

Golden coquí
(*Eleutherodactylus jasperi*)

5-Year Review:
Summary and Evaluation



April 2022

U.S. Fish and Wildlife Service
South Atlantic–Gulf Region
Caribbean Ecological Services Field Office
Boquerón, Puerto Rico

5-YEAR REVIEW

Golden coquí (*Eleutherodactylus jasper*)

I. GENERAL INFORMATION

A. Methodology used to complete the review:

The U.S. Fish and Wildlife Service (Service) conducts status reviews of species on the List of Endangered and Threatened Wildlife and Plants (50 CFR 17.12) as required by section 4(c)(2)(A) of the Endangered Species Act (Act; 16 U.S.C. 1531 et seq.). The Service provides notice of status reviews via the Federal Register and requests information on the status of the species. Data for this status review were solicited from interested parties through a Federal Register notice announcing this review on March 25, 2020 (85 FR 16951). This review was prepared by the Caribbean Ecological Services Field Office and summarizes the best available information pertaining to distribution, life history, habitat, and potential threats of this species. This review considers both, new and previously existing information in the species' file, publications and reports produced since listing the species, and the latest monitoring data.

B. Reviewers

Lead Regional Office: Carrie Straight, South Atlantic-Gulf Region, 404-679-7226;
Kristi Young, South Atlantic-Gulf Region

Lead Field Office: Angel Colón-Santiago, Caribbean Ecological Services Field Office,
caribbean_es@fws.gov

C. Background

1. Federal Register Notice citation announcing initiation of this review:

March 25, 2020 (85 FR 16951)

2. Listing history

Original Listing

Federal Register Notice: 42 FR 58756

Federal Register Notice date: November 11, 1977

Entity listed: Species

Classification: Threatened

Critical Habitat was also designated as part of the final listing rule.

3. Review History

Previous 5-year Review/s: September 30, 2013. A previous status review recommending no change in status was signed in 2013. This review elaborated on the species biology and life history as well as threats for the species in the past. It was noted in the review that a significant amount of effort had been invested in the search of the species since it was first listed. All efforts to find the golden coquí after 1981 have not been successful.

4. Species' Recovery Priority Number at start of review:

5C

Degree of Threat: High

Recovery Potential: Low

Taxonomy: Species

The "C" reflects a degree of conflict with construction, other development projects, or other forms of economic activity

5. Recovery Plan:

Name of plan: Golden Coquí Recovery Plan

Date issued: April 19, 1984

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. Was the species listed prior to 1996?** Yes
- 3. Is there relevant new information that would lead you to consider listing this species as a DPS in accordance with the 1996 policy?** No
The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This species was not listed as a DPS, and we have no new information that would indicate the species should be listed as a DPS under the Service's 1996 DPS Policy.

B. Extinction

Generally, the Service considers three common criteria whenever we are assessing whether a species is extinct, e.g., detectability, survey effort, and time since last detection (see 86 FR 54298 for an example rulemaking). The scientific and commercial information available at the time of this review has led us to assess the golden coquí under and whether the species listing may no longer be warranted under the Act.

The three criteria and a brief description are:

- 1. detectability of the species** (Biological or ecological requirements as it relates to the detectability of the species, including but not limited to: Lifespan, life stage, maturation period, physical description and ease of identification, vocalization, and habitat requirements for feeding, breeding, and sheltering)
- 2. adequacy of survey efforts** (Survey efforts past and current including information on how extensive the surveys were, the methodology used in the survey, and how effective were the methods used to detect the species (i.e., were the surveys designed to effectively detect the species if it is present in the area?))

3. **time since last detection** (Last sighting of the species including a description of location of the sighting, the type of sighting (e.g., visual or auditory), length of time since last detection, and the frequency of last sightings)

1. **Detectability.**

Visual detection: The golden coquí is endemic to Puerto Rico and its distribution was restricted to a small area south of the municipality of Cayey (Service 1984, p. 1). When listed, the species was reported to occupy a total area of approximately 24 hectares (ha) (59.30 acres (ac)) (Service 1984, p. 3) on mountain tops, from 700 to 850 meters (m) (2,296-2,788 feet (ft)) in elevation, at Cerro Avispa, Monte el Gato, and Sierra de Cayey (Service 1984, pp. 1-3). The species was listed with low recovery potential. All known collected specimens were found in bromeliads located within these elevations. The species inhabited the water-filled leaf axils of dense clusters of bromeliads growing on trees, rock edges, and on the ground (Drewry and Jones 1976, p. 164; Service 1984, p. 3). The known species range is an area of relatively low rainfall but heavy moisture that promotes bromeliad growth. The known microhabitat of the species is an altitudinal zone with a dense development of bromeliads in the area. At the time of description, the species was not found in areas where bromeliads were scattered, even when interspersed with areas of dense inhabited bromeliads (Drewry 1986, p. 10).

The golden coquí “is readily distinguished from all other Puerto Rican *Eleutherodactylus* by the golden background color without dorsal markings, and lack of dark pigmentation on the ventral surface” and by the lack of prevomerine teeth (Drewry and Jones 1976, p. 164). In life, dorsally, the color is a uniform olive-gold to yellow-gold. If the frog is disturbed, the color may pale (Drewry and Jones 1976, p. 162). The golden coquí can be distinguished by its sometimes-metallic reflections mainly around the upper eyelids, by its flattened head, which is constricted posteriorly, and having distinct, protruding glandules along the flanks (Rivero 1998, p. 323). However, the golden coquí’s most distinguishing feature is its ovoviviparous habits. The females give birth to small frogs within the mother’s oviduct, and the young frogs are exact copies of the mother (Rivero 1998, p. 323). This characteristic makes the golden coquí the only ovoviviparous frog in the Western Hemisphere. This characteristic means that this amphibian species does not require congregation at water sources for mating and egg-laying (Drewry and Rand 1983, p. 941) and may make it harder to detect. However, all reports described it as a water dependent species with low dispersal inhabiting bromeliads in a small range at the Sierra de Cayey (Rivero 1998, p. 323; Joglar 1998, p. 107), and it has never been found out of the Sierra de Cayey. Furthermore, experts on the species agreed that after genus identification, it is simple enough to visually identify the golden coquí by comparison with photographs or descriptions, mainly because its color (Drewry 1986, p. 2; Rivero 1998, p. 323; Joglar 1998, p. 107). These distinguishing features along with the species occurring primarily on bromeliads as their primary habitat increased the probability of detection in the past and should have led to high detection probability during visual surveys since the species’ listing. Even so, despite numerous search efforts, the species has not been detected.

Sound: The call of the golden coquí consists of two to six notes of the same tone and has been described as a “tweet-tweet-tweet” emitted by the male to call the female (females don’t sing) with a frequency of 5 kHz during nighttime (Drewry 1986; p. 10; Joglar 1998; p. 108; Rivero 1998, p. 323). The scientists describing the species detailed information on the duration of calling individuals (typically from 10 to 120 seconds in a sequence) and the call description (Drewry and Jones 1976, p. 162). Drewry and Jones (1976, p. 163) also note that the “calls of golden coquí are less intense than most other frog species in the same habitat, making them difficult to hear when other species are calling loudly.” They found that the species continues to call actively between midnight and dawn when noise from the other species usually subsides. However, the golden coquí appears to rely on an auditory mating communication system in acoustic competition with the many other species that do, and the result seems to be that unless it is unusually cold or dry, some males typically call for at least part of the night on most nights (Drewry 1986, p. 10). Drewry and Jones (1976, p. 162) also note that individuals using calling in antagonistic social interactions and that “neighboring males seem to join together in loose synchronization of call sequences.” These calling behaviors make calling individuals (males) in a range of acoustic recorders or surveyors detectable. Since this species uses calling and response during social interactions, call-back surveys should increase the probability of detection for the species during surveys. During call-back surveys, a recording of the species’ calls is played, and an observer (listener) assesses for a specified period for a response (the target species calls back). This technique was successfully used with the golden coquí in 1976 and 1978 (Drewry 1986, p. 11; Moreno 1991, p. 37). Yet, subsequent surveys using these techniques did not yield observation of a single individual golden coquí.

In summary, given the species’ distinctive visual appearance and the common belief among experts that the species is easily identifiable, we do not believe it would have been misidentified by experts working on surveys targeting the species. In addition, passive acoustic recordings had proved effective in detecting the species during the early and late 1970s (Drewry 1986, p. 11; Moreno 1991, p. 37). Thus, we believe that the species, if present, can be easily detected and identified by experts. However, no detection has been made since 1981, leading the Service to believe that the species is extinct.

2. Adequacy of Survey Efforts since 1981

The last confirmed detection of the species occurred during a survey in 1981 (Drewry 1986, p. 9; Joglar 1998, p. 110). On June 16, 1986, scientists Barbara Cintrón, Peter Ortiz, and George Drewry heard one single call in a patch of native forest on Cerro Avispa that resembled the call of the golden coquí. However, the call came from a bromeliad three to four meters up in a tree and was unreachable (Drewry 1986; p. 15). Therefore, since the bromeliad patch was inaccessible and they did not hear the call again, they could not confirm the species presence. In recent years, the use of both visual, sound (both passive and active acoustic), and call-back has been employed to increase the detectability of the species. This technique was successfully used with the

golden coquí in 1976 and 1978 by Dr. Drewry and Dr. Rivero, yielding positive species detection (Drewry 1986, p. 12.). However, subsequent species surveys using both techniques had not resulted in a single observation of the golden coquí.

The only available population estimates are those developed by scientists George E. Drewry, Julia R. Clark, and Jasper J. Loftus-Hills while conducting field investigations between 1973 and 1974 and provided to the Service as a personal communication in 1984. Their estimates were a total of approximately 1,500 to 3,000 individuals, with less than ten individuals at Cerro Avispa, 500-1,000 individuals at Monte El Gato, and 1,000-2,000 individuals at Sierra de Cayey (Service 1984, p. 3). There is no documentation referencing how they calculated these estimates, and since the species has not been seen since 1981, there are no population fluctuation studies.

In 1986, Dr. Drewry, who regularly detected the species in the early 1970s, conducted surveys at 47 sites on 11 areas he considered likely to harbor the species or where the species had been previously collected, seen, or heard. He employed acoustic techniques and visual searches. However, these surveys did not result in detecting the species (Drewry 1986, p. 11). In his report, he noted that several areas where the species was heard in the early 1970s "are in present or past cultivation for fruit or coffee, and pastures are also common." In addition, Dr. Drewry recommended additional surveys be carried out at different times of the year to increase the detectability of the species. As a follow-up to this recommendation, scientist Jorge Moreno was contracted by the Puerto Rico Department of Natural Resources to conduct searches for the golden coquí from July through August of 1987 (Moreno 1991, p. 37).

Moreno conducted species surveys using acoustic call-back during the previously described peak calling hours (between midnight and dawn) and visually searched for the species (Moreno 1991, p. 36). To maximize the probability of detecting the golden coquí, he visited sites where the species was previously recorded and seen, plus two additional locations with suitable habitats for the species. A total of 10 sites were surveyed 44 times. These surveys yielded no golden coquí detections (Moreno 1991, p. 37). Based on those surveys and lack of detections, the author concluded that the golden coquí population was dramatically reduced in numbers and noted that "many of the areas visited did not have large tracts of what is regarded as good habitat. Human incursions into the Sierra de Jajome and other sites have led to the destruction of large numbers of bromeliad-covered trees. Several cliff faces have either burned or been cleared so that bromeliads are no longer found on the ground" (Moreno 1991, p. 39), similar observations to those made by Drewry in 1986.

After Moreno's findings in 1987, scientists Patricia Burrowes and Rafael Joglar carried out a long-term acoustic and active search for three species of *Eleutherodactylus*, including the golden coquí, from February of 1989 to July of 1990. They examined 1,671 bromeliads and 138 samples of water, spending approximately 712 person-hours of search (Burrowes and Joglar 1991, p. 42) in areas where the species had previously been detected. Their efforts resulted in no golden coquí detections either. The authors stated that deforestation might be the most significant factor for the decline of the

species, followed by urban development and over-collection (Burrowes and Joglar 1991, p. 44). They also suggested that acid rain was a possible contributing factor to the species' decline but noted that there is not enough evidence to prove that conclusively. In addition, the authors identified the introduction of exotic mammals such as feral cats, the Indian mongoose (*Herpestes auropunctatus*), and rats as detrimental to these species (Burrowes and Joglar 1991, p. 45). Even though they could not detect the species, they recommended conducting additional surveys for the golden coquí and other coquí species in Puerto Rico.

In 1991, Hedges and Thomas (1991, p. 58) refuted Burrowes and Joglar's (1991, p. 44) claim that over-collection contributed to the decline of the golden coquí and other coquí species. They identified other factors such as deforestation and development as a more significant factor in reducing amphibian and reptile species in Puerto Rico. The authors stressed the importance of continued monitoring and searching outside of historical sites because of the possibility of dispersal of the species. They mentioned that nearly every species they examined had exhibited some geographic variation throughout its range (Hedges and Thomas 1991, p. 60). The authors believed that the golden coquí probably survives in other habitats (i.e., Carite Commonwealth Forest and surrounding areas).

From 1989 to 2001, scientists Patricia Burrowes, Rafael Joglar, and David Green spent approximately 3,400 person-hours searching for the species through extensive active searches, day and night using visual and acoustic methods, of historical and nearby suitable habitat. However, their efforts resulted in no detections of the golden coquí, and their reports remarked that the species is likely extinct (Burrowes et al. 2004, p.142-144). In addition to the previously mentioned focused studies, herpetologist Dr. Neftalí Ríos (University of Puerto Rico, Humacao Campus) also searched for the species during the summers of 2007, 2010, and 2011 in all the historical locations without any positive results (Service 2013, p. 7).

In 2013, the Service published the 5-year status review for the golden coquí. It stated that the original population might have been overestimated considering that in just five years of its discovery in 1976, the species went from a total estimated 1,500-3,000 individuals down to no individuals seen or heard after 1981 (Service 2013, p.5). In that 5-year status review, the Service recommended conducting surveys outside the historical locations using habitat suitability models to identify new areas with potential habitat for the species and using acoustic surveys to maximize chances of species detection (Service 2013, p. 12). The Service sponsored a project between March and April 2016 to conduct golden coquí surveys in the Sierra de Cayey using habitat suitability models to target areas not previously surveyed for the species. The study surveyed and analyzed 60 sites using passive acoustic methods, collecting 44,684 1-minute recordings (from 6 pm to 5 am for seven days). Another 90 sites were sampled between April and August 2017, containing 74,421 1-minute recordings (Aide et al. 2017, p. 2). In total, those surveys tested 150 sites and collected more than 1,900 hours of recordings. However, the species was not heard nor observed. Thus, the authors concluded that the golden coquí is extinct (Aide et al. 2017, p. 7).

In 2019, Marconi Campos-Cerqueira and Mitchell Aide conducted field research during August to assess and survey locations that were not covered during the 2016 and 2017 surveys at Sierra de Cayey (Campos-Cerqueira and Aide 2019, entire). This survey evaluated ten sites and a total of 9,991 1-minute recordings (from 6 pm to 5 am for seven days). The species were not detected at any of the sites. The study concluded that it is highly improbable that the golden coquí is present in these sites, supporting their hypothesis that the species is extinct (Campos-Cerqueira and Aide 2019, p. 4).

In summary, a significant amount of time and effort has been invested in detecting the golden coquí since its last sighting in 1981. All researchers have used adequate and proven detection methods to locate the species using visual and recording techniques. Yet, the species has not been detected. Thus, the best available scientific information strongly suggests that the golden coquí is extinct.

3. Time since last observation

Unfortunately, the species was last seen and heard in 1981 (forty years ago), five years after Drewry and Jones described it (Burrowes et al. 2004, p. 141; Joglar 1998, p. 110). Joglar (1998, p. 110) commented that the species exhibited severe survival problems when discovered based on the population estimates by Drewry, Clark, and Loftus-Hills in the early 1970s. Many of the earlier surveys were conducted by one of the individuals who described the species, Dr. Drewry, who was familiar with its habitat, call, and identification. In his 1986 report, he detailed that he could not find the species in areas where in the early 1970s, he could always reliably hear the species at any time of the night (Drewry 1986, p. 21).

As detailed above, 40 years have passed since the last record of the species, even though significant efforts have been made to find the species throughout its historical range and new areas of habitat (e.g., 1986 (47 sites), 1987, 1989-2001 (3,400 person-hours), 2007, 2010, 2011, 2016 (60 sites), 2017 (90 sites), and 2019 (10 sites)). No evidence indicates that individuals or relict populations of golden coquí remain. Since the species is easily detectable and considerable efforts have been made to find the species since it was last seen, the available information strongly suggests that the golden coquí is likely extinct.

C. Summary of Factors Affecting the Species

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act, including:

Factor A (the present or threatened destruction, modification, or curtailment of its habitat or range).

Factor B (overutilization for commercial, recreational, scientific, or educational purposes).

Factor C (disease or predation).

Factor D (the inadequacy of existing regulatory mechanisms).

Factor E (other natural or manmade factors affecting its continued existence).

A summary of this assessment is detailed below.

Drewry and Jones (1976, p. 164) stated that the golden coquí was restricted to water-containing bromeliads found in clusters on the ground, in low trees, and on some large boulders susceptible to fires and habitat modification. Thus, when the species was listed in 1977, the Service identified habitat destruction and modification as one of the most significant factors affecting the species since deforestation for development projects was considered an imminent threat to the survival of the golden coquí (Service 1977, p. 58757). That most of the known habitat and the critical habitat is located on privately owned land was a concern for the Service since deforestation and development could occur in those areas (Service 2013, p. 8).

In 1986, Drewry documented changes in habitat for agriculture and housing developments since his last visits to the confirmed species sites in the early 1970s (Drewry 1986, p. 23). In 1991, Blair and Thomas identified deforestation and development as more significant factors in declining amphibian and reptile species in Puerto Rico, including the golden coquí (Hedges and Thomas 1991, p. 58). In 1991, Moreno did not find the species and concluded that the state of the golden coquí was dramatically reduced in numbers and merited official endangered status (Moreno 1991, p. 38). He stated that the potential causes for declining species were related to toxic rain and atmospheric dust, drought events occurring within the habitat, and habitat destruction due to human incursions into the Sierra de Cayey and other sites (Moreno 1991, p. 39).

In 1991, Burrowes and Joglar declared that deforestation might be the most significant factor for the decline of the golden coquí, followed by urban development and over-collection (Burrowes and Joglar 1991, p. 44). They also pointed out that acid rain was a possible contributing factor to species decline but stated that there was insufficient evidence to support that hypothesis. The authors identified the introduction of exotic mammals such as feral cats, the Indian mongoose (*Herpestes auro-punctatus*), and rats as detrimental to these species (Burrowes and Joglar 1991, p. 45). The authors concluded that the Golden coquí was possibly extinct based on their findings (Burrowes and Joglar 1991, p. 42).

In 1997, Joglar denoted that the golden coquí was presumed extinct since an exhaustive search conducted by his research group in the species habitat during appropriate hours and time, throughout its geographic range, failed to locate any individual of the species (Joglar 1998, p. 110). He indicated that the same group of bromeliads where they found the species in 1975 was filled with litter and other organic matter as observed during site visits conducted between 1986 and 1994. The quantity of organic matter in the bromeliads contrasted with the condition in which the bromeliads were found in 1975 and could indicate that this type of habitat was no longer appropriate for the species (Joglar 1998, p. 111). This would promote a decline of the population.

Burrowes et al. (2004, pp. 141-142) identified human-related habitat deterioration and severe droughts events as the most significant factor for the species' decline. They

concluded that since the golden coquí was restricted and dependent on water-containing bromeliads, significantly drier years from 1979 to 1983 may have had severe consequences for the species (Burrowes et al. 2004, p. 149).

Overutilization for commercial, recreational, scientific, or educational purposes was also identified as an important factor affecting the golden coquí at the time of listing (Service 1977, p. 58757). When the species was listed, it had been recently discovered and only a few individuals were known. Nevertheless, its unique reproductive adaptation and attractive coloration were thought to potentially create a large demand for the species for scientific, educational, and display purposes. However, the Service has no specific information indicating overcollection indeed occurred.

At the time of listing, no regulations existed pertaining to the protection and conservation of the golden coquí. Thus, inadequacy of existing regulatory mechanisms also was identified as a factor affecting the species. However, in 1999, the Commonwealth of Puerto Rico approved the Law No. 241-1999 (12 L.P.R.A. Sec. 107), 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 Puerto Rico Department of Natural and Environmental Resources (DNER) 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; DNER 2004). This regulation includes the list of all species designated as threatened and endangered by the Commonwealth of Puerto Rico and the Endangered Species Act of 1973, as amended. The golden coquí was designated as critically endangered under Regulation 6766 (DNER 2004, entire). Article 2.05 of Regulation 6766 prohibits to kill, harm, and hunt, among other activities, any threatened or endangered wildlife species within the jurisdiction of Puerto Rico. Both Law No. 241-1999 and Regulation 6766 are managed and enforced by the DNER. In the 2013 5-year status review, the Service determined that inadequacy of existing regulatory mechanisms was no longer be considered a threat to the golden coquí. The 2016 Regulation of Vulnerable and Endangered species, the Commonwealth of Puerto Rico categorized the golden coquí as critically endangered and possibly extinct and cites reasons for the species category from habitat loss, climate change, and chytridiomycosis (DNER 2016; pp. 60-61).

Other natural or manmade factors were also identified as threats to the golden coquí. The specialized, obligate bromeliad-dwelling mode of existence employed by the species, coupled with its low reproductive rate, apparent inability to disperse, and limited range created a naturally precarious status for its survival (Service 2013, p. 7). The Service considered the golden coquí vulnerable to catastrophic natural events, such as hurricanes, that may dramatically affect forest species composition and structure, felling large trees and creating numerous canopy gaps and changes in microclimatic conditions. Also, the synergistic effects of warming trends and climatic factors were identified as a continuous threat to the species survival (Burrowes et al. 2004, pp. 148 and 150).

When the golden coquí was listed, neither disease nor predation was identified as a threat to the species (42 FR 58756). However, according to Burrowes et al. (2004, pp. 146-150), another factor that could lead to the extinction of the golden coquí is the presence of chytrid fungus (*Batrachochytrium dendrobatidis*) that causes chytridiomycosis diseases among endemic Puerto Rican frog species. They conducted a study where analysis of climatological data showed an association between years with periods of extended droughts and the presence of chytrid fungus between the 1970s and 1980s with the amphibian declines in Puerto Rico (Burrowes et al. 2004, p. 141). When climate conditions are significantly drier than the average, *Eleutherodactylus* species that become infected by chytrids are more likely to die from the disease due to their inability to uptake water. Significantly drier years from 1979–1983 (when the golden coquí was last seen) may have had severe consequences on the species, which was restricted to bromeliads and dependent on the water accumulated in the axils, and the chytrids were affecting amphibian species on the island (Burrowes et al. 2004, p. 150). This suggests a possible synergistic interaction between drought and pathogenicity of chytrid fungus that affected the golden coquí.

D. Synthesis

A significant effort has been invested in searching for the golden coquí since it was listed in 1977. The species is easily detectable but has not been seen in 40 years. All researchers that have searched for the golden coquí after 1981 have used adequate and proven techniques for detection. However, their efforts have not yielded any observation of the species in its historical locations, neighboring locations, or new locations identified through habitat suitability models, strongly suggesting the golden coquí is extinct. Furthermore, much of the species' habitat has been modified and most experts have pointed that the species is likely to be extinct. Therefore, the best scientific and commercial information leads the Service to conclude that the golden coquí is extinct and recommend delisting the species due to extinction.

III. RESULTS

A. Recommended Classification:

- ☐ Downlist to Threatened
- ☐ Uplist to Endangered
- ☒ **Delist** (*Indicate reasons for delisting per 50 CFR 424.11*):
 - ☐ Recovery
 - ☒ Extinction
 - ☐ Original data for classification in error
 - ☐ No change is needed

IV. REFERENCES

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U.S. FISH AND WILDLIFE SERVICE
5-Year Review of Golden Coqui (*Eleutherodactylus jasper*)

Current Classification: Threatened.

Recommendation resulting from the 5-Year Review:

☐ Downlist to Threatened
☐ Uplist to Endangered
☒ Delist due to extinction
☐ No change needed

Review Conducted By: Angel G. Colón-Santiago, Caribbean Ecological Services Field Office.

FIELD OFFICE APPROVAL:

Field Supervisor, Caribbean Ecological Services Field Office, Fish and Wildlife Service

Approve _____

REGIONAL OFFICE APPROVAL:

Assistant Regional Director – Ecological Services, Fish and Wildlife Service

Approve _____