Palo de Ramón
(*Banara vanderbiltii*)

5-Year Status Review:
Summary and Evaluation

Photo by: Carlos Pacheco, USFWS Biologist

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

June 2025

5-YEAR REVIEW
Palo de Ramón (*Banara vanderbiltii)*

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Caribbean Ecological Services Field Office, Mayagüez, Puerto Rico
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Reviewers: Lead Regional Office: Atlanta Regional Office, Carrie Straight

Date of original listing: February 13, 1987 (52 FR 1459; January 14, 1987)

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973 (Act), as amended, 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 palo de Ramón to inform this status review.

A notice of the initiation of this 5-year review was published by the Service in the Federal Register on June 6, 2024 (89 FR 48437), with a 60-day comment period. We received no public comments during this period. The primary sources of information used in this analysis were the original final listing rule for the species, the recovery plan for the species, peer-reviewed literature, personal communications with qualified biologists and experts on the species, and unpublished reports from field visits and recovery activities conducted by Service biologists. All recommendations resulting from this review are the result of thoroughly reviewing the best available information related to palo de Ramón.

FR Notice citation announcing the species is under active review:
June 6, 2024 (89 FR 48437)

Species' Recovery Priority Number at start of 5-year review (48 FR 43098): 5. At the time of listing, palo de Ramón was recognized as a species with a high degree of threat and low recovery potential.

Review History:
Previous 5-year status reviews, recommending no change in species' status, were signed on January 10, 2014 (Service 2014) and March 10, 2020 (Service 2020).

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature

Palo de Ramón (*Banara vanderbiltii*) is the name accepted in the recent checklists for Puerto Rico (Axelrod 2011) and the West Indies (Acevedo-Rodríguez and Strong 2012).

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 does not apply.

Recovery Criteria

Recovery Plan

Recovery Plan for the *Banara vanderbiltii* (Service 1991).
Amendment to the Recovery Plan for *Banara vanderbiltii* (Service 2019).

Recovery plans are not regulatory documents and are intended to provide guidance to the Service, States, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act (84 FR 45020).

The downlisting criteria for palo de Ramón are as follows (Service 1991):

1. The two known populations at Río Lajas and Cayey are placed under protective status;

2. At least two new populations capable of self-perpetuation have been established within protected units of the Commonwealth Forest System in the karst region (e.g., Vega or Cambalache), and in the central mountain region (e.g., Carite or Toro Negro).

Criterion 1 is partially complete. Las Piedras del Collado area, also known as Las Tetas de Cayey, or more informally Cayey in the recovery plan, now has protections. On September 1, 2000, the Commonwealth of Puerto Rico signed Law No. 283, known as "Ley para designar los montículos de las Piedras del Collado, mejor conocidas como Las Tetas de Cayey, como Reserva Natural" (Law to designate Las Piedras del Collado, also known as Las Tetas de Cayey, as Nature Reserve). Thus, the palo de Ramón population known to occur in Las Piedras del Collado is now protected within a nature reserve (Figure 1). However, the population of palo de Ramón known from Río Lajas is located in private land and threatened

by urban and commercial development. Therefore, until this population is placed under protective status, this criterion will not be fully met.

Criterion 2 has been initiated. The Service has worked with the Puerto Rico Department of Natural and Environmental Resources and the non-government organization Para La Naturaleza, to conduct propagation of palo de Ramón for planting the species within protected units of the Commonwealth Forest system in the karst region. The palo de Ramón introduced populations that fall within the karst region are found in the Cambalache Commonwealth Forest, Guajataca Commonwealth Forest, Río Abajo Commonwealth Forest, Finca Escalera (at Río Encantado), and Hacienda la Esperanza Nature Reserve. These protected units are distributed along the municipalities of Arecibo, Isabela, Utuado, Florida and Manatí. Most of these introduced populations have not been monitored since planted. Thus, we cannot confirm if the populations have been established and exhibit a stable or increasing trend, evidenced by natural recruitment, and multiple age classes.

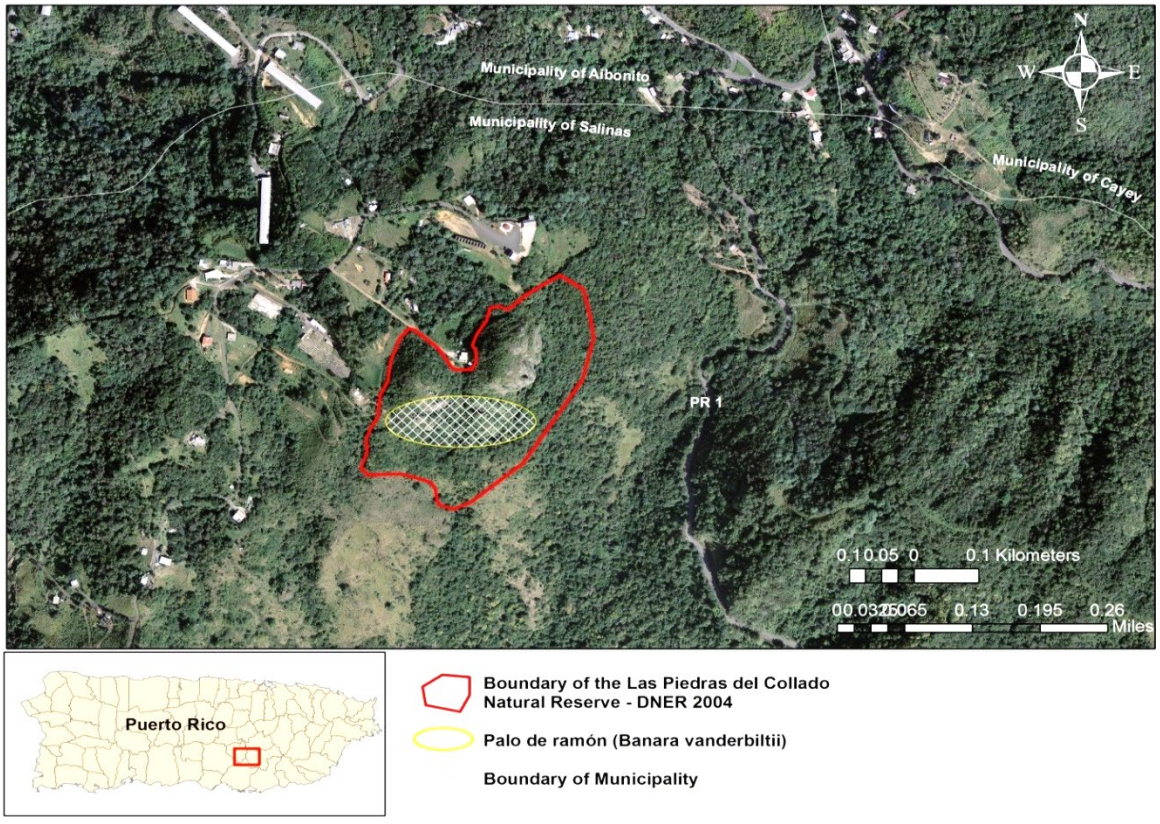

Figure 1. Boundary of Las Piedras del Collado Nature Reserve and the area where palo de Ramón is known to occur.

Biology and Habitat Summary

A detailed review of the species' biology, distribution, abundance, and its habitat can be found in the previous palo de Ramón 5-year status reviews (Service 2014, 2020). Below is a summary of our current knowledge of the species' distribution and abundance.

Species Distribution and Abundance

Palo de Ramón is rare shrub or small tree endemic to Puerto Rico (Axelrod 2011). Available data on the habitat and distribution of palo de Ramón suggests that the species occurs within the subtropical moist forest life zone on both limestone and volcanic substrates at elevations of 10 to 840 m (33 to 2,756 ft) (Axelrod 2011). This species has a limited geographic range that may reflect a remnant population of a species whose habitat has been altered or lost due to agricultural practices (Service 1991). Despite historical records, the species is believed to no longer persist in municipalities of Cataño and San Juan due to the urban expansion in the San Juan metropolitan area (Service 2014).

We have limited recent population information for a majority of the populations of palo de Ramón. We provide summaries of those for which we have current information below and in the Conservation Effort section. Unless otherwise noted, we consider populations still extant until assessments can be made on their condition.

Currently, palo de Ramón is known from 14 localities, 4 natural populations with about 67 individuals, and 10 additional populations with approximately 478 individuals planted throughout different locations in Puerto Rico (Figure 2). Since we do not have new information for some populations, we determined population's current species abundance as "unknown" if they had not been monitored during the past five years or more (Table 1). Nonetheless, we expect that some individuals are still present at some of these locations and, thus, the overall abundance may be artificially reduced.

In order to standardize the species' size classes, for the purposes of this 5-year review, and all future reviews on palo de Ramón, we will classify adult palo de Ramón as any individual taller than 6 feet that produces flowers or fruits, saplings as those that are 6 inches to 6 feet in height without flowers or fruits, and seedlings as those that are 6 inches tall or less. We acknowledge, however, that the height of the plant may vary due to habitat conditions such as wind, soil, humidity and precipitation so plants maturity may not always fit into these size categories.

Río Lajas and Las Piedras de Collado Populations

At the time of listing palo de Ramón was only known from a single locality west of Bayamón and at the time of the writing of the recovery plan, palo de Ramón was known from two natural populations: one at Río Lajas Ward in the municipality of Dorado, with six individuals, and one at Las Piedras del Collado in the municipality of Salinas, with five individuals (Figure 2; Service 1987 and 1991). The most recent abundance information available for both locations is 14 individuals at Río Lajas, and 39 individuals at Las Piedras del Collado (PRDNER 2018).

On April 26, 2018, biologists from the Service and the Puerto Rico Department of Natural and Environmental Resources conducted a post-hurricane María assessment in Río Lajas and confirmed the species was still present at this site. The team found one adult and two saplings within the surveyed area. Although no hurricane impacts to the species were reported, they mentioned that the vegetation at the site had been severely impacted (Service 2020).

Aibonito Population (Fina Tres Vidas)

In 2018, the Puerto Rico Department of Natural and Environmental Resources reported a new palo de Ramón natural population of in the municipality of Aibonito (PRDNER 2018). This population was last monitored on February of 2022, where 3 adults and 4 seedlings seedlings are reported to be present in a private property know as Finca Tres Vidas (Figure 2; O. Monzón pers. comm. 2025[b]). Finca Tres Vidas is under a conservation easement with Para La Naturaleza and is located about 10.5 kilometers (6.5 miles) northwest of Las Piedras del Collado (PRDNER 2018). This population has not been monitored since it was first documented, therefore, its current status is unknown.

Vega Baja Population

In September 2024, Para La Naturaleza discovered another palo de Ramón natural population at their Cerro del Faro Natural Protected Area in the municipality of Vega Baja (Figure 2). This population was last monitored on May of 2025, where 8 adults, 3 saplings, and 20 seedlings are reported to be present (O. Monzón pers. comm. 2025[b]). They described the saplings as individuals that were taller than 6 feet (O. Monzón pers. comm. 2025 [a]).

Conservation Efforts

Several palo de Ramón planting efforts have been conducted in the past several years to augment current populations and to establish new populations in protected areas. Locations are noted in Figure 2.

Since 1986, Fairchild Tropical Botanic Garden in Florida has kept palo de Ramón individuals in their living collection and seeds in their germplasm repository. Presently, they have 10 palo de Ramón individuals among their living collection. In addition, they have shared plants (9) with other institutions and private citizens over the years (Possley, pers. comm., 2025).

By the end of 2022, Para La Naturaleza had a total of 326 palo de Ramón trees in their plant nurseries and continued planting the species within their natural protected areas (Para La Naturaleza 2022). As of March 2025, they still had about 128 palo de Ramón trees in their nurseries, which are available for future planting events (Rosado, pers. comm., 2025).

In 2014, the Puerto Rico Department of Natural and Environmental Resources planted about 190 palo de Ramón individuals at eight sites in areas managed for conservation in the municipalities of Guaynabo, Villalba, Coamo, Isabela, Sabana Grande, Utuado, and San Juan (Río Piedras) (Table 1; Service 2020). The population planted in the Guajataca Commonwealth Forest in Isabela was severely impacted by Hurricane María, and all individuals subsequently died, thus, this introduced population is considered extirpated (Service 2020). The other seven introduced populations have not been monitored after Hurricane María;

hence, their current status is unknown.

In recent years, Para La Naturaleza also has propagated palo de Ramón to expand the specie's distribution on the Island. Detailed information is summarized below and in Table 1.

- 2017: 18 individuals planted in Finca Escalera within the Río Encantado Natural Protected Area.
- 2022: 10 individuals planted at Finca Escalera.
- 2023: 94 individuals planted in various sites: Finca Escalera (42), Jájome Natural Protected Area (49), and Hacienda la Esperanza Natural Reserve (3).
- 2023: 50 individuals planted at the Jájome Natural Protected Area.
- 2024: 96 individuals planted in February at Finca Escalera, followed by an additional 20 individuals planted later (October) that year at this same site.

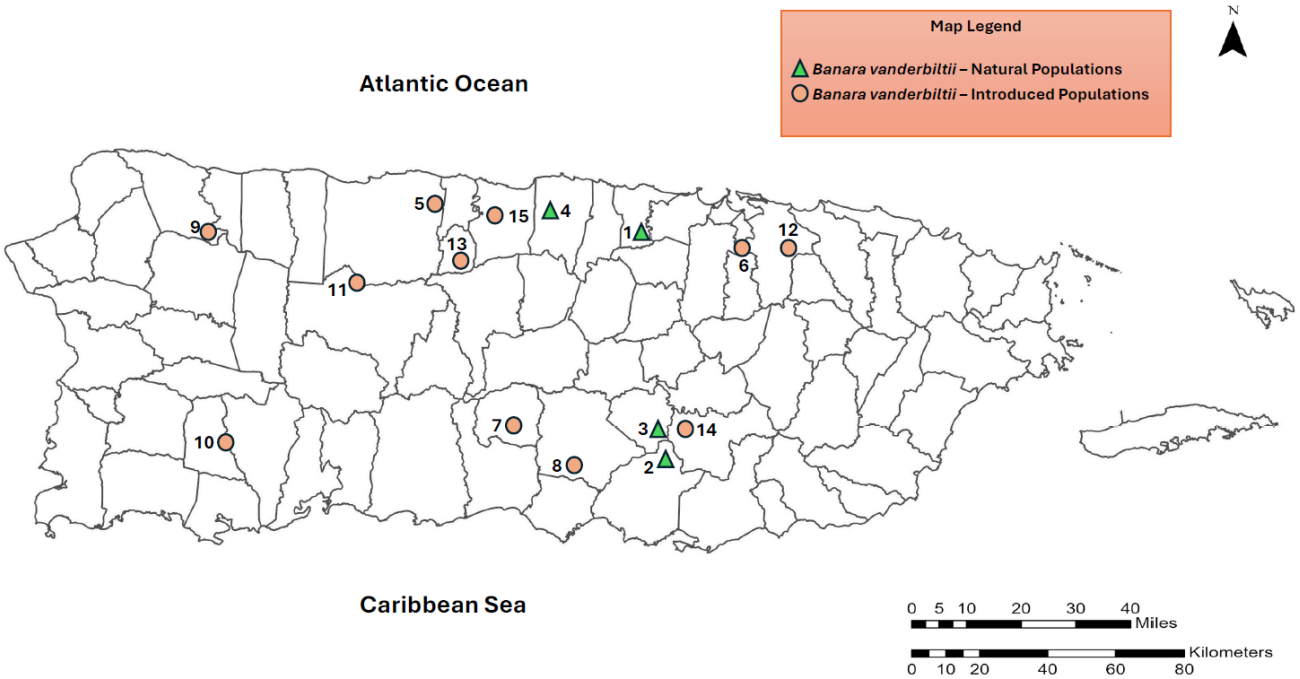

Figure 2. Distribution of palo de Ramón in Puerto Rico. Localities: Natural populations: **1**- Río Lajas; **2-** Las Piedras del Collado (Cayey); **3-** Finca Tres Vidas; **4-** Cerro del Faro; and introduced Populations: **5-** Cambalache Commonwealth Forest; **6-** Fort Buchanan; **7-** Toa Vaca Commonwealth Forest; **8-** Gabia Farm; **9**- Guajataca Commonwealth Forest; **10-** Susúa Commonwealth Forest; **11-** Río Abajo Commonwealth Forest; **12-** Fundación Luis Muñoz Marín; **13-** Finca Escalera; **14-** Jájome Natural Protected Area; **15-** Hacienda la Esperanza Nature Reserve.

Table 1. Estimated number of palo de Ramón individuals per known locality.

Population	Municipality (Ownership/Management) [Additional Information]	Species Abundance (first documented)	Species abundance (current)	References
Río Lajas (Cruce de la Virgencita)	Dorado (private land)	6*	14***	Service 1991, PRDNER 2018
Las Piedras del Collado	Salinas (protected land)	5*	39***	Service 1991, PRDNER 2018
Finca Tres Vidas	Aibonito (private land managed for conservation)	2*	3*	PRDNER 2018, O. Monzón pers. comm. 2025 [b]
Cerro del Faro	Vega Baja (protected land)	11*	11*	O. Monzón pers. comm. 2025 [b]
Cambalache Commonwealth Forest	Arecibo (protected land)	8**	Unknown***	Service 2014
Fort Buchanan	Guaynabo (federal)	5**	Unknown***	Service 2014
Toa Vaca Commonwealth Forest	Villalba (protected land)	90**	Unknown***	Service 2014
Gabia Farm	Coamo (protected land)	60**	Unknown***	Service 2014
Guajataca Commonwealth Forest	Isabela (protected land)	17**	Extirpated	Service 2014, 2020
Susúa Commonwealth Forest	Sabana Grande (protected land)	5**	Unknown***	Service 2014
Río Abajo Commonwealth Forest	Utuado (protected land)	2**	Unknown***	Service 2014
Fundación Luis Muñoz Marín	Río Piedras (private)	3**	Unknown***	Service 2014
Finca Escalera	Florida (protected land) [Planting Event #1]	18**	Unknown ***	Service 2020

Population	Municipality (Ownership/Management) [Additional Information]	Species Abundance (first documented)	Species abundance (current)	References
Finca Escalera	Florida (protected land) [Planting Event #2]	10**	10	Para La Naturaleza 2022
Finca Escalera	Florida (protected land) [Planting event #3]	42**	42	Para La Naturaleza 2023
Jájome Natural Protected Area	Cayey (protected land) [Planting Event #1]	49**	49	Para La Naturaleza 2023
Jájome Natural Protected Area	Cayey (protected land) [Planting Event #2]	50**	50	PRDNER 2023
Hacienda la Esperanza Natural Reserve	Manatí (protected land)	3**	3	Para La Naturaleza 2023
Finca Escalera	Florida (protected land) [Planting Event #4]	96**	96	Para La Naturaleza 2024
Finca Escalera	Florida (protected land) [Planting Event #5]	20**	20	Para La Naturaleza 2024
Total:		**496**	**284**	

*Natural populations. Number based on historical records. No information of current population status available.
**Introduced populations. Number based on number of individuals originally planted in the area.
***Populations not monitored during the past five years or more.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act. A detailed review of the species' threats can be found in the previous 5-year status reviews (Service 2014, 2020) and in the recovery plan (Service 1998) of the species. A summary of current threats is detailed below.

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

As described in the previous 5-year status reviews (Service 2014, 2020), the Service has identified habitat destruction and modification causing loss of populations, individual plants, fragmentation of habitat, soil erosion, and changes in forest structure as important factors affecting palo de Ramón. Sources of this habitat loss included agricultural practices, an abandoned dumping site, and maintenance of power lines and their rights-of-ways (Service 1991).

The species continues to be threatened by habitat destruction and modification, particularly in locations that are not protected. For example, the palo de Ramón natural population in Río Lajas occurs in a private property located at a short distance from a power line right-of-way (Service 1991). The vegetation along powerlines is occasionally removed by the local power company to avoid power interruptions (LUMA 2024). Clearing of vegetation may result in direct impacts (i.e., cutting of individuals) or indirect impacts like opening forest gaps that can serve as corridors for invasive plant species, which can negatively affect the species. Any unintentional expansion of the right-of-way during vegetation removal activities may result in damage or elimination of individuals of this population. Since the species abundance at this site is low (only 14 individuals), any loss of individuals can affect the species as a whole. Fortunately, most palo de Ramón populations occur on protected lands, thus, purposeful human-caused habitat modification in those areas is expected to be low.

B. Overutilization for commercial, recreational, scientific, or educational purposes

We have no information that overutilization for commercial, recreational, scientific or educational purposes is a threat to the species.

C. Disease or predation

A lobate lac scale insect, *Paratrachartina pseudolobata*, is a species native to India and Sri Lanka that can cause significant damage to individual plants. This insect was detected in all palo de Ramón individuals in Río Lajas (PRDNER 2018). Presently, the effect of this insect on palo de Ramón is not well understood (Service 2020). Therefore, due to the lack of information on the effect of the lobate lac scale bugs on the palo de Ramón, we cannot conclude that this is a significant threat.

D. Inadequacy of existing regulatory mechanisms

In addition to the Act, palo de Ramón, is protected under Commonwealth Law No. 241-1999 (12 L.P.R.A. Sec. 107), known as *Nueva Ley de Vida Silvestre de Puerto Rico* (New Wildlife Law of Puerto Rico) and Regulation 6766 or *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 govern the management of threatened and endangered species in the Commonwealth of Puerto Rico; DRNA 2004). The provisions of Law No. 241 and Regulation 6766 extend to private lands.

Most of the known palo de Ramón populations are found within protected lands managed for conservation (Table 1), which make them less vulnerable to threats related to anthropogenic impacts. Nonetheless, the enforcement of these regulatory mechanisms is challenging, particularly during maintenance work along power lines rights-of-way (e.g., cutting, pruning, mowing) as personnel conducting that work might be unaware of the presence of the species and can cause damages to it. Although most populations are protected, regulatory mechanisms are still inadequate to protect the species from all threats, especially those on private lands, accidental impacts within protected lands, and other natural or manmade factors discussed below.

E. Other natural or manmade factors affecting its continued existence

Palo de Ramón is vulnerable to extinction due to low population numbers and restricted distribution. Small populations of palo de Ramón may be more vulnerable to natural or anthropogenic events such as hurricanes, wildfire, and genetic variation, compromising the continued existence of this species.

Given the small numbers of individuals and natural populations, and the limited geographic distribution of the species, it is very likely the genetic variability of palo de Ramón is low. Likewise, there may be genetic differences between the populations in northern and south-central Puerto Rico, as they are separated by the Island's central mountain range (Service 2014). Therefore, the protection and monitoring of known individuals should be considered a high priority for the conservation of the species.

Hurricanes also are a potential threat to the palo de Ramón. In 2017, Hurricane María caused extensive damage across Puerto Rico and to the habitat and forest structure of the Island. It is estimated that this hurricane killed or severely damaged over 20 million trees throughout Puerto Rico (Feng et al. 2018), and the rainfall was estimated within a range of 178-483 mm (7-19 inches) (Pasch et al. 2019). It is likely that catastrophic winds, along with flooding and erosion may have affected palo de Ramón. In fact, during a site visit to the population at Río Lajas, it was documented that the vegetation in the area had been severely affected by Hurricane María (e.g., defoliation, fallen trees, invasive species intrusion, etc.) (Service 2020). These impacts likely affected the palo de Ramón individuals as well. As previously discussed, the introduced population in the Guajataca Commonwealth Forest in Isabela was severely impacted by Hurricane María, and all individuals subsequently died (Service 2020).

Models predict future increases in temperature (increases in extreme heat events and increased drought), extreme precipitation and associated increases in intensity and frequency of flooding and increases in the number of strong hurricanes (Runkle et al. 2022). Although it is unknown how palo de Ramón will respond to these changes, hurricane impacts have already resulted in the losses of individual plants and impacts on the species can be exacerbated, particularly on isolated small populations.

Human-induced fires could be a threat to palo de Ramón at Las Piedras del Collado and adjacent suitable habitat. Annually, there are wildfires near the area where the species is found at this location (Service 2014, 2020). Moreover, the disturbance caused by fires may create conditions favorable for the establishment of invasive plant species that could outcompete native plants such as palo de Ramón. Since fires are not a natural component of subtropical forests in Puerto Rico, they can threat the continued existence of palo de Ramón in areas susceptible to human-induced fires. With the predicted increases in temperature and corresponding increases in drought, fires may be more common on the island in the future.

Synthesis

Palo de Ramón is a small tree endemic to Puerto Rico, currently known to occur in the northern and south-central parts of the Island. As part of the recovery efforts, a total of 478 palo de Ramón individuals have been planted in seven private lands managed for conservation and five Commonwealth Forests. Based on the latest available information, the current estimated number of Palo de Ramón individuals is approximately 284 across 14 localities, including both natural and planted individuals, which is an increase from the 2020 estimate of 263 individuals in 9 localities. The current abundance did not include counts from localities where no surveys have been conducted during the past five years, which likely underrepresents the current number of individuals. Threats to palo de Ramón include habitat destruction and modification causing loss of populations, individual plants, fragmentation of habitat, soil erosion, and changes in forest structure as important factors affecting palo de Ramón. Habitat modification is an increased threat in locations that are not protected, such as the population at Río Lajas (Factor A). Also, the species is threatened by its low number of individuals and low number of natural populations, and restricted distribution. Hurricanes and wildfires continue to be a threat to all populations (Factor E). Additionally, small populations of palo de Ramón may be more vulnerable to natural and anthropogenic events and impacts related to reduced genetic variation. Based on the ongoing threats, limited geographic distribution and low number of individuals, we recommend that palo de Ramón remain listed as endangered.

RECOMMENDATIONS FOR FUTURE ACTIVITIES

A detailed discussion of recovery actions is presented in the Recovery Plan (Service 1991) and past 5-year status reviews (Service 2014, 2020).

Recovery Activities

- Continue propagating palo de Ramón for reintroduction purposes in protected areas and to augment existing populations
- Work with landowners and other partners to enhance existing populations and establish new ones within protected areas that ensure their long-term protection.
- Collect seed material for seed banking.

Monitoring and Research Activities

- Conduct an assessment of all populations to determine their status and recruitment of individuals.
- Studies should be conducted to determine the effects of the lobate lac scale bugs (*Paratachardina pseudolobata*) on the palo de Ramón.

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RESULTS / SIGNATURES

U.S. Fish and Wildlife Service
Status Review of Palo de Ramón

Status Recommendation:

On the basis of this review, we recommend the following status for this species (50 CFR § 424.11). A 5-year 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.
___ Delist:
___ *The species is extinct.*
___ *The species is recovered.*
___ *New information indicates 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.

FIELD OFFICE APPROVAL:

Field Supervisor, Caribbean Ecological Services Field Office, U.S. Fish and Wildlife Service

Approve LOURDES MENA Digitally signed by LOURDES MENA Date: 2025.06.09 15:53:20 -04'00'