

Recovery Plan for *Peperomia wheeleri* (no common name)
U.S. Fish and Wildlife Service (USFWS). 1990. *Peperomia wheeleri* Recovery Plan. Atlanta, Georgia. 15 pp.

Original Approved: November 26, 1990
Original Prepared by: US Fish and Wildlife Service, Southeast Region

AMENDMENT 1

We have identified best available information that indicates the need to amend recovery criteria for the herbaceous plant *Peperomia wheeleri* since the recovery plan was completed. In this modification, we synthesize currently available information, identify amended recovery criteria, and present 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 7 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: _____
Regional Director, U.S. Fish and Wildlife Service

Date: _____

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendments to the recovery criteria are based on the latest 5-year status review (USFWS 2014) and the most recent studies for this species. This information was analyzed by U.S. Fish and Wildlife Service (Service) biologists and managers in the Caribbean Ecological Services Field Office in order to develop the delisting criteria for *Peperomia wheeleri*.

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 the [Recovery Plan for *Peperomia wheeleri* \(no common name\)](#) on page 7.

Synthesis

When the recovery plan for *Peperomia wheeleri* was signed, the species was known to occur only in two localities on Culebra Island; one population at Monte Resaca with an estimate of several hundred individuals, and another at the Helipad Hill with less than 20 individuals (USFWS 1990). However, at present, the available information indicates that *P. wheeleri* is not endemic to the Culebra Island since the species has also been reported from St. Maarten (Dutch West Indies) and Virgin Gorda (British Virgin Islands). In 2007, Service biologists conducted a rapid assessment of the species in Puerto Rico and Culebra Island, and estimated about 2,312 individuals distributed in three localities on Culebra Island, and approximately 154 new individuals in an area known as El Costillar in the municipality of Isabela in northern Puerto Rico (USFWS unpublished data, 2007 a, b). The species seems to have particular habitat requirements and is only found growing on organic matter (humus) accumulated in forested drainages of Culebra Island or on limestone boulders in the municipality of Isabela. However, little is known about its phenology, or natural recruitment. Since 2007, the Service has propagated approximately 140 individuals of *P. wheeleri* and planted those individuals in three localities in Puerto Rico, including both private and public lands managed for conservation such as Río Encantado (Rodríguez 2013, pers. comm.), El Tallonal (USFWS 2010), and Guajataca Commonwealth Forest (USFWS 2009).

Peperomia wheeleri is found in both semi-evergreen seasonal open forest (e.g., Culebra Island) and subtropical wet forest (e.g., Quebradillas/Isabela municipalities, Puerto Rico). Although knowledge about the overall distribution of *P. wheeleri* has expanded in the past twenty years, this plant has a very limited spatial distribution and distinct habitat needs. Currently, the species is known from nine localities: seven localities in Puerto Rico including Culebra Island, one locality at St. Maarten, and one locality at Virgin Gorda (USFWS 2012). The number of individuals outside of Puerto Rico is not known, but we do know that the species presents a clumped distribution in all areas found. In Puerto Rico, the seven localities can be aggregated into four distinct populations with a total of approximately 2,400 individuals the majority of which are found on Culebra Island (USFWS 2014). The majority of the Puerto Rico population is located on private lands.

Peperomia wheeleri is currently threatened by destruction, modification, or curtailment of its habitat or range (Factor A), disease and predation (Factor C), and other natural or manmade factors (Factor E). Habitat modification and predation (grazing/browsing) by cattle, white-tailed deer (*Odocoileus virginianus*), feral goats (*Capra aegagrus hircus*), and domestic fowls (*Gallus gallus domesticus*) has limited the habitat available for this species and restricted expansion of population patches. Additionally, the Service has identified habitat modification and degradation for residential and tourist developments as a current threat to the species (USFWS 2014). One of the populations on Culebra Island is located within an area under current development pressure for residential lots and adjacent (less than 100 meters) to a privately owned land dedicated to

agricultural practices such as cattle and goat farming.

The low number of individuals per population and its clumped or restricted spatial distribution, suggest the species has highly specialized ecological requirements (USFWS 2014). Habitat alteration or loss may exacerbate vulnerability of the species to natural or anthropogenic events such as hurricanes and fires, compromising its continued existence (USFWS, unpubl. data, 2007a, b). In the absence of knowledge on the natural recruitment capacity and habitat requirement of this species, it is difficult to predict its recovery after natural or anthropogenic events such as hurricanes, human-induced fires and climate change. Thus, human-induced fires, physical damage caused by human trampling, hurricanes and storms are considered threats to this species.

Peperomia wheeleri has been frequently misidentified as *P. myrtifolia* and vice versa. *Peperomia myrtifolia* is a highly variable taxon distributed throughout the Lesser Antilles and the Virgin Islands (Axelrod 2011). Both species have been frequently confused in herbarium collections as well as in the field. Presently, some species experts agree that *P. wheeleri* is not a distinctive species from *P. myrtifolia* because the major difference between the two species is the leaf shape and leaf apex (Axelrod 2011, Breckon 2014, pers. comm.). Hence, some authors (e.g., Axelrod 2011) treat *P. wheeleri* as a synonym of *P. myrtifolia*. Currently, no genetic studies have been conducted to demonstrate that *P. wheeleri* is or is not a valid species. Until genetic studies are conducted and further scientific evidence is provided, the Service will continue to work towards the recovery of the species as currently listed.

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 *P. wheeleri* 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 proposed the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

We are providing delisting criteria for *P. wheeleri*, which will supersede those included in its Recovery Plan (USFWS 1990). The recovery criteria presented below represent our best assessment of the conditions that would most likely result in a determination that delisting of *P. wheeleri* 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 *P. wheeleri* are as follows:

1. Existing populations of *P. wheeleri* in Culebra Island (2 populations) and Puerto Rico (2 populations) exhibit a stable or increasing population trend, evidenced by natural recruitment, and multiple age classes (addresses Factors A, C, and E).
2. Establish or discover two (2) additional populations (as defined in criterion 1) of *P. wheeleri* on lands protected via a conservation mechanism on Culebra Island (Addresses Factors A and E).
3. Establish two (2) additional populations of *P. wheeleri* (as defined in criterion 1) on lands protected via a conservation mechanism on mainland Puerto Rico (Addresses Factors A and E).
4. Threats have been addressed and/or managed to the extent that the species will remain viable into the foreseeable future (addresses Factor C and E).

Justification

Justification for criterion 1: Enhancing or augmenting the four currently known populations of *P. wheeleri* to the level that they show a stable or increasing population trend, evidenced by natural recruitment, and multiple age classes will have immediate beneficial effects on the species viability. Augmenting the number of individuals of *P. wheeleri* will result in the population as a whole being better able to withstand stochastic and catastrophic events, occupying a wider range within its already known habitat. Since *P. wheeleri* propagates well from cuttings, enhancement efforts with strategically selected individuals from all known populations will promote the highest diversity of traits possible into the future. Evidence of natural recruitment in these populations is essential for recovery of the species.

Justification for criterion 2 & 3: Establishing a total of four new healthy, viable and self-sustainable populations, two in protected areas within Culebra such as the Culebra Island NWR and two on mainland Puerto Rico will result in increased resiliency and redundancy to withstand disturbances and stochastic events. The establishment of new populations on protected land (e.g., Culebra Islands NWR) representing the genetic stock of the existing populations of Puerto Rico is essential for the recovery of the species as it will increase its representation, and thus the species capacity to better adapt to changing environmental conditions.

Justification for criteria 4: One of the threats to the *P. wheeleri* populations on Culebra Island is the predation of the plants by herbivores. This threat limits the species recruitment to a level that does not allow new individuals to get established. This factor directly affects the species' persistence, hence, viability. Working with landowners on Culebra to implement Best Management Practices on properties adjacent to established *P. wheeleri* populations would minimize the grazing and trampling impacts of herbivores.

Rationale for Recovery Criteria

The recovery criteria reflect the best available and most up-to-date information on the biology of *P. wheeleri*, and its current status and threats. The species is currently in danger of extinction due to the small number of populations (4) coupled with specific habitat needs, adverse habitat modification, predation, and natural or anthropogenic events such as hurricanes or human-induced fires. Achieving the recovery criteria would mostly be based on efforts to propagate the species throughout the collection of cuttings from the wild, establish new self-sustaining populations on protected lands, and increase the number of plants on current populations. Cutting viability is known to be high and propagation is feasible. Enhancing the known populations with more individuals would increase the species viability knowing that some threats like predation and hurricanes are inevitable (Factor C and E).

In order to determine when the species populations are stable, a long-term monitoring program should be initiated along the species range. Documenting the effects by white-tailed deer and goats on Culebra should be part of the monitoring program. Additional research in the areas of phenology, genetics and reproductive biology are also necessary for the establishment of robust propagation program.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS.

1. Conduct genetic studies to determine whether *P. wheeleri* is a synonym of *P. myrtifolia*.
New Recovery Task.
2. International coordination is needed for the implementation of protection and management actions in the other Caribbean Islands and to ensure species' viability outside of U.S. jurisdiction. New Recovery Task.

LITERATURE CITED

Axelrod, F. S. 2011. *A Systematic Vademecum to the Vascular Plants of Puerto Rico*. Botanical Research Institute of Texas. Fort Worth, Texas, USA. 420 pp.

- Breckon, G. 2014. Personal communication. Email conversation between USFWS Caribbean Ecological Service Field Office, and Dr. Gary Breckon, former professor University Puerto Rico Mayagüez. Email February 25, 2014
- Gordon, R. 2018. Correcting Falsely “Recovered” and Wrongly Listed Species and Increasing Accountability and Transparency in the Endangered Species Program.
- Rodríguez, R. 2013. Personal Communication. Email conversation between USFWS Caribbean Ecological Service Field Office, and Ricardo Rodríguez, Para La Naturaleza. September 16, 2013.
- Santiago-Valentín, E. and M. A. Vives-Helyger. 1997. “*Peperomia wheeleri* Britton (Piperaceae): Un nuevo record para la isla de Puerto Rico”. *Moscosoa* 9:62-68.
- Schaffer, M. L., and B. A. Stein. 2000. Safeguarding our precious heritage (Chapter 11), in B.A. Stein, L.S. Kutner, and J.S. Adams editors, *Precious heritage: the status of biodiversity in the United States*. Oxford University Press, New York:301-321.
- Vivaldi, J. L. and R. O. Woodbury. 1981. Status report on *Peperomia wheeleri*. Status report submitted to U.S. Fish and Wildlife Service, Atlanta, Georgia. 30 pp.
- U.S. Fish and Wildlife Service (USFWS). 1990. *Peperomia wheeleri* Recovery Plan. Atlanta, Georgia. 15 pp.
- U.S. Fish and Wildlife Service (USFWS). 2007(a). Rapid Assessment on *Peperomia wheeleri* population at El Costillar in Isabela, Puerto Rico. U.S. Fish and Wildlife Service Field Report. 4 pp.
- U.S. Fish and Wildlife Service (USFWS). 2007(b). Rapid Assessment on *Peperomia wheeleri* population in Culebra Island, Puerto Rico. U.S. Fish and Wildlife Service Field Report. 5 pp.
- USFWS. 2009. Establishment of New Populations of the Endangered *Peperomia wheeleri* “Piperaceae” in the Guajataca Forest Reserve. U.S. Fish and Wildlife Service Field Report. 7 pp.
- USFWS. 2010. Establishment of *Peperomia wheeleri* Populations at El Tallonal, Dominguito Ward, Arecibo, USFWS, memo to the file, July 19, 2010.
- USFWS. 2012. *Peperomia wheeleri* Britton at Gorda Peak in Virgin Gorda, British Virgin Island. U.S. Fish and Wildlife Service Field Report. 5 pp.
- USFWS. 2014. *Peperomia wheeleri* 5 Year Review: Summary and Evaluation. 22 pp.