Recovery Plan for *Cladonia perforata* (Florida perforate cladonia)
https://www.fws.gov/verobeach/msrppdfs/flperforate.pdf

Current Approved: May 18, 1999
Current Prepared by: South Florida Ecological Services staff

AMENDMENT 1

We have identified best available information that indicates the need to develop recovery criteria for *Cladonia perforata* (Florida perforate cladonia) since the recovery plan was completed. In this modification, we synthesize the adequacy of the existing criteria, show amended recovery criteria, and provide the rationale supporting the recovery plan modification. The modification is shown as an addendum that supplements the South Florida Multi- Species Recovery Plan (MSRP; U.S. Fish and Wildlife Service [Service] 1999), superseding only the recovery criteria on page 4-897. Recovery plans are a non-regulatory document that provide guidance on how best to help recover species.

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

Approved: _____
Acting **Regional Director, U.S. Fish and Wildlife Service**

Date: 9/24/19

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The amendments to the recovery criteria are based on the recovery plan, the current five year review (Service 2007), and recent studies with the species. These were discussed with the U.S. Fish and Wildlife Service (Service) biologists and managers in the South Florida Ecological Services Field Office in order to develop the delisting criteria for the Florida perforate cladonia. The amendment to this recovery plan is based on the most recent information regarding the species and current threats to the species.

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) have also affirmed the need to frame

recovery criteria in terms of threats assessed under the five listing factors (ESA 4(a)(1)).

Recovery Criteria

The MSRP only provides downlisting criteria, and they can be found on page 4-897 (https://www.fws.gov/verobeach/msrppdfs/flperforate.pdf).

Synthesis

Florida perforate cladonia is a member of the family Cladoniaceae, commonly called the reindeer lichens. Florida perforate cladonia is restricted to the high, well-drained sands of rosemary scrub in Florida. Specimens can be up to 8 centimeters (cm) (3.2 inches) across and several cm high. The oldest parts of the lichen degenerate, leaving no means of determining ages. Other terrestrial species of lichens commonly co-occur with Florida perforate cladonia, but can easily be distinguished from it. Reproduction in these lichens is typically by means of sexually produced spores or dispersal of vegetative fragments or simple fragmentation.

Since the recovery plan was completed, 11 additional sites supporting Florida perforate cladonia were discovered on the Atlantic Coastal Ridge in 2009. This species is known to occur on approximately 41 sites in Florida in four distinct geographic clusters. There are three (3) sites in the panhandle in Okaloosa County; 22 sites on Lake Wales Ridge in Polk and Highlands counties; 15 sites on the Atlantic Coastal Ridge in St. Lucie, Martin, and Palm Beach counties; and a single site on the southwest coast in Manatee County (Richardson and Moore 2009, 2011).

Typical habitat for Florida perforate cladonia is found on the high sand dune ridges of Florida's peninsula, including the Atlantic Coastal and the Lake Wales Ridges. In these areas it is restricted to the highest, xeric white sands in sand pine scrub and rosemary scrub, which is characterized in part by persistent, open patches of sand. Florida perforate cladonia typically occurs in open patches of sand between shrubs in areas with sparse or no herbaceous cover.

Florida scrub has historically experienced variable fire frequencies and patchy high-intensity fires. Scrub plant communities are therefore fire adapted, and recover relatively quickly. In sand pine and rosemary scrub, however, recovery of dominant species is slower than in oak dominated scrubs and open spaces between shrubs persist longer. In these fire-maintained systems, low-fuel, bare sand patches may serve as refugia from fire for Florida perforate cladonia and other lichen species which cannot survive fire. These refugia provide a local source for recolonization and population recovery. Due to Florida perforate cladonia presumed slow growth and observed slow recolonization, land managers should avoid complete burns in large areas supporting Florida perforate cladonia. Such fires likely reduce the possibility of recolonization from unburned patches within sites or from nearby sites.

Florida perforate cladonia was listed as endangered in 1993 (58 FR 25754) because of the significant loss of scrub habitat (Factor A). Less than 15 percent of the historical distribution of scrub habitat persisted as of 1992 (Service 1999), and land conversion to citrus and residential development continues to diminish scrub habitat. As with all species restricted to the developable

upland landscape, including species of the scrubs of the Lake Wales Ridge, nearby parallel central ridges, and the Atlantic Coastal Ridge, habitat loss is the most critical concern. In addition to habitat loss, Florida perforate cladonia is also threatened by trampling, off-road vehicles, hurricane storm surge, and land management practices that are incompatible with the species (Factors D and E).

The current needs to prevent extinction and recover this species are to: 1) maintain existing populations and 2) protect existing scrub habitat in the species' range. The species is dependent upon judicious management of fire to ensure that some patches of lichen go unburned to allow suitable habitat to be recolonized.

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 Florida perforate cladonia 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 which 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." Thus, while recovery plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

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 are providing delisting criteria for the Florida perforate cladonia, which will supersede the downlisting criteria included in MSRP.

Delisting Recovery Criteria

The Florida perforate cladonia will be considered for delisting when:

1. At least 40 populations exhibit a stable or increasing trend, evidenced by natural recruitment and multiple size classes. (Factor A)

2. Populations (as defined in criterion 1) occur in white sand rosemary and sand pine scrub habitats and are distributed across the historical range of the species. (Factor A)

3. Populations (as defined in criterion 1) must be protected via a conservation mechanism and/or managed such that enough suitable habitat is present for the species to remain viable for the foreseeable future. (Factors A, D, and E)

Justification

The recovery criteria provide standards to address the resilience (size) of existing populations (Criterion 1), their distribution (representation) across the species' historical range (Criterion 2), and redundancy of the species in terms of a sufficient number of resilient populations to withstand stochastic events such as hurricanes or fire (Criteria 1, 2, and 3).

When the scrub habitat is lost (destroyed) or not managed effectively (for example converted into manicured exotics and/or fire-suppressed and overgrown), lichen populations are reduced drastically in number or become extirpated. A key criterion in the recovery of Florida perforate cladonia is applying prescribed fire to maintain the surrounding ecosystem while being conscientious of the need to allow some unburned patches so Florida perforate cladonia can survive and recolonize burned areas (Criterion 3).

Most of the known populations occupy less than 1 km^2 (0.39 mi^2) (Richardson and Moore 2011) and these populations are more vulnerable to loss from a single fire or other disturbance. Populations that occur across larger areas are more resilient because disturbed areas can be recolonized from neighboring intact patches.

Florida perforate cladonia has been successfully translocated into suitable habitat within its historical range (DeBolt 2015). The transplanted lichens have a relatively high survival rate. This indicates the potential to reintroduce the species to sites where fire kills a large percentage or extirpates the population.

The recovery criteria address those factors necessary for the species' recovery. Threats under Factor A include the documented loss and impacts to the species' habitat from development; and fire management that does not consider the species requirements for long-term persistence.

The existing Federal and State regulations designed to protect endangered and threatened plant species provide protections in collection and transport but inadequately protect listed plant species from the major threat of habitat loss. The threats to Florida perforate cladonia under

Factor D are addressed with the recovery criteria to develop and implement mechanisms (such as cooperative agreements) for protecting Florida perforate cladonia habitat and extant populations on private lands, and through the effective management of suitable habitat on already protected lands (Criterion 3). These criteria address the need to assure long-term persistence and protection of Florida perforate cladonia within suitable habitats. The recovery criteria are measurable and continue to address the existing framework and strategy of the active recovery plan in enhancing populations and preventing further degradation of existing habitat.

Achievement of Criteria 1, 2 and 3 will ensure that at least 40 robust populations are adequately protected and sufficiently managed to maintain and/or increase population resiliency, redundancy, and representation throughout the historical range.

Rationale for Amended Recovery Criteria

The existing criteria for Florida perforate cladonia in the MSRP (Service 1999) lacked delisting criteria and included only downlisting criteria for the species. With these amendments, delisting has been clearly defined with measurable, objective criteria in keeping with the recovery strategy and goals outlined in the MSRP. These criteria address what is necessary to ensure resiliency, redundancy, and representation by addressing factors that threaten Florida perforate cladonia. In achieving these criteria, we expect Florida perforate cladonia to have a low probability of extinction for the foreseeable future and have robust, stable populations needed for long-term recovery. We will work together with our partners to strategically and efficiently implement the new criteria.

LITERATURE CITED

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