

**St. Thomas Prickly-Ash**  
*(Zanthoxylum thomasianum)*

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



Photo by Omar A. Monsegur Rivera (Service)

**U.S. Fish and Wildlife Service  
South Atlantic-Gulf Region  
Caribbean Ecological Services Field Office  
Boquerón, Puerto Rico**

**September 2022**

## STATUS REVIEW

### St. Thomas Prickly-Ash (*Zanthoxylum thomasianum*)

#### GENERAL INFORMATION

**Current Classification:** Endangered

**Lead Field Office:** Caribbean Ecological Services Field Office (CESFO), Boquerón, Puerto Rico, Omar A. Monsegur-Rivera, omar\_monsegur@fws.gov.

**Reviewers:**

**Lead Regional Office:** Mississippi Basin Region, South Atlantic - Gulf Region Office, Carrie Straight (404) 679-7226.

**Date of original listing:** December 20, 1985 (50 FR 51867)

#### **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 ([50 CFR 424.11](#)). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the St. Thomas prickly-ash (*Zanthoxylum thomasianum*) to inform this status review. We announced initiation of this review in the Federal Register on June 23, 2021 (86 FR 32965) with a 60-day comment period and received no public comments during the open comment period. We used a variety of information resources, including monitoring reports, surveys, and other scientific and management information. Specific sources included the final rule listing this species under the Act, peer reviewed scientific publications, unpublished field observations by Federal, State, and other experienced biologists, unpublished studies and survey reports, and notes and communications from other qualified individuals.

#### **FR Notice citation announcing the species is under active review:**

June 23, 2021 (86 FR 32965)

**Species' Recovery Priority Number at start of 5-year review** (48 FR 43098): 5C. At the time of listing, St. Thomas prickly-ash was recognized as a species with a high degree of threat and a low recovery potential, and having conflict with construction or other development project or other form of economic activity.

**Review History:** A previous 5-year status review was published on August 28, 2015 (Service 2015). The 2015 Species Status Review recommended no change in status.

## REVIEW ANALYSIS

### Listed Entity

#### **Taxonomy and nomenclature:**

In a recent revision of the Caribbean species of *Zanthoxylum* (Reynel 2017), the St. Thomas prickly-ash is treated as a subspecies of *Z. punctatum*, and specimens intermediate between *Z. punctatum* and *Z. thomasianum* are assigned to *Z. punctatum ssp. punctatum*. Thus, in 2019 a Cooperative Agreement (F19AC00780) was signed between the Service and the Royal Botanic Garden, Kew (Kew) to conduct population assessments and support research on the systematics of the St. Thomas Prickly-Ash and related taxa. Dried leaf samples have been collected for DNA extraction to enable phylogenetic (its relations with other species) analysis of St. Thomas Prickly-Ash and its close relatives, and for population-level analysis of genetic diversity across the species range. However, until further analyses are conducted and verified, the Service will continue to treat *Zanthoxylum thomasianum* as a valid entity.

#### **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 is not applicable.

### Recovery Criteria

#### **Recovery Plan**

St. Thomas Prickly-Ash (*Zanthoxylum thomasianum*) Recovery Plan, April 5, 1988 (Service 1988).

Amended Recovery Plan for St. Thomas Prickly-Ash (*Zanthoxylum thomasianum*), September 24, 2019 (Service 2019a).

The Amended Recovery Plan establishes that St. Thomas Prickly-Ash could be considered for delisting when the following five criteria are met:

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 on 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 (Guanica or Guajataca Commonwealth Forests, or lands designated for 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 (Vieques National Wildlife Refuge). The new populations indicate 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).

The delisting criteria have not been met.

### **Biology and Habitat Summary**

A detailed review of the species' biology and habitat information can be found in the St. Thomas prickly-ash 2015 5-year status review (Service 2015). Based on the information available at the time of the 2015 5-year review, the localities from St. John had a mean abundance of 38 individuals across surveyed sites (ranging from 6 to 112 individuals) (Service 2015). The Royal Botanic Garden Kew is conducting population, taxonomy, and conservation assessments of the St. Thomas prickly-ash across its range (Service 2019b). This research includes Puerto Rico, the USVI and extends to the neighboring BVI (Tortola and Virgin Gorda) and provides updated information on the status of the species (Table 1). Based on the current available information, we have documentation of an estimated 748 individuals in the Puerto Rico, USVI and BVI (Table 1). Although this number appears to be a significant increase for the species, the last review did not capture detailed information about the species status across much of its range. The new locations noted below do not, therefore, indicate a natural expansion of the species, but learning more about its current range and habitat as the result of increased survey efforts to assess the species.

Puerto Rico: In Puerto Rico, the species has been historically known from the Guajataca River, along the boundary of the municipalities of Isabela and Quebradillas. Surveys by Thomas Heller (Kew) at the historical locality of Cara del Indio in Isabela, failed to find any individuals at this site, which may indicate that the species is extirpated from that location (Hamilton et al. 2020). Heller further visited the locality of El Costillar, also in Isabela, and confirmed the presence of one individual growing associated with *Hohenbergia antillana* and two endangered plants, i.e., *Peperomia whelerii* and *Ottoschulzia rhodoxylon* (Hamilton et al. 2020; Monsegur-Rivera 2020 pers. obs.).

In 2020, St. Thomas prickly-ash was recorded from a cliff area facing the Guajataca River at Charcas Ward, municipality of Quebradillas (Morales 2020). At this site, Alcides Morales from the NGO Para La Naturaleza, observed approximately ten individuals, although he did not conduct a formal population assessment (Morales 2020). More recently, a new locality of the species was reported by José Román (manager of the Guajataca Commonwealth Forest), and the site was surveyed by José Sustache (botanist from the Puerto Rico Department of Natural and Environmental Resources) and Service Biologist Omar A. Monsegur-Rivera, estimating approximately 50 St. Thomas prickly-ash individuals (Service 2021). These two sites were surveyed again by Thomas Heller in 2022, where he noted a lack of natural recruitment with the population skewed towards old individuals (Heller 2021; Monsegur-Rivera 2022 pers. obs.).

Therefore, the current estimated number of individuals along the Guajataca River is approximately 60 individuals (Table 1).

As for the historical localities of the St. Thomas prickly-ash along the southern coast of Puerto Rico, the species was known from Cerro Cariblanco and las Piedras Chiquitas in the boundary of the municipalities of Salinas and Coamo (Heller 2021; Table 1). These sites were recently surveyed by Thomas Heller with no positive finding of individuals despite the availability of suitable habitat for the species in the area (Hamilton et al. 2020). Nonetheless, Heller was able to located seven new individuals in a steep cliff area adjacent to PR road 155 in Pasto Ward in the municipality of Coamo. This locality was thought to be extirpated at the time of the final rule (Service 1985), which indicates some resiliency of the species to disturbance. Therefore, the current estimated number of individuals along southern Puerto Rico is at least 7 individuals (Table 1). The known St. Thomas Prickly-Ash individuals for Puerto Rico (68) represent only 9% of the global species population.

U.S. Virgin Islands. In the island of St. John (USVI), the species remains known from the localities reported in the 2015 5-year review (Service 2015) (Table 1). Despite the recent surveys by T. Heller not being a comprehensive population assessment, he did find an increase in the number of individuals in at least two of the St. John localities (e.g. from 6 to 18 individuals at Calabash Boom/Johnson Bay Ridge and from 13 to 26 individuals at Cub Gut/Mina Hill) (Service 2015; Heller 2021). At present, the estimated number of individuals of the St. Thomas Prickly-Ash at St. John is approximately 244 individuals, comprising about 33% of the known plants of the species (Heller 2021) (Table 1). However, the known localities at St. John have little evidence of natural recruitment (no juveniles or seedlings), a pattern consistent with other listed species occurring in this Island (e.g., *Solanum conocarpum*) and likely resulting from predation by feral ungulates (Monsegur-Rivera 2010-2019 pers. obs.). In the island of St. Thomas (USVI), the species is currently known from three localities; Beverly Hills (50 individuals), Hawk Hill/Flag Hill (2 individuals) and Estate Bovoni (36 individuals) for a current total estimated number of 88 individuals (Heller 2021; Heller 2019) (Table 1).

British Virgin Islands: The core of the St. Thomas prickly-ash individuals occurs within the Island of Virgin Gorda in BVI, where the species extends into two main localities: Gorda Peak (66 individuals), and Leverick Bay (290 individuals), representing 49% of the total known individuals across the species' range (Table 1) (Heller 2021). At Tortola, BVI, the species is known from two localities: Hawks Nest (21 individuals) and Lloyds (1 individual). The majority of these individuals occur on private lands currently subject to development (e.g., Leverick Bay, Hawk's Nest and Lloyds) (see discussion under the Five-Factor Analysis, below).

Table 1. Population estimates of St. Thomas Prickly-Ash (*Zanthoxylum thomsonianum*) across its geographical range.

Location	Population/locality name	Estimated Number of Individuals	Source (Notes)
Isabela (PR)	Cara del Indio	0	Heller 2021 (may be extirpated)
Isabela (PR)	El Costillar	1	Heller 2021 (lack of recruitment noted)
Isabela (PR)	Guajataca River, south of El Costillar	50	Heller 2021; Service 2021 (lack of recruitment noted)

<b>Location</b>	<b>Population/locality name</b>	<b>Estimated Number of Individuals</b>	<b>Source (Notes)</b>
Quebradillas (PR)	Guajataca River, Charcas Ward	10	Heller 2021 (lack of recruitment noted)
Coamo/Salinas border (PR)	Piedras Chiquitas	0	Heller 2021
Coamo/Salinas border (PR)	Cerro Cariblanco	0	Heller 2021
Coamo (PR)	Above Highway 155	7	Heller 2021(lack of recruitment noted)
St. Thomas (USVI)	Beverly Hills Road	50	Service 2016
St. Thomas (USVI)	Hawk Hill/Flag Hill	2	Heller 2021
St. Thomas (USVI)	Estate Bovoni	36	Heller 2021
St. John (USVI)	Point Rendezvous/Giffit Hill	112	Ray and Stanford 2005; Heller 2021 (limited recruitment noted)
St. John (USVI)	Calabash Boom/Johnson Bay Ridge	18	Ray and Stanford 2005; Heller 2021 (limited recruitment noted)
St. John (USVI)	Cob Gut/Minna Hill	26	Ray and Stanford 2005; Heller 2021 (limited recruitment noted)
St. John (USVI)	Cob Hill	36	Ray and Stanford 2005; Heller 2021 (limited recruitment noted)
St. John (USVI)	Bordeaux Heights	22	Ray and Stanford 2005; Heller 2021 (limited recruitment noted)
Virgin Gorda (BVI)	Leverick Bay and north facing slopes to Long Bay	290	Heller 2021
Virgin Gorda (BVI)	Gorda Peak and east facing slopes over South Sound	66	Heller 2021
Tortola (BVI)	Hawks Nest	21	Heller 2021
Tortola (BVI)	Lloyds	1	Heller 2021
Total number of individuals	(Overall estimate)	748	

### **Threats (Five-Factor Analysis) Summary**

A detailed review of the species' threats can be found in the 2015 St. Thomas Prickly-Ash 5-year status review (Service 2015). 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 summary of current threats is detailed below. The present or threatened destruction, modification, or curtailment of the habitat (Factor A), predation (Factor C), the inadequacy of existing regulatory mechanisms (Factor D) and other natural or manmade factors (Factor E) continues to threaten the St. Thomas prickly-ash as described in the 2015 5-year status review (Service 2015). Impacts to habitat include changes in land use, degradation of habitat, fire impacts, invasive species, and competition with other plants, which resulted in fragmented and isolated populations. As stated above, the core of the species (49%) occurs in BVI, where the individuals are concentrated on the island of Virgin Gorda (Table 1) and plants are threatened by urban development, particularly at Leverick Bay where habitat is been deforested for the construction of houses and hotels) (Monsegur-Rivera 2015-2017 pers. obs.). Same scenario occurs in Tortola, where individuals at Hawks Nest are threatened by deforestation for urban development, including the construction of houses (Monsegur-Rivera 2015 pers. obs.). In the case of the island of St. John, the largest locality at Point Rendezvous/Giff Hill occurs on lands outside the Virgin Islands National Park (National Park Service) and is subject to habitat fragmentation and deforestation for urban development, with the known locality encroached by the construction of houses (Monsegur-Rivera 2016 pers. obs.). Similarly, all known individuals of St. Thomas prickly-ash on the island of St. Thomas occur within private lands, where plants are directly impacted by ongoing deforestation for urban development (Service 2016). The area of Beverly Hills Road in St. Thomas continues to be deforested, and development has occurred in areas where the species is known to occur resulting in direct impacts to individuals and further habitat degradation (Monsegur-Rivera 2016 pers. obs.). Similarly, all known localities at Puerto Rico occur on private lands, and individuals along the cliffs of the Guajataca River may be vulnerable to the proposed extension of Highway PR-22 from the municipality of Hatillo to Aguadilla. In fact, the recent discovery of at least two new localities along the Guajataca River highlights the potential occurrence of further unidentified localities along this geographical feature. Moreover, analysis of Google Earth (2021) aerial images shows deforestation associated to a rock quarry in the municipality of Isabela in an area known to harbor suitable habitat for the species. Considering the St. Thomas prickly-ash dioicous reproductive biology (female and male on different plants), ongoing deforestation and habitat fragmentation may result on a reduced potential for cross-pollination and lack of effective reproduction. Researchers in USVI have found that about 75% of the seeds they collected were not viable, a possible effect of the species' reproductive biology coupled with the small number of individuals (Factor E), and the habitat fragmentation (Hamilton and Heller, 2020). Similarly, the new locality recorded at the cliff of the Guajataca River in the municipality of Isabela shows no seedlings and only a single fruit was recorded during recent surveys (Monsegur-Rivera 2021-22 pers. obs.).

In the case of the localities in Salinas and Coamo, there is no direct evidence of impacts due to ongoing urban development. Nonetheless, these areas have been extensively degraded due to former deforestation for cattle ranching and the associated habitat intrusion by nonnative invasive plant species (e.g., *Megathyrsus maximus*). The presence of *Megathyrsus* makes the habitat vulnerable to human induced fires, hence, making the St. Thomas prickly-ash susceptible to fire events (Factor E). In fact, these areas are affected by extensive fires on a yearly basis, with aerial images (Google Earth) showing fire events affecting the sites of Cerro Cariblanco and Las Piedras Chiquitas (Monsegur-Rivera 2022 pers. obs.). This may explain why the species has not been located at these historical sites over the last decade despite search efforts by local experts. Thomas Heller further mentioned that the locality at PR road 155 in Coamo may be vulnerable to damaging impacts from grazing (Heller 2021). On the island of St. Thomas (Beverly Hills

Road), habitat intrusion by nonnative plant species has also been documented. At this site ornamental species such as *Callisia fragrans*, *Kalanchoe daigremontiana*, *Sansevieria hyacinthoides*, *Tradescantia spathacea* and *Triphasia trifoliata* has created a thick understory which precludes the germination and recruitment of the St. Thomas prickly-ash (Service 2016). The impact by invasive exotic species is not limited to urban areas, the Service has records of *Tradescantia spathacea* at El Costillar (Puerto Rico) despite this is a remote and steep locality (Monsegur-Rivera 2020 pers. obs.).

As stated on the previous St. Thomas prickly-ash 5-year review (2015), foraging of feral goats (*Capra aegagrus hircus*), pigs (*Sus scrofa*), white tail deer (*Odocoileus virginianus*), and donkeys (*Equus asinus*) still results in impacts to the habitat in USVI and BVI (Factors C and E). These feral animals result in severe impacts and alters the ecosystem as the vegetation evolved in the absence of these exotic species and native plants are not able to cope with such grazing pressure (The BVI Tropical Important Plant Areas (TIPAs) National Team 2019). Additionally, these feral animals feed on seedlings of native plants (including the St. Thomas Prickly-Ash), and also expose soil resulting in erosion and promoting the expansion of invasive plants species (The BVI TIPAs National Team 2019). In the case of the localities in St. John, the impact from feral browsers may explain the absence of seedlings and lack of recruitment of the St. Thomas prickly-ash, since similar impacts have been recorded on other federally listed species (e.g., *Solanum conocarpum*) (Service 2022).

The impacts of climate change and weather events also have continued and potentially increasing impacts to the species and their habitat (Factor E). In September 2017, Puerto Rico and the Virgin Islands received the impact of two catastrophic hurricanes (Irma and María) (Pérez et al. 2021). Both events produced extensive damage across this geographical area, with Hurricane María killing or severely damaging over 20 million trees throughout Puerto Rico (Feng et al. 2018). Post hurricane assessments by Kew staff at BVI resulted in finding previously known St. Thomas prickly-ash individuals along the trail to Gorda Peak National Park that appeared to be in good health (Hamilton and Clubbe 2018, Dani Sanchez et al. 2020). In 2019, Thomas Heller noted that the east-facing area at Minna Hill on St. John had been relatively well protected from disturbance of Hurricane Irma, however, the nearby west-facing side of Minna Hill was highly disturbed, and that the vegetation at Cob Hill was also impacted (Heller 2020). However, these surveys did not comprise a full population assessment, and based on the magnitude of both Irma and María, we suspect adverse direct impacts to species throughout much of its range. Despite the St. Thomas prickly-ash evolving with tropical storms, the current low number of individuals per locality along with the species reproductive biology makes it vulnerable to hurricane impacts. In fact, winds and landslides from Hurricane Irma impacted known localities of the St. Thomas prickly-ash as evidenced by nearby extirpations of endangered *S. conocarpum* (Service 2022). Models predict that extreme weather events, including extreme hurricanes like those seen in 2017, and changes in overall weather patterns (e.g., decreases in mean precipitation and increases in heat) are likely to continue (Intergovernmental Panel on Climate Change [IPCC] 2021). Thus, the St. Thomas prickly-ash would still be vulnerable to these catastrophic events.

Lastly, based on the existing State, Territorial and Federal (National Park Service) laws and regulations protecting this species, the Service considers that the inadequacy of existing regulatory mechanisms (Factor D) is not a threat to St. Thomas prickly-ash in Puerto Rico nor in the USVI. However, the inadequacy of enforcement and environmental review remains a

threat to the species on private lands on St. Thomas and on St. John. In addition, in BVI (i.e., Tortola and Virgin Gorda), the Service is unaware of any formal regulatory mechanism currently protecting the St. Thomas prickly-ash. At present, there are 21 terrestrial National Parks across the BVI, which includes the Gorda Peak National Park, the only protected area in the BVI where the St. Thomas prickly-ash is present. In summary, as mentioned above, the core of the St. Thomas prickly-ash individuals at the BVI occur on lands vulnerable to development and where the species is not protected by regulations.

During this review, we found no information indicating that overutilization for commercial, recreational, scientific, or educational purposes (Factor B) pose a threat to the St. Thomas prickly-ash.

### **Synthesis**

St. Thomas prickly-ash is a small evergreen shrub endemic to Puerto Rico, U.S. and British Virgin Islands. At present, the species' is known from 749 individuals across the species range. It occurs in four populations in the British Virgin Islands, including two core populations (e.g., Gorda Peak and Leverick Bay) representing 49% of the known individuals. The species is known from eight localities, representing 33% of the known individuals in the U.S. Virgin Islands. Only 68 individuals (9% of known individuals) are known to occur in Puerto Rico. The majority of all plants occur on private lands, offering it little protection from development, habitat fragmentation, and other modifications associated with human activities. There is evidence of adverse habitat modification across the range of the species. Moreover, there is evidence of feral browsers affecting the species and their habitat on islands with the stronghold populations (i.e., Virgin Gorda and St. John). Although there is an apparent increase in the number of individuals compared to the previous status review, this is partially a result of incomplete survey efforts associated with the last review. Additionally, survey information indicates an overall lack of natural recruitment and continued and increasing threats to all populations. Lastly, the current low number of individuals per locality along with the species reproductive biology renders the species vulnerable to hurricane impacts (e.g., wind, flash floods, and landslides), which are likely to become more frequent in the future. Because of ongoing threats and the current condition of the species, the St. Thomas prickly-ash continues to meet the definition of an endangered species.

### **RECOMMENDED FUTURE ACTIVITIES**

1. Protection of privately-owned lands in Puerto Rico and USVI should be given a high priority for conservation through land acquisition, conservation easements, private landowners programs, due to its importance for the recovery of the St. Thomas Prickly-Ash.
2. Since the Flag Hill population in St. Thomas is located entirely on a private land, it is recommended that the USVI Department of Planning and Natural Resources provide guidance to private landowners about the importance of maintaining native dry forest vegetation. Due to the species dioecious condition (separate male and female plants), low seed germination rate and limited seed dispersal, the protection of this known population should be considered a priority.

3. A critical step for the long-term conservation of the species is the accession of seed (seed banking) and live material from all known localities across the species range (Puerto Rico, USVI and BVI) into *ex situ* conservation.
4. Due to the species' dioecious nature and unknown sex ratios in the known populations, research on the species phenology is needed to determine the sex ratio and reproductive status of known localities.
5. A germination protocols should be developed to optimize the species propagation and maximize the use of the little seed material available. The protocol must also include propagation by cuttings.
6. Research is needed to determine the populations' genetics, and the relative importance of each population for the long-term conservation of the species. Ongoing research on the species phylogenetics needs to continue to clarify the taxonomic boundaries of the species.
7. The Service and partners (e.g., Kew and PRDNER) should continue habitat assessments across the species range.

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**APPROVALS/SIGNATURES**

**U.S. FISH AND WILDLIFE SERVICE  
STATUS REVIEW of St. Thomas Prickly-Ash (*Zanthoxylum thomasianum*)**

**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
- 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:**

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

Approve \_\_\_\_\_

\* Since 2014, Southeast Region Field Supervisors have been delegated authority to approve 5-year reviews that do not recommend a status change.