

**Britton's Beargrass**  
*(Nolina brittoniana)*

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



Chi to Branch Reserve, Hillsborough County. Photo by Todd Mecklenborg

**U.S. Fish and Wildlife Service  
Southeast Region  
North Florida Ecological Services Office  
  
Jacksonville, Florida**

## **5-Year Review Britton's Beargrass (*Nolina brittoniana*)**

### **I. GENERAL INFORMATION**

#### **A. Methodology used to complete the review**

In conducting this 5-year review, we relied on the best available information pertaining to historic and current distributions, life history, potential threats, and habitat of this species. Specific sources include the final rule listing this plant under the Endangered Species Act (Act), the 1996 recovery plan, research project reports, peer reviewed scientific publications, unpublished field observations, and personal communications. A *Federal Register* notice with a 60-day comment period (published May 7, 2018; 83 FR 20092) announced the initiation of the 5-year review and request for information on this species. We received no comments in response to this announcement. The draft 5-year review was submitted to the cooperating Service Field Office and regional office for review. No part of this 5-year review was contracted to or drafted by an outside party. This 5-year review was completed by the U.S. Fish and Wildlife Service's (Service) species lead recovery biologist in the North Florida Ecological Services Office.

#### **B. Reviewers**

**Lead Region:** Kelly Bibb, Southeast Region, 404-679-7132

**Lead Field Office:** Todd Mecklenborg, North Florida Ecological Services,  
904-731-3029

**Cooperating Field Office:** David Bender, South Florida Ecological Services,  
772-469-4294

#### **C. Background**

- 1. Federal Register Notice citation announcing initiation of this review:** 83 FR 20092, May 7, 2018.
- 2. Species status:** Improving (since 2010 5-Year Review).

The number of locations with element occurrences of this species has increased since the last 5-year (2010), which was also an increase from the time it was listed as endangered on April 27, 1993. Element occurrences are defined as an area of land and/or water in which a species or natural community is, or was, present. For species, it corresponds with the local population (portion of a population or a group of nearby populations). When listed, 8 to 10 populations were known to occur on conservation lands in Marion, Hernando, Lake, Osceola, Orange,

Highlands, and Polk counties. The prior 5-Year Review noted a total of 72 known occurrences of which 34 populations were located on 24 conservation lands. As of 2019, the species had 111 total populations of which 72 populations are located on a minimum of 30 conservation lands in Highlands, Polk, Lake, Manatee, Hillsborough, Hardee, Pasco, and Marion counties. No populations occur in Orange/Osceola counties on protected sites per the recovery criteria. (Appendix I, FNAI 2019).

- 3. Recovery achieved:** 3 (50-75%) We are required to use the best available information to evaluate and determine the likely current and future threats and the current and future response of the species' to those threats. Currently, destruction, modification or curtailment of its habitat or range is a likely threat to 35% of known populations because 35% of the populations exist on non-protected private land. Because 65% of the populations exist on public lands that are protected habitat destruction, habitat destruction is not a likely current or future threat to those populations.

- 4. Listing history**

Original Listing

Federal Register notice: 58 FR 25746

Date Listed: April 27, 1993

Entity Listed: species

Classification: endangered

- 5. Associated rulemaking:** None.

- 6. Review history:** A 5-Year Review was completed in May 2010. The species status was determined to be "Uncertain." The review indicated the species was likely in decline based on the majority of the known populations occurred on unprotected private lands. No status change was recommended in that document.

Recovery Plans: 1996 and 1999

Each year, the Service reviews and updates listed species information for eventual inclusion in the required Recovery Report to Congress. Through 2013, we did a recovery data call that included status recommendations such as "Uncertain" for this plant. We continue to show that species status recommendation as part of our 5-year reviews. The most recent evaluation for this plant was completed in 2018.

- 7. Species Recovery Priority Number at the start of review (48 FR 43098):** 8. This number for Britton's beargrass indicates a species with a moderate degree of threat and a high recovery potential.

- 8. Recovery Plan:**

**Name of plan:** Recovery Plan for Nineteen Florida Scrub and High Pineland Plant Species.

**Date issued:** June 20, 1996

**Name of plan:** South Florida Multi-Species Recovery Plan (MSRP) (identifies recovery contributions for the South Florida Ecological Service's office work area).

**Date issued:** May 18, 1999

## **II. REVIEW ANALYSIS**

### **A. Application of the 1996 Distinct Population Segment (DPS) Policy**

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife that interbreeds when mature. This definition limits listing a DPS to only vertebrate species of fish and wildlife. Because the species under review is a plant, the DPS policy is not applicable.

### **B. Recovery Criteria**

- 1. Does the species have a final, approved recovery plan containing objective, measurable criteria? Yes**
- 2. Adequacy of recovery criteria:**
  - a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat? No.** The recovery criteria do not address the species' biology nor any requirements for suitability of the habitat.
  - b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threats)? No.** A recovery meeting was held after the comment period ended for the recovery plan; however, issues discussed were incorporated in the plan's explanation following the criteria. It is noted that better seedling recruitment information is warranted (Factor E), which is not addressed in any of the criterion to reclassify or delist.
- 3. List the recovery criteria as they appear in the recovery plan, and discuss how each of the criteria has or has not been met, citing information. For threats-related recovery criteria, please list which of the 5 listing factors are addressed by the criterion.**

“For reclassification, protect eight populations at four or more sites, with simple genetic assessment of number of individuals and demographic monitoring for 5 years.

For delisting, 20 viable populations at five or more sites, with sites in each of Highlands, Polk, Orange/Osceola, and Lake counties, Florida.”

The criteria to reclassify or delist the species addresses the following listing factors: the present or threatened destruction, modification, or curtailment of its habitat or range (Factor A), the inadequacy of existing regulatory mechanisms (Factor D), and other natural or manmade factors affecting its continued existence (Factor E).

The metric “eight populations at four or more sites” for reclassification and “populations at five or more sites” in specified counties (redundancy and representation) for delisting addresses Factor A. The term “protect” addresses Factor D. Assessing the “number of individuals” and “viable populations” (population resiliency) incorporates Factor E.

There are currently 111 populations of which 72 populations occur on a minimum of 30 conservation lands (protected sites). These populations are present in Highlands, Polk, Lake, Manatee, Hillsborough, Hardee, Pasco, and Marion counties. No populations occur in Orange/Osceola counties on protected sites per the recovery criteria.

Fifty-two populations throughout the range of the species (Orlando Ridge, Winter Haven Ridge, and Lake Wales Ridge) have had simple assessments of the number of individuals present and genetic sampling of tissue (Menges et al. 1996). The vast majority of the populations on conservation lands in the FNAI 2019 database have also been assessed for individuals present. Population monitoring occurred from 1991 through 2001 at Lake Wales Ridge State Forest (LWRSF) – Tiger Creek Preserve (Slapcinsky et al. 2010) and is currently being monitored at LWRSF – Arbuckle Tract (Rosner-Katz 2018).

## C. Updated Information and Current Species Status

### 1. Biology and Habitat

- a. **Abundance, population trends, demographic features, or demographic trends:** The FNAI’s EOR database lists 111 extant populations in 2019 with 65% (72 EOR) of the populations occurring on over 30 conservation lands. This is an increase from 2010 when there were 72 extant populations of which 47% (34 EOR) occurred on 24 conservation lands.

*Nolina brittoniana* is a perennial herb with a moderate to long life span (>10 years). The species resprouts post disturbance with relatively stable

demography and low annual turnover (Thomas et al. 1998, Menges et al. 2001).

- b. Genetics, genetic variation, or trends in genetic variation:** Genetic assessments on 52 populations in Highlands, Polk, Orange, and Osceola counties confirms high genetic diversity (Menges et al. 1996). The species has two traits associated with high genetic diversity (Menges et al. 2001; Heaney 2010).
- c. Taxonomic classification or changes in nomenclature:** No change in classification or nomenclature.
- d. Spatial distribution, trends in spatial distribution or historic range:** The current spatial distribution is most likely similar to the species' assumed historic range, but now occurs in a highly fragmented landscape with less species abundance resulting from continual habitat loss from anthropogenic development. *Nolina brittoniana* occurs principally on five of the central peninsular ridges (Mount Dora, Orlando, Lake Wales, Lake Henry, and Winter Haven) from Marion County south through Highlands County. The species is also present west of these ridges along the west coast of central Florida in five counties. Counties with extant populations in the FNAI's 2019 database along with vouchered specimens from the Atlas of Florida Plants – Institute for Systematic Botany include: Marion, Lake, Orange, Osceola, Polk, Highlands, Hernando, Pasco, Hillsborough, Manatee, and Hardee (Table 1).

There are currently no populations on conservation lands in Orange, Osceola, or Hernando counties. The one population in Orange County on private land was last observed in the mid 1990s. Three populations on private lands in Osceola County were last observed in the late 1980s and the fourth population was last observed in the late 1990s. The Hernando County population on private land has not been observed since 1961. These populations may be historic records at this point. Periodic surveys have also confirmed as noted in the FNAI database that 3 populations exist in Orange County, one population in Lake County, and one population in Polk County as extirpated (not included in Table 1.). Therefore, future protection and active habitat management necessary for species persistence in these counties and on all private lands is uncertain in the future.

Table 1. Number of populations per county on conservation lands and private lands (FNAI 2019 database).

County	Conservation Lands	Private Lands
Marion	1	
Lake	1	9
Orange		1
Osceola		4

Polk	35	10
Highlands	30	14
Hernando		1
Pasco	2	
Hillsborough	2	
Manatee	1	
Hardee	1*	
<b>TOTAL</b>	<b>72</b>	<b>39</b>

\* Population occurs in both Highlands and Hardee Counties (Highlands Hammock State Park).

- e. **Habitat conditions:** *Nolina brittoniana* is a habitat generalist and occurs in multiple xeric upland communities, including scrub and sandhill (Christman 1988, Christman and Judd 1990, Menges et al. 2007). Plant persistence in these habitats requires adaptation to survive in high temperatures, ability to respond to aboveground tissue loss (fire or other disturbance), or avoidance of these conditions through survival in unburned patches or in soil seed bank (Slapcinsky et al. 2010). *Nolina brittoniana* re-sprouts, produces flowering stalks, and flowers in response to fire and survivorship is high (Thomas et al. 1998, Weekley and Menges 2003, and Rosner-Katz 2018).

**2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)**

- a. **Present or threatened destruction, modification or curtailment of its habitat or range:** The loss of habitat and habitat degradation continues to be the principle threats to the species on unprotected private lands. Populations occurring on private lands are potentially exposed to further habitat loss (development, conversion to agriculture) and degradation (fire suppression). There are 39 populations (35%) on private lands (not protected) subject to these threats.

The 72 populations (65%) occurring on conservation lands are no longer threatened with destruction of their habitat since these locations are protected from development. All conservation lands have management plans for the long-term preservation and conservation of the species' present albeit funding, limited personnel availability, and the location on the landscape (smoke management constraints) may preclude management activities at times. As noted prior, the species pyrogenic flowering requires fire for seed production, nevertheless even with intermittent fire suppression *Nolina brittoniana* has very high survivability in the absence of fire management due to its clonal ability to spread locally. Over 20 of the populations were first observed in the late 1980's and still currently persists on these conservation lands, which is a measure of long-term viability for a population. Most certainly, the remaining populations have existed prior to listing; however, they were not known because range-wide surveys were not conducted on private lands and many of

the current conservation lands were in private ownership in the late 1980's through the 1990's. Acquisitions since the species was listed have greatly improved the current number of populations on conservation lands.

Having the vast majority of the populations occurring on conservation lands with active management, a high number of populations present, and the longevity of the species, the Service should conduct a species status assessment to evaluate the viability of the species on these lands.

- b. Overutilization for commercial, recreational, scientific, or educational purposes:** No reports or information indicating overutilization. Also, the species (listed as endangered by the State of Florida) is protected from "wanton exploitation or destruction" by Florida Statute 581.185 "Preservation of native flora of Florida".  
[http://www.leg.state.fl.us/Statutes/index.cfm?App\\_mode=Display\\_Statute&Search\\_String=&URL=0500-0599/0581/Sections/0581.185.html](http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0500-0599/0581/Sections/0581.185.html)
- c. Disease or predation:** No new information is available regarding disease or vertebrate predation for this species to indicate these stressors are increasing or above natural levels.
- d. Inadequacy of existing regulatory mechanisms:** Existing regulatory mechanisms that protect conservation lands occupied by this species provide protection to 65% of the known populations. The species' habitat is not protected on private lands. The species itself (listed as endangered by the State of Florida) is protected from "wanton exploitation or destruction" by Florida Statute 581.185 "Preservation of native flora of Florida".  
[http://www.leg.state.fl.us/Statutes/index.cfm?App\\_mode=Display\\_Statute&Search\\_String=&URL=0500-0599/0581/Sections/0581.185.html](http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0500-0599/0581/Sections/0581.185.html)
- e. Other natural or manmade factors affecting its continued existence:** Limited knowledge is available to determine seedling recruitment in natural populations. This could affect small population's genetic variation long-term. However, the species has been propagated from seed in plant nurseries and also introduced on conservation lands from seeds. With the increase in fire management on many of the conservation lands over the last several decades, future monitoring should be designed to detect seed viability in populations as it is evident from previous genetic assessments (Menges et al. 1996).

## D. Synthesis

In conducting this 5-year review, best available data indicated 111 populations range-wide. Sixty-five percent (72 populations) are located on a minimum of 30 conservation lands. Destruction, modification or curtailment of its habitat or range is a likely threat to 35% of known populations because 35% of the populations exist on non-protected private land. Because 65% of the populations exist on public lands that

are protected from habitat destruction, habitat destruction is not a likely current or future threat to those populations.

These populations exist in eight counties. The number of individuals has been periodically assessed for the majority of the populations on conservation lands and demographic monitoring has been conducted at several of the sites.

Overutilization and disease or predation are unlikely threats to *Nolina brittoniana* that exist on conservation lands. There is a lack of information on seedling recruitment in natural populations. Genetic assessments on 52 populations in Highlands, Polk, Orange, and Osceola counties confirms high genetic diversity, and with the species persistence (clonal tendencies) these are not a limiting factor (Heaney 2010). We recommend a SSA be conducted to examine the current and future resiliency, redundancy, and representation of this species to evaluate its viability.

### **III. RESULTS**

**A. Recommended Classification:** No Change in Status.

### **IV. RECOMMENDATIONS FOR FUTURE ACTIONS**

Increase demographic monitoring on conservation lands.

Conduct a Species Status Assessment to evaluate species viability across its current range.

Review recovery criteria and revise as appropriate based on best available data.

## V. REFERENCES

- Christman, S.P. 1998. Endemism and Florida's interior sand pine scrub. Final Project Report. Project Number GFC-84-101. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida.
- Christman, S.P. and W.S. Judd. 1990. Notes on plants endemic to Florida scrub. *Florida Scientist* 53:52-73.
- [FNAI] Florida Natural Areas Inventory. 2019. Supplemental element of occurrence records. On file, Fish and Wildlife Service, Jacksonville, Florida.
- Heaney, J.M. 2010. Systematics and Conservation Genetics of 2 Florida Endemics *Nolina brittoniana* and *N. atropurpurea*. UF
- Menges, E.S. 2007. Integrating demography and fire management: an example from Florida scrub. *Australian Journal of Botany* 55:261-272.
- Menges, E.S., R.W. Dolan, R. Yahr, and D.R. Gordon. 2001. Comparative genetics of seven plants endemic to Florida's Lake Wales Ridge. *Castanea* 66:98-114.
- Rosner-Katz, H. 2018. Lake Wales Ridge scrub plant monitoring report. Unpublished, Florida Forest Service, Frostproof, Florida.
- Slapcinsky, J.L., D.R. Gordon, and Menges E.S. 2010. Responses of rare plant species to fire in Florida's pyrogenic communities. *Natural Areas Journal* 30:4-19.
- Thomas, K., J.L. Slapcinsky, and D.R. Gordon. 1998. Monitoring report: *Nolina brittoniana*. Unpublished, The Nature Conservancy, Gainesville, Florida.
- University of South Florida. 2019. Plantatlas.org. Institute for Systematic Botany. Tampa, Florida
- Weekley, C.W., and E.S. Menges. 2003. Species and vegetation responses to prescribed fire in a long unburned, endemic-rich Lake Wales Ridge scrub. *Journal of Torrey Botanical Society* 130:265-282.

**U.S. FISH AND WILDLIFE SERVICE  
5-YEAR REVIEW of Britton's Beargrass (*Nolina brittoniana*)**

Current Classification: Endangered

Recommendation resulting from the 5-Year Review

- Downlist to Threatened
- Uplist
- Delist
- No change is needed

Review Conducted By: Todd Mecklenborg, North Florida Ecological Services Field Office

**FIELD OFFICE APPROVAL**

Lead Field Supervisor Fish and Wildlife Service

Approve  Date 8/26/2019