

Higo Chumbo (*Harrisia portoricensis*) Recovery Plan

US Fish and Wildlife Service (USFWS). 1996. *Harrisia portoricensis* (higo chumbo) Recovery Plan. Atlanta, Georgia. 24pp.

Original Approved: 1996

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AMENDMENT 1

We have identified additional (or new) best available information that indicates the need to amend recovery criteria for the cacti *Harrisia portoricensis* (higo chumbo) since the recovery plan was completed. In this modification, we synthesize the adequacy of the existing recovery criteria, we show amended recovery criteria, and we provide the rationale supporting the recovery plan modification. The modification is shown as an addendum that supplements the recovery plan, superseding only Part II A page 11 of the recovery plan. Recovery plans are a non-regulatory document that provides guidance on how best to help recover the species.

For
U.S. Fish and Wildlife Service
Atlanta, Georgia

Approved: Franklin J. Amador
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METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendments to the recovery criteria are based on recent studies on the species and the information contained in the completed 2018 5-year review. These amended recovery criteria were developed by U.S. Fish and Wildlife Service (Service) biologists and managers in the Caribbean Ecological Services Field Office (CESFO).

ADEQUACY OF RECOVERY CRITERIA

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list." Legal challenges to recovery plans (see *Fund for Animals v. Babbitt*, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five listing factors.

Recovery Criteria

See previous version of criteria in [Harrisia portoricensis Recovery Plan](#) on page 11.

Synthesis

At present, there are three populations of higo chumbo. The populations on Mona and Monito islands have not changed significantly since the species was listed. The Desecheo NWR population is increasing after the eradication of rats, goats and monkeys (Figuerola-Hernández *et al.* 2017). The latest studies indicate that the population size of the species is approximately 59,000 individuals in Mona Island; 136 adult individuals in Monito Island; and 72 individuals in Desecheo NWR (Rojas-Sandoval and Meléndez-Ackerman 2009, 2010, 2012, 2013; USFWS 2018; and Figuerola- Hernández *et al.* 2017).

The 2018 5-year review determined that the higo chumbo continues to be threatened by Factor C (disease and predation), and Factor E (other natural or manmade factors) and therefore still meets the definition of a threatened species (USFWS 2018). On Mona Island, the species continues to be affected by predation by exotic species (goats, feral hogs), whose numbers are reduced by an annual hunting season. In 2008, the Puerto Rico Department of Agriculture identified infestation by the *Harrisia* cacti mealybug (*Hypogeococcus pungens*) affecting several species of cacti (*Leptocereus quadricostatus*, *Pilosocereus royenii*, *Melocactus intortus*, and *Cereus hexagons*) in southwestern Puerto Rico. The infestation is now found along the southern coast of Puerto Rico, from Cabo Rojo to Yabucoa (Segarra-Carmona *et al.* 2010). Therefore, establishing additional populations of the cactus on the main island of Puerto Rico as previously proposed in the recovery plan would only expose them to this insect. However, mealybugs spread through various means including wind, water, rain, birds, and humans (Mani and Shivaraju 2016). At the present time, the mealybug has not been found in Mona, Monito or Desecheo islands. However, there is potential for the mealybugs to reach these islands.

In addition, about 40 percent of adult higo chumbo individuals studied on Mona Island and 88 percent of adult higo chumbo individuals studied on Monito Island were observed with tissue lesions caused by an unidentified insect (Rojas-Sandoval and Meléndez-Ackerman 2013). This is in spite of the fact that the population on these islands has not varied significantly over the years. According to Figuerola *et al.* (2017), the population on Desecheo Island has improved after the removal of feral goats, rats and monkeys.

Questions as to whether higo chumbo is indeed a true species or a subspecies or simply a synonym for another species have surfaced in recent years. The MONOGRAPH OF HARRISIA (CACTACEAE), by Alan R. Franck (2016) discusses whether *H. portoricensis* is a synonym for *H. hurstii*, or *H. divaricata* in Dominican Republic. *H. hurstii* in turn may be a synonym for *H. divaricata* since they were collected in the same localities. However, the spines of *H. portoricensis* densely overlap on the stem whereas the spines of *H. divaricata* are sparser on the stem. Though regarded as endemic to Puerto Rico, herbarium specimens may indicate the possible presence of *H. portoricensis* on Hispaniola. However, the monograph concludes that additional study is needed to verify or refute the geographic distribution of *H. portoricensis*.

Likewise, the online cactus guide <http://cactiguide.com/cactus/?genus=harrisia&species=hurstii> seems to classify all three names as synonymous to one another citing the New Cactus Lexicon (NCL) (Hunt 2013) as the reference. However, Franck (2016) cites that the work of the NCL is recognized as being more of the next step in cactus taxonomy and not claimed to be the final authority in this highly controversial study.

Based on the uncertainty regarding this taxonomic issue, the Service will continue to recognize the higo chumbo as an endemic species.

AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the Act are no longer necessary and the higo chumbo may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from endangered to threatened. The term “endangered species” means any species (species, sub-species, or DPS) which is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made “solely on the basis of the best scientific and commercial data available.” Thus, while recovery plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species’ status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or threatened species. A decision to revise the status of or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the recovery plan. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

We provide new delisting criteria for higo chumbo, which will supersede those included in its Recovery Plan. The recovery criteria presented below represent our best assessment of the conditions that would most likely result in a determination that delisting of higo chumbo is warranted as the outcome of a formal five-factor analysis in a subsequent regulatory rulemaking. Achieving the prescribed recovery criteria is an indication that the species is no longer threatened or endangered, but this must be confirmed by a thorough analysis of the five factors.

Amended Delisting Recovery Criteria:

The amended delisting criteria for higo chumbo are as follows:

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).

Rationale for Recovery Criteria

The recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat.

The principal listing criteria for this species in 1990 were habitat destruction and modification (Factor A), and disease and predation (Factor C). At that time, there were several industrial development project proposals in Mona Island which could have adversely affected species within the island. Also, higo chumbo at the Desecheo NWR were threatened by feral goats, monkeys and a large rat population. Throughout the years, Factor A has been addressed for this species. Since 1984, the Service and the Puerto Rico Department of Natural and Environmental Resources (PRDNER) coordinate recovery activities for all federally listed species throughout a Cooperative Agreement under Section 6 of the ESA (USFWS and DNR 1984). Also, Mona Island is managed by the PRDNER for conservation; however, the species continues to be threatened by predation by introduced goats and pigs on the island (Factor C). Although a regular hunting season on Mona Island has kept the goat and pig population at manageable levels, eradication of feral pigs would remove an additional stressor from the species. At present, there are no other eradication plans for introduced predators on Mona Island. Efforts toward eradication of feral pigs and control of goats on Mona Island should be a priority action for the species. At the Desecheo NWR, threats related to predation have been eliminated since the goats, monkeys and rats were removed from the island. Threat reduction activities on Mona Island should be maintained, and invasive predator monitoring continued on Desecheo to a degree that the species does not need protection under the ESA.

Although listing Factor A is no longer a threat, the 2018 5-year review included Factor E (other natural or manmade factors) as a threat to the species based on Julissa Rojas-Sandoval and Elvia Meléndez-Ackerman (2010, 2011, 2012, 2013). These authors found that recruitment stages (seeds, seedlings and juveniles) were very sensitive to changes to microclimatic conditions. For that reason, higher temperatures caused by climate change may adversely affect natural recruitment.

Establishing an additional population of the species on other protected offshore islands would increase the redundancy and resiliency of the species in the event of a natural event such as a hurricane. Also, this new established population would increase resiliency to the species in case any of the other populations get infected by *Harrisia cacti* mealy bug. Current populations are all located in western Puerto Rico, the new population is being proposed near the type location in southern Puerto Rico, but on an offshore island. In addition, the establishment of at least one new population on offshore islands managed for conservation would avoid human induced threats such as fires that are present on the main island of Puerto Rico.

Although at present time populations of higo chumbo in Mona, Monito and Desecheo islands have not been reported to be infected with the *Harrisia cacti* mealy bug, active monitoring is needed to make sure this invasive pest does not reach these islands and to take rapid action if it does.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS.

Develop and implement monitoring protocols to ensure that the cactus mealy bug does not pose a threat to unaffected higo chumbo populations. This recovery action will be coordinated with PRDNER, APHIS, and the Service's National Wildlife Refuge System.

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