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

Original Approved: September 27, 1994
Original Prepared by: Southeast Region

DRAFT AMENDMENT 1

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 provides guidance on how best to help recover a species.

For
U.S. Fish and Wildlife Service
Southeast Region
Panama City Field Office
Panama City, Florida

March 2019

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was accomplished using information obtained from the 2017 5-year status review, Recovery Plan of September 1994, unpublished field survey results, reports of current research projects, peer-reviewed scientific publications, unpublished field observations by Service, State, Park, and other experienced biologists.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 peer-reviewed by five 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 listing factors.

Recovery Criteria

See previous version of downlisting criterion in recovery plan, pages ii and nine.
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Synthesis

Conradina glabra is an extremely rare species with most plants/ramets found on approximately 1,000 ha (2,471 acres) (Spector and Bente 2014) to 1,470 ha (3,632 acres) (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 large areas of this species' sandhill habitat was destroyed 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 occurrence[1] (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 stem counts without a basic knowledge of clonality extent or numbers of sexually reproducing individuals. The estimated number of stems in 2009 and 2017 was > 50,000 (Spector 2009) and > 900,000 (USFWS 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 private silvicultural land (USFWS 2017) and rights-of-way with unknown numbers of plants. 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 DPS) 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.

[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.

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.

We provide new delisting criteria for Apalachicola Rosemary, which will supersede those included in its recovery plan (USFWS 1994). The recovery criteria presented below represent our best assessment of the conditions that would most likely result in a determination that delisting of Apalachicola Rosemary is warranted as the outcome of a formal five-factor analysis in a subsequent regulatory rulemaking. Achieving the prescribed recovery criteria is an indication that the species is no longer threatened or endangered, but this must be confirmed by a thorough analysis of the five listing factors.

Delisting Recovery Criteria

1. The Sweetwater Creek Tract population exhibits a stable or increasing trend as evidenced by natural recruitment and multiple size-classes (addresses Factor A).

2. Five (5) additional populations are: 1) discovered or reintroduced within the historic range of the species, and 2) protected by a conservation mechanism. These populations must exhibit a stable or increasing trend as evidence by natural recruitment and multiple size-classes (addresses Factors A and D).
3. Threat reduction and management activities (e.g. compatible silviculture practices, fire return interval and intensity, and restoration) have been implemented to a degree that *C. glabra* will remain viable for the foreseeable future (addresses Factors A, D and E).

Justification

Criterion 1. *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, FL. Additionally, the Recovery Plan mentioned that six naturally occurring populations were on lands owned by 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. This criterion considers this current geographic extent and addresses Factor A. Recruitment is very difficult to assess for this species because most recruitment occurs by vegetative reproduction, and vegetative recruits cannot be distinguished from older individuals in the field; therefore, Action 3 below will help address uncertainties of sexual reproduction.

Criterion 2. The main threat for *C. glabra* is habitat loss 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 land conversion to pulpwood plantations probably extirpated some *C. glabra* populations and many other species as a result of this disturbance (Gordon 1996). Consequently, the historical range and abundance and the various habitats where this species might have occurred are currently unknown (Gordon 1996, Shinners 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 forecast 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).

Criterion 3. Minimal data exists 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 (4500 acres) of altered sandhill natural community in SCT where *C. glabra* occurs. Sandhills naturally burned every 1-10 years (Myers 1990), but the use of a too frequent fire return interval and intensity may be detrimental to survival of *C. glabra* (USFWS 2017); also too infrequent fire return interval may be detrimental to long-term survival of the longleaf ecosystem upon which *C. glabra* depends. 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). This criterion 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 their 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 clonality is the main reproductive strategy. Proper management for a narrow endemic requires protection and maintenance of genetic diversity *in-situ* (criterion 3) and 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 evaluate state park management practices. Determining the fire regime (intensity) and the effect of this event on *C. glabra* density, fecundity, and size structure is 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 stems, habitat restoration and management, genetic information, and current review of the threats posed to its continued existence. Critical to recovery is to preserve SCT, address uncertainties of appropriate management techniques including the effect of fire on *C. glabra*, and to conserve new resilient wild populations. This addendum provides a framework for the recovery of *C. glabra* so that its protection by the 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. Over collection 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 are recommended 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 germplasm[2] 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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[2] Germplasm: living tissue such as seeds, leaves, stem cuttings, pollen, or even just a few cells