Culebra Island Giant Anole
(*Anolis roosevelti)*

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Southeast Region
Caribbean Ecological Services Field Office
Boquerón, Puerto Rico

5-YEAR REVIEW
Culebra Island Giant Anole *(Anolis roosevelti)*

I. GENERAL INFORMATION

A. Methodology used to complete the review:

In conducting this 5-year review, we relied on the best available information pertaining to distribution, life history, habitat, and potential threats of this species. We announced initiation of this review and requested information concerning the biology and status of the species in a published *Federal Register* notice with a 60-day comment period (71 FR 56545). We received no new information from the public on the Culebra giant anole.

A Service biologist prepared the 5-year review that summarizes information that was gathered in the species file since it was listed. Specific sources included the final rule listing this species under the Endangered Species Act, the Recovery Plan, peer reviewed scientific publications, unpublished field observations by the U.S. Fish and Wildlife Service, state and other experienced biologists, and notes and communications from other qualified individuals. There is no new information regarding the historical distribution of the species. We found no new information about the species' status.

B. Reviewers

Lead Region: Southeast Region, Kelly Bibb, (404) 679-7132

Lead Field Office: Caribbean Ecological Services Field Office, Felix López, (787) 851-7297, ext. 210

C. Background

1. Federal Register Notice citation announcing initiation of this review: September 27, 2006. 71 FR 56545.

2. Species Status: 2013, unknown. The species is possibly extirpated from Culebra and Vieques Islands. Based on the best available information in our records, the species has not been observed since 1932 in the U.S. Caribbean. Procter and Fleming (1999) did report the species occurring in the British Virgin Islands (BVI). There have been several sightings reported in recent years but none has been substantiated. There is no additional information regarding the species' status.

3. Recovery achieved: 1 (1 = 0-25% species' recovery objectives achieved)

4. Listing history
Original Listing

FR notice: 42 FR 37371
Date listed: July 21, 1977
Entity listed: Species
Classification: Endangered

5. Associated rulemakings: None.

6. Review History:

The final rule to list the Culebra Island giant anole (*Anolis roosevelti)* and the Culebra Island giant anole recovery plan (hereafter the recovery plan) are the most comprehensive analyses of the species' status and are used as the reference point documents for this 5-year review.

At the time of listing, very limited information was available on the status and distribution of the species. Grant first described the species in 1931 based on one specimen collected by a local child (see probable type locality figure 1) on Culebra Island, Puerto Rico (Grant 1931). In 1932, he received and reported another specimen also collected by a local resident from Culebra (Grant 1932). No additional specimens were collected until the development of the recovery plan (USFWS 1983). Therefore, the recovery plan was based only on the information from these two collected specimens.

It is uncertain as to the possible causes of decline and extinction of this species in Culebra, Vieques, and St. John, U.S. Virgin Islands (USVI). We can speculate that the extensive deforestation that occurred between the mid-19th to mid 20th centuries was the main ecological factor affecting the species. The absence of sightings and information on habitat use, preclude us from identifying other limiting factors. However, the recovery plan did suggest, that predation by native and non-native lizards, snakes, and birds could be a potential threat to the recovery of the species.

A species' review was conducted for the Culebra Island giant anole in 1991 (56 FR 56882). In this review, the status of many species was simultaneously evaluated with no in-depth assessment of the five factors or threats as they pertain to the individual species. The notice stated that the Service was seeking any new or additional information reflecting the necessity of a change in the status of the species under review. The notice indicated that if significant data were available warranting a change in a species' classification, the Service would propose a rule to modify the species' status. No change in the Culebra Island giant anole listing classification was found to be appropriate.

Recovery Data Call: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013. Every year the Service reviews the status of listed species and update species information in the Recovery Data Call (RDC).

7. Species' Recovery Priority Number at start of review (48 FR 43098): 5. At the time of listing, the Culebra giant anole was recognized as a species with high degree of threat and low recovery potential. There were not known existing populations throughout its range.

8. Recovery Plan:

Name of plan: Culebra Island Giant Anole Recovery Plan
Date issued: January 28, 1983

II. REVIEW ANALYSIS

A. Application of the 1996 Distinct Population Segment (DPS) policy

1. Is the species under review listed as a DPS? No.

2. Is there relevant new information that would lead you to consider listing this species as a DPS in accordance with 1996 policy? No.

B. Recovery Criteria

1. Does the species have a final, approved recovery plan containing objective, measurable criteria? Yes. The Culebra giant anole has a final recovery plan establishing delisting as the recovery objective. However, the recovery criteria are not entirely measurable.

2. Adequacy of recovery criteria

a. Do the recovery criteria reflect the best available information on the biology of the species and its habitat? No. The recovery plan contained limited information, based on only two specimens collected in the early 1930s. Additional museum collections have existed in Europe since the 19th Century but that information was unknown at the time that the recovery plan was written. We considered this new information in this 5-year review, and will discuss it below.

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threat)? No.

3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information.

According to the Plan, the Culebra Island giant anole will be considered for delisting when the following conditions are met:

1. Field studies have determined that the species is still extant in the wild

on Culebra Island.

2. These studies have identified the biotic and abiotic factors essential for the species' continued survival.
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.
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.

Since the plan was developed, no living individuals have been located despite several survey attempts; thus, none of these criteria have been met.

C. Updated Information and Current Species Status

1. Biology and Habitat

a. Abundance, population trends (e.g., increasing, decreasing, stable), demographic features, or demographic trends:

The species has not been located since 1932, and information about its abundance is unavailable. Population trends, demographic features and trends are not possible to define because only between eight or nine specimens in total have ever been collected. Of the six specimens whose locations are currently known, four are male and two are female.

b. Genetics, genetic variation, or trends in genetic variation:

No new information exists regarding genetics of the species.

c. Taxonomic classification or changes in nomenclature:

Since it was originally described, the taxonomic status and nomenclature of the Culebra giant anole has not changed. The validity of its classification was confirmed by a work conducted on the phylogeny of anoles species (Poe 2004).

d. Spatial distribution, trends in spatial distribution, or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

At the time of listing, only two collected specimens were known to exist, both from Culebra Island. Drs. Gregory C. Mayer and Mogens Andersen documented seven additional museum specimens in the late 1990s (Mayer,

pers. comm. 2007). The previously known historical range of the Culebra giant anole expanded to include the island of Vieques (PR), the island of St. John (USVI), and the island of Tortola (BVI). Two specimens are missing from Denmark museums. Another specimen that was last known to be in the possession of herpetologist E.D. Cope is also missing (Mayer 1989). Of the two specimens that are currently missing from Denmark museums, one is known to have been collected in Tortola (BVI). The other missing specimen is believed to be a possible ninth specimen whose collection locality remains unknown (Mayer, pers. com., 2007). The two missing specimens whose collection locations are unknown will not be considered in the discussion of the species' distribution.

Culebra Island:

The two specimens collected from Culebra are the original holotypes for the species (Grant 1932). The Service is unaware of any surveys for the Culebra giant anole between 1932 and 1985 on this Island.

Ava Gaa Ojeda Kessler visited the Culebra archipelago (Figure 1) in 1986 to conduct interviews with local residents older than 50 years of age to collect anecdotal information of the possible presence of the Culebra giant anole on the Island, and to eliminate the potential for false reports. She presented them photographs of collected specimens of the Culebra giant anole, other *Anolis* species, and the introduced Green Iguana (*Iguana iguana*). Kessler (1987) interviewed Mr. Dimas Villanueva who captured one of the original holotypes for Major Grant in 1932. Mr. Villanueva mentioned during the interview that after he collected the specimen for Grant, he never saw another lizard that closely resembled the Culebra giant anole again. Kessler (1987) stated that the testimony provided by Mr. Villanueva and his contemporaries appears to support the belief that the Culebra giant anole was very rare on Culebra, even in the early 1930s. Other "old timers" interviewed by Ms. Kessler who also caught lizards and snakes for Grant reported never seeing anything like the lizard captured by Mr. Villanueva ever again (Kessler 1987).

The above-mentioned information conflicts with the original information contained in the Plan that mentions Mr. Villanueva reporting seeing this species as late as 1978 feeding on the fruits of Ficus trees (USFWS 1983).

In addition, Mr. Villanueva's statement also contradicts the statements recently made by Mr. Villanueva's son, Mr. Dimas Villanueva Jr. to Service biologist Silmarie Padrón. He stated that he helped his father capture reptiles for collectors including a male and female specimen of Culebra giant anole. He stated that he and his father captured the pair from the U.S. Virgin Islands, brought them back to Culebra, and released them at Playa Larga. He did not clarify which of the U.S. Virgin Islands

that they captured these specimens on, but mentioned a collection site called Yellow (town or bay). He also went on to give a detailed description of the Culebra giant anole and the differences between it and the *Iguana iguana*. He also described searching for the Culebra giant anole in the higher canopies (Padrón, pers. comm. 2007).

Kessler (1987) searched for the Culebra giant anole in Monte Resaca, San Isidro, Cerro Balón, Punta Molero, Punta Almodovar, Punta del Viento, Punta Vaca, Punta Carenero and Punta Padilla (Figure 1). She also surveyed Culebrita (PR) and Cayo Luis Peña (PR) (Kessler 1987). Surveys were conducted in forested habitats such as mangroves, coastal forest and other subtropical dry forest formations that could possibly support an anoline lizard. She used a systematic boustrophedon (serpentine) pattern and a selection of random parallel transects oriented from the top of a mountain to sea level and back to the top in an attempt to survey and cover as much area as possible. Kessler and her team also conducted diurnal searches with the aid of binoculars. These survey efforts were concentrated in the semi-moist boulder, dry and littoral forests, and mangrove areas. In spite of these extensive surveys, she was unable to find any evidence that the species still exists in Culebra. Kessler also conducted surveys in the islands of Vieques and St. John without success.

Dr. Jorge Moreno, former director of the Terrestrial Resources Division of the Puerto Rico Department of Natural and Environmental Resources (PRDNER), conducted searches in Culebra after Hurricane Hugo in 1989, but found no specimens and stated that the species was possibly extinct. However, he recommended conducting surveys on Vieques, Tortola and St. John (Moreno 1991).

Dr. Kevin de Queiroz of the National Museum of Natural History Smithsonian Institution and another biologist, conducted surveys for species on Culebra and Cayo Luis Peña (a cay near Culebra) in 2002 and 2004. They spent approximately 19 person/search hours with negative search results (K. de Queiroz, pers. comm. 2007).

Vieques Island:

Ms. Kessler and Dr. Richard Thomas, from the University of Puerto Rico, Rio Piedras Campus, and one of his graduate students, conducted a two-week long search in Vieques (Kessler 1987; Figure 2). Surveys were restricted to the Monte Pirata since they believed that the forest types in the area would be the most likely to harbor giant anoles. Kessler described the area of Monte Pirata as consisting of vegetation that was much lusher and better preserved than that of Culebra. According to her description, the lowland and coastal areas contained vegetation with mats

of vine tangles hanging from the trees all the way to the ground and over streams. Although this type of habitat was considered ideal for the collection of giant anoles, the Culebra giant anole was not found at any of the study sites, nor was there any evidence that this lizard still exists in the U.S. Caribbean (Kessler 1987).

Aerial photos from 1934 and 1964 show Monte Pirata as densely forested while the rest of the island was clear of forests (DNER, PRTC and DOI 2002). Vieques Island was deforested by the end of the 19th century mostly due to the sugar cane industry. With the turn of the 20th century, the Vieques sugar cane industry started declining and their lands served as forage lands until 1940. By 1941, the U.S. Navy acquired 2/3 of Vieques for military purposes, allowing the vegetation to regenerate and develop into the secondary forests observed today on the Island (Figure 4).

Dr. Kevin de Queiroz and another biologist conducted surveys in 2002 and 2004 in the north central coast, and in an area called Secret Beach (Figure 2) of Vieques for approximately five person/search hours. They also searched the area of Monte Pirata assisted by Mike Barandiaran, Manager for Vieques National Wildlife Refuge, for approximately 7.5 person search hours, again without success (K. de Queiroz, pers. comm. 2007).

U.S. Virgin Islands:

In August 1986, Kessler and her team spent a few days searching in the Island of St. John, also with negative results (Kessler 1987). In November 2004, Dr. Kevin de Queiroz and Dr. Renata Platenberg of the USVI Department of Planning and Natural Resources, Division of Fish and Wildlife (DPNR-DFW) also conducted surveys on the Island of St. John, specifically in the Reef Bay Trail area for approximately 6 person/search hours, and had no positive results (K. de Queiroz, pers. comm. 2007). This area is located within the V.I. National Park/V.I. Coral Reef National Monument.

Rafe Boulon (NPS-USVI, pers. comm., 2007) stated that the terrestrial portion of the V.I. National Park/V.I. Coral Reef National Monument includes approximately 6,958.49 acres (2,816 hectares) (Figure 5). Most of the forests consist of secondary growth (post-plantation era) and represent some of the best dry tropical forest types found in the Caribbean.

British Virgin Islands:

Dr. James Lazell of the Museum of Comparative Zoology and Department of Organismic and Evolutionary Biology at Harvard University (hereafter MCZ) has searched for the species, although not intensively, in the USVI and BVI for the last twenty years, but has never

seen one. However, he feels that the best place to look would be undisturbed areas both on the Western and Eastern sides of Vieques. He has reported receiving "plausible reports" of recent sightings in the BVI's, where an arachnologist reported seeing a huge Anole while working on Guana Island (BVI). Also, an entomologist working in the remnant rain forest on Sage Mountain, Tortola, BVI, reported sighting a huge anole and describes it as an anole as big as the biggest male *Anolis cristatellus*, but obviously female: light mid-dorsal stripe; no crests, with very large, expanded digital pads. Dr. Lazell suggests this as, "a perfect description of a female Culebra giant anole (Lazell, pers. comm., 2007). In November 2007, we received a copy of this manuscript from Dr. Jonathan B. Losos also of the MCZ.

Dr. Gad Perry of Texas Tech University also reported receiving the same reports as Dr. Lazell (Perry, pers. comm., 2007). However, Dr. Perry has never been able to confirm those sightings, and he believes that the Culebra giant anole is probably extinct in the BVI's (Perry and Gerber 2006). Dr. Perry also conducted sporadic searches for the Culebra giant anole over the last decade in the USVI and BVI, including Sage Mountain on Tortola (BVI) and Guana Island (BVI). He suspects that the lizard never existed in the latter (Perry, pers. comm., 2007). On September 2006, Dr. Losos and Dr. de Queiroz spent approximately 48 person/ search hours in Guana Island (BVI) and at other locations in the British Virgin Islands without success. However, Dr. Losos believes that there is still plenty of suitable habitat in the Virgin Islands where the species may still exist (Losos, pers. comm., 2007). For this reason, he believes that the Culebra giant anole may still be extant**,** but remains undetected (Losos, pers. comm., 2007). Nonetheless, Dr. Losos did not specify what type of habitat he would consider suitable for the species.

In summary, although surveys were conducted in Culebra (PR), Vieques (PR), St. John (USVI) and BVI without observing a live specimen, some researchers still believe that the species may still exist. There is a reasonable probability that the species was not found because, based on experts' opinion, giant anoles are often hard to find even where they are known to occur. Except for a few well-conducted surveys of the Culebra giant anole (e.g., Kessler), most surveys have been sporadic and not comprehensive in design. In the absence of a described habitat and behavior of this species, for instance, it would be very difficult to aim the search at specific trees species, tree height, and other habitat variables. Furthermore, there are many experts in systematic classification, particularly those researchers who have "rediscovered" other presumed extinct species (e.g. the Jamaican Iguana, a much larger lizard (several feet long)), that have not searched for the Culebra giant anole (Hedges, pers. comm., 2007).

e. Habitat/ecosystem conditions:

Efforts have been conducted to search for the species in Culebra, Vieques, St. John, Tortola, and Guana Island, but the species has not been located since 1932. Furthermore, the collected specimens from Culebra, Vieques, and St. John were brought to the researchers rather than having been collected personally. Therefore, there is no concrete information on the habitat of the species, past or present.

Kessler (1987) extrapolated information from other closely related anoles (e.g. *A. cristatellus*) and inferred that the Culebra giant anole would generally be a crown inhabitant, and would also forage on the ground and sometimes sleep low on a tree trunk. She also said that it could be speculated that like other male anoles, the Culebra giant anole would be territorial and defend a harem of females that move freely within its domains. She continued on by stating, "The territorial behavioral displays exhibited by the males of this genus such as doing push-ups, rushing forward, and flashing their dewlaps at intruders, made them conspicuous and exposed to predators." She finished by stating that, "In general, a large male *Anolis* would be more obvious than the females of the genus due to their behavior." At the time of listing, we only had information about males of the species. However, based on the specimens examined by Dr. Mayer, which included females of the species, we have additional biological information regarding the physical characteristics of both the male and female of the species. According to Mayer (1989) females are smaller with a maximum SVL (snout to vent length) that is approximately 88.8% that of a male. Females also lack the tale crest, have a smaller dewlap, and do not have enlarged postanals. Mayer (1989) also stated that there is a slight geographic variation among specimens. More specifically with the Culebra specimens, the anterior supralabial extends dorsally to contact the nasal. The specimen without a known locality demonstrates these same characteristics. With the Vieques specimens, these two scales are not in contact. The Culebra specimens have a somewhat more swollen, tubercular, and rugose head scales, especially on the posterior portion of the head. Dr. Mayer concludes by saying: "Despite the diagnosability of the two island populations on the basis of these traits, the sample size is too small to attribute any great significance to these differences" (Mayer 1989).

2. Five Factor Analysis

a. Present or threatened destruction, modification or curtailment of its habitat or range:

At the time of listing, and when the recovery plan for the species was approved, deforestation for residential and tourist development projects

was considered an imminent threat to its survival. Additionally, researchers have not found live individuals since 1932. Nonetheless, at the time of listing, the Service also designated critical habitat for the species in Culebra (Figure 3). Part of the lands designated as critical habitat lay within the USFWS Culebra National Wildlife Refuge (Figure 3). The remaining habitat is located on private lands in the north-northeastern portion of the Island, which is currently under high development pressure for tourism or residential projects. Habitat modification related to these projects could possibly affect the habitat characteristics necessary for the species' survival, should any individuals remain extant.

Forested area in Puerto Rico (including Vieques and Culebra islands) has increased 147% from 1951 to 2000 due to the economic shift away from agriculture on the island (Kennaway and Helmer 2007). However, unprotected forests remain vulnerable to development, especially those forests that are in close proximity to urbanized areas (Kennaway and Helmer 2007). The subtropical dry forest life zone covers sizable areas of Culebra, Vieques, and St. John, and is the driest life zone in the U.S. Caribbean (Ewel and Whitmore 1973). This life zone receives a mean annual rainfall ranging from 24 to 40 inches (60 to 100 centimeters). The vegetation in this zone typically forms a nearly continuous single-layered canopy, with little groundcover, and it is deciduous on most soils. The leaves of dry forest species are succulent or coriaceus (leathery), and species with spines and thorns are common. Tree heights usually do not exceed 49 feet (15 meters) and crowns are typically broad, spreading and flattened (Ewel and Whitmore 1973).

Although the exact collection locations of the recently recovered museum specimens collected in Vieques are currently unknown, approximately 1,800 acres of relatively undisturbed habitat for the Culebra giant anole lies within the boundaries of the 17,769-acre Vieques National Wildlife Refuge (Figure 4) (O. Díaz, USFWS, pers. comm., 2007). In addition to the protected areas managed by USFWS, Para La Naturaleza (formerly known as the Puerto Rico Conservation Trust) administers a parcel known as Cerro el Buey Reserve, which consists of approximately 600 acres of land adjacent to the Vieques NWR. This area and some private lands located on Cerro Martineau were identified by O. Díaz (USFWS, pers. comm., 2007) as potential suitable habitat for the species in Vieques.

On the Island of St. John, there are approximately 6,958.49 acres (2,816 hectares) of terrestrial area within the USVI National Park administered by the U.S. National Park Service (Figure 5). This habitat is considered some of the best dry-tropical forest habitat remaining in the Caribbean, and is used by other large *Anolis* species.

Based on the above discussion, approximately 85% of the potential suitable habitat for the Culebra Island giant anole remains in protected areas, in Culebra, Vieques, and St. John. Although the majority of the potential suitable habitat for the species occurs in protected lands, remaining potential habitat in Culebra within designated critical habitat under private status, may still be threatened by residential and tourism development. Therefore, we still believe that habitat modification should be considered a threat to the species, if it remains present. However, we consider this threat low in scale as most habitat is under protected status.

b. Overutilization for commercial, recreational, scientific, or educational purposes:

In the final rule, the Service did not consider this factor in the decline of the species. At the present, we are not aware that overutilization for commercial, scientific, or educational purposes constitutes a limiting factor for the Culebra giant anole.

c. Disease or predation:

With no documented live individuals at the moment, we are not aware that disease or predation constitutes a limiting factor for the species.

d. Inadequacy of existing regulatory mechanisms:

Two years after the recovery plan for this species was approved (1982); the PRDNER (then known as the Puerto Rico Department of Natural Resources) entered into the ESA Section 6 Cooperative Agreement with the Service. At the time, that agency had in place the Wildlife Law of Puerto Rico (Law No. 70 of 1976), under which all federally listed species also were protected. In 1999, the Commonwealth of Puerto Rico amended Law No. 70 and approved Law No. 241, known as the "Nueva Ley de Vida Silvestre de Puerto Rico" (New Wildlife Law of Puerto Rico). The purpose of this law is to protect, conserve, and enhance both native and migratory wildlife species, declare property of Puerto Rico all wildlife species within its jurisdiction, and regulate permits, hunting activities, and exotic species, among others.

In 2004, the PRDNER approved the "Reglamento para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico" (Regulation 6766) to regulate the management of threatened and endangered species in Puerto Rico. The Culebra giant anole was listed as critically endangered under this regulation, which prohibits collecting, harassing, hunting, removing, among other activities, listed species within the jurisdiction of Puerto Rico. This regulation also protects the Culebra giant anole critical habitat designated by the Service.

The Culebra giant anole is currently protected in USVI by the Virgin Island Code, Title 12 - Chapter 2; Protection of Indigenous, Endangered and Threatened Fish, Wildlife and Plants of the Endangered and Indigenous Species Act of 1990. The purpose of this Chapter is to protect, conserve and manage indigenous fish, wildlife and plants, and endangered or threatened species for the ultimate benefit of all Virgin Islanders, now and in the future. The Section 105 of this Chapter prohibits the harassment, injury or killing, or the attempt to do the same, or sell or offer for sale any specimen, or parts or products of an endangered or threatened species.

The species *Anolis roosevelti* is listed on Appendix I of the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES). This subspecies is also protected by the Lacey Act (P.L. 97-79, as amended; 16 U.S.C. 3371 et seq.) which makes it unlawful to import, export, transport, sell, receive, acquire, or purchase any wild animal (alive or dead including parts, products, eggs, or offspring) under this Act.

In the U.S. Caribbean, the species, although not recently observed, continues to be protected by Federal, Commonwealth, and Territorial laws and regulations. Therefore, we believe that inadequacy of existing regulatory mechanisms should not be considered a threat to the Culebra giant anole.

e. Other natural or manmade factors affecting its continued existence:

Due to the unknown status of the species, we cannot conclusively determine the effect that natural or manmade factors may have had on the species. However, based on the effects that these factors have on closely related *Anolis* species, we can infer that the Culebra giant anole would be vulnerable to either natural or manmade catastrophic events. Catastrophic natural events such as hurricanes, may dramatically affect forest species composition and structure, felling large trees and creating numerous canopy gaps. Furthermore, fire is not a natural component of subtropical dry forest in Puerto Rico and Virgin Islands. Hence, species found in this type of habitats are not fire adapted, so human-induced fires constitute a threat the Culebra giant anole and its habitat.

D. Synthesis

The Culebra giant anole is a large brownish gray lizard with a 160 mm SVL (snout to vent length) similar in length and taxonomically related to the *Anolis cuvieri* group. The species was listed as endangered due to its extreme rarity (last confirmed sighting in 1932) and its seemingly limited distribution to Culebra Island. New information from eight to nine known museum specimens has expanded our knowledge of the species' historical range consisting [i.e., Culebra (PR), Vieques (PR), St. John (USVI), and

Tortola (BVI)]. All of the specimens were collected between the late 1800s and the early 1930s. There is no direct evidence for the causes of its endangered status, but it may be the result of the extensive deforestation in Culebra and Vieques Islands for agricultural purposes during that same time period. During the last three decades, numerous researchers have conducted extensive searches for the species, but no single individual has been sighted in the wild. Nevertheless, some researchers may argue the efforts invested on these surveys are not off sufficient duration to rule out the existence of the species throughout its range.

Due to the current lack of definitive evidence that the species is in fact extinct, new surveys would be needed, contingent on the procurement of adequate funding, in all areas with potential habitat for the species. We believe that once these new surveys are completed, the Service will have the best available information for the possible delisting the Culebra giant anole due to extinction.

III. RESULTS

A. Recommended Classification:

_____ Downlist to Threatened.
_____ Uplist to Endangered.
_____Delist.
__X__ No change is needed.

B. New Recovery Priority Number: 17 Based on the above analysis, we believe that both the level of threat to the species, and the recovery potential are low.

C. If applicable, indicate the Listing and Reclassification Priority Number:

Delisting (Removal from list regardless of current classification) Priority Number:

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

Based on our five listing factors analysis, if the species and its habitat remain, it would not be impossible that a relic population(s) may exist. If existent, the Culebra giant anole and its habitat may be threatened by modification, and manmade and natural catastrophic events. Therefore, as proposed by some researchers, more intensive and comprehensive surveys should be conducted to verify the status of the species.

Within the next 5 years, contingent on adequate funding, the Service recommends gathering expert opinion to develop a habitat suitability model and choose the best areas to search for the species. Comprehensive searches by well-qualified anolis experts in forested habitats need to be conducted in Culebra, Vieques, St. John and Tortola.

V. REFERENCES

Ewel, J.S. and J.L. Whitmore. 1973. Ecological life zones of Puerto Rico and the U.S. Virgin Islands. USDA Forest Service. Res. Paper ITF-18. 72pp.

Grant, C. 1931. A revised list of the herpetological fauna of Culebra Island. Journal of the Department of Agriculture of Porto Rico. 15: 215.

Grant, C. 1932. The herpetology of Vieques Island. The Journal of the Department of Agriculture of Porto Rico. 16(1): 37-39.

Kennaway, T. and Helmer, E.H. 2007. The forest types and ages cleared for land development in Puerto Rico, GIScience & Remote Sensing. 44(4): 356-382.

Mayer, G.C. 1989. Deterministic aspects of community structure in West Indian amphibians and reptiles. Ph.D. dissertation. Harvard University, Cambridge, Mass. 32pp.

Moreno, J. 1991. Accounts of those species considered to be of concern. In Status y distribución de los reptiles y Anfibios de la región de Puerto Rico. Jorge A. Moreno (Editor). Publicación Científica Miscelánea No. 1. Departamento de Recursos Naturales de Puerto Rico, San Juan, Puerto Rico. 67pp.

Ojeda-Kessler, A.G. 1987. Culebra Giant Anoles Status Determination Study. Final Report. Scientific Research Area. Departamento de Recursos Naturales de Puerto Rico, San Juan, Puerto Rico. 29pp.

Perry, G. and G.P. Gerber. 2006. Conservation of amphibians and reptiles in the British Virgin Islands: Status and patterns. Applied Herpetology 3:237-256.

Poe, Steven. 2004. Phylogeny of Anoles. Herpetological monographs. 37-89.

Procter, Deborah, and L. Vincent Fleming, eds. 1999. Biodiversity: the UK overseas territories. Peterborough: Joint Nature Conservation Committee.

Puerto Rico Department of Natural and Environmental Resources, Puerto Rico Conservation Trust, and United States Department of the Interior. 2002. Management Plan for the Western Vieques Conservation Areas Vieques, Puerto Rico. 99 pp.

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

VII. APPENDICES:

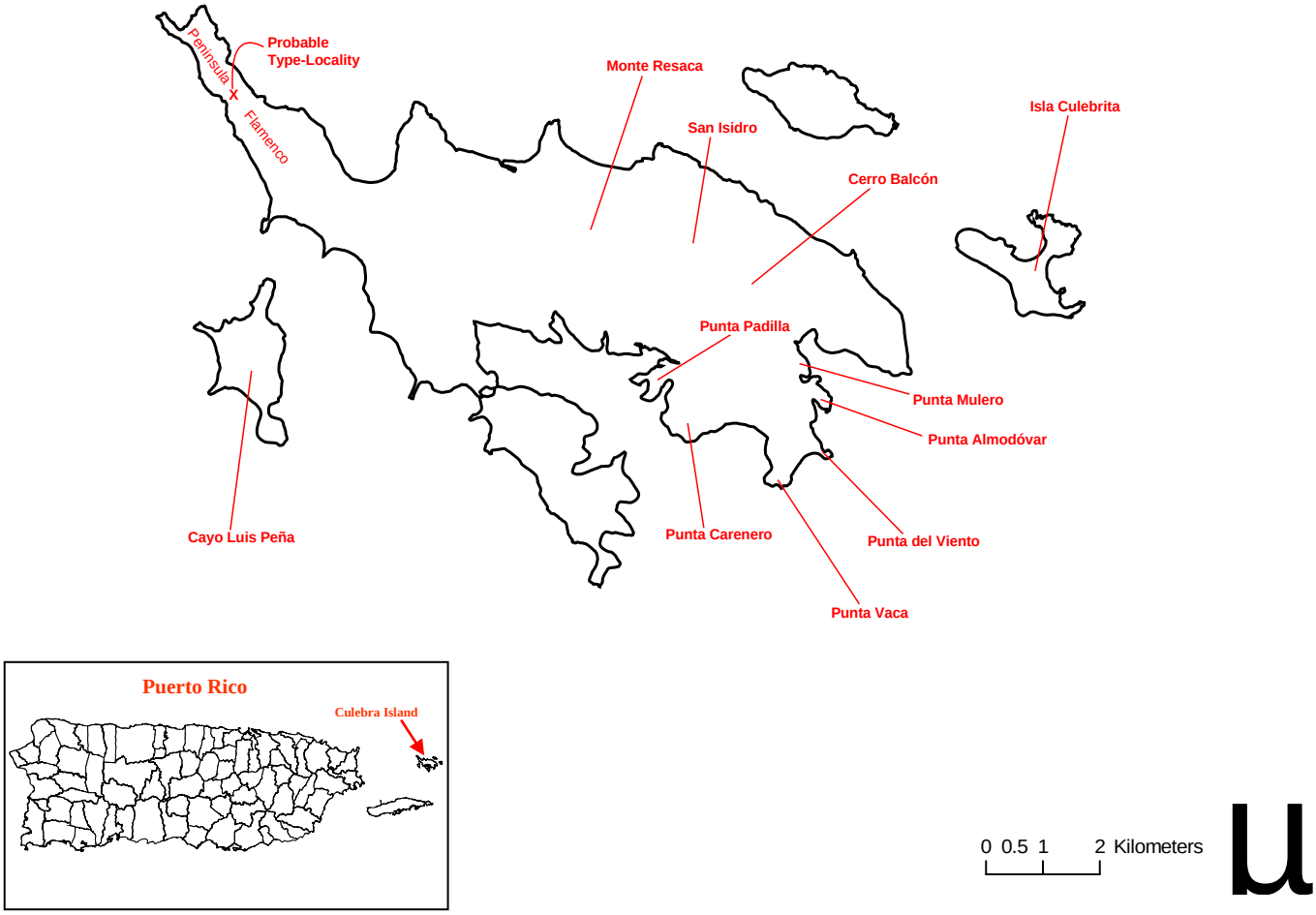

Figure 1. Kessler (1986) Search Sites on Culebra Island (PR). Data source: Puerto Rico Base Map from Puerto Rico Planning Board UTM27.

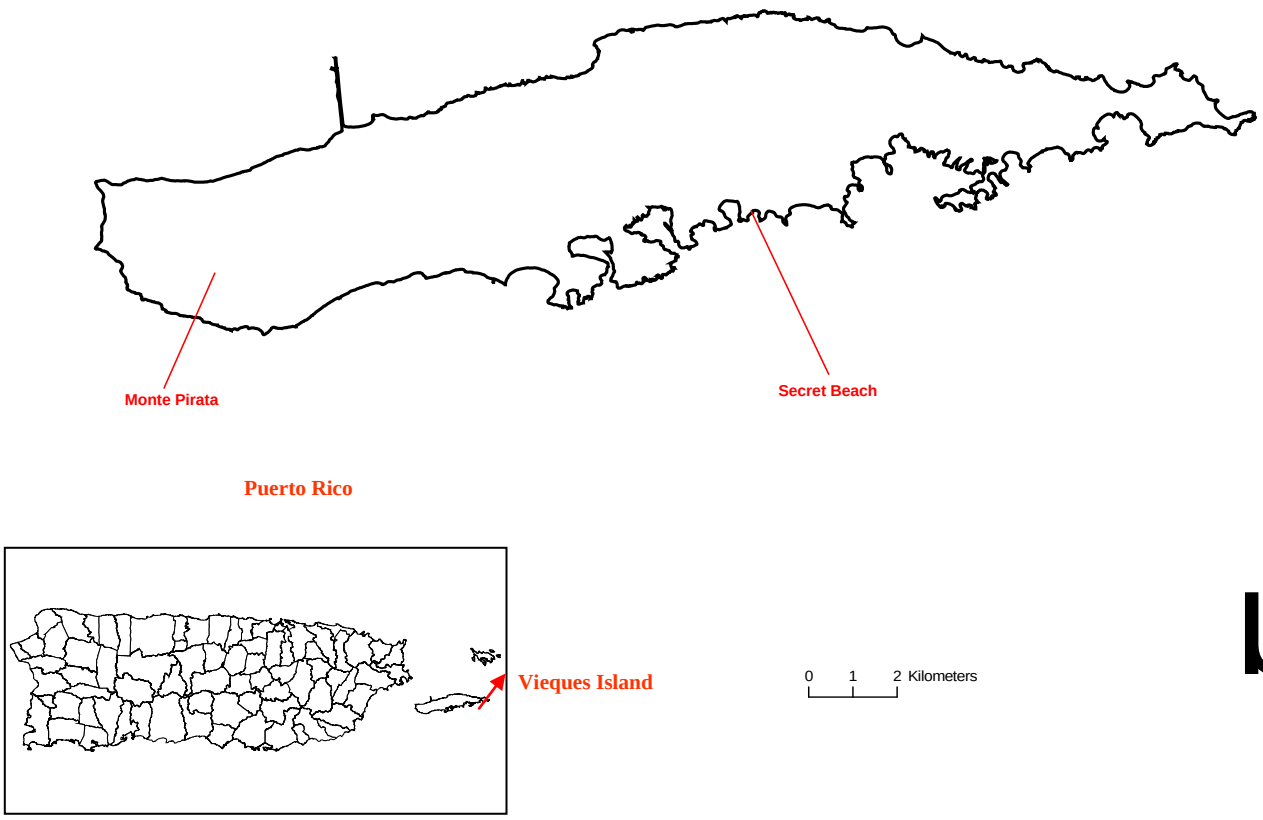

Figure 2. Kessler (1986) Search Sites on Vieques Island (PR). Data source: Puerto Rico Base Map from Puerto Rico Planning Board UTM27.

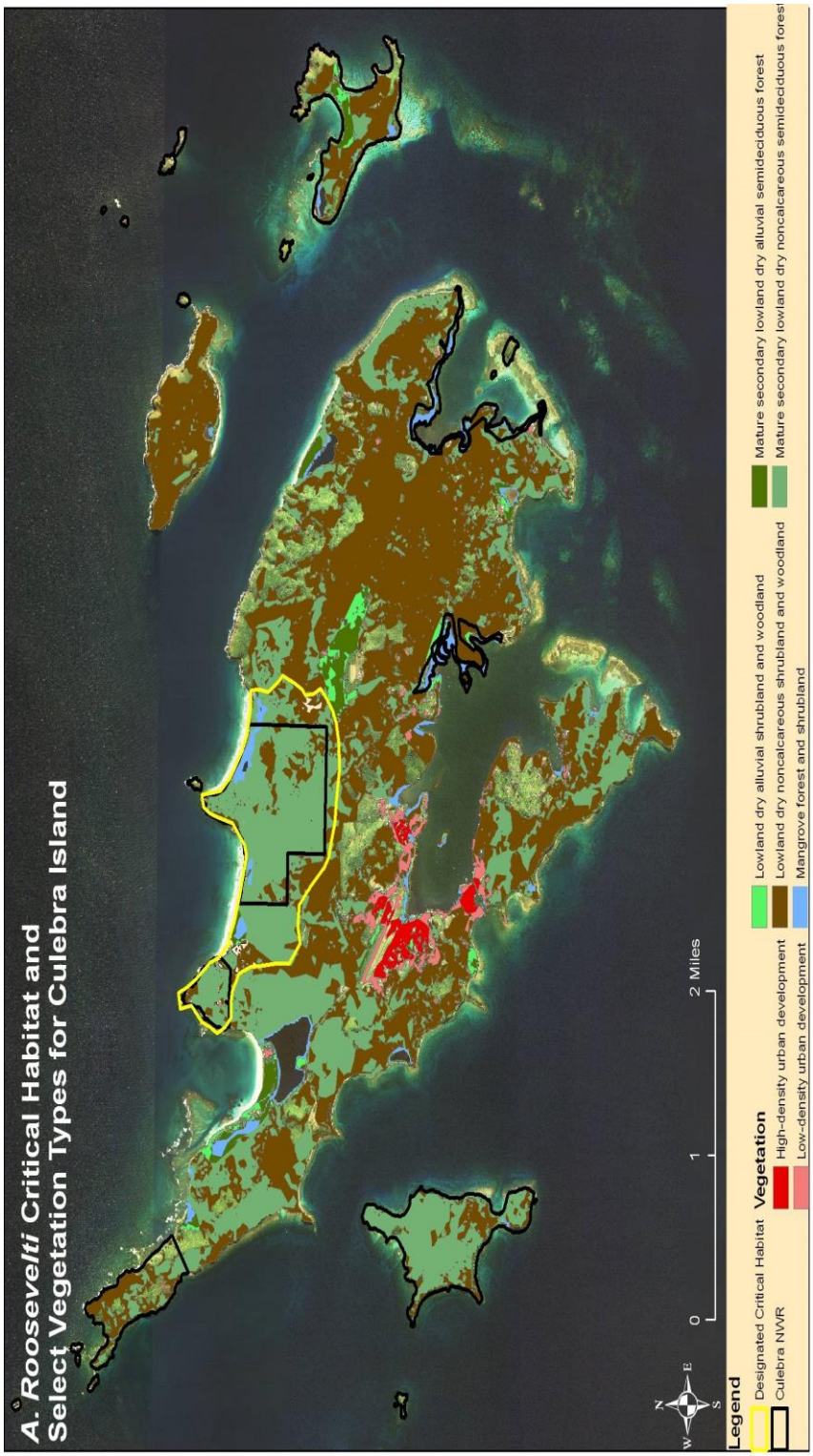

Figure 3. Culebra giant anole critical habitat and vegetation associations on Culebra Island. Aerial Orthphotography 2004, USFWS R4 Realty Office and USDA Forest Service IITF.

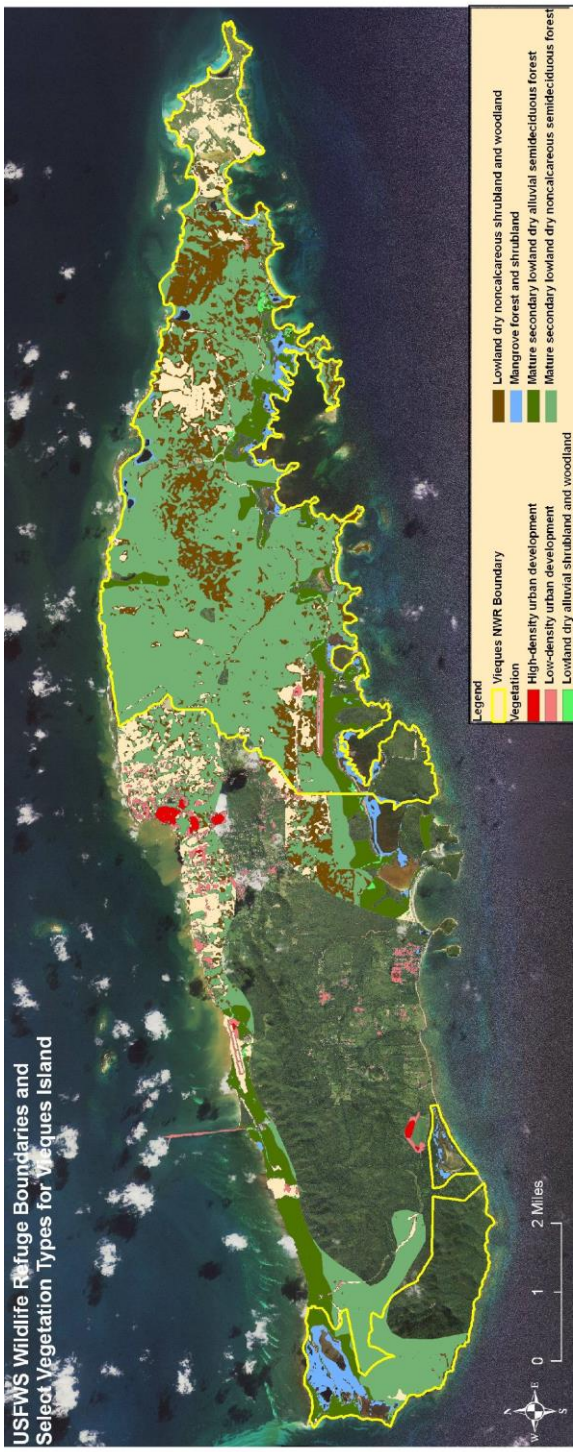

Figure 4. Vieques Island National Wildlife Refuge. Aerial Orthphotography 2004, USFWS R4 Realty Office and USDA Forest Service IITF.

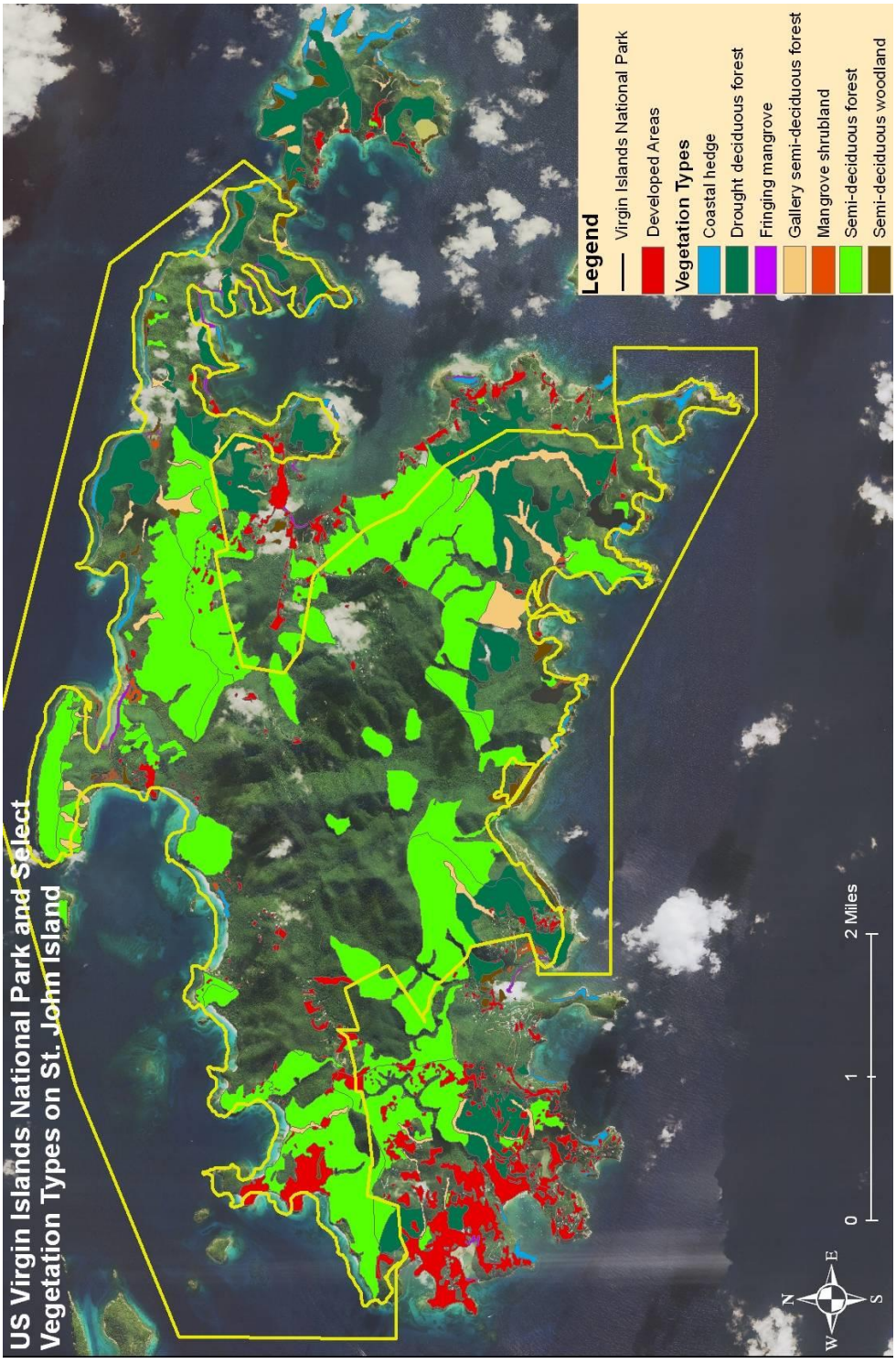

Figure 5. U.S. Virgin Island Islands National Park on the Island of St. John. Aerial Orthphotography 2004, USFWS R4 Realty Office and University of the Islands St.Thomas, USVI.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of the Culebra Island giant anole (*Anolis roosevelti*)

Current Classification Endangered

Recommendation resulting from the 5-Year Review

_____ **Downlist to Threatened**
_____ **Uplist to Endangered**
_____ **Delist**
__X__ **No change is needed**

Appropriate Listing/Reclassification Priority Number

Review Conducted By Felix López, Caribbean Ecological Services Field Office

FIELD OFFICE APPROVAL:

Edwin E. Muñiz, Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve Edwin Muñiz Date Dec 10, 2013

REGIONAL OFFICE APPROVAL:

for
Lead Regional Director, U.S. Fish and Wildlife Service

Approve Aaron L Wat Date 1-14-14