

Recovery Plan for *Spigelia gentianoides* (Gentian pinkroot)

https://ecos.fws.gov/docs/recovery_plan/20120124_Spigelia%20Recovery%20Plan%20FINAL%202.pdf

Original Approved: January 24, 2012

Original Prepared by: Dr. Vivian Negrón-Ortiz

We have identified best available information that indicates the need to amend recovery criteria for *Spigelia gentianoides* (Gentian pinkroot) since the recovery plan was completed. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and the rationale supporting the proposed recovery plan modification. The proposed modification is shown as an addendum that supplements the recovery plan, superseding p. iv (Executive summary) and pp. 26-27 (Recovery section) of the recovery plan. Recovery plans are non-regulatory documents that provide guidance on how best to help recover a species.

**For
U.S. Fish and Wildlife Service
Atlanta, Georgia**

Approved: _____

Acting

Franklin J. Anderson III
Regional Director, U.S. Fish and Wildlife Service

Date: _____

11/7/2019

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendment to the Recovery Plan of 2012 was accomplished using information obtained from the 2018 status review, the Recovery Plan of January 2012, peer-reviewed scientific publications, several unpublished research projects, unpublished field observations by U.S. Fish and Wildlife Service (Service), State and other experienced biologists, and personal communications. The two most used documents for this amendment were the 2018 *S. gentianoides* status review and the Recovery Plan of 2012. The document was peer-reviewed by four external reviewers. This review was completed by the Service's lead Recovery botanist in the Panama City Field Office, Florida.

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 delisting Factors.

Recovery Criteria

See previous version of downlisting criteria in recovery plan pages *iv*, 26-27.

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Synthesis

Spigelia gentianoides (Gentian pinkroot) is a small herbaceous plant with a very narrow distribution and a low population density. It is restricted to three counties in northwestern Florida, and one county in southern Alabama. On November 26, 1990 (55 FR 49046) it was federally listed as an endangered species under the Endangered Species Act of 1973, as amended. The species has a recovery priority number of 2, which indicates a species with a high degree of threat and a high recovery potential.

The plant, found on both public and private lands, grows as solitary individuals or in small clumps in predominately well-drained upland pinelands where it is a component of a fire-prone longleaf pine-wiregrass ecosystem. It is also found in areas where limestone outcrops and calcareous soils are widespread, in soils somewhat dry but rich in humus, and in pine-oak-hickory woods. The primary threat to *S. gentianoides* is habitat loss and alteration. Conversion of much of the historical forest land to commercial pine plantations has possibly extirpated many populations. Because this species occurs in fire-prone habitats, lack of fire and subsequent growth of shrubs and saplings in the understory, has reduced *S. gentianoides* abundance in areas where it was previously at high density. No problems have been detected with disease or predation.

At the time the Recovery Plan was issued, the species was comprised of two varieties located in Jackson and Calhoun counties (Florida), and Geneva and Bibb counties (Alabama). Morphological and molecular studies reassessed the appropriate ranks of these varieties and elevated variety *alabamensis* to species (USFWS 2018, Weakley et al. 2011). Consequently, *Spigelia gentianoides alabamensis* is now a different species.

The focus of this amendment is only on those populations that are *S. gentianoides*, and these occur in four counties west of the Apalachicola River: Calhoun, Jackson, and Washington counties in Florida, and Geneva County in Alabama. Surveys in early 2018 indicated that the species were stable at two Florida sites [The Nature Conservancy (TNC) *Spigelia* Preserve (TNC *Spigelia* Preserve) and Three Rivers State Recreational Area (Three Rivers SRA)], and increasing at three other sites, two in Florida [Apalachee Wildlife Management Area (Apalachee WMA) and Rock Hill TNC Preserve] and the other in Alabama [Geneva State Forest (Geneva SF)] (USFWS 2018). In these sites, numbers of observed individuals range from three to about 2,000. However, Hurricane Michael and post-storm salvage and cleanup operations affected the

habitat at all the Florida populations (FNAI 2019). Surveys relocated plants in all but the TNC *Spigelia* Preserve where no plants were found (FNAI 2019). Therefore, a comprehensive census is needed to update this information and accurately evaluate the status of *S. gentianoides* and the response of this species to hurricane and post-storm operations. A few conservation measures have been conducted and include development of propagation protocols from seed and vegetatively; establishment of an *ex-situ* collection at two botanical institutions; habitat management; and ongoing surveys.

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 *S. gentianoides* 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 distinct population segments) which is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any species that 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.”

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.

The objective of this addendum is to provide a framework for the recovery of *S. gentianoides* so that its protection by the Endangered Species Act is no longer necessary. We provide delisting criteria for the *S. gentianoides*, which will supersede those included in the Recovery Plan for *Spigelia gentianoides* (Gentian pinkroot).

Delisting Recovery Criteria

1. Existing core populations [Apalachee WMA, TNC *Spigelia* Preserve, Three Rivers SRA, Rock Hill TNC Preserve, and Geneva SF] are restored and properly managed, and monitoring demonstrates that the populations are stable or increasing over multiple

prescribed burn cycles, evidenced by a type of natural recruitment and/or multiple size-classes (addresses Factors A, D, and E).

2. At least five (5) new populations are discovered or established within the historic range of the species on lands protected by a conservation mechanism. These populations should exhibit stable or increasing trends over multiple prescribed burn cycles, evidenced by a type of natural recruitment and/or multiple size-classes (addresses Factors A and E).
3. Threats to *S. gentianoides* and its habitat (e.g., exotic species, site disturbance, urban development, hurricanes) have been managed and reduced to ensure the persistence of *S. gentianoides* into the foreseeable future (addresses Factors A, D, and E).

Justification

Criterion 1. The change in taxonomic rank and population extirpations due to threats related to Factor A have led to a reduction of this species' range and overall genetic diversity. Currently, *S. gentianoides* is known from seven extant populations located in Calhoun, Jackson, and Washington counties (Florida), and Geneva County (Alabama). One of the seven extant populations occurs on a private property in Florida. Given that the Endangered Species Act does not provide protection for plants on private lands, it is potentially threatened by future development for home-sites, agriculture, logging of associated hardwoods, recreational facilities, or other purposes (USFWS 2012). In addition, sites owned by the U.S. Army Corps of Engineers and The Nature Conservancy should all be considered protected, but some coordination with land managers is necessary. Fire management and reduced soil disturbance practices have been conducted for various sites, resulting in a slight increase or stable *S. gentianoides* (USFWS 2018). Prescribed burnings at 3 – 5 year intervals seem to maintain optimal *S. gentianoides* populations and should be implemented at these core populations over a period of 20 years. Currently, non-indigenous plants such as Japanese climbing fern (*Lygodium japonicum*) and Japanese honeysuckle (*Lonicera japonica*) do not pose a threat to *S. gentianoides*, but have been found near this species and are becoming problematic in areas of the Southeast. Specifically, threats from invasive species should be assessed post-Hurricane Michael as disturbances, can enhance invasive species infestation (FNAI 2019). This criterion considers measures to protect the existing populations as well as maintaining the current populations assessed as stable, addressing Factors A, D, and E. To implement this criterion, a time frame of at least 20 years is necessary to evaluate whether these areas are relatively invulnerable to extirpation or sustained population declines.

Action 1 includes study of genetic variation, which may reveal which populations have rare alleles or elevated levels of genetic diversity. Conserving the extent of the genetic makeup of the species across a species' range, as expressed by Action 4, the adaptability of a species over time is preserved to target improvement of its conservation status, temporary rescue, protecting against catastrophes or imminent threats. This information is critical to inform management, population trends, and the ecological principles of resiliency and representation for reducing extinction risk and maintaining self-sustaining populations.

Note: The additional specific action stated for *S. gentianoides* as ‘var. *gentianoides* in the 2012 Recovery Plan [page 5: sizes of populations #1 to #4 (Table 3) are increased via prescribed burns until plant numbers are stabilized over a period of 15 years] was modified and now it is contained in criterion 1.

Criterion 2. This criterion and Action 3 will help establish, or detect new populations / patches, addressing the ecological principle of redundancy (multiple populations widely distributed across the species’ range, reducing the likelihood of extinction or extirpation due to catastrophic events). This criterion guarantee that there is adequate representation across the species’ historic and current range. Although we are suggesting five additional populations for downlisting, this criterion can be re-evaluated based on new information from Action 3, and criteria 1 and 3. A time frame of at least 20 years will be necessary to assess whether the newly discovered populations are likely to persist in the wild over five or more prescribed burn cycles.

Criterion 3. Population extirpations due to threats related to Factors A (clearcutting and/or selective thinning, conversion of land to pine plantations, disruption of fire regimes, lack of management, and permanent habitat loss through development), D (inadequate existing regulatory mechanisms) and E (exotic species) have led to a reduction of this species’ range and, likely, the overall genetic diversity. This criterion and Actions 1-4 ensures that threats are addressed or managed, in addition to maintain current potential stable populations (e.g., the Apalachee WMA, TNC *Spigelia* Preserve, Three Rivers SRA, Rock Hill TNC Preserve, and Geneva SF). At least 20 years is necessary to track threats to the species and its habitat, and evaluation of this species resiliency.

Note: Information contained in criteria 3 [monitoring programs and management protocols on selected populations (e.g., largest populations) are established for at least 15 years to track threats to the species and its habitat (e.g., control exotic species, minimize site disturbance, urban development)], and 4 [the extant populations (including subpopulations at the Ketona Glades, Bibb Co., Alabama) of the 2012 Recovery Plan] overlapped; therefore, they were modified and became amended criterion 3.

Rationale for Amended Recovery Criteria

At the time the recovery plan was completed (2012), the criteria for delisting *S. gentianoides* were not specified given the lack of information about (1) the species’ biology, (2) the magnitude of current threats from development, and (3) abundance of populations and individuals. The criteria reflect current available information obtained over the past eight years and will fulfill the goal of the plan, to conserve and recover gentian pinkroot.

The recovery criteria are clearly linked to Factors A, D, and E, and the ecological principles of representation, resiliency, and redundancy (Schaffer and Stein 2000). Factors contributing to this species’ threat will be addressed by the recovery criteria because they consider elements such as surveying, monitoring, improving management protocols including the establishment of fire management regimes, and finding and securing extant populations. One population occurs

on a private property in Florida, and thus, permanent protection is necessary to conserve this population. Neither Factor B nor C are currently known to be threats to this species.

Of the nine downlisting criteria of the 2012 Recovery Plan, we deleted two and modified five criteria because they no longer represent the best scientific data. Criterion 9 (protect 50% of the glades known to support the variety on private land through conservation agreements, easements, verbal agreements, or land acquisition) and information pertinent to Bibb County site for criteria 4 and 7 of the 2012 RP were removed. Criterion 5 (the minimum viable population (MVP) has been determined for each variety using PVA) was removed from the RP because recent studies raised questions about the utility of the MVP for conservation planning and cautioned against using general MVP thresholds and abundance-based criteria as a basis for conservation urgent decisions (Flather et al. 2011, Reed and McCoy 2014). Long-term demographic data collection combined with demographic modeling can be an alternative to project future population growth and extinction risk; this is represented by a subset of Action 1 and will inform amended criteria. Information pertinent to Bibb County site was removed from these new criteria.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

To accomplish the amended criteria, the following actions below should be met. For other recommended actions, see the 5-year review of 2018, pages 15 and 16.

1. Conduct research on key aspects related to (1) demography (e.g., density, effect of fire on seedling establishment), (2) reproductive biology, (3) levels and distribution of genetic diversity, (4) seed ecology to facilitate better understanding of this species' biology and potential impacts of threats such as low density, and changes in fire regime and (5) effects of catastrophic events such as hurricanes on populations and habitat of *S. gentianoides* (addresses Factor E, and resiliency, and inform representation).
2. The effects of forest management practices (e.g., logging) on long-term persistence of *S. gentianoides* is assessed and a standardized monitoring technique is in place (addresses Factor D and resiliency).
3. Inventories (i.e., the total number of individuals, number of flowering vs. non-flowering plants, presence of pollinators, and whether seedling recruitment is occurring) have been conducted across the species' historic sites and/or on new locations where appropriate habitat exists (addresses Factors A and D).
4. A living collection of viable germplasm, collected from genetically distinct sites, is maintained in protected facilities (ex-situ) for research, recovery, and public outreach (addresses Factors A and E, and representation).

Note: Downlisting criteria 6 [research on key aspects related to demography (e.g., density, effect of fire on seedling establishment), reproductive biology, and seed ecology is accomplished] and 7 of the Recovery plan (viable germplasm representing > 50% of the populations for each variety is maintained ex-situ) were modified, and now are included as Actions 1 and 4; information relevant to Bibb County variety was removed.

COSTS, TIMING, PRIORITY OF ADDITIONAL RECOVERY ACTIONS

Not applicable.

LITERATURE CITED

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- Reed, J.M. and E.D. McCoy. 2014. Relation of minimum viable population size to biology, time frame, and objective. *Conservation Biology*. 28: 867-870
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- U.S. Fish and Wildlife Service (USFWS). 2018. *Spigelia gentianoides* (Gentian pinkroot) 5-year review: Summary and Evaluation. Pp. 17.
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APPENDIX. SUMMARY OF PUBLIC, PARTNER, AND PEER REVIEW COMMENTS RECEIVED

We published a notice of availability in the Federal Register on August 6, 2019 (84 FR 38291) to announce that the draft amendment to the *Spigelia gentianoides* Recovery Plan was available for public review, and to solicit comments by the scientific community, State and Federal agencies, Tribal governments, and other interested parties on the general information base, assumptions, and conclusions presented in the draft revision. An electronic version of the draft amendment was posted on our Species Profile website (https://ecos.fws.gov/docs/recovery_plan/Gentian%20Pinkroot%20Recovery%20Plan%20Amendment.pdf). We also sent specific notifications to key stakeholders in conservation and recovery efforts to ensure that we provided adequate notification to all potentially interested audiences of the opportunity to review and comment on the draft amendment.

We received four responses in total (two responses specific for *S. gentianoides*, and two documents with collective comments to the amendment plans). These included comments from interested citizens as well as non-governmental organizations and interest groups. Public comments ranged from providing minor editorial suggestions to specific recommendations on plan content. We have considered all substantive comments. We thank the reviewers for these comments and to the extent appropriate, we have incorporated the applicable information or suggested changes into the final recovery plan amendment. In response to comments expressing concerns about the proposed revised recovery criteria, we edited the proposed criteria and specified a time frame for conducting population trend analyses. Below, we provide a summary of public comments received; however, some of the comments that we incorporated as changes into the recovery plan amendment (e.g., updating citations, updating information about Hurricane Michael, and management) did not warrant an explicit response and, thus, are not presented here.

Comment 1 (*suggested by two reviewers*): “The number of additional populations chosen needs some justification, and need a time frame to assess whether the newly discovered populations are likely to persist”

Response: The number of populations (delisting criterion 2) can be re-evaluated based on Action 3 and criterion 1 (page 5, criterion 2). A time frame of at least 20 years (see justification) will allow rigorous evaluation of population projections and this species' status.

Comment 2 (*two related comments by 2 different reviewers (a, b)*):

- a. a. ‘...population(s) exhibit a stable or increasing trend as evidenced by natural recruitment and multiple size classes...’. It is not clear how this provides quantitative criteria for what constitutes recovery.’
- b. b. “you might want to add a timeline for the stable or increasing population trend or status. It should be over a time period that makes sense biologically and be long enough for the trend analysis to have some statistical rigor.”

Response: Criteria 1 and 2 were edited; a time frame of at least 20 years was specified in the justification section of each criterion. This time frame will provide sufficient time to conduct at

least five prescribed burn cycles allowing for rigorous evaluation of population projections and this species' status.

Comment 3 (two related comments by 2 different reviewers):

- c. "The *Spigelia gentianoides* plan amendment should be updated to consider the effects of Hurricane Michael, which occurred on October 10, 2018. Annual monitoring of all populations to adequately evaluate the effects of Hurricane Michael should be specifically included under Action 1 as (5) effects of Hurricane Michael on populations and habitat of *S. gentianoides*."
- d. "Hurricane Michael severely affected the Gentian Pinkroot populations at Three Rivers SRA by the felling of most of the canopy pine trees in the area."

Response: Action 1 was edited as suggested by comment 1a: (page 6, Action 1(5)) ... effects of catastrophic events such as hurricanes on populations and habitat of *S. gentianoides*. In addition, several sentences related to Hurricane Michael were inserted throughout the document.

Comment 4 (two related comments by 2 different reviewers):

- a. "The threat of invasive plants should be assessed post-Hurricane Michael as disturbance often brings increased threat from invasive plants."
- b. "The Japanese Climbing Fern definitely posed a problem to the Gentian Pinkroot to the TNC *Spigelia* Preserve"...the TNC *Spigelia* Preserve population may be gone because of lack of prescribed fire management.

Response: This comment was addressed by adding the following sentence to page 4: "Specifically, threats from invasive species should be assessed post-Hurricane Michael as disturbances, can enhance invasive species infestation."