 2003**

- 3.3.1 To reach and maintain optimum health in the restocked population in the QE II Botanic Park, commencing in November 2001 and ongoing until health is deemed satisfactory and sustainable.
- a) Monitor growth and health of individual released animals twice per year, and at any other time capture is needed for other reasons, commencing in 2002 and ongoing. Collect blood and feces during twice per year captures for health monitoring.  
Action: B. Raphael, R. Goodman, F. Burton.  
Funding: Morris Animal Foundation; Univ. Tennessee research funding?
  - b) Design data sheet to standardize future health and growth data collection.  
Action: R. Goodman and S. Echternacht, by Jan 2002.

3.3.2 Enhance iguana habitat in the QE II Botanic Park to increase growth, reproduction and carrying capacity by the 2003 breeding season.

a) Institute a supportive feeding regime, providing captive diet including native food plants 3 times per week (see 3.4.1.a), targeted towards females and individuals in food-poor territories. To commence in 2002 (This strategy could also be used to attract animals into settling in new areas, particularly along the nature loop).

Action: Iguana Facility Manager with NTCI volunteers.

b) Create additional nesting sites modeled after successful nests in the Park and in the wild, especially in existing female territories in which breeding is currently unsuccessful, by the 2002 breeding season.

Action: R. Goodman, QEIIBP staff, volunteers, and/or contracted labor.

Funding?

c) Increase rat controls by the 2002 nesting season: install approx. 50 bait boxes centred on captive facility and female territories. Monitor and record bait uptake weekly and replace as necessary.

Action: DEH to provide, monitor and record bait boxes. Q. Bloxam to contact Zeneca Agrochemicals to investigate possible Zeneca advice and involvement including donation of bait. QEIIBP to provide storage for donated bait.

d) Increase cat trapping effort in 2002 by purchasing 5 traps which can be deployed in event of a cat sighting in the Park.

Action: NTCI to buy traps, Department of Agriculture to set traps on request by QEIIBP or NTCI and dispose of trapped cats. Funding: \$500 needed.

e) Maintain active total dog exclusion from the Park, permanently.

Action: QEIIBP assisted by Department of Agriculture.

3.3.3 Identify optimum release strategy to reduce post-release migration out of the Park, by 2003.

a) Mark all wild hatchlings produced by released animals with colored beads and PITs for permanent individual identification, and weigh & measure, beginning in 2002.

Action: Rachel Goodman, Fred Burton, and future NTCI affiliated researchers.

Funding: PIT cost \$200 per year, to be reviewed annually; 2 sets of Pesola scales (\$600) to weigh and measure all animals immediately prior to release.

b) Trial soft-releases of 2-year-olds for restocking, from temporary field enclosures or restricted territories imposed by “herding” by field staff, restricting animals for up to a week prior to full release. Scatter individual’s feces from captive enclosures in area to encourage site fidelity. Offer supplementary feeding as per 3.3.2.a. Commencing in 2001.

Action: F. Burton, NTCI volunteers.

c) Monitor all released 2-year-olds for at least a week following release, with radiotelemetry if possible (radio cost = \$120-200 each).

Action: Burton in 2001; radio telemetry in 2003 needs additional receiver (\$500) and aerial \$100); 15 internal (ingestable) radio tags @ \$120.

- 3.3.4 Continue restocking in 2001, 2003 and beyond dependent on carrying capacity.
- a) Release the 1999 juveniles as soon as health screening indicates they are clear of pathogens (late 2001).  
Action: F. Burton.
  - b) Use existing genetic information to guide where particular individuals are released in the future to avoid over-representation of particular genotypes at certain localities.  
Action: F. Burton (ongoing).
- 3.3.5 Determine the carrying capacity limit for the QEIBP after habitat enhancements by 2003.
- a) Further research on habitat and space use by all age classes  
Action: R. Goodman, 2002-3.

**3.4 OBJECTIVE: To improve and maintain in situ captive breeding/headstarting to provide sufficient animals for all restocking & reintroduction needs identified in this plan.**

- 3.4.1 Improve nutrition of the captive population by 2002
- a) Institute new diet initially targeting 75% dark leafy greens, 20% pellets (high quality commercial iguana diet), 5% fruits (all by volume). Homogenize food mixture to ensure that pellets are consumed. Increase protein levels based upon age of animal (10 – 15% protein by weight for 1-3 years; 5 – 10% protein by weight in adults) – by February 2002.  
Action: F. Burton, K. Marsh, D. Donaldson, L. Blumenthal, NTCI volunteers
  - b) Install larger food bowls by February 2002.  
Action: F. Burton, L. Blumenthal, NTCI volunteers
  - c) Document a standard feeding protocol for iguana facility manager (see 3.4.5) and volunteers, based on Anegada headstarting facility manual.  
Action: F. Burton by late 2002
  - d) Plant an iguana food garden by March 2002.  
Action: initially QEIBP staff/volunteers/temp labor, maintained thereafter by Iguana Facility Manager.
  - e) Incorporate wild plant foods in place of proportion of dark leafy greens during 2002.  
Action: Iguana Facility Manager, NTCI volunteers.
  - f) Use radiographic techniques to review bone density in event of any signs of metabolic bone disease.  
Action: local veterinarian, B. Raphael.

- g) Commence assessing nutritional content and digestibility of captive diet and major wild foods in March 2002.  
Action: zoo nutritionist - B. Raphael to discuss with Ellen Dierenfield at WCS and Allison to discuss with Mark Edwards for input.  
Funding: portion of EF-OT grant (NTCI).
- h) Expand nutritional comparison of captive and wild diets.  
Action: Morris Animal Foundation funding is being sought by Fort Worth Zoo (Ann Ward); pre-proposal submitted November 2001.

#### 3.4.2 Institute regular health screening of captives by 2001

- a) Continue routine health evaluations as commenced by B. Raphael in November 2001 on captive population  
Action: B. Raphael, 2001 – 2003 and ongoing.  
Funding: initially Morris Animal Fund grant.
- b) Perform health screening on pre-release iguanas.  
Action: B. Raphael, 2001 – 2003 and ongoing.  
Funding: initially Morris Animal Fund grant.
- c) Measure range of normal physiological values on blood from free ranging population.  
Action: B. Raphael, 2001 – 2003.  
Funding: Morris Animal Fund grant.
- d) ISG veterinarian advisor to work with local veterinarian or local government veterinary services to develop protocols for routine health care, necropsies and collection of biological samples on free ranging wild iguanas when available.  
Action: B. Raphael, 2002.  
Funding: Morris Animal Fund grant.

#### 3.4.3 Improve captive breeding and rearing facilities commencing in 2002.

- a) Trim back foliage to allow for increase of direct/indirect sunlight.  
Action: F. Burton, QEIIBP labor, by January 2002 (completed)
- b) Add basking shelves in A and B cages by January 2002. Leave sides on east and west open (i.e. no sun barriers).  
Action: NTCI volunteers.
- c) Design a new breeding facility initially sufficient for 4 breeding pairs with larger units and more complex physical environments, capable of future modular expansion; estimate cost; by March 2002.  
Action: NTCI / F. Burton advised by J. Binns and J. Lemm
- d) Plan and implement fundraising to build breeding facility.  
Action: NTCI, ISG



- e) Construct 4 breeding enclosures by December 2002 dependent on funding.  
Action: NTCI contractor or Service Club volunteers.
- f) Move top priority breeders to new facility; use Cages 1-14 for animals up to 1 year of age; cages B1-B16 for animals up to to 3 years of age; cages A1-A12 for holding adults.  
Action: F. Burton; Iguana Facility Manager
- g) Evaluate ARKS suitability for record keeping in this project.  
Action: F. Burton & Q. Bloxam (completed)
- h) Improve record keeping (ARKS or existing MS Access database) to track all aspects of animal management, health and breeding.  
Action: F. Burton (completed)
- i) Trial and record results of different socialization techniques in preparation for pairing potential breeding pairs.  
Action: F. Burton, Iguana Facility Manager - to commence in the 2002 breeding season.

3.4.4 Increase local human resources available to the project in 2002

- a) Develop job description for a local part time Iguana Facility Manager by March 2002.  
Action: NTCI / F. Burton with review by ISG co-chairs (completed)
- b) Submit funding proposal to IIF for Iguana Facility Manager salary, by the February 2002 IIF meeting date.  
Action: NTCI / F. Burton (completed)
- c) Build funding base from US zoos holding/desiring GC iguanas in 2002.  
Action: R. Hudson coordinating – IIF Board.
- d) Recruit Iguana Facility Manager on part time basis (initially 20 hours per week), in 2002.  
Action: NTCI.
- e) Conduct on-site training for all iguana care staff and develop a daily animal care report.  
Action: J. Lemm, 2002.
- f) Implement routine veterinary monitoring through strengthening the working relationship between a local veterinarian and ISG veterinarian (cf. 3.4.2).  
Action: B Raphael.

3.4.5 Maintain genetic management of the in-situ captive population, 2002 ongoing.

- a) Maximize genetic diversity in the in-situ captive population by following guidelines provided annually by studbook advisor and SPMAG. Note: all below recommendations are contingent on analysis of stud book data and mean kinship values and the need to equalize founder representation.

- b) Seek to breed from representative(s) of the “Wild95” head-started group in 2003.  
Action: F. Burton, Iguana Facility Manager.
- c) Breed “Hal” in 2002.  
Action: F. Burton, Iguana Facility Manager
- d) Genetically Screen “Windsor” to confirm that he is a pure bred lewisi founder.  
Action: Scott Davis (blood sample from Bonnie Raphael)
- e) Euthanasia of 2 medically compromised males from over-represented LFBS bloodline #431-#434.  
Action: F. Burton - 2002.
- f) Attempt to breed from “Billy” (#359) by any female other than the over-represented Sara (#334), in 2002.  
Action: F. Burton, Iguana Facility Manager

3.4.6 Use facility for marketing and volunteerism

- a) Involve ZSSD conservation education fellow Lee Pagni (to accompany Lemm in 2002), with input from Karen Graham.
- b) Cost, design (Pagni & Graham 2002) and install interpretive and fund-raising graphics at the QEIIBG visitor center (2002-3). Funding to be determined.
- c) Increase existing signage throughout the Park and add iguana images around park facility (parking, entrance, visitors center) – including warnings about iguanas biting. By 2003. Funding to be determined.
- d) Develop visitor outreach program – programmes through with the Iguana Facility Manager and/or an interpretive volunteer interact with visitors. By 2003.  
Action: F. Burton, Iguana facility Manager, K. Graham and others.

3.4.7 Adopt a disaster preparedness plan for the facility

- a) Develop an iguana emergency protocol before the 2002 hurricane season.  
Action: F. Burton.
- b) Place protocol with NTCI as part of organization’s disaster preparedness plan.  
Action: NTCI

**3.5 OBJECTIVE: To establish an ex-situ captive population sufficient to retain 90% of genetic diversity over 100 years, as a genetic reservoir, as a safeguard against catastrophic loss to the Grand Cayman populations, and as a flagship for fundraising.**

- 3.5.1 Establish and maintain an ex-situ captive population of sufficient individuals (see 3.5.1.a) in ISG approved institutions.

- a) Determine a target ex-situ captive population size and timeline to establish this, based on population projections from studbook data.  
Action: Bob Wiese (Small Population Management Advisory Group Chair) and Tandora Grant (Cyclura Studbook Keeper) in early 2002.
- b) Identify an AZA institution to coordinate the importation of individuals to represent new bloodlines (needed to strengthen and sustain the ex-situ captive population long term) and to increase numbers available for management within the USA, including preparation of permit applications.  
Action: R. Hudson (initially to approach J. Block at US National Zoological Park) – by early 2002
- c) Annually identify animals in the in situ captive programme, which are surplus or non-essential for restocking / reintroduction and which represent blood lines needed for the ex-situ captive programme. This should be completed one year before the proposed date of each importation to the USA.  
Action: F. Burton, T. Grant, SPMAG, commencing 2002-3
- d) Transfer animals identified in 3.5.1.b, progressively including all existing bloodlines from the in-situ captive population and overall, the incorporation of 20 additional founders to the ex-situ population over the next 20 years.  
Action: NTCI; institution designated in 3.5.1.a; recipient institutions.
- e) Ensure new founder specimens are placed only with ISG approved institutions.  
Action: R. Hudson subject to any conditions in 3.5.1.e, with institution designated in 3.5.1.a.
- f) Draft and adopt a Memorandum of Agreement between the Cayman Islands and the AZA Rock Iguana SSP that vests/transfers ownership of all existing specimens to the Cayman Islands. All future importation and their progeny will be the property of the Cayman Islands and placed on loan to participating institutions.  
Action: Q. Bloxam to provide sample of loan agreement, NTCI, CI Dept Environment, R. Hudson to facilitate formal adoption – in 2002
- g) Identify space/institutions to participate in the AZA Rock Iguana SSP program for Grand Cayman iguanas. Identify suitable breeding facilities and recruit Cyclura experienced holding institutions that can replace non - targeted taxa – by (specify target completion date and/or commencement date).  
Action: R. Hudson (and others)

3.5.2 Manage the ex-situ captive population and the in situ captive population together as an integrated genetic management unit

- a) Coordinate the NTCI program and the AZA Rock Iguana SSP captive populations through the international Cyclura studbook.  
Action: Tandora Grant / SPMAG (ongoing)
- b) Monitor the potential for frozen germplasm banking, and advise NTCI and AAZA Rock Iguana SSP if technology becomes available.  
Action: A. Alberts 2003 ongoing

**3.6 OBJECTIVE: To institute long-term education and awareness programs to ensure sustained support from the local community and visitors for the conservation of lewisi in the wild**

- 3.6.1 Develop and conduct a Conservation Education Campaign (CEC) using lewisi as the flagship species for the year 2003 – “the Year of the Iguana”
- a) Open discussions with the Quintecennial Celebrations Office to explore partnerships using the Blue Iguana as a flagship image for the year.  
Action: B. Quappe, December 2001
  - b) Seek funding / sponsorship for a part time local education & awareness specialist to conduct a Conservation Education Campaign (CEC), by June 2002.  
Action: NTCI, F. Burton, ISG partners
  - c) Recruit part time CEC officer by September 2002.  
Action: NTCI.
  - d) Conduct CEC for one year, using the RARE Centre CEC manual as a guide and the Blue Iguana as the flagship species.  
Action: CEC officer.
- 3.6.2 Produce educational resource materials on lewisi for local schools, tightly linked to the National Curriculum, in 2002-3
- a) Review current National Curriculum modules to identify all aspects that connect with NTCI’s education and awareness goals for the Blue Iguana.  
Action: J.Ebanks (NTCI), in December 2001.
  - b) Project future curriculum development and design timeline for creation of educational resource packs for older students in future years.  
Action: J. Ebanks (NTCI), by January 2002.
  - c) Create a curriculum-linked teacher’s resource pack on the Blue Iguana for Key Stages 1 and 2 by September 2002.  
Action: J. Ebanks, with F. Burton and L. Blumenthal.
  - d) Create a video / DVD short documentary on the Blue Iguana, to serve as an additional teaching resource and retail item, by September 2002.  
Action: F. Burton, S. Boxall, others to be determined.
  - e) Create additional resource packs for Key Stages 3 and above, to coincide with the times the relevant National Curriculum (Sciences, and Social Studies) modules are implemented in schools.  
Action: L. Blumenthal, J. Ebanks
- 3.6.3 Develop a range of retail items highlighting lewisi to sell in the Cayman Islands both as a fundraiser (see 3.7) and to raise awareness in the general public, in 2002. (Action steps listed in 3.7.5)

- 3.6.4 Resolve current debate on taxonomic status of *Cyclura (nubila) lewisi*, in 2003, to clarify education & awareness messages.
- a) Obtain blood from *Cyclura nubila* in eastern Cuba and conduct comparative DNA analysis.  
Action: A.Alberts & R.Hudson to advise on collection, C. Lehn (Wildlife Conservation Society, Bronx) for DNA analysis.
  - b) Prepare comparative scale drawings of the *C. nubila* subspecies and *C. Cyclura*.  
Action: John Bendon.
  - c) Reach consensus on taxonomic revision if any.  
Action: ISG members with relevant expertise
  - d) Publish.  
Action: S. Davis with other active collaborators.
- 3.6.5 Publish completed field research to serve as inputs to educational resources and current research.
- a) Submit papers to peer reviewed scientific journal(s) by the end of 2003.  
Action: F. Burton.

**3.7 OBJECTIVE: To secure sufficient financial, technical and human resources to implement this action plan.**

- 3.7.1 Redirect funds held by NTCI within the restricted EF-OT iguana fund, from proposed habitat restoration in the Mastic Reserve, to the 2001-2 section of this plan, effective immediately.
- a) Advise UK Foreign & Commonwealth Office by copy of this plan and manage funds accordingly.  
Action: F. Burton
- 3.7.2 IIF to apply to the Disney Foundation for a ca. \$20,000 grant towards 2002 costs of this plan, by January 2002
- a) Define elements of plan to be covered by proposed grant.  
Action: F. Burton and R. Hudson (completed)
  - b) Apply for funds.  
Action: R. Hudson / A. Alberts (completed)
- 3.7.3 NTCI to apply for a Darwin Initiative grant (UK Government) for ca. \$30,000 per year from 2003-2005. To be submitted by October 2002.
- a) Identify elements of plan to constitute proposed Darwin project, by February 2002.  
Action: F. Burton, Q. Bloxam

- b) Identify partner institution(s) by March 2002.  
Action: F. Burton.
  - c) Obtain NTCI and partner(s) approval for grant application, by May 2002.  
Action: NTCI, Partner organization(s)
  - d) Draft application to be finalized and accepted by all parties by September 2002.  
Action: F. Burton, Partner organization(s)
  - e) Submit application in October 2002 (subject to deadline).  
Action: F. Burton.
- 3.7.4 Cyclura.com to develop online sales of lewisi items with profits directed to this plan via IIF, commencing by December 2001
- a) Introduce a line of lewisi images to the retail products on sale through Cyclura.com.  
Action: J. Binns (completed).
- 3.7.5 Related product sales through NTCI in Cayman to commence generating sustainable income to the programme in 2002.
- a) Select products likely to sell well locally.  
Action: NTCI, Cyclura.com
  - b) Plan logistics (including financing, product storage and distribution).  
Action: NTCI
  - c) Obtain sponsorship to cover the initial capital cost of production.  
Action: NTCI staff and/or volunteers
  - d) Organize volunteer group for product distribution to retail outlets.  
Action: L. Blumenthal, P.Clifford
  - e) Launch of products including media event. Action: NTCI
- 3.7.6 Create an avenue and incentive for donations to the iguana programme, from visitors at the QE II Botanic Park, commencing in 2002 and developing in 2003.
- a) Design media /activities for communication (signs, pamphlets, tours etc).  
Action: K. Graham, F. Burton, A. Guthrie, Lee Pagni
  - b) Agree procedures for handling donations.  
Action: QEIIBP, NTCI
  - c) Source capital to produce relevant media.  
Action: NTCI
  - d) Phase in programme gradually.  
Action: NTCI, QEIIBP, others to be identified in design phase.

- 3.7.7 “Adoption” sponsorship of released iguanas to be restructured and continued starting in 2003
- a) Design a sponsorship scheme which does not conflict with conservation goals or overstretch human resources, by March 2002.  
Action: F. Burton, NTCI
  - b) Implement scheme in 2002 (details to be planned above)
- 3.7.8 Develop improved volunteer programme specific to the iguana project by 2003
- a) Communicate this plan with existing volunteers, by March 2002.  
Action: F. Burton
  - b) Plan a renewed volunteer programme, identifying volunteer opportunities and incentives, and defining programme management. By August 2002.  
Action: F. Burton, L. Blumenthal, Iguana Facility manager
  - c) Advertise for volunteers in autumn 2002.  
Action: NTCI
  - d) Select and recruit to start by the beginning of 2003.  
Action: L. Blumenthal
- 3.7.9 Maintain international partnerships for technical support.
- a) Network through ISG to maximize the contribution of international partnerships, to maintain high technical standards and to minimize direct on-island programme costs. Ongoing.  
Action: all existing partners identified in this plan.



## 2. Appendix

### 4.1 List of Workshop Participants

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## Workshop Participants

Grand Cayman - November 2001



***Top Row - Left to Right:***

Rick Hudson, Joseph Smith-Abbott, Bonnie Raphael, Scott Davis, Karen Graham, Allison Alberts, Lisette Ramos, Raymond Walker, Peter Tolson, Joe Wasilewski, Quentin Bloxam, Jan Ramer, Howard Snell, Elizabeth Erasito, Jeff Lemm, Miguel Garcia, Fred Burton, Tandora Grant, Robert Powell, Victor Hugo Reynoso, Glenn Gerber, and Kelly Bradley.

***Bottom Row - Left to Right:***

Oscar Flores, Karin Nelson, Nancy Lung, John Iverson, Rachel Goodman, John Bendon, Sandy Echternacht, Sandy Binns, and John Binns

**4.3 The Blue Iguana Conservation Project recognizes and sincerely thanks the following donors for their generous and valuable contribution to the conservation of the Grand Cayman Blue Iguana.**

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*Gold Donors:*

*John Binns & Sandy Binns*

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*Silver Donors:*

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*Bronze Donors:*

*Desiree Wong*

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*Friends of the Blue Iguana:*

*Roger Membreno  
Beth A. Moeller  
Jennifer Upchurch*



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