

St. Thomas prickly-ash Recovery Plan

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Original Prepared by: U.S. Fish and Wildlife Service, Atlanta

DRAFT AMENDMENT 1

We have identified the best available information that indicates the need to amend recovery criteria for *Zanthoxylum thomsonianum* (St. Thomas prickly-ash) since the recovery plan was completed. In this proposed modification, we synthesize the currently available information, identify amended recovery criteria, and provide the rationale supporting the proposed recovery plan modification. The proposed modification will be shown as an addendum that supplements the recovery plan (USFWS 1988), superseding only Part II A, pages 14 and 15 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
Caribbean Ecological Services Field Office, Region 4
Boquerón, Puerto Rico**

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METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The proposed amendments to the recovery criteria are based on the most recent studies with the species and the information contained in the latest species' 5-year status review (USFWS 2015). The best available science was utilized by 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 St. Thomas prickly-ash.

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 [St. Thomas prickly-ash Recovery Plan](#) on pages 14 and 15.

Synthesis

The St. Thomas prickly-ash was listed as endangered on December 1985. The species is historically known from St. Thomas and St. John in the U.S. Virgin Islands, and a few scattered localities in Puerto Rico (i.e., Quebradillas-Isabela in northwestern Puerto Rico, and Coamo-Salinas in the south-central region; USFWS 1988). The species was later reported at Gorda Peak National Park in Virgin Gorda, and Hawk's Nest in Tortola, British Virgin Islands (BVI) (Clubbe et al. 2003, Pascoe 2014). Data from the time when the species was listed indicates that populations in St. Thomas and St. John comprised about 250 and 50 individuals, respectively, whereas the populations in Puerto Rico consisted of only two individuals at each of three known locations.

In St. John, Ray and Stanford (2005) reported a mean abundance of 38 individuals across surveyed populations (ranging from 6 to 112 individuals), occurring in dry scrub thickets and woodlands at elevations ranging from 29 to 310 meters (95 to 1017 ft). Currently, the total number of known plants for the St. John populations is estimated to be 189 individuals; with 26% occurring within the National Park Service boundaries (USFWS 2015). Ray and Stanford (2005) reported the populations are composed of individuals biased toward intermediate and old age classes with little evidence of recruitment, suggesting an aging population. In St. Thomas, 7 individuals of St. Thomas prickly-ash were located during a recent visual inspection of the current habitat for the species (Barry 2015). A later assessment by Service staff recorded at least 50 individuals in the same area surveyed by Barry in 2015, including seedlings (USFWS 2016). Furthermore, the 2016 assessment revealed that the habitat was severely fragmented and threatened by urban development, and there was clear evidence of habitat intrusion by exotics.

In Puerto Rico, the species is known from two localities: at *Las Piedras Chiquitas* within the U.S. Army National Guard Camp Santiago, between the municipalities of Salinas and Coamo in the south, and from the boundary between the municipalities of Isabela and Quebradillas (Río Guajataca Gorge) in the north (USFWS 1988). In 2014, Acevedo-Rodriguez conducted a floristic assessment of Camp Santiago, and did not detect the St. Thomas prickly-ash (Acevedo-Rodriguez 2014). This historical locality is presumed extirpated. Along the Río Guajataca, the species is known from two individuals at a haystack hill or *mogote* known as *El Costillar* in the municipality of Isabela (USFWS 2015). This site was visited by Service biologists in 2012 and 2014, and consistent with previous monitoring from researchers from the University of Puerto Rico, there was no evidence of seedling recruitment or flower production, and only one adult plant was documented. St. Thomas prickly-ash is further known (amount not specified) from the top of a *mogote* known as *La Cara del Indio* in the municipality of Isabela as reported by J. Román (Guajataca Commonwealth Forest manager (USFWS 2015).

In 2014, Nancy Pascoe (National Parks Trust of the British Virgin Islands) indicated that the St. Thomas prickly-ash population in Tortola (Hawks Nest) was composed of at least 11 individuals on privately owned lands, and 5 plants on lands owned by the British government (USFWS, 2015). Nonetheless, the number of individuals is suspected to be greater as there is substantial

habitat to be surveyed. In Virgin Gorda, recent surveys by staff from the Royal Botanic Garden (KEW) reported the St. Thomas prickly-ash extends outside the boundaries of Gorda Peak National Park towards Leverick Bay and Fanny Hill (Barrios and Hamilton 2018). KEW staff conducted a post hurricane Irma assessment on the British Virgin Islands from January to February 2018 and the original plants located by Clubbe et al. (2003) on Gorda Peak National Park were found in good condition (Hamilton and Clubbe 2018).

The St. Thomas prickly-ash is currently threatened by Factor A (present or threatened destruction, modification, or curtailment of its habitat or range) and Factor E (other natural or manmade factors affecting its continued existence) (USFWS, 2015). Despite the potential suitable habitat for the species within the boundaries of the Virgin Islands National Park, where there may be undetected populations, most known populations on St. Thomas and St. John occur within private lands that are subject to urban development. Also, all known populations of St. Thomas prickly-ash in Puerto Rico occur on private lands where they can be affected by habitat modification or unintentional direct impacts due to lack of knowledge of the species by landowners (USFWS 2015).

We also consider the cumulative effects caused by hurricanes, landslides, genetic drift, and exotic and invasive species (i.e., plants and animals) to be detrimental to St. Thomas prickly-ash. The effects of these threats are exacerbated by the fact that population dynamics of the species are poorly understood, only a few populations are known, and there is limited information to determine what constitutes a viable population. In addition, the species dioecious reproductive biology (separate sexes) pose a challenge for the species recovery as populations composed of few individuals (e.g., El Costillar in Puerto Rico) may be functionally extirpated.

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 St. Thomas prickly-ash 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 new delisting criteria for the St. Thomas prickly-ash, 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 St. Thomas prickly-ash 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 St. Thomas prickly-ash are as follows:

1. The two (2) natural populations within the Virgin Islands National Park boundaries in the U.S. Virgin Islands, and the one (1) natural population within the boundaries of Gorda Peak National Park in the British Virgin Islands show a stable or increasing trend, evidenced by natural recruitment, and multiple age classes.
2. The natural populations within private lands in St. John (3), St. Thomas (1), and Puerto Rico (1) are protected through a conservation mechanism, and populations show a stable or increasing trend, evidenced by natural recruitment, and multiple age classes (Addresses Factors A and E).
3. At least two (2) new populations (genetically representing the Puerto Rico population) are established on lands protected by a conservation mechanism in Puerto Rico (e.g., Guánica or Guajataca Commonwealth Forests, or lands designated for the conservation). New populations show stable or increasing population trends, evidenced by natural recruitment, and multiple age classes (Addresses Factor A and E).
4. At least one (1) new population (genetically representing the St. Thomas population) is established on lands protected by a conservation mechanism (e.g., Vieques National Wildlife Refuge). The new populations shows a stable or increasing population trend, evidenced by natural recruitment, and multiple age classes (Addresses Factor A and E).

5. Threat reduction and management activities have been implemented to a degree that the species is viable into the foreseeable future (Addresses Factor A and Factor E).

Justification

Justification for criterion 1: The St. Thomas prickly-ash populations referenced in this criterion occur within the boundaries of the Virgin Islands National Park and Gorda Peak National Park, within habitat protected and managed for conservation. The habitat at these sites is characterized as a remnant of native forest that include other endemic species, and with little habitat intrusion by exotics plants. However, these St. Thomas prickly-ash populations show little evidence of natural recruitment, likely due to the dioiceous reproductive biology of the species (separate sexes) and because of the presumed predation by feral ungulates (e.g., goats and deers). Thus, to secure the species resiliency it is necessary to augment the number of individuals and manage them until they show a healthy population structure, evidenced by multiple size classes.

Justification for criterion 2: Considering the St. Thomas prickly-ash dioiceous reproductive biology (separate sexes), small number of natural populations, low number of individuals, and that these localities are physically fragmented due to previous land use, the conservation of known natural populations extending onto private lands through conservation easements or landowners agreements should be implemented. These conservation mechanisms will increase the species resiliency. Augmenting the size of the populations will help the species to withstand and rebound following stochastic events such as environmental disturbances (e.g., hurricanes). In addition, larger populations will help the species to cope with its dioiceous reproductive biology, as there will be an increased likelihood of effective gene flow (cross-pollination) within and among proximate populations.

Justification for criterion 3: The core populations of the St. Thomas prickly-ash are known to currently occur on the islands of St. John and St. Thomas in U.S. Virgin Islands, and on Tortola and Virgen Gorda in British Virgin Islands, with two small fragmented populations in Puerto Rico. Very likely, the species was once more common on Puerto Rico, and its currently reduced range is the result of the extensive deforestation that occurred in Puerto Rico during the early 1900s. Thus, the Service anticipates the extant populations in Puerto Rico may harbor a genetic diversity that may be crucial for the species recovery in the face of possible inbreeding depression and a reduced genetic breath. Therefore, the establishment of new populations on protected land (e.g., Guajataca Commonwealth Forest) representing the genetic stock of the existing populations on the main island 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 environmental changing conditions.

Justification for criterion 4: The St. Thomas prickly-ash may face possible inbreeding depression and reduced genetic diversity that may preclude the species ability to adapt with climate change and adverse environmental conditions. The conservation of the St. Thomas population is extremely important; particularly considering this is a population that shows some evidence of natural recruitment and a healthy population structure. Nonetheless, the entire St. Thomas population lies within private lands subject to urban development. Thus, the

establishment of an *ex situ* population genetically representing the St. Thomas' stock is needed. Overall, this action will increase the species redundancy by increasing the likelihood of this population to survive catastrophic events such as severe hurricanes coupled with the ongoing threats from habitat modification. Habitat at the Vieques NWR (e.g., Monte Pirata) harbors suitable habitat for the St. Thomas prickly-ash, making it an alternative for the establishment of new populations of this species.

Justification for criterion 5: All St. Thomas prickly-ash known populations show some threat from habitat modification, particularly those in USVI and BVI. In those Islands St. Thomas prickly-ash is threatened by feral ungulates, which are compromising the natural recruitment of the species. Therefore, the management or control of these exotic mammals is a priority for the recovery of the St. Thomas prickly-ash. Other important threats to manage are the impacts from deforestation for urban development and human-induced fires.

Rationale for Amended Recovery Criteria

The proposed delisting recovery criteria reflect the best available and most up-to-date information on the biology of St. Thomas prickly-ash and its habitat. The species is currently in danger of extinction due to the small number of populations and individuals, coupled with habitat modification particularly for urban development along its range (Factor A). In addition, the St. Thomas prickly-ash is threatened by other natural or manmade factors (i.e., hurricanes and landslides, genetic drift, invasive species and its dioecious condition (Factor E) (USFWS 2015). In this regard, the species dioecious reproductive biology (separate sexes) pose a challenge for the species recovery, and highlights the importance of protecting and enhancing existing populations to increase its viability (resiliency, representation, redundancy).

The recovery approach is to protect and enhance the 3 natural populations of St. Thomas prickly-ash on the island of St. John that extend to private lands through long-term conservation mechanisms (e.g., land acquisition, conservation easements and land-owners conservation agreements); and enhancing the 2 populations currently known within National Park Service boundaries also on the island of St. John. The geographical area of St. John provides a substantial amount of habitat with the microhabitat conditions necessary for the species' natural recruitment. In addition, the extensive stands of native forest serves as a buffer that precludes habitat intrusion by exotic plants and reduce the risk of human induced fires because of the absence of exotic grasses that serve as fuel for fires.

In addition, we aim to protect (through long-term conservation mechanisms) the known natural populations of the species on private lands at St. Thomas and Puerto Rico. Considering the low number of populations and individuals, these genetically distinct populations are important for the recovery of St. Thomas prickly-ash (e.g., individuals genetically adapted to drought stress). Recent information on the genetics of this species from St. John indicates a low genetic variability among sampled populations (Ray and Stanford 2005). Apparently, the distance between islands is large enough to preclude genetic exchange among distant populations (USFWS 2015). Preserving the species' representation is important in reducing the likelihood of losing genetic variation due to genetic drift (Factor E).

The approach of establishing at least three new viable populations on lands managed for conservation aims to increase the species' viability as populations on private lands are vulnerable to habitat fragmentation and threats like hurricanes and landslides are inevitable. Lands managed for conservation where new populations of St. Thomas prickly-ash can be established may include the Vieques National Wildlife Refuge, Guánica Commonwealth Forest and Guajataca Commonwealth Forest.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

A protocol for the propagation and reintroduction of St. Thomas prickly-ash should be developed in collaboration with partners (e.g., UPR, KEW, Fairchild Tropical Botanic Garden, PRDNER, Para La Naturaleza and Natural Resources Conservation Service). The protocol should address the feasibility of seed banking this species, and if deemed necessary, seed material should be stored at the Millennium Seed Bank (KEW) and USDA National Laboratory for Genetic Resources Preservation (NLGRP) in Ft. Collins. Studies on the species' population genetics should be conducted to determine patterns of genetic diversity across the species natural distribution (including BVI), and to provide baseline information for sound management of the species. **Recovery task: 33.**

Due to the low number of populations and individuals, along with the little evidence of natural recruitment and limited dispersal, the reproductive biology and ecology of St. Thomas prickly-ash should be determined. In particular, the factors limiting seed dispersal and seedling recruitment should be studied. This should include the establishment of a long-term monitoring program (including permanent parcels) to determine seedling recruitment and survival, and the conditions necessary for their establishment. **Recovery task: 31 and 32.**

Since the core populations of St. Thomas prickly-ash extend to the BVI, the Service foresees collaboration with overseas partners (KEW and National Park Trust in order to maximize the species recovery (e.g., exchange of species information and prioritization of research needs). **Recovery task: 21, 31, 32 and 33.**

Invasive feral mammals (i.e., white-tail deer, goats and wild hogs) pose a serious threat to the native vegetation of St. John (particularly natural recruitment). Thus, a management plan for the control of feral mammals within the Virgin Islands National Park (St. John) should be developed and implemented. **Recovery task: 11 and 12.**

LITERATURE CITED

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