

CULEBRA ISLAND GIANT ANOLE  
RECOVERY PLAN

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for

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Approved: \_\_\_\_\_

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Date: \_\_\_\_\_

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THIS IS THE COMPLETED GIANT ANOLE RECOVERY PLAN. IT HAS BEEN APPROVED BY THE U.S. FISH AND WILDLIFE SERVICE. IT DOES NOT NECESSARILY REPRESENT OFFICIAL POSITIONS OR APPROVALS OF COOPERATING AGENCIES, AND IT DOES NOT NECESSARILY REPRESENT THE VIEWS OF ALL INDIVIDUALS WHO PLAYED A KEY ROLE IN PREPARING THIS PLAN. THIS PLAN IS SUBJECT TO MODIFICATION AS DICTATED BY NEW FINDINGS AND CHANGES IN SPECIES STATUS AND COMPLETION OF TASKS ASSIGNED IN THE PLAN. GOALS AND OBJECTIVES WILL BY ATTAINED AND FUNDS EXPENDED CONTINGENT UPON APPROPRIATIONS, PRIORITIES, AND OTHER BUDGETARY CONSTRAINTS.

LITERATURE CITATIONS SHOULD READ AS FOLLOWS:

U.S. Fish and Wildlife Service. 1982. Giant Anole Recovery Plan.  
U.S. Fish and Wildlife Service, Atlanta, Georgia. 19pp.

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## PART I. INTRODUCTION

The Culebra Island "Giant" anole, Anolis roosevelti, a rather large brownish-gray lizard growing to about 160 mm snout-vent length, was first described by Chapman Grant in 1931 on the basis of one specimen collected by a local child on Culebra Island, Puerto Rico (Grant, 1931b). Despite the lack of any significant series of specimens, Major Grant was quite certain that the specimen he possessed represented a new taxon. The type description contains a comparison of this new species with both A. cuvieri from the mainland of Puerto Rico and A. ricordi from the Island of Hispaniola. It is evident from this comparison that the new species possesses characteristics of both of these two species of giant anoles, but that it is distinct from either.

In 1932, Major Grant received and reported on another specimen of this species, also collected by a local resident of Culebra Island (Grant, 1932a). This specimen, an adult male, provided additional characters to differentiate A. roosevelti from A. cuvieri. It was the last specimen of the species to be seen by biologists.

Aside from occasional references to the presence of this species in the fauna of Puerto Rico, the Culebra Island giant anole has been almost ignored since its discovery. The natural history and ecology of the Culebra giant anole are unknown. Since the species is known from only two preserved specimens (the second specimen is in the University of Michigan Museum of Zoology, UMMZ 73644), and has not been collected since 1932, some authors have expressed the opinion that the species is extinct. There is reason, however, to believe the species survives in remaining forest on Culebra.

Recent workers have located Mr. Dumas, who collected the lizard for Major Grant in 1931. He not only remembers the habits of A. roosevelti but claims to see one occasionally today (as recently as 1978). Mr. Dumas relates that the initial specimen of A. roosevelti was collected on the Flamenco Peninsula before it was deforested. That area once supported a forest of tall gumbo-limbo (Bursera) and Ficus trees, much like the small patches that remain on steep northern slopes of the island. Mr. Dumas describes the lizard as living high in the trees, where it is occasionally seen on the branches. He claims that he sees it most commonly when the fruits of the trees, especially the Ficus, are ripe. Mr. Dumas remembers the lizard as being grey or brown, which is consistent with the original description. Other verbal reports of giant anoles from Culebra referred to them as being green, suggesting that the observers were seeing the introduced iguana. The question is whether the Culebra Island giant anole is extinct. Several parties of herpetologists have made specific searches for the species in the last few years without success. The remaining small patches of virgin forest habitat, however, should be large enough to maintain a few lizards (Figure 1.). The arboreality of A. roosevelti should provide some protection from house cats and other introduced predators, and there are no mongooses on the island. Surveys should be conducted prior to listing the species as extinct and potential remaining habitat should be protected. Anolis roosevelti is listed as Endangered by the U.S. Fish and Wildlife Service, and "Critical Habitat" has been determined on Culebra Island to include most of the remaining forest habitat (Figure 2.).

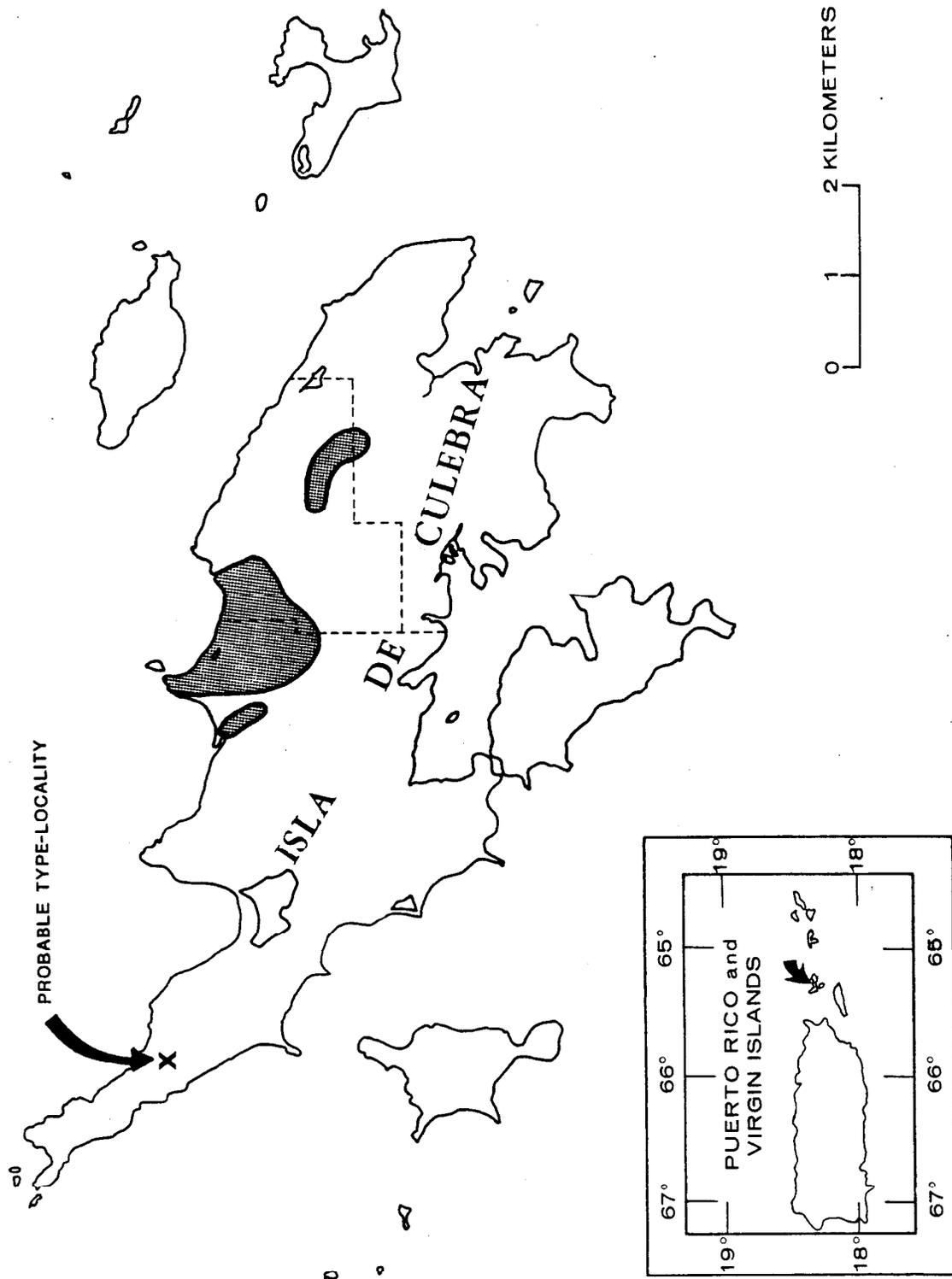


FIGURE 1. REMAINING POTENTIAL HABITAT FOR THE GIANT ANOLE

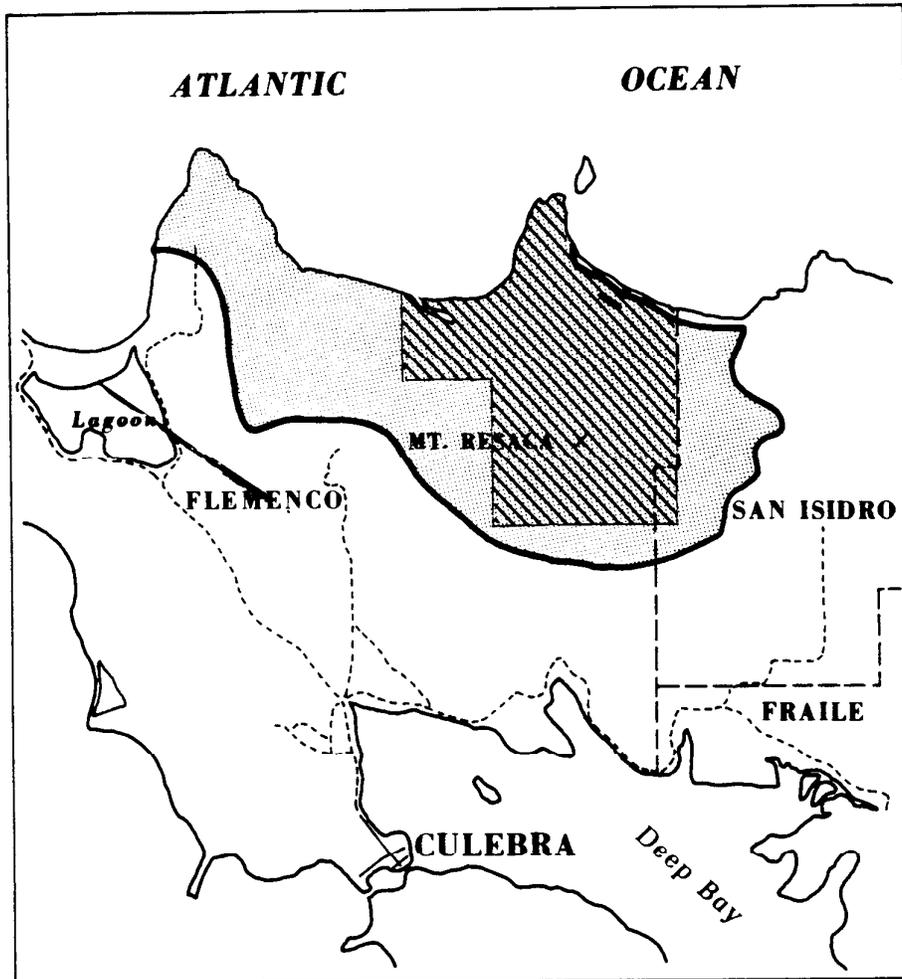


FIGURE 2

-  DESIGNATED CRITICAL HABITAT FOR THE GIANT ANOLE
-  NATIONAL WILDLIFE REFUGE LAND

DESCRIPTION A large Anolis in the ricordii species group of the cuvieri series (Williams, 1976) reaching a length of approximately 160 mm snout-vent. The color in life is brownish-grey with two lines on each side. One line begins around the ear and extends posteriorly to the groin; the other begins in the shoulder region and extends into the groin. There is a distinct light spot on the temple, and the eyelids are yellow. The throat fan is grey except for the lower rear quarter which is light yellow. The tail is yellowish-brown and the underside of the belly is whitish. The tail is deeply scalloped and supports a large fin along most of its length. This fin is high: the third from the distal most ray is twice as long as the depth of the tail, and the fourth proximal ray is as long as the depth of the tail. The edge of the tail fin is scalloped between rays in A. roosevelti, as opposed to straight in A. cuvieri. Anolis roosevelti is additionally distinguished from Anolis cuvieri by being grey, not green or brown; by a decidedly sloping loreal area (vertical in A. cuvieri); by lacking postanal scales in males (present in A. cuvieri); by smooth scales under the base of the tail (keeled in A. cuvieri), and by its larger size.

Grant (1931b, 1932b) and Williams (1962) give general morphological descriptions and provide tables of comparison with A. cuvieri and Hispaniolan giant anoles. Grant (1931b, 1932a) and Rivero (1978) give general notes on coloration. Etheridge (1959) provides information on skeletal morphology.

ILLUSTRATIONS The only illustrations of this species are lateral and dorsal black and white photographs of the head of the type specimen contained in the original description (Grant, 1931b). A photograph of the entire type specimen will be in Dodd and Campbell (1982).

DISTRIBUTION This species is historically known only from Culebra Island, Puerto Rico.

FOSSIL RECORD None (Pregill, 1981).

PERTINENT LITERATURE This species was described by Grant (1931b) who provided notes on its morphology and coloration. Additional morphological and color descriptions, and comparisons with other giant anoles, are contained in Grant (1932a), Williams (1962) and Rivero (1978). Etheridge (1959) gives information on skeletal morphology which he believed allied it in uncertain position within a group of Anolis, Williams (1976) places Anolis roosevelti in the ricordii species group of the cuvieri series. Pregill (1981) noted zoogeographic relationships with Anolis cuvieri. This species is included in several checklists without additional comment (Grant, 1931a, 1932b; Barbour, 1935, 1937; Schwartz and Thomas, 1975; Williams, 1976) and checklists including statements concerning extreme rarity or possible extinction (Anon., 1973; Philibosian and Yntema, 1977; Groombridge, 1981). Honegger (1979) summarized its conservation status. Carr (ms, p. 20) mentions that the lizard is still said to be seen by local people on Culebra and records a conversation with a farmer on Monte Resaca in which the appearance, size, and habitat of the lizard were described convincingly. Dodd and Campbell (1982) provide a general review of the literature on the species.

ETYMOLOGY The species is named in honor of Theodore Roosevelt, Jr., then Governor of Puerto Rico.

POPULATION NUMBERS AND TRENDS We have no information on population numbers and trends. There have been no confirmed observations of the species since 1932.

REASONS FOR CURRENT STATUS We have no direct evidence of the causes of the current status of Anolis roosevelti. It is presumed that the extensive deforestation of Culebra Island is the chief ecological problem.

HABITAT This lizard is presumably arboreal and restricted to the large Ficus and gumbo-limbo trees. There is no other information on its ecology on the island.

FOOD AND FORAGING BEHAVIOR The only information available on its food and foraging behavior is that provided by Mr. Dumas who reports having seen the lizard feeding on the fruits of fig trees. This is consistent with our knowledge of the diets of other large Anolis which will feed on fruits as well as insects and small lizards.

SHELTER REQUIREMENTS No information is available on the shelter requirements of the species.

REPRODUCTIVE BEHAVIOR Reproduction behavior is unknown.

OVIPOSITION AND INCUBATION REQUIREMENTS Not known.

OTHER CRITICAL ENVIRONMENTAL REQUIREMENTS There is no information on the other environmental requirements of this species.

PREDATION There is no direct evidence of predation on these lizards, but potential predators do exist on Culebra. The lizard Ameiva exsul feeds occasionally on Anolis and juvenile A. roosevelti could be susceptible. The snakes Alsophis portoricensis and Arrhyton exiguum feed almost exclusively on lizards and Alsophis could probably subdue even adult A. roosevelti. Potential avian predators, although the probability of actual predation is probably very remote in some cases, include Buteo jamaicensis, Falco sparverius, Coccyzus minor, Crotaphaga ani, Mimus polyglottus and Margarops fuscatus (taken from Wetmore, Auk 34(1):51-62, 1917). Most of these could take only juvenile A. roosevelti, but Buteo and Falco could take all size classes.

The recovery effort for the giant anole should proceed with additional efforts to confirm the existence of the species. Given our scant knowledge of the natural habitat of the species, we should make every effort to protect the few remaining patches of fig forest on Culebra until such time that we can be assured that the species is extinct or until it is rediscovered and its precise habitat requirements are determined.

## PART II: RECOVERY

## A. Recovery Objective:

The Culebra Island Giant Anole will be considered "Recovered" and no longer in any danger of extinction when the following conditions are met:

- 1) Field studies have determined that the species is still extant in the wild on Culebra Island and;
- 2) These studies have identified the biotic and abiotic factors essential for the species continued survival and;
- 3) Appropriate agreements between all involved government and private agencies and organizations and individuals have been formalized which will guarantee the continued survival of the remaining patches of forest on Culebra Island and;
- 4) A management plan has been developed for this forest which will guarantee the continued stability of this habitat for the lizard;
- 5) A program for monitoring the lizard's population to insure that the population levels are stable or increasing is established and functioning.

B. Step-down Outline

1. Establish healthy population levels of lizards in expanded habitat.
  - 1.1. Conduct field studies on Culebra Island to determine present population levels and ecological requirements of the population.
  - 1.2. Conduct field studies of other giant anole species to determine representative population densities of other species to assist in setting target population levels.
  - 1.3. Manage forest areas to the maximum benefit of the giant anoles, as determined by ecological studies (1.1.).
2. Expand present forest remnants to the minimum size essential habitat area determined necessary under tasks 1.1 and 1.2.

C. Narrative

1. Establish healthy population levels of lizards in expanded habitat.

The total population size needed for long-term viability is completely unknown at present, but there is limited information which suggests that from the genetic standpoint, an isolated population should contain a minimum of 500 breeding individuals (Franklin 1980). This number may be necessary to maintain sufficient genetic variability to assure long-term adaptability to environmental changes. When other information also becomes available on "normal" population density and total numbers needed to assure population stability from short-term stresses, a more accurate estimate of "healthy" population levels will be possible.

- 1.1 Conduct field studies on Culebra Island to determine present population levels and ecological requirements of the population.

The recovery effort must begin with continued and increased efforts to confirm the existence of the species. This effort should entail, at minimum, 3-5 field surveys per year, during all seasons, for 2-3 years, each survey to involve no less than three experienced herpetologists for a minimum of 5 days actual field survey time each (this includes time for surveying satellite islands around Culebra). It would also be preferable to select individuals to conduct the surveys who have extensive experience in observing and collecting other West Indian anoles, as new populations and new taxa of these animals are being continually

discovered, often in areas well worked by previous researchers. At the end of the survey period, if the lizard has not been seen, the herpetologists actually involved in the surveys and other appropriate government officials should meet to determine whether or not additional surveys are needed or reasonable.

In a letter to the Fish and Wildlife Service dated July 20, 1982, Mr. Ronald Crombie with the National Museum of Natural History cautions that the following factors should be considered when conducting these surveys:

"...we know nothing about the juveniles of A. roosevelti or the parameters of variation in adults. Rand and Andrews (J. Herp. 9(2):257-260, 1975) document that the closely related Anolis cuvieri is dimorphic (independent of sex) as an adult and monomorphic (but strikingly different from either adult morph) as a juvenile. If A. roosevelti is similarly polymorphic, identification and consequent estimation of population densities would be difficult indeed without comparative material. This problem is accentuated when extended to other islands whence giant anoles (as yet unidentified) have been reported. Anolis cuvieri (identification very uncertain) has been reported from Isla Vieques, but A. roosevelti is a more likely possibility. Unverified reports of large anoles continue from Vieques and Beef Island in the British Virgins and adequate to excellent habitat is present on both. Verification of the species involved in these sightings necessitates collection of specimen(s) and, if they prove to be A. roosevelti, the status of the species would require considerable reconsideration."

Surveying herpetologists might also consider the possibility, although very remote, of gaining some insight into the past status of the giant anole through the location and study of fossil sites, and into the present status by an examination of the gut contents of potential predators.

1.2. Conduct field studies of other giant anole species to determine representative population densities of other species to assist in setting target population levels.

This task would be initiated only if 1.1. indicates the giant anole is still present, and the survey does not yield sufficient information for setting a target population level. Extrapolating data from other species would definitely be a second choice and could only be done with reservations.

1.3. Manage forest areas to the maximum benefit of the giant anoles, as determined by ecological studies (1.1).

For the present, and continuing until such time as the lizard may be determined to be extinct, the remaining patches of forest on Culebra Island and the satellite islands around Culebra should be protected from any alterations which would involve reduction in the number and size of trees or the nature of the ground cover beneath the trees, unless it should be determined during surveys that some specific attribute of the forest is of importance to the giant anole and management information is available to allow enhancement of this (these) attribute(s).

2. Expand present forest remnants to the minimum size habitat area determined necessary under tasks 1.1 and 1.2.

About half of the land in the designated Critical Habitat area formerly belonged to the U.S. Navy and was declared as excess property in the 1970's. This excessed land, which covers approximately 485 acres and includes what is considered the prime remaining habitat for

the giant anole, was transferred to the Fish and Wildlife Service in 1982 as part of the National Wildlife Refuge System (Figure 2). Unless future biological surveys indicate otherwise, this tract may prove sufficiently large to assure perpetuation of the species within a secure management area. The surrounding land is in private holdings.

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PART III.

IMPLEMENTATION SCHEDULE

Priorities within this section (Column 4) have been assigned according to the following:

- Priority 1 - Those actions absolutely necessary to prevent extinction of the species.
- Priority 2 - Those actions necessary to maintain the species' current population status.
- Priority 3 - All other actions necessary to provide for full recovery of the species.

IMPLEMENTATION SCHEDULE

General Category	Plan Task	Task Number	Priority	Task Duration	Responsible Agency		Estimated Fiscal Year Costs			Comments/Notes
					FMS Region	Program	Other	FY 1	FY 2	
I1, I3	Conduct status surveys for the giant anole	1.1	2	2-3 yrs.	4	Contractor, DNR*	30,000	30,000	30,000	Possibly for a future fiscal year
I6	Conduct field studies for other giant anole species	1.2	3		4					For present, limit action to protection only
M3	Habitat management/protection on Culebra and vicinity	1.3	1	Continuing	4	Refuges				
										*Puerto Rico Department of Natural Resources

GIANT ANOLE

## GENERAL CATEGORIES FOR IMPLEMENTATION SCHEDULES \*

## Information Gathering - I or R (research)

1. Population status
2. Habitat status
3. Habitat requirements
4. Management techniques
5. Taxonomic studies
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contaminant
13. Reintroduction
14. Other information

## Management - M

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

## Acquisition - A

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

## Other - O

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

\* (Column 1) - Primarily for use by the U.S. Fish and Wildlife Service.