

Gesneria pauciflora (no common name)

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



(Photo: Jan Paul Zegarra, U.S. Fish and Wildlife Service)

**U.S. Fish and Wildlife Service
Southeast Region
Caribbean Ecological Services Field Office
Boquerón, Puerto Rico
July 2024**

STATUS REVIEW

Gesneria pauciflora (no common name)

GENERAL INFORMATION

Current Classification: Threatened

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Date of original listing: April 6, 1995(60 FR 12483, March 7, 1995)

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 *Gesneria pauciflora* 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 May 11, 2023 (88 FR 30324), 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 recovery plan and amendment, personal communication with species experts, and other relevant literature. All recommendations resulting from this review are the result of thoroughly reviewing the best available information related to *Gesneria pauciflora*.

FR Notice citation announcing the species is under active review:

May 11, 2023 (88 FR 30324)

Species' Recovery Priority Number at start of 5-year review ([48 FR 43098](#)): 11, *G. pauciflora* is recognized as a species with moderate degree of threat and low recovery potential.

Review History:

Previous 5-year reviews recommending no change needed were published on April 24, 2013 (Service 2013) and September 11, 2019 (Service 2019).

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature:

We are not aware of any changes to the taxonomy of this entity, and it is still considered valid by the Service. **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 or Outline:

Gesneria pauciflora Recovery Plan, October 1998 (Service 1998).

Gesneria pauciflora Recovery Plan Amendment, September 2019 (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 ESA. 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 delisting criteria for delisting *Gesneria pauciflora* are as follows:

1. The existing six (6) populations of *G. pauciflora* within the Maricao Commonwealth Forests and adjacent private lands exhibit a stable or increasing population trend, evidenced by natural recruitment, and multiple age classes (addresses Factor A and E).
2. Of the six (6) currently known natural populations, the three (3) populations extending onto private lands adjacent to the Maricao Commonwealth Forest are protected through a long-term conservation mechanism (addresses Factors A and E).
3. Threats due to forest management activities (e.g., trail and dirt roads maintenance and improvements in areas adjacent drainage crossings) have been addressed and/or managed to the extent that the species will remain viable for the foreseeable future.

Currently, none of the criteria have been met.

Biology and Habitat Summary

Gesneria pauciflora is a small shrub found in the southwest portion of Puerto Rico, with approximately nine populations (defined by watersheds) occurring within the Maricao Commonwealth Forest (MCF) and neighboring private lands (Figure 1). The plant's flowers contain nectar and are hummingbird pollinated, however they contain less nectar than flowers of other gesneriad species, therefore they are visited less often compared to other *Gesneria* species (Pérez et al. 2018). *Gesneria pauciflora* must reach a certain size in order to flower, and when it does, it produces 1 to 3 flowers per inflorescence.

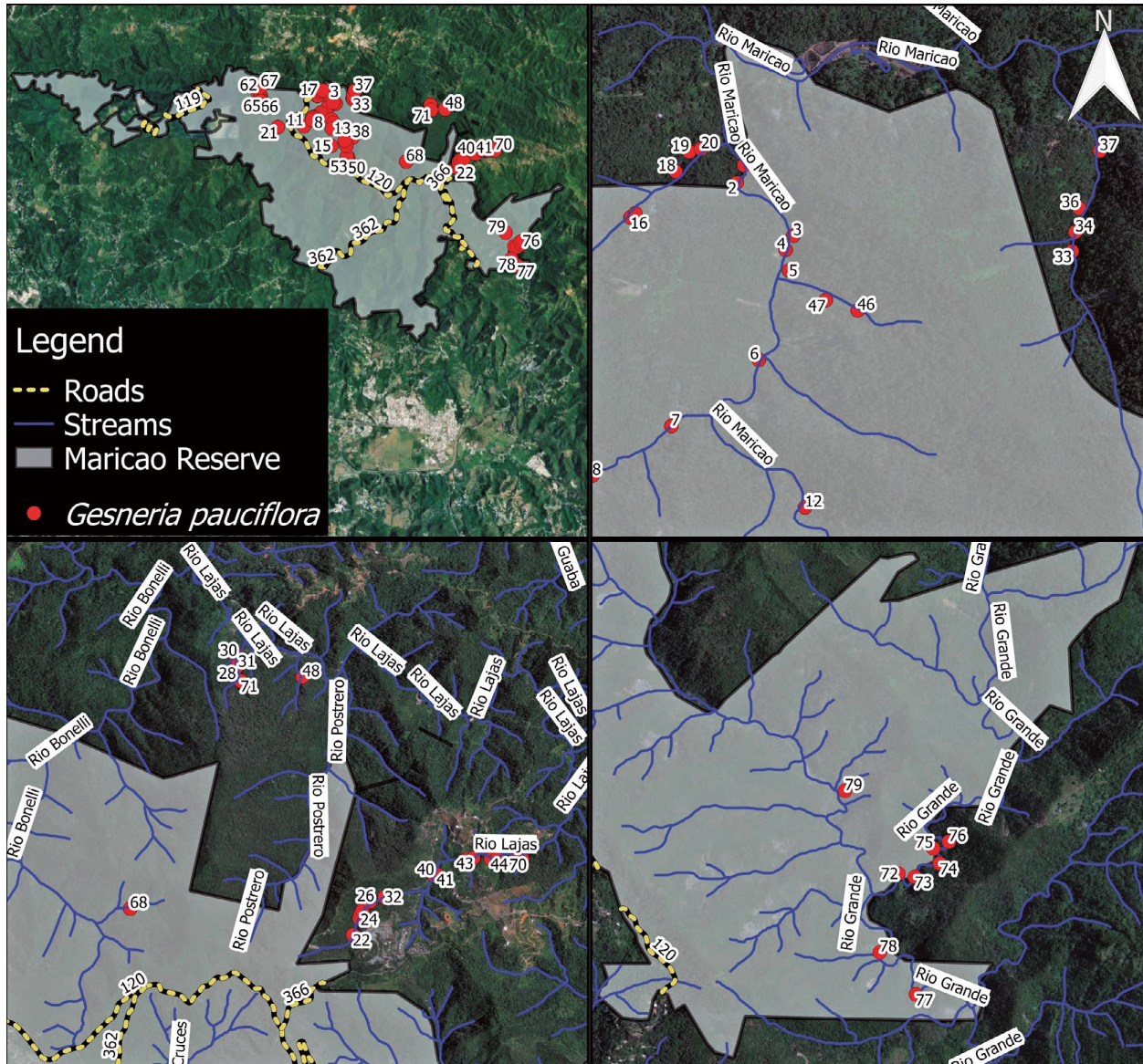


Figure 1: Distribution of the 79 known colonies of *Gesneria pauciflora* in and around the Maricao Commonwealth Forest concentrated in some portions of the forest and adjacent private lands in the municipalities of Sabana Grande and Maricao (Pérez et al. 2021).

Gesneria pauciflora occurs in wet environments, often found along rivers margins and other water bodies. They occur on the steep faces of wet, serpentine rocks, often along the sides of and underneath waterfalls. This species is able to survive with little to no soil formation but is restricted to serpentine soil and rock with moist and shaded conditions (Service 2019a).

Population impacts from hurricanes. *Gesneria pauciflora* does not do well in open sunlight areas, preferring shade and canopy-covered habitat. Hurricane María caused the fall of lots of trees, removing the canopy cover in areas supporting populations of *G. pauciflora*. Additionally, landslides and flash floods from the hurricane also adversely affected this species and its habitat, dislodging plants and changing microhabitat conditions needed for the recruitment of new individuals. Surveys performed after the hurricane found that mortality ranged from 26-89%, with the majority of localities experiencing over 63% mortality (Pérez et al, 2021). Post hurricane surveys in 2018 discovered 23 new colonies, though it is unknown what levels of mortality these populations experienced from the storm as there was no previous data about the size of these colonies (Pérez et al, 2021). Moreover, seven known colonies were completely extirpated as a result of hurricane María (Pérez et al, 2021).

Species population information. The 2018 surveys of the known *G. pauciflora* colonies within the MCF and adjacent private lands documented approximately 7,853 plants, of which 2,068 (26.3%) were reproductive (adults) and 664 (8.5%) were seedlings (Pérez et al, 2021). This estimate accounts for declines that were seen in all colonies from the Hurricane María. As of the time of this status review, these colonies have not recovered and remain with few individuals and little evidence of natural recruitment (O.A. Monsegur-Rivera, Service pers. obs. 2019-2024). In 2020, a new colony of plants was found in El Pilón along Río Cain in the Municipality of San Germán (a photo of this colony is shown on the cover of this document).

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, 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 detailed review of the species' threats can be found in the previous 5-year status reviews (Service 2013, 2019a) and in the recovery plan (Service 1998) of the species. A summary current threats is detailed below.

Gesneria pauciflora is under threat from a variety of sources. As stated in the previous species status review (2019), the most significant threats to *G. pauciflora* are direct impacts to individuals and their habitat from hurricanes and extreme weather events, and modification of habitats within private lands. This threat was illustrated with the impacts from Hurricane María, which resulted in 68 to 89% mortality in colonies along the main Maricao River channel, and 26 to 76% mortality in colonies along river tributaries (Pérez et al, 2021). Landslides and flooding from the storm caused degradation of habitat, dislodging of *G. pauciflora* plants, and clearing of canopy cover, which has been associated with mortality in this species (Factor A). Despite the lack of a comprehensive monitoring, the localities assessed by Pérez et al. (2021) has not recovered from the damages from Hurricane María (2017), and most of these remains with few

individuals and little evidence of natural recruitment (O.A. Monsegur-Rivera, Service pers. obs. 2019-2024). In addition, in 2022 Puerto Rico was affected by Hurricane Fiona, which resulted in numerous records of over two feet of rainfall across Puerto Rico and multiple USGS river gauges rising above major flood stage. This includes the Río Guanajibo in southwest Puerto Rico, a river whose upper watershed is found within the MCF, potentially affecting known localities of the species.

Although most of the known *G. pauciflora* populations occur within the boundaries of the MCF, remaining populations are on private lands. In the 2019 status review (Service 2019a), the Service reported a population adjacent to a quarry area with evidence of direct impacts to the species and its habitat due to the deposit of fill material downslope and the associated erosion. The Service has no new information about the status of the *G. pauciflora* individuals at this site, however, based on aerial images (dated January 7, 2024) this quarry remains active, posing a threat to the known localities at this site. Additionally, two other localities outside the reserve are subject to habitat modification to provide water for nearby communities; the installation and management of water pipes at this site has the potential to incidentally harm the plants (Service 2019a). Agricultural practices can be also harmful for plants due to the use of pesticides, fertilizer, and because of the soil erosion associated to agricultural activities. As stated in the previous species' status review, human recreation, overuse, and inadequate maintenance of trails might also be harming plants near the Salto Curet area, a highly visited waterfall in the Forest (Service 2019a, b).

At present, we are not aware of overutilization of this species for commercial, recreational, scientific or educational purposes (Factor B). As stated in the previous status review (Service 2019), there is evidence of predation on buds and flowers, however, currently disease and predation (Factor C) is not considered a significant threat to the species.

Currently, this plant is protected under Commonwealth's 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). The provisions of Law No. 241-1999 and Regulation 6766 extend to private lands. However, the protection of listed species on private lands is challenging as landowners may damage those species (e.g., by cutting, pruning, or mowing) unaware they are protected species. These measures will provide some protections for the species on protected lands; however, they will be inadequate to protect the species on private lands or from invasive species and impacts from fire (Factor D).

Lastly, future threats from climate change have the potential to further affect populations of *G. pauciflora* (Factor E). Future models project that impacts from hurricanes, including periodic extreme rainfall, and increase in the number of the strongest hurricanes (Category 3, 4, and 5) are projected to increase as well as predicting increases in temperature and decreases in annual precipitation in the future (Factor E; Runkle et al. 2022; Intergovernmental Panel on Climate Change 2023). Hurricane impacts could reduce canopy cover and promote unsuitable habitat conditions, through wind and landslides damaging habitat, including erosion, dislodging plants, and reducing habitat suitability as described above and in Pérez et al. (2021). Additionally,

extreme hurricanes could impact hummingbirds' populations depending on the event (Wunderle 1995; Tossas 2006), which are the only known organism responsible for of outcrossing for the species. The decline in the abundance of hummingbirds along with the reduction in the number of reproductive individuals of *G. pauciflora* following catastrophic hurricanes may reduce the crosspollination and gene flow between localities.

Gesneria pauciflora populations are small and fragmented as well as having a relatively limited geographic distribution. These features make the recovery of the species from catastrophic events slow or impossible depending on the impact to the habitat and nearness to surviving plants. Furthermore, *G. pauciflora* has a low rate of outcrossing. Therefore, it is very likely the genetic diversity of this species is low, which may make it harder for the species to overcome negative stochastic events in the future (Hughes et al. 2008; Factor E).

Synthesis

Gesneria pauciflora is a perennial small shrub restricted to the southwest of Puerto Rico, within and around the MCF. The most recent survey (2018) reports that there are now approximately 7,853 known individuals within 8 known populations, including an additional indetermined small number of individuals at a new population discovered in 2020, along Río Cain in the Municipality of San German. However, the species suffered as much as 89% mortality in some areas due to impacts from Hurricane María in 2017 and resulted in the extirpation of at least seven known localities (colonies), plus other unknown locations that were likely extirpated. Additionally, the hurricane cleared canopy cover at many of the sites, negatively affecting this shade-dependent species. Though the surveys in 2018 discovered 23 previously unknown colonies of this species, only a quarter of plants were flowering, thus, capable of reproduction. In addition to hurricane and extreme weather events, *G. pauciflora* is also threatened by human activity. Approximately 29% of known individuals are found outside of the MCF, and therefore, have minimal protection. Erosion from agriculture and trail use also contribute to landslides that might dislodge plants, and the use of pesticides and fertilizer can further degrade habitat. An active quarrying operation also poses a known threat to one of the populations of *G. pauciflora*, while two other sites are affected by human disturbances related to a water supply line to local communities. Because of these threats along with very specific habitat requirements, limited geographic distribution, and apparent limited apparent recruitment, we recommend the species remain listed as threatened.

RECOMMENDED FUTURE ACTIVITIES

A detailed discussion of recovery actions is presented in the Recovery Plan (Service 1998) and past 5-year reviews (Service 2013, 2019a). In the course of this status review new and/or targeted potential recovery activities were identified and are included below.

Recovery Activities

- Assess and develop a protocol to relocate individuals to augment, reestablish, or introduce populations.
 - Prioritize identification of sites for population enhancement or species introduction.

- Development and refine propagation techniques for the species.
- Outreach with private landowners and communities to inform them about the presence of the plant and discuss options to protect the species' known locations.

Monitoring / Research Activities

- Monitoring of known sites for this species after heavy disturbance events to identify whether there are any delayed mortality events.
- Conducting research on the genetic diversity of the species, both within and among populations.
- Continue surveying suitable habitat to identify new localities or populations, and to identify potential reintroduction sites.
- Assess how flower predation by the plume moth influences the species reproductive output and viability.

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RESULTS / SIGNATURES

U.S. FISH AND WILDLIFE SERVICE

Status Review of *Gesneria pauciflora*

Status Recommendation:

On the basis of this review, we recommend the following status for this species. 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 ESA.

- Downlist to Threatened
- Uplist to Endangered
- Delist (*Indicate reasons for delisting per 50 CFR 424.11*):
 - 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.*
- No change needed

FIELD OFFICE APPROVAL:

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

Approve _____