

5-Year Review: Summary and Evaluation
***Styrax platanifolius* ssp. *texanus* (Texas Snowbells)**
Current Classification: *Endangered*

U.S. Fish and Wildlife Service
Austin Ecological Services Field Office

1.0 GENERAL INFORMATION

1.1 Reviewers:

Lead Regional Office: Jennifer Smith-Castro, Southwest Region, Regional Recovery Biologist, (281) 212-1509.

Lead Field Office: Chris Best, State Botanist, Austin Ecological Services Field Office.

1.2 Methodology: Beginning in 2015, U.S. Fish and Wildlife Service prepared a Species Status Assessment (SSA) of *Styrax platanifolius* ssp. *texanus* (Texas snowbells). The SSA incorporated an updated review of the subspecies' natural history, taxonomy, ecology, distribution, abundance, and populations; a potential habitat model and maps; an assessment of individual, population, and species requirements, factors affecting the species' survival, current conditions, and conservation efforts; and an evaluation of the current status and projected future viability in terms of resilience, redundancy, and representation. In August 2017, we sent the draft SSA to three expert peer reviewers and received constructive comments from all. We completed the final SSA in October 2017. We based this 5-year review on the information and evaluations provided in the SSA.

1.3 Federal register citation announcing initiation of this review: April 15, 2015 (80 FR 20241) and May 31, 2018 (83 FR 25034).

2.0 REVIEW ANALYSIS

2.1 Review Summary: Texas snowbells is a rare, endemic shrub of the Edwards Plateau of Texas. We listed it as an endangered species, *Styrax texanus*, on October 12, 1984 (49 FR 40036). We currently recognize this plant as *S. platanifolius* ssp. *texanus*, one of five closely related subspecies described in the most recent taxonomic treatment (Fritsch 1997).

When listed as endangered, only 25 individuals had been documented in five locations; however, a report of four individuals from Kimble County was later determined to be incorrect. The recovery plan (U.S. Fish and Wildlife Service 1987) listed 39 individuals in six sites. Since 1986, field surveyors have documented 400 mature and 452 immature Texas snowbells plants in 22 naturally occurring sites in Real, Edwards, and Val Verde counties. By comparing with other plant species that have similar, well-studied life histories, we estimate that

the minimum viable size of metapopulations is from 900 to 1,200 individuals. The global population spans a range of 121 km (75 mi) east to west and 35 km (22 mi) north to south. The known populations occur along watercourses, on or near steep slopes, in exposed limestone and gravel of the upper reaches of the Nueces, West Nueces, and Devils River watersheds. We estimate that about 15,043 ha (37,172 ac) of potential habitat exist in these watersheds. An unconfirmed population has also been reported from the lower West Frio River.

Texas snowbells usually flowers in April, and if fertilized, flowers produce a typically single-seeded dry fruit that matures in August. However, investigations of the breeding system of Texas snowbells and another closely related species of *Styrax* indicate that it is an obligate out-crosser; fertilization requires transfer of pollen between individuals that are not too closely related. The known pollinators include native species of bumblebee and carpenter bee and the introduced honey bee. High rates of fertilization probably require that Texas snowbells plants are separated by no more than 0.5 to 1.0 km (0.3 to 0.6 mi). Almost all documented reproduction of Texas snowbells in the wild, as indicated by the presence of immature plants, occurs among populations that have at least 56 mature individuals dispersed over a distance of 1.6 km (1.0 mi) or less. Little or no reproduction occurs among isolated individuals and small populations.

Native white-tailed deer and introduced ungulate species are present at very high densities in many parts of the Edwards Plateau. Severe browsing by these ungulates causes very high mortality of seedlings and juvenile Texas snowbells plants. Consequently, mortality exceeds recruitment in all but the two largest populations of Texas snowbells. In addition to small population sizes and ungulate browsing, other factors that affect the subspecies' survival include low levels of genetic diversity within and among populations, isolation and fragmentation of populations, severe floods, and endemism to a small geographic and habitat range. Climate changes and pollinator deficiency may potentially affect future viability. A large portion of known individuals and populations occurs on privately owned lands, which makes effective conservation more challenging.

The original recovery plan (U.S. Fish and Wildlife Service 1987) did not establish criteria for reclassifying Texas snowbells to a threatened status (downlisting) or for removal from the endangered species list (delisting). In May 2017, we prepared a revised recovery plan that takes into account the experiences and data acquired over the last 3 decades, and establishes criteria for downlisting and delisting. We sent this draft, revised recovery plan to three expert peer reviewers, who all provided constructive comments. This draft recovery plan was finalized in August 2018.

We base our assessment of species viability, defined as the likelihood of persistence over the long term, on the concepts of representation, redundancy, and resilience. Texas snowbells is endemic to a small area and has a low level of

genetic diversity, and therefore has low representation. Since there are few populations, redundancy is low. Resilience is low because all known populations are far below the estimated minimum viable population level. In synthesis, the viability of Texas snowbells is low. Therefore, the classification of Texas snowbells should remain as endangered.

3.0 RESULTS

3.1. Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist (*Indicate reasons for delisting per 50 CFR 424.11*):

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 Recovery Priority Number: No change (3).

Brief Rationale: In our previous 5-yr review (U.S. Fish and Wildlife Service 2008), the recovery priority number (48 FR 43104) was determined to be 3. Our current assessment indicates that the degree of threat remains high, the recovery potential remains high, and the taxon remains a subspecies. Therefore, the current recovery priority number remains 3.

4.0. RECOMMENDATIONS FOR FUTURE ACTIONS.

- 4.1. Private landowner outreach. Promote awareness of Texas snowbells through written and on-line sources. Promote the continued efforts of private landowners to conserve Texas snowbells. Provide technical and/or financial assistance, as needed, to support monitoring, surveys, and management actions. Promote conservation easements for long-term protection of habitats and populations among willing landowners.
- 4.2. Reduce ungulate browse pressure. An immediate but short-term objective is to protect vulnerable individuals and small populations, where possible, with deer-fencing or other methods of exclusion. A more permanent objective is management of white-tailed deer and introduced ungulates at densities that do not deplete Texas snowbells and other native vegetation.
- 4.3. Population augmentation and reintroduction. Use nursery-propagated seedlings and/or direct-seeding to augment small populations to: a) increase numbers of individuals and genetic diversity within pollinator ranges to ensure high fertilization rates; and b) increase metapopulation size to MVP levels (increase resiliency). Reintroduce populations into currently unoccupied potential habitats to: a) reduce isolation and fragmentation and establish gene flow among populations; and b) establish

additional metapopulations (increase redundancy). Prepare a controlled propagation and reintroduction plan, as required by Service policy (65 FR 56916). Limit augmentation and reintroduction to the upper watersheds of the Nueces, West Nueces, and Devils Rivers; augmentation and reintroduction may also be appropriate in the Frio, West Frio, Dry Frio, and Sycamore Creek watersheds if natural populations are confirmed there.

- 4.4. Pollinator conservation. Promote conservation and management of native bees, butterflies, and other pollinators. This may include management and restoration of diverse native grasslands, shrublands, and savannas.
- 4.5. Search for new populations. Conduct surveys, with landowner permission, in potential habitats throughout the subspecies' range. In particular, the discovery or confirmation of populations in the Frio, West Frio, Dry Frio, or Sycamore Creek watersheds would increase our knowledge of the subspecies' geographic range and adaptability, and might confer greater genetic diversity (representation) to the subspecies as a whole.
- 4.6. Develop an improved potential habitat model, using actual slope, distance-to-slope, and distance-to-watercourse data (and possibly other factors) collected from plant locations in the field.

Texas Snowbells Five-Year Review - Final

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of
Styrax platanifolius ssp. *texanus*

Current Classification: Endangered.

Recommendation resulting from the 5-Year Review:

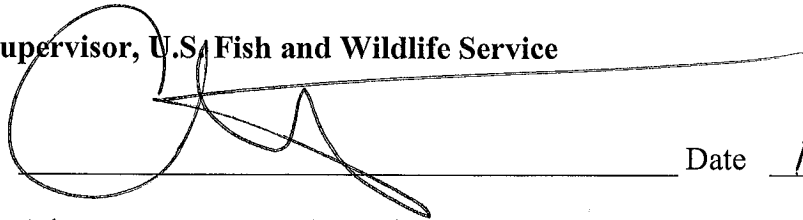
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed.

Review Conducted By: Chris Best, State Botanist, Austin Ecological Services Field Office.

FIELD OFFICE APPROVAL:

Lead Field Supervisor, U.S. Fish and Wildlife Service

Approved



Date

August 21, 2018

Adam Zerrenner, Austin Ecological Services Field Office