**Recovery Plan for fragrant prickly-apple (*Cereus eriophorus* var. *fragrans* [syn. *Harrisia fragrans*])**
https://www.fws.gov/verobeach/MSRPPDFs/Fragrant.PDF

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

## AMENDMENT 1

We have identified best available information that indicates the need to amend recovery criteria for *Cereus eriophorus var. fragrans* (syn. *Harrisia fragrans*) (fragrant prickly-apple) since the recovery plan was completed. In this modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and provide the rationale supporting the recovery plan modification. The modification will be 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 4-833. Recovery plans are a non-regulatory document that provides guidance on how best to help recover species.

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

**Approved:** Franklin J. Arnold III
Acting **Regional Director, U.S. Fish and Wildlife Service**

**Date:** 9/24/19

## METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

This amendment to the recovery criteria was developed using the most recent and best available information for the species. This information was analyzed by U.S. Fish and Wildlife Service (Service) biologists and managers in the Asheville, North Carolina and South Florida Ecological Services Field Offices in order to develop the delisting criteria for fragrant prickly apple. Species experts were contacted from partner organizations to inform this work.

## 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 factors.

**Recovery Criteria**

The MSRP only provides downlisting criteria, and they can be found on page 4-833 (https://www.fws.gov/verobeach/MSRPPDFs/Fragrant.PDF).

**Synthesis**

Florida Natural Areas Inventory (FNAI; 2009) reported that fragrant prickly-apple occurs on 10 confirmed sites and one (1) unconfirmed site and it occurred historically on one (1) other site. Six (6) of the 10 confirmed sites are protected, two (2) are entirely on privately owned properties, and three (3) are partially protected (i.e., a portion of the site where the population occurs is privately owned) (FNAI 2009). Nine (9) of the 10 confirmed sites occur on or around Savannas Preserve State Park (SPSP) in St. Lucie County (FNAI 2009). The other confirmed site is in Volusia County (Woodmansee in litt. 2006; FNAI 2009). The unconfirmed site is from Indian River County (Woodmansee et al. 2007; FNAI 2009). Woodmansee et al. (2007) also reported two (2) extirpated populations from Brevard County that were not included in the FNAI records. In 2015, FNAI reported 12 element occurrences, 11 of which (91.7 percent) were on management areas.

The current range of fragrant prickly-apple is limited to Volusia and St. Lucie Counties, but is projected to include Brevard and Indian River Counties. With the identification of the cacti in Volusia County in 2006, the known current range of the species expanded; however, the sites where it occurs are fragmented, mainly along the Atlantic coastal ridge. With population declines of three (3) monitored subpopulations noted in 2007, a total of less than 3,000 fragrant prickly-apples are thought to remain on 10 sites, primarily on or around SPSP.

Where habitat remains intact, fragrant prickly-apple depends upon active management to persist. Land management practices, including prescribed fire applied across multiple burn units used for the reduction of dense canopies and the creation of open areas, are important for maintaining the quality of coastal sand pine scrub habitat where this plant resides. The removal of exotic species is especially important for maintaining habitat and preventing competition with fragrant prickly-apple. However, individual cactus are killed by fire, so they must regenerate from seeds banked in the soil. Existing regulatory mechanisms are inadequate on private lands, because this plant occurs in habitat which is desirable for development due to its elevation, and plants have limited protection on private lands (Factor D). Habitat loss, fragmentation, and changes in land use continue, and conversion of scrub to urban use along the Atlantic coastal ridge is projected to continue over the next 50 years (Factor A). The species' restriction to specialized habitat, its limited distribution, and its limited reproductive capacity also renders it vulnerable to random natural events, such as freezes and hurricanes (Factor E; Service 2010).

Since the 1999 recovery plan revision, the threats the species is facing have not changed considerably. Updated census information since 2007 is not currently available.

Fragrant prickly-apple has been successfully propagated from seed for reintroduction efforts (Moore 2011). Reintroductions were made in three (3) locations, with the goal of re-establishing populations in northern St. Lucie County and Indian River County. Initially survival rates were good, averaging 70 percent across populations. Moore (2012) found that termites are a threat to fragrant prickly-apple. The smaller cacti were most vulnerable to termite predation. Additionally, desiccation was a major factor in mortality of very young seedlings. Despite initial success, the reintroduction project largely failed due to vandalism (Moore pers. comm. 2013). Cacti appear to have been targeted and uprooted or cut at the base with a machete. If sites can be secured, reintroductions will be a valuable recovery tool for this species.

## 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 fragrant prickly-apple 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 fragrant prickly-apple, which will supersede the criteria included in the MSRP.

**Delisting Recovery Criteria**

The fragrant prickly-apple will be considered for delisting when:

1. At least 15 populations exhibit a stable or increasing trend, evidenced by natural recruitment and multiple age classes.

2. Populations (as defined in criterion 1) in coastal sand pine scrub habitat are distributed across the historical range of the species. (Factors A and E)

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

**Justification**

The recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat. When this species was listed as endangered in 1985 (50 FR 45618), the primary threat to the fragrant prickly-apple was the destruction of sand pine scrub habitat as a result of seaside residential, commercial, and sand mine development (Factor A).
The fragrant prickly-apple is currently threatened by Factors, A, B, D, and E (see most recent 5-year review [Service 2010]). Therefore, the recovery criteria are focused on actions that address the threats associated with these factors, ensuring the species is no longer vulnerable to habitat loss or degradation and other factors by protecting and managing enough resilient populations within the historical range of the species.

Habitat loss, fragmentation, and changes in land use continue to threaten the existence of fragrant prickly-apple (Factor A). Where plants occur on private sites, development has led to both direct destruction of habitat as a result of land clearing and habitat degradation from lack of management (Service 2010). The sites that exist on protected land may still be vulnerable to habitat degradation if not actively managed to maintain sand pine scrub habitat. Because the sites are fragmented on a developed landscape, fire management may not always be feasible and encroachment by exotic plant species is likely (Factor E).

At the time of listing, overutilization was identified as a potential threat for fragrant prickly-apple, but indiscriminate collecting was not known to occur. Because it is limited in distribution and population sizes are relatively small, indiscriminate collecting could adversely affect the species. Like many other species of cacti, fragrant prickly-apple is vulnerable to unlawful exploitation and collection due to poaching. The Service believes that there is a continuing threat from overutilization for commercial or recreational purposes (Factor B).

Factor C, disease and predation, was not known to be a threat when the fragrant prickly-apple was listed. Since listing, Moore (2009), observed insect damage on young seedlings and a native scale insect was observed destroying stems (Bradley et al. 2002a; Bradley and Gann 2002). However, the scale insect did not appear to kill the host plant, and these forms of predation are not considered serious threats to the fragrant prickly-apple (Service 2010).

The Act provides limited protection for the species and its habitat. Existing Federal regulations prohibit the removal or destruction of listed plant species on Federal lands. The fragrant prickly-apple is also listed by the Florida Department of Agriculture and Consumer Services (FDACS) as endangered (5B-40.0055 Regulated Plant Index), but this legislation does not provide any direct habitat protection. State regulations require both written permission from the owner or legal representative and a permit issued by FDACS to collect or remove plants listed as endangered on the Florida Regulated Plant Index. Title 62D-2.013 of the Florida Administrative Code prohibits the removal, destruction, or damage of plants from the Florida Department of Environmental Protection (FDEP), Division of Recreation and Park properties. This regulation provides protection for much of the population where it occurs on SPSP. Existing regulatory mechanisms do not appear to be adequate, as several properties with fragrant prickly-apple on private lands have been developed (Factor D). Where the species occurs on public land, there is protection from development but not necessarily from habitat degradation.

The species' restriction to specialized habitat, its limited distribution, and its limited reproductive capacity also renders it vulnerable to random natural events, such as freezes and hurricanes (Factor E). Sea level rise may also threaten cacti on sites with low elevation, such as those at Canaveral National Seashore (Factor E) (Woodmansee et al. 2007). Woodmansee et al. (2007) suggested that freezing temperatures may have led to the extirpation of the species at one location in Brevard County. Although the species did well through the Category 1 hurricane in 2000 and the Category 2 and 3 storms in 2004 and 2005 (Bradley and Gann 2002; Woodmansee et al. 2007), specific conditions such as storm surge and amount of debris dumping following the event vary greatly with each hurricane and may render sites with few plants vulnerable to destruction. Hurricanes have the potential to adversely affect fragrant prickly-apple populations in other ways. High winds can bring surrounding vegetation crashing down on top of individual cacti, injuring or killing them.

Achievement of Criteria 1, 2 and 3 will ensure that at least 15 robust populations are adequately protected and sufficiently managed to maintain and/or increase population resiliency, redundancy, and representation throughout the known range. Fifteen (15) resilient populations will provide sufficient redundancy to reduce the vulnerability of the species to range-wide impacts. Narrow ranging endemic species that re-sprout from root-stocks following regular natural disturbances such as fire, rather than relying solely on regeneration from the soil seed bank, and/or are long-lived are less vulnerable to extirpation by stochastic events and demographic fluctuations, such that populations numbering in hundreds of plants are resilient.

**Rationale for Amended Recovery Criteria**

The existing criteria for fragrant prickly-apple in the MSRP (Service1999) lacked delisting criteria and included only "stabilization" 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 fragrant prickly-apple. In achieving these criteria, we expect fragrant prickly-apple 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.

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