Higo Chumbo (*Harrisia portoricensis*)

5 Year Status Review:

Summary and Evaluation

Photo by: Jan P. Zegarra, U.S. Fish and Wildlife Service

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

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STATUS REVIEW
Higo Chumbo (*Harrisia portoricensis*)

GENERAL INFORMATION

Current Classification: Threatened

Date of original listing: August 8, 1990 (55 FR 32252)

Lead Field Office: Caribbean Ecological Services Field Office (CESFO), Mayaguez, Puerto Rico, Marielle Peschiera, marielle_peschiera@fws.gov; and Maritza Vargas, maritza_vargas@fws.gov

Reviewers
Lead Regional Office: Carrie Straight, South Atlantic-Gulf and Mississippi Basin Region, Atlanta, GA (404) 679-7226.

Species' Recovery Priority Number at start of 5-year review (48 FR 43098): 14. This RPN indicates that it is a species that faces a low degree of threat and has a high recovery potential.

Review History: Previous 5-year status reviews were signed on January 20, 2010 (Service 2010) and February 6, 2018 (Service 2018). Both reviews recommended no change in status.

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of higo chumbo to inform this status review. In conducting this 5- year review, we relied on the best available information pertaining to historical and contemporary distributions, life histories, genetics, habitats, and threats of this species.

FR Notice citation announcing the species is under active review
May 13, 2022 (87 FR 29364). No public comments about this species were received during the public comment period.

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature:
No new information exists for higo chumbo regarding changes in nomenclature or taxonomy.

Distinct Population Segment (DPS):
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 definition limits listing of a DPS to only vertebrate species. Because the species under review is a not a vertebrate, the DPS policy is not applicable.

Recovery Criteria

Recovery Plans

Higo chumbo *(Harrisia portoricensis)* Recovery Plan, November 12, 1996 (Service 1996).

Amended Recovery Plan for higo chumbo (*Harrisia portoricensis*), September 24, 2019 (Service 2019).

The Amended Recovery Plan establishes that higo chumbo could be considered for delisting when the following three criteria are met:

1. The existing three (3) populations on Monito, Mona, and Desecheo islands show a stable or increasing population trends, evidenced by natural recruitment and multiple age classes.
2. Within the historic range, establish one (1) additional population with a stable or increasing trend, evidenced by natural recruitment and multiple age classes (addresses Factor C and E).
3. Threat reduction and management activities have been implemented to a degree that the species will remain viable into the foreseeable future (addresses Factor C).

None of the above delisting criteria have been met.

Biology and Habitat Summary

A detailed review of the species' biology, distribution, abundance, and its habitat can be found in the previous 5-year status reviews for higo chumbo (Service 2010 and 2018). Higo chumbo is historically known from three islands off the west coast of Puerto Rico: Mona, Monito (managed by the Puerto Rico Department of Natural Environmental Resources), and Desecheo (Desecheo National Wildlife Refuge; Figure 1). In addition, there was a collection report from a location in the municipality of Ponce in main island Puerto Rico; however, this location is presumed extirpated.

The most recent available information regarding the abundance of the species is presented below:

Mona Island: The most recent population assessment on the island occurred in 2013, where approximately 59,000 individuals were found and a demographic profile that included 59% adults, 34% juveniles, and 7% seedlings. The stages observed suggest some recruitment within this population (Rojas-Sandoval and Meléndez-Ackerman 2013; Service 2013; Table 1).

Monito Island: The most recent population assessment on the island occurred in 2014, where 136 individuals were found, which includes 72% adults and 28% juveniles (Service 2014, unpublished data). No seedlings were documented (Service 2018; Table 1).

Desecheo Island (NWR): There were 73 individuals recorded during a survey conducted by Island Conservation (IC) in 2017, 30 of these individuals were found dead and 43 were found alive of which 62.8% were adults and 37.2% juveniles (IC 2018). Seven of the adults were found with fruits (IC 2018). Six individuals previously tagged by IC were not located during this survey (IC 2018). Seedling recruitment was observed away from non-native grass dominated areas during the visits conducted by García-Cancel in March and April 2016 (García-Cancel et al., 2019; Table 1). However, García-Cancel et al. (2019) did not provide the number of seedlings observed nor their condition.

Figure 1. Western Puerto Rican Islands: Mona, Monito and Desecheo NWR.

Between the 2020 and 2021, the USDA-Animal and Plant Health Inspection Services (APHIS) conducted a project to safeguard several native cacti species, including the threatened higo chumbo, from the threat of the *Harrisia* cacti mealybug (HCM*, Hypogecoccus pungens*) and the cactus moth (*Cactoblastis cactorum*). The project included collection of vegetative samples from the wild (i.e., fruits and cuttings) to secure in *ex situ* conservation at the Naples Botanical Gardens (NBG) in southwest Florida. A total of 19 cuttings and 15 fruits were collected from higo chumbo individuals from Desecheo NWR and Mona Island and sent to NBG where they banked approximately 62,200 seeds and propagated 12 surviving cuttings (Torres-Santana and Ventosa-Febles 2021).

Table 1: Higo chumbo natural populations estimates per location.

Location	Population Estimate	Stages observed	Comments	Source
Desecheo NWR	550	Adults/juveniles/ seedlings	Suggest reproduction and recruitment	Breckon and Kolterman 1994
Desecheo NWR	5	-	Population decreased	Santiago-Velez 2000
Desecheo NWR	9	-		Joseph Schwagerl, pers. comm. 2006
Desecheo NWR	72	-		Figuerola-Hernández et al., 2017
Desecheo NWR	43	Adults, juveniles and seedlings	Out of the 73 individuals reported, 30 were found dead and 43 alive	IC 2018; García-Cancel et al., 2019
Mona Island	20,280	Adults and juveniles	Observed indicators of reproduction recruitment and population turnover	Breckon and Kolterman 1994
Mona Island	Approx. 59,000	Adults/juveniles/ seedlings	Some recruitment is occurring	Rojas-Sandoval and Meléndez-Ackerman 2013
Monito Island	Individuals present	-	No estimate provided	Breckon and Kolterman 1994
Monito Island	149	Adults only		Rojas-Sandoval and Meléndez-Ackerman 2013
Monito Island	136	Adults and juveniles	No seedlings were documented	Service 2014, unpublished data

Table 2: Higo chumbo *ex-situ* locations and number of planted individuals.

Introduced Location	Individuals	Comments	Source
Cabo Rojo NWR	1	Status unknown	Joseph Schwagerl, pers. comm. 2006
Caja de Muerto Natural Reserve	5	Status unknown	Kolterman, pers. comm. 2006
Boquerón Commonwealth Forest	25	Status unknown	Service 2018

Threats (Five-Factor Analysis) Summary

A detailed review of the species' threats can be found in the 2010 and 2018 higo chumbo 5-year status review (Service 2010 and 2018). 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).

During this review, we found no new information indicating significant changes on how the above-mentioned Factors are affecting the overall status of higo chumbo from the previous 2018 5-year status review (Service 2018). A summary of the threats to the species is provided below.

Higo chumbo is restricted to three protected islands (i.e., Mona, Monito and Desecheo). Because of the protections on these islands, habitat modification (Factor A), overutilization (Factor B), and inadequacy of existing regulatory mechanisms (Factor D) are not considered threats to the species' existence.

The stressors related to disease and herbivory (Factor C) continue to be considered threats to the species. An insect, a hemipteran *Leptoglossus sp*. was reported on Mona and Monito islands and was observed laying eggs and feeding on branches and main stems of higo chumbo, causing damages that eventually led to bacterial and fungal infections. Damage observed (e.g., tunnels, holes, rotted areas and dry tissues) increase progressively resulting in necrosis of branches and main stems that drop off entirely and caused the death of the plants (Rojas-Sandoval 2010, Rojas-Sandoval and Meléndez-Ackerman 2013). In addition, feral invasive species (i.e., goats, pigs) continue to be present on Mona Island, impacting its ecosystem and the native flora and fauna of the area (Rojas-Sandoval 2010). The feral goats and pigs impact individuals directly by predation and trampling seedlings and juveniles' plants causing mortality.

As mentioned in the 2018 5-year review and earlier in this document, another potential threat to higo chumbo is the HCM. Presently, this cactus mealybug has not been documented affecting higo chumbo on Mona, Monito, or Desecheo islands, but there is a high potential that the HCM could reach the islands transported by storms or hurricanes (Service 2018). Due to the potential threat posed by the cactus mealybug, it was crucial to maintain an *ex-situ* representation of the species to safeguard its genetic pool in case the cactus mealybug decimate this cactus. This action was accomplished by APHIS in 2021.

Competition with invasive grasses (Factor E) like the African Guinea grass (*Megathyrsus maximus*) reduces the natural recruitment of seedlings. The invasive grass could alter microclimate and nutrient cycling of the habitat that higo chumbo depends on (Rojas-Sandoval and Melendez-Ackerman 2012). In addition, hurricanes (Factor E) can have an impact on the species recruitment by breaking individuals. An assessment of the species after

the hurricane María documented the resprouting of affected individuals (IC 2018). Luckily, the three islands have sufficient elevation that will result in only limited sea level rise impacts to the islands (NOAA 2022). The cumulative effects of hurricanes, invasive species, and the limited distribution and relatively low number of natural populations (particularly in Monito and Desecheo islands) could be detrimental to the higo chumbo and limit its ability to recover from disturbance events.

Synthesis

The higo chumbo is a slender, upright, columnar cactus under the Cactacea family that is endemic to Puerto Rico. The natural distribution of higo chumbo has not changed and continues to occur in the islands of Mona, Monito and Desecheo (Desecheo NWR) off the west coast to Puerto Rico. The latest estimates indicate that the higo chumbo population in Mona Island consists of approximately 59,000 individuals; in Monito Island is about 136 individuals; and in Desecheo NWR is about 43 individuals. The species was listed as threatened and continues to be threatened by disease and predation (Factor C) due to insect pests, predation and trampling by feral invasive goats and pigs, and by natural stressors (Factor E) such as competition with invasive grasses, direct and indirect hurricane impacts, a restricted distribution as well as low population numbers. Because of ongoing threats, and uncertainty about the current condition of the species, we believe that higo chumbo continues to meet the definition of a threatened species.

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STATUS RECOMMENDATION

Based on this review, we recommend the following status for this species. A 5-year status review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist:
____ *The species is extinct*
____ *The species does not meet the definition of an endangered or threatened species*
____ *The listed entity does not meet the statutory definition of a species*
__X_ No change needed, the species remains listed as threatened.

APPROVAL/SIGNATURE

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

Approve EDWIN MUNIZ Digitally signed by EDWIN MUNIZ Date: 2023.05.10 12:19:33 -04'00'

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