

**Mona Ground Iguana**  
**(*Cyclura stejnegeri*)**

**5-Year Review:**  
**Summary and Evaluation**



Photo credit: Service - Jan P. Zagarra

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

**June 2022**

**U.S. FISH AND WILDLIFE SERVICE**  
**5-Year Status Review of Mona Ground Iguana (*Cyclura stejnegeri*)**

**I. GENERAL INFORMATION**

**A. Methodology used to complete the review**

On June 23, 2021, the U.S. Fish and Wildlife Service (Service) published a notice in the Federal Register (86 FR 32965) announcing the five-year status review for Mona iguana (*Cyclura stejnegeri*). It requested new information and comments from the public related to this threatened reptile's biology and status. We received one public comment during the public comment period and have incorporated their comments where appropriate. Comments mostly provided information we already had in our files and were in support for continued listing as a threatened species. A record of all public comments and responses are maintained in the administrative record for this review. This status review was prepared by a Service biologist and summarizes information about the species and any new information that the Service has received for the Mona iguana since the previous 5-year status review for this species (Service 2015).

**B. Reviewers**

**Lead Region:** Carrie Straight, South Atlantic-Gulf Region, Atlanta, GA (404) 679-7226.

**Lead Field Office:** Jan P. Zegarra, Caribbean Ecological Services Field Office (CESFO), Boquerón, Puerto Rico. jan\_zegarra@fws.gov

**C. Background**

- 1. Federal Register Notice Citation Announcing Initiation of this Review:** June 23, 2021 (86 FR 32965).
- 2. Listing History**
  - Original Listing and Designation of Critical Habitat
  - FR notice: 43 FR 4618
  - Date listed: February 3, 1978
  - Entity listed: Species (Mona ground iguana)
  - Classification: Threatened
  - Critical Habitat: Mona Island- entire island
- 3. Review History:** In 1991 (56 FR 56882), the Service conducted a five-year review of different species simultaneously with no species-specific, in-depth assessment of the five factors as they pertained to the different species recovery. In particular, no changes were proposed for the status of the Mona iguana in this 1991 review. The 2015 5-year status review recommended no change to the listing status of the Mona iguana, that is, continue to be threatened.

4. **Species' Recovery Priority Number at start of review (43 FR 4618):** 3. At the time of listing, the Mona iguana was recognized as species with a high degree of threat and a high recovery potential.

5. **Recovery Plan:**

Name of plan: Recovery Plan for the Mona Iguana

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. **Is there relevant new information that would lead you to consider listing this species as a DPS in accordance with 1996 policy?** No. We do not have new information to consider listing the Mona ground iguana as a DPS.

### B. Recovery Criteria

1. **Does the species have a final, approved recovery plan containing objective, measurable criteria?** The Mona iguana has an approved recovery plan (Service 1984), but it is outdated. The information known at the time of the recovery plan was very limited so the criteria to delist the species are rudimentary and not entirely measurable.
2. **Adequacy of recovery criteria**
  - a. **Do the recovery criteria reflect the best available (most up-to-date) information on the biology of the species and its habitat?** No. The recovery plan does not include up-to-date information about the biology and ecology of the Mona iguana. When the Service approved the Plan, additional information about the species' past and present population levels was needed, precluding the formulation of quantitative recovery criteria.
  - b. **Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?** 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.**

The 1984 recovery plan recommended the species be considered recovered (i.e., delisted) when the following four conditions are met:

- (a) the population increases or stabilizes during ten consecutive years;
- (b) nesting sites are effectively protected from predation by pigs and goats, as well as trampling by humans, by means of exclosures;

- (c) feral mammals threatening the species are effectively controlled, or eradicated if feasible; and
- (d) a habitat management plan to insure long-term availability of nesting areas for an expanded population is prepared and put into effect.

At this time, the Service and its partners have been working towards implementing recovery actions on Mona Island. For example, the Service has an ongoing cooperative agreement with Island Conservation to conduct iguana surveys, enhance nesting habitat, implement exotic mammal control strategies, particularly feral cats, and help reinforce the pig exclusion fence. The Puerto Rico Department of Natural and Environmental Resources also have an active role towards the Mona iguana recovery as they managed the pig and goat hunting season, provided staff to reinforce the pig exclusion fence, and manage and educate the public to reduce invasion of the exotic green iguana.

**C. Updated information and current species status is documented below.**

General information about the species’ biology and habitat can be found in the 2015 5-year status review and the recovery plan (Service 1984, 2015). Any additional information pertinent to the current status of the species is provided below.

**1. Biology and Habitat**

- a. Information regarding the species’ abundance, population trends (e.g., increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends**

Populations of Mona iguana appear to have generally fluctuated since around the time of listing in 1978. The variability in methodology and calculation of estimates make it difficult to determine if these trends are significant or just reflections in natural variability in populations or differences in methodology and analysis (Table 1).

Table 1. Estimate of Mona iguana population through time.

<b>Year</b>	<b>Estimated density of individuals/ha</b>	<b>Estimated number of individuals</b>	<b>Source</b>
1977	0.33-0.66	2,000-4,000	Wiewandt (1977)
1995	0.21	1,155 ± 165	Moreno (1995)
2000	0.96 ± 0.47	5,093 ± 2,500	Pérez-Buitrago and Sabat (2000)
2019	1.5 (95% CI 0.92-2.47)	N/A	Island Conservation (2020)
2021	0.64 (95% CI 0.41-1.02)	3,520 (95% CI 2,255-5,610)	Island Conservation (2022)

**Surveys Since 2015.** During October 2019 and October-November 2021, a new systematic island-wide survey of the Mona iguana was completed as part of a cooperative agreement between the Service and Island Conservation (IC) (IC 2020, 2022). Results of the 2019 survey estimated an average of 1.5 iguanas/ha (1.5 iguanas/2.47 ac) (Table 1, CI 95% 0.92 - 2.47). This 2019 effort did not obtain the number of iguana detections needed within the survey transects to conduct a robust population estimate using the distance sampling method (IC 2020, IC 2022). Only 6 iguanas were detected on the 40 transects while 90 individuals were detected outside of the transects. Thus, only an overall density was estimated mostly from the detections outside of the transects. This approach increased the uncertainty of the density estimate as shown by its confidence interval. However, the 2021 effort increased the number of transects and their position in order to reduce uncertainty.

The 2021 survey estimated an average of 0.64 iguanas/ha (0.98 iguanas/2.47 ac) (CI 95% 0.41 - 1.02) and abundance of approximately 3,250 (95% CI: 2,255 - 5,610) Mona iguanas (Table 1, IC 2022), which is lower than the abundance estimate of  $5,093 \pm 2500$  Mona iguanas estimated by Pérez-Buitrago et al. (2000). However, both surveys implemented different methods and effort, making comparisons between the two studies uncertain, thus, not necessarily indicating a decline in the species abundance.

The most recent International Union for Conservation of Nature (IUCN) Mona iguana assessment suggests an increasing population trend for the species with an estimated 4,000 to 5,000 mature individuals (García et al. 2020). Although this population estimate is within the boundaries of both Pérez-Buitrago et al. (2000) and IC (2022) estimates, the IUCN suggested increased population trend is uncertain. Therefore, implementing a long-term and consistent monitoring program for the Mona iguana is needed in order to increase the certainty of estimates and trends.

**b. Taxonomic classification or changes in nomenclature.**

The past 5-year review addresses the history of the taxonomy of the species since its listing. Pasachnik et al. (2020) provided additional insight into the taxonomic status of the Mona iguana suggesting that the species should continue to be recognized as a distinct species, *Cyclura stejnegeri*. The Service will continue to recognize the Mona iguana as a distinct species.

**c. Spatial distribution, trends in spatial distribution, or historic range.**

The species continues to have an overall wide distribution throughout Mona Island (IC 2020, 2022). The two most recent surveys by IC (2020 and 2022) showed that the majority of individuals are found most abundantly in the plateau forest, followed by coastal and depression forests, which is consistent with other studies (Service 2015), and thus, there is no indication that the spatial distribution of the Mona iguana has changed since the last review in 2015.

**d. Other relevant information**

Pérez-Buitrago et al. (2016) provided additional information regarding the nesting migrations and reproductive ecology of the Mona iguana, for example, overall hatching success of 75.9% from 2003 to 2005, with a few nests lost due to flooding and feral pigs.

From approximately 2001 to 2013, 259 iguana juveniles were released by the headstarting program, of which 54 have been recaptured all in good physical condition (Alvarez et al. 2013). However, the head start program for the Mona iguana was ceased in 2017 due to the lack of personnel available to manage the facility (Puerto Rico Department of Natural and Environmental Resources (PRDNER) 2021). According to García and Gerber (2016), the head start program provided “short-term goals of improving the population structure and bolstering recruitment of Mona iguanas” and “the focus is now on the eradication of feral pigs, cats, and rats.” However, the PRDNER (2021) specified that the effects of the head start program on the Mona iguana population are unknown, in part, because no periodic population surveys were being done to evaluate the effectiveness of the head start program on the status of the Mona iguana population.

**2. Five factor analysis**

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

Since the species listing (1978), habitat modification at the designated camping areas in Mona (Sardinera and Pájaros) has been noted, particularly those that may be affecting iguana nesting areas (Service 2015). However, there is no new information regarding the effects of this factor on the species and its habitat besides what is discussed in the 2015 5-year status review (Service 2015; see pages 10-11). Thus, Factor A is still considered a low and occasional threat to the Mona iguana (Service 2015).

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

There is no new information to indicate that this factor should be considered a threat to the Mona iguana.

**c. Disease and predation:**

Predation from feral cats and pigs is still considered the most important and recurrent threat to the Mona iguana. Goats are also speculated to be a concern to Mona iguanas, but it is not considered a mayor threat (Service 2015). The regular pig and goat hunting program ceased for more than a year due a combination of earthquake events on January 2020, and the COVID-19 pandemic in Puerto Rico. Thus, with no hunting during that time, the pig and goat populations likely increased and potentially exacerbated their effects on the Mona iguana population. However, pigs where still being trapped by PRDNER until 2019

within several areas of Mona Island and the pig exclusion fence was reinforced in 2021 in order to continue excluding pigs from the most important Mona iguana nesting area in the west-southwest coast. In 2021 as well, the hunting program restarted and is ongoing. Besides the potential for goats to trample iguana nests, the effect of an increased goat population on the Mona iguana are not well understood beyond speculation. Assessments conducted by IC on the feasibility of removing feral pigs and cats from Mona Island indicates that such recovery action is possible (IC 2015a, b). However, no project has yet been implemented aiming at eradicating these two feral predators.

Current ongoing efforts by the PRDNER and other partners to reduce predation pressures on the Mona iguana include continued maintenance to the existing pig exclusion fence which covers the main nesting area of the Mona iguana in the west-southwest part of the island, and minimizes predation of Mona iguana nests by pigs. Other ongoing projects conducted by IC include the removal of Casuarina (*Casuarina equisetifolia*) trees, which degrade the Mona iguana nesting areas and the future removal of a limited number of feral cats.

Lastly, the exotic green iguana (*Iguana iguana*) has also been recently documented in Mona Island (PRDNER 2017, IC 2020). Although no green iguana populations are thought established on Mona, there is concern with the potential of this species hybridizing with *Cyclura* species (Vuillaume et al. 2015, Moss et al. 2018). Due to this incident, the PRDNER reached out to the public and provided information about the implications of the invasion of the green iguana in Mona Island and recommended measures to avoid and minimize the potential transport of green iguanas into Mona Island (PRDNER 2017). No green iguanas were observed during the recent November 2021 Mona iguana survey (IC 2022).

**d. Inadequacy of existing regulatory mechanisms its continued existence:**

This factor is still not considered a threat to the Mona iguana.

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

There is no new information regarding the effects of this factor (i.e., sea-level rise (SLR), hurricanes, climate change) as previously described (Service 2015). Since the most important nesting area for the Mona iguana lies within the limited sandy coastal plains of Mona Island, the species may be threatened by climate change related sea-level rise. The nesting sites closest to shore and of lowest elevation would be susceptible to flooding and this could affect nesting habitat suitability.

Hurricanes and tropical storms may also affect nesting habitat suitability by modifying the structure of the habitat and by potentially flooding some available nests and thus, reducing reproductive output. For example, while some nests can flood if located in the plateau depression areas, other nests laid in the sandy areas of the coastal plain do not flood even during wet years (Pérez-Buitrago et al. 2016). Models identify increases in temperature, intensity of extreme weather (tropical cyclones/hurricanes), storm surge, droughts, sea-level rise, and invasive

species (Intergovernmental Panel on Climate Change (IPCC). 2022). However, Mona Island has not been directly impacted by a hurricane since Hurricane Georges in 1998 (<https://coast.noaa.gov/hurricanes/#map=4/32/-80>) and there is no specific information on what were the effects of that hurricane on the Mona iguana population.

Thus, Factor E is still considered a threat to the Mona iguana, although not imminent at this time. The frequency of hurricanes affecting Mona Island is low, and climate change effects on Mona Island and the Mona iguana are uncertain; however, hurricanes, SLR, and other climate impacts are likely to gradually increase (Service 2015).

#### **D. Synthesis**

The Mona ground iguana is a large bodied, heavy headed lizard endemic to Mona Island. The species continues to have an overall wide distribution throughout Mona Island and are found most abundantly in the plateau forest, followed by coastal and depression forests. The most recent surveys were completed during October 2019 and October-November 2021. Based on the 2021 results, the current estimated abundance of Mona iguanas is 3,520 (95% CI: 2,255 – 5,610). The confidence interval for this estimate is within previous historical estimates, but making comparisons is inappropriate due to differences in methods and effort. The main identified threat that continues affecting the Mona iguana is nest loss due to feral pig predation within nesting areas island-wide and feral cat predation of iguana neonates and juveniles throughout the island. There is a new potential threat of a non-native iguana species that could compete for habitat and food resources as well as posing a hybridization threat that warrants careful monitoring in the future. Climate change is likely to negatively impact Mona iguana habitat (e.g., SLR and hurricanes) and potentially impact the species directly in the future; however, this threat is not imminent and there is uncertainty about the extent of this impact. Based on the information gathered during this review, the Service believes that the Mona iguana continues to meet the definition of a threatened species.

### **III. RESULTS**

#### **A. Recommended Classification:**

No change is needed

### **IV. RECOMMENDATIONS FOR FUTURE ACTIONS**

Most of the recommendations included in the 2015 5-year status review (Service 2015) still apply. One of those recommendations, the feasibility assessment for the removal of invasive species, was completed during 2015. The eradication of pigs and cats from Mona Island is a high recovery priority for the Mona iguana.

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**U.S. FISH AND WILDLIFE SERVICE**  
**5-Year Review of Mona Ground Iguana (*Cyclura stejnegeri*)**

**Current Classification:** Threatened.

**Recommendation resulting from the 5-Year Review:** No change needed

**Review Completed By:** Jan P. Zegarra, Caribbean Ecological Services Field Office, Boquerón,  
Puerto Rico.

**FIELD OFFICE APPROVAL FY 2021\***

Field Supervisor, Caribbean Ecological Services Fish and Wildlife Service

Approve \_\_\_\_\_ Date \_\_\_\_\_

\*In 2014, Southeast Region Field Supervisors have been delegated authority to approve 5-year reviews that do not recommend a status change.