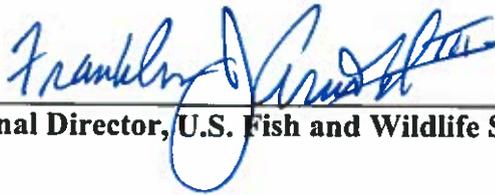


Recovery Plan for *Conradina glabra* (Apalachicola rosemary)
https://ecos.fws.gov/docs/recovery_plan/940927d.pdf

Original Approved: September 27, 1994
Original Prepared by: South Atlantic-Gulf Region

We have identified best available information that indicates the need to amend recovery criteria for *Conradina glabra* (Apalachicola rosemary) since the recovery plan was completed in 1994. 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 pages ii and nine 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 Regional Director, U.S. Fish and Wildlife Service

Date: 11/12/19

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendment was accomplished using information obtained from the 2017 5-year status review, Recovery Plan of September 1994, unpublished field survey results, reports of current research projects, peer-reviewed scientific publications, and unpublished field observations by the U.S. Fish and Wildlife Service (Service), State, Park, and other experienced biologists. These documents are on file at the Panama City Field Office (PCFO). In addition, the recovery plan amended criteria included information from two calls involving the Service, the Atlanta Botanical Garden botanists, and a Florida State Parks biologist. The document was reviewed by the Service Leadership and peer-reviewed by six external reviewers. The Service's lead recovery botanist in the PCFO completed this document.

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 criterion in recovery plan, pages ii and nine.

https://ecos.fws.gov/docs/recovery_plan/940927d.pdf

Synthesis

Conradina glabra is an extremely rare species with most plants/clumps (hereafter clumps) found on approximately 1000 ha (Spector and Bente 2014) to 1,470 ha (USFWS 2017) in Liberty County, FL. It is listed as an endangered species, primarily due to habitat loss and incompatible forestry practices. Historical extent and abundance of this species is unknown because the silviculture industry destroyed large areas of this species' sandhill habitat during the 1950s, and the species was not described until 1962. Therefore, it is extremely vulnerable because of its limited current distribution.

The only element of occurrence¹ (hereafter population) on public land is found at the Sweetwater Creek Tract (SCT), Torreya State Park; it contains the majority of *C. glabra*. This population is managed by the Florida Department of Environmental Protection, Florida Park Service. Censuses to date are essentially estimated clump counts without a basic knowledge of clonality extent or numbers of sexually reproducing individuals. The estimated number of clumps in 2009 and 2017 was > 50,000 (Spector 2009) and between 196,000 and 450,000 (Pruner and Schmidt 2017). At present, about 15-20% of the core known habitat within the park remains to be surveyed. Data are collected on an ongoing basis, allowing for trend analysis as well as assessing the effects of restoration, particularly the effects of aggressive fire on survival, growth and reproduction of *C. glabra* (i.e., resiliency). Several locations occur on privately owned silvicultural land (USFWS 2017) and rights-of-way with unknown numbers of plants. Since 2017, at least two of these sites have been cleared and no plants have been seen since (A. Johnson, FNAI, 9/13/2017, pers. comm.). These two sites are 1) the pine plantation east of SCT (and east of the road to Torrey SP) which was recently harvested, bedded, and replanted and 2) the SW corner of the junction of Dempsey Barron Road and SR 12 which was cleared. In addition, *C. glabra* was reintroduced within its original range onto xeric sandhill sites at The Nature Conservancy's Apalachicola Bluffs and Ravines Preserve (ABRP) in 1991; ABRP has at least one natural population. Three reintroduced populations were projected to grow or remain stable (Bladow et al. 2017). The species status over the short-term appears stable, but uncertain over the long-term (USFWS 2017).

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 Apalachicola rosemary 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 segment) which is in danger of extinction throughout

¹ Element Occurrence (EO): 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). It is also referred to as occurrence, location, or site.

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 Recovery Plan only contains one quantitative downlisting criterion (5 geographically distinct, self-sustaining populations are protected and managed throughout its historic range) that now requires revision due to a substantial amount of new information. The Plan does not contain delisting recovery criteria. We provide both downlisting and delisting criteria for *Conradina glabra*, which supersede those included in Recovery Plan for Apalachicola Rosemary (*Conradina glabra*), as follows:

Downlisting Recovery Criteria

1. The Sweetwater Creek Tract population is assessed as resilient² (addresses Factor A).
2. Five additional populations are: 1) discovered or reintroduced within the historic range of the species, and 2) under long-term protection. These populations must be resilient (addresses Factors A and D).

Justification

Criterion 1. For this criterion, at least 75% (1,102 ha of current occupied 1,470 ha) of the SCT must be considered resilient (naturally reproducing, exhibiting a stable or increasing population trend, and actively and appropriately managed with a minimum of 3 prescribed burn cycles (Action 2)). *Conradina glabra* possesses a limited range that includes well drained sandhill natural community and its ecotones on the east side of the Apalachicola River south of the Cody Scarp, in Liberty County, Florida (Spector and Bente 2014). Previously, it was identified and collected from two disjunct locations, with the second in Santa Rosa County, Florida. However, microsatellite studies identified the Santa Rosa County population as *C. canescens* (Edwards et al. 2008), thus the entire range of *C. glabra* is found in Liberty County, Florida. Additionally, the Recovery Plan mentioned that six naturally occurring populations were on lands owned by

² Resilient: naturally reproducing, stable or increasing in number, and actively and appropriately managed.

St. Joe Timberland Company. Most of these populations were acquired by the State of Florida by purchasing the Sweetwater Creek Tract (SCT) from the St. Joe Timberland Company in 2002 (USFWS 2017). The SCT is an A-ranked population (Hammerson et al. 2008) because it contributes the most to the representation, resiliency, or redundancy of the species, and thus, its loss would result in a decrease in the ability to conserve the species. The amended downlisting criterion 1 considers this current geographic extent and addresses Factor A.

Criterion 2. The main threat for *C. glabra* is habitat lost and modification as a result of incompatible silviculture practices. The entire range where this species occurs was altered by site preparation (e.g. bulldozing of topsoil into linear berms called windrows, and possible herbicide application) and conversion to pine plantations in the 1950s (Spector and Bente 2009). Forest conversion to pulpwood plantations probably extirpated some *C. glabra* populations and many other species (Gordon 1996). Consequently, the historical range and abundance and the various habitats where this species might have occurred are currently unknown (Gordon 1996, Shinnors 1962). This criterion addresses Factor A and uncertainties related to *C. glabra* historical range. In addition, by carrying out inventories of sites where appropriate habitat may exist (Action 1, below), we may be able to determine the number of populations distributed across the species' range, addressing redundancy (multiple populations widely distributed across the species' range, reducing the likelihood of extinction or extirpation due to catastrophic events). Although we are suggesting five additional populations for downlisting, this criterion can be re-evaluated based on new information from Action 1 and Criterion 1.

Delisting Recovery Criteria

The Apalachicola rosemary may be considered for removal from the Federal list of endangered and threatened species when, in addition to the downlisting criteria referenced above:

1. Threat reduction and management activities (e.g., compatible silviculture practices, fire return interval and intensity, and restoration) have been implemented to a degree that the long-term resiliency of all six *C. glabra* populations and habitat is demonstrated over multiple prescribed burn cycles (addresses Factors A and D).

Justification

Criterion 1. Minimal data exist on the effectiveness of various management techniques and current restoration for *C. glabra*. The Florida Park Service is in the process of restoring about 1,821 ha of altered sandhill natural community in SCT where *C. glabra* occurs. Sandhills naturally burned every 1-3 years (FNAI 2010, Pruner and Schmidt 2017), but the use of a too frequent fire return interval and intensity may or may not be detrimental to long-term survival of *C. glabra* (USFWS 2017). Circumstantial evidence suggests that fire kills above-ground parts of several other members of the mint family (e.g., *Conradina canescens*, *Calamintha ashei*), but these plants resprout from underground ramets or populations recover from seed. According to Gordon (1996), low-intensity fires tend to have a more positive effect on the survival of adults of *C. glabra* than high-intensity fires (although fire temperature was not monitored). This criterion will address uncertainties of appropriate management techniques, and whether restoration of the pine plantation back to sandhill promotes recovery of this species (Action 2). Thus, implementing prescribed burnings for at least 20 years will be necessary to examine whether population trends over a longer period of time are consistent. Actions 2 and 3 will address

resiliency, the characteristics of a species that allow it to recover from periodic disturbance, such as annual environmental variation and stochastic events.

Being a narrow endemic species, *C. glabra* is likely to be susceptible to the stresses of changing climate such as heatwave intensities and drought events (USFWS 2017). Genetically, this species seems to have high levels of genetic diversity (Martin 1992), providing some adaptive capabilities to withstand incremental changes to its environment. Greater genetic diversity means a population is more likely to include individuals that can tolerate a new stress or that are well-suited to a changed environment (e.g., climate change). Action 3, specifically, will further address the extent of genetic variation and whether vegetative reproduction is the main reproductive strategy. Proper management for a narrow endemic requires protection and maintenance of genetic diversity *in-situ* (criterion 3) and *ex-situ* (in nurseries of botanical gardens or other institution) (Action 4) to target improvement of its conservation status, temporary rescue, protecting against catastrophes or imminent threats; Action 4 will address the ecological principle of representation, and both actions address Factor E.

The delisting criterion will help achieve Factor D. Currently, we have not been able to comment on state park management practices. Determining the fire regime (intensity) and the effect of this event on *C. glabra* density, fecundity, and size structure are crucial to evaluate the benefits and risks of current management protocols.

Rationale for Recovery Criteria

At the time the recovery plan was completed in 1994, the plan neither incorporated delisting criteria nor provided an explanation of why it was not practicable to incorporate them. At present, the downlisting criterion (i.e., adequately protect and manage five populations on public land or under conservation easement) is no longer adequate because most of the populations (the recovery plan does not define ‘population’) known at the time the species was listed were on SCT, which was purchased by the State of Florida in 2002. Although some of the threats to *C. glabra* have been addressed, ongoing data collection will help assess one of the main threats, the effects of certain forestry practices on *C. glabra* survival.

The amended criteria reflect current available information obtained over the past two decades about the species distribution, ongoing plant surveys, estimated number of clumps, habitat restoration and management (Pruner and Schmidt 2017), population genetics, and current review of the threats posed to its continued existence. Critical to recovery is preservation of SCT, resolution of uncertainties of appropriate management techniques including the effect of fire on *C. glabra*, and conservation of new viable wild populations. This addendum provides a framework for the recovery of *C. glabra* so that its protection by the Endangered Species Act is no longer necessary, as the criteria are designed to maintain resilient habitat, increase population numbers, and alleviate current threats related to factors A, D, and E. Overcollection is not a threat, and no problems have been detected with disease or predation; therefore, factors B and C are not relevant to *C. glabra*. Meeting the amended recovery criteria would address the ecological principles of representation, resiliency, and redundancy (Schaffer and Stein 2000) for reducing extinction risk and maintaining self-sustaining populations as these concepts relate to abundance, distribution, diversity.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

To accomplish these criteria, all the following actions should be met and their consequences for protection and management integrated into main management plans and restoration protocols. For other recommended actions, see the 5-year review of 2017, pages 16 and 17.

1. An in-depth *C. glabra* inventory across the species' historic sites and on new locations is conducted where appropriate habitat exists (addresses Factor A and redundancy)
2. The effects of prescribed fire and forest management practices on long-term persistence of *C. glabra* (survival, growth and reproduction) in the sandhill community is assessed and a standardized monitoring technique is in place (addresses Factor D and resiliency).
3. The contribution of sexual reproduction and clonal propagation to population maintenance is assessed via research related to (1) *in-situ* soil seed bank, seed viability, and seedling recruitment (*in-situ* seed germination, seedling survival and growth), and (2) genetic composition and clonality (addresses Factors A, D, and E, and resiliency; it will inform representation)
4. A living collection of viable germplasm³ is maintained at botanical gardens and other Service approved facilities for research, recovery, and public outreach (addresses Factor E, and representation).

COSTS, TIMING, PRIORITY OF ADDITIONAL RECOVERY ACTIONS

Not applicable.

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³ Germplasm: living tissue such as seeds, leaves, stem cuttings, pollen, or even just a few cells

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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 *Conradina glabra* 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/Apalachicola%20Rosemary%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 six responses in total (four specific for *C. glabra*, 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 updated the document by reinstating downlisting and delisting 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., adding citations, updating the sandhills' fire return interval) did not warrant an explicit response and, thus, are not presented here.

Comments 1, 2 and 3 will have one response

Comment 1: “The proposed amendment describes only delisting criteria and has no mention of the revised downlisting criteria we had initially discussed. We at the Atlanta Botanical Garden suggest that the amended downlisting criteria we initially discussed be included in this document. Below are the amended downlisting criteria we recommend:

- a. The Sweetwater Creek Tract population is assessed as resilient (addresses Factor A).
- b. Two additional populations are: 1) discovered or reintroduced within the historic range of the species, and 2) under long-term protection. These populations must be resilient (addresses Factors A and D). “

Comment 2: “Overall the justification and rational, for the amended recovery criteria, jumping over downlisting *Conradina glabra* from an endangered species to a threatened species, and going straight on to proposing a delisting amended recovery criteria is too soon.”

Comment 3 (suggested by two reviewers): “The number of additional populations chosen also needs some justification. Is there a spatial configuration of those populations that would be desirable?”

Response: Progress toward recovery, i.e., downlisting, had been steadily occurring over the past decades by a suite of stakeholders, specifically understanding the proper management of sandhills to help guide the protection of this species at SCT. The global distribution of the

species is limited to 1000 – 1,470 ha in Liberty County, and the SCT population appears to be stable only on a short term basis, but uncertain, on a long term basis. Based on these comments and after a thorough evaluation of these criteria and the conservation needs of this species and its habitat, we included downlisting criteria as suggested by the reviewers and initially discussed. For criterion two, we retained five additional populations. This number (downlisting criterion 2) can be re-evaluated based on Action 1 and downlisting criterion 1 (page 4, criterion 2, last sentence).

Comment 4 (three related comments by 3 different reviewers (a, b, c)):

- a. “The proposed amendment recommends that Recovery Criteria be ‘objective, measurable guidelines’. The delisting criteria mentioned in this document include subjective criteria and must be changed to be objective and measurable. Delisting criterion 1 states “The Sweetwater Creek Tract population exhibits a stable or increasing trend as evidenced by natural recruitment and multiple size-classes (addresses Factor A). For this to be objective and measurable, there should be a time frame associated with it We suggest that the population be considered stable or increasing for at least twenty years before a decision regarding delisting be made.”
- b. “the first criteria states: “...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.’
- c. “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: *Conradina glabra* was listed as an endangered species, primarily due to habitat loss and incompatible forestry practices. The entire range where this species occurs was altered by site preparation, and the effectiveness of various management techniques and current restoration for this species is unknown. The delisting criterion will take at least 20 years (see justification) to conduct a minimum of 5 prescribed burn cycles allowing for rigorous evaluation of population projections and species status.

Comment 5: “it is recommended to change “stem counts” to “plant counts”.

Response: Reproduction for *C. glabra* occurs both rhizomatously/clonally and sexually via seed set, but in-situ attempts at seed germination have failed; seed viability is low. Currently, we cannot distinguish whether or not nearby stems are from the same genetic individual, so it is difficult to determine what constitutes a “plant.” For now, we will use ‘clumps’, which was also used by Pruner and Schmidt (2017) for *C. glabra*.

Comment 6: ‘Recruitment via clonal growth vs. seed germination.’ “The studies of Gordon (1996), Bladow et al. (2017), and Slapcinsky and Gordon 2004, found most reproduction occurred from seed germination.”

Response: According to Spector and Bente (2009), vegetative recruitment via re-sprouting of broken stems or roots (ramets) likely accounted for the increase of *C. glabra* in flattened windrows. The authors also reported < 10% seed viability, and suggested that *C. glabra* might

be an episodic recruiter. To determine whether most reproduction occurs from seed germination (i.e., contributions sexual reproduction to population growth), it is necessary to carry out in-situ seed germination experiments (e.g., seeds monitored in the field over time) and genetic studies to assess plant vs. clonal delimitations. Therefore, the sentence was deleted.