Vahl's Boxwood (*Buxus vahlii*) Recovery Plan
U.S. Fish and Wildlife Service (USFWS). 1987. Vahl's Boxwood (*Buxus vahlii*) Recovery Plan. Atlanta, GA. 21 pp.

Original Approved: April 28, 1987
Original Prepared by: U.S. Fish and Wildlife Service

AMENDMENT 1

We have analyzed the best available information and find that there is a need to amend recovery criteria for *Buxus vahlii* (Vahl's boxwood or diablito de tres cuernos) since the recovery plan was completed. In this modification, we synthesize the current information available, assess the adequacy of existing recovery criteria, 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 (USFWS 1987), superseding only Part II A page 14 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: _____
Acting **Regional Director, U.S. Fish and Wildlife Service**

Date: 9/24/19

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendments to the recovery criteria are based on recent studies with the species and the information contained in the 2013 5-year review (USFWS 2013). This information was discussed with U.S. Fish and Wildlife Service (Service) biologists and managers in the Caribbean Ecological Services Field Office (CESFO) in order to develop the delisting criteria for diablito de tres cuernos.

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 factors.

Recovery Criteria

See previous version of criteria in Vahl's Boxwood (Buxus vahlii) Recovery Plan on page 14.

Synthesis

At the time of listing, approximately 85 diablito de tres cuernos individuals were known from two localities in Puerto Rico: Punta Higüeros in Rincón, and Hato Tejas in Bayamón (USFWS 1987). Habitat destruction and modification related to urban and industrial development, human-induced fires, and trash disposal were identified as the main threats to the species.

Based on the most recent information, the estimated number of individuals of diablito de tres cuernos in Puerto Rico and U.S. Virgin Islands (USVI) is about 4,500 individuals (including seedlings) in nine natural populations (USFWS 2013). The number of individuals reported are as follows: In Puerto Rico, 700 individuals in Rincón (Punta Higüeros), 1,000 individuals in Isabela (Guajataca Commonwealth Forest), 21 individuals in Bayamón-Parque de las Ciencias, 1,280 individuals in Hato Tejas-Bayamón, 370 individuals in a site between Peñuelas and Ponce (former alignment of the South Gas Pipeline), and 100 individuals at the Encarnación Ward in Peñuelas (boundary of Quarry Valdivieso); in USVI, 1,000 individuals in St. Croix-Frederiksted, and about 11 individuals in another small population reported in St. Croix-Christiansted (Carrero 2011; CSA group 2007; Lebrón and Associates 1992; Sustache, 2011, pers. comm.; O'Reilly, 2011 pers. comm.; USFWS 2013). Lastly, a new population of approximately 100 individuals was found in Los Cedros in the municipality of Aguadilla (Morales, 2018, pers. comm.). This population is located within a remnant forest inside the Ramey Solar Observatory (a photovoltaic solar facility to generate electricity) property of the U.S. Air Force.

The known populations of the diablito de tres cuernos in Puerto Rico and St. Croix occur primarily within the subtropical dry forest life zone and to a lesser extent the subtropical moist forest life zone. These life zones were extensively deforested for agriculture in post-Columbian times and almost all of the existing forest cover consists of secondary growth (Ewel and Whitmore 1973).

In Puerto Rico, five (5) of the current populations are within privately owned or public lands subject to habitat destruction and modification for urban development, quarry or infrastructure. For example, the two reports from the Peñuelas-Ponce were located during project evaluation surveys (e.g., South Gas Pipeline and Valdivieso Quarry). In Bayamón, the species occurs on two privately owned sites within an urbanized landscape and surrounded by the highway and shopping malls. The land ownership of the Hato Tejas population remains unknown despite the fact that it was proposed to be transferred to the PRDNER by Levitt Homes Puerto Rico (Lebrón and Associates 1992). The population in Rincón (Punta Higüeros) lies within a land area managed by the Puerto Rico Electric and Power Authority in the boundary of a former nuclear experimental site. Although this population has been reported as stable (Breckon and Kolterman 1993), human disturbance and human-induced fires have been documented at the site. The only

site currently protected in Puerto Rico is the population from the Guajataca Commonwealth Forest in Isabela. This population, located just off one of the trails to the south of the forest, is rather inaccessible and appears to be subject to very little human impact (Kolterman, 2010, pers. comm.). The population recently reported in Aguadilla is located within a Federal land near a proposed photovoltaic solar facility.

In St. Croix, USVI, only one of the four sites currently occupied by the species is protected and managed by the Service (Sandy Point National Wildlife Refuge). Two other populations are on the hills south and east of the town of Christiansted, and the fourth site consists of a single individual located in the former ALCOA (Saint Croix Alumina Refinery) site close to the airport. These three privately-owned sites are threatened by urban development resulting in habitat fragmentation and destruction, competition with exotic plant species such as Sansevieria (*Sansevieria* spp.) and Coral Vine (*Antigonon letopus*), as well as devastating human-induced fires.

In the Caribbean, native plant species, particularly endemics with limited distribution, may be vulnerable to natural or anthropogenic events such as hurricanes and human-induced fires. Populations of diablito de tres cuernos that occur in Rincón, Peñuelas-Ponce, and St. Croix may be susceptible to human-induced forest fires (Factor E), particularly on private lands where fire could be accidentally or deliberately ignited. Such damage has been observed in the Rincón population (Breckon and Kolterman 1993). Evidence of fires in the habitat and adjacent to known populations have been observed at Ponce (Monsegur, 2011, pers. obs.). In Rincón, plants were observed partly or entirely dead with trunks that were split longitudinally suggesting damage caused by hurricanes (USFWS 2013). Hence, cumulative effects of severe tropical storms may affect the Rincón population. The cumulative effect of coastal erosion due to severe hurricanes, can further diminish the availability of suitable habitat, and therefore, limit the population expansion and colonization of new areas at Rincón and St. Croix. In addition, the possibility of severe droughts may contribute to an increase in the quantity and frequency of fires on the islands.

Diablito de tres cuernos has been successfully propagated by PRDNER at the Guajataca Commonwealth Forest (Román, 2009, pers. comm.). They documented a high germination rate on seed material collected at Rincón. Twenty-five (25) individuals were planted in the Guajataca Forest (PRDNER 2011). Also, the U.S. Fish and Wildlife Service had an agreement with the Puerto Rico Conservation Trust for the reintroduction of this species at El Convento property in Peñuelas. About 22 mature diablito de tres cuernos individuals were planted in January 2011 at El Convento. So far, all individuals have survived and at least one of the plants had fruits by early July 2011 (Monsegur, 2011, pers. obs.). The material used on this project was part of the original material propagated at the Guajataca Commonwealth Forest.

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 diablito de tres cuernos 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 an

endangered species to a threatened species. 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, which triggers rulemaking. 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 delisting criteria for the diablito de tres cuernos, which will supersede those 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 diablito de tres cuernos 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 diablito de tres cuernos are as follows:

1) The five (5) existing populations on private land (Rincón, Bayamón, Peñuelas-Ponce, Aguadilla, and St Croix) show a stable or increasing trend, evidenced by natural recruitment and multiple age classes, and are protected via a conservation mechanisms (addresses Factor A).

2) Within the historic range and in protected suitable habitat, establish and manage four (4) additional populations with a stable or increasing trend, evidenced by natural recruitment and multiple age classes (addresses Factor 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 A and E).

Rationale for Recovery Criteria

The recovery criteria reflect the best available and most up-to date information on the biology, distribution and habitat of diablito de tres cuernos. Currently, there are nine (9) sites occupied by diablito de tres cuernos in Puerto Rico and St. Croix, USVI. The species is currently threatened by habitat destruction and modification (Factor A) and natural and manmade effects such as human-induced fires, hurricanes and droughts (Factor E). In order to maintain genetic variability, provide adequate representation throughout the species range, and increase resiliency during stochastic events, the recovery criteria have been designed to protect and manage privately owned populations and establish new self-sustaining populations to ensure long-term viability of the species. The recovery criteria are threat-based strategies to maintain viability of the species.

The long-term protection and management of existing populations will minimize or eliminate the threats to the currently known population at Rincón, Bayamón, Aguadilla, Peñuelas-Ponce and St. Croix to the degree that the species is viable or self-sustaining. These protection mechanisms may include land acquisition, conservation easements, private landowner agreements and habitat restoration practices. Also, we are proposing to establish four (4) new self-sustaining populations with genetics representation from each site within protected suitable habitat in Puerto Rico and USVI (e.g., Caja de Muertos, Guánica Commonwealth Forest, Cambalache Commonwealth Forest, Bosque de Vega, Salt River National Park). Furthermore, management practices such as habitat restoration, reforestation, eradication of exotics and invasive species are important for the recovery of the existing populations. Although the number of individuals for a self-sustaining population has not been defined, the population of Guajataca Commonwealth Forest or Rincón can be utilized as models since they are relatively large and they have been reported as stable with different age classes.

Long-term management and monitoring of currently known and new established populations are needed to establish population trends and appropriately address site-specific threats and species needs.

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