

# Recovery Outline for Florida Brickell-bush (*Brickellia mosieri*)

November, 2015



## I. INTRODUCTION

This document outlines a preliminary course of action for the recovery of the Florida brickell-bush until a comprehensive recovery plan for this species is approved.

The Florida brickell-bush is a slender perennial herb, approximately 0.3–1.1 meters (1.0–3.5 feet), with small white disk flowers. Its historical range has diminished by more than 30 percent, and at present the species is known to occur on as few as 17 sites. The Florida brickell-bush was listed as an endangered species on September 4, 2014 (79 FR 52567). The primary threats to the species include habitat destruction, fragmentation, and modification primarily due to development, inadequate fire management, non-native invasive plants, inadequate existing regulatory mechanisms, and sea level rise.

Critical habitat was designated for the Florida brickell-bush on August 17, 2015 (80 FR 49845), and consists of 1,062 hectares (2,624 acres) in seven units in Miami-Dade County. Five of the seven critical habitat units are currently occupied by the plant.

### Listing and Contact Information:

Listing Classification:	Endangered range wide
Effective Listing Date:	October 6, 2014
Lead Agency, Region:	U.S. Fish and Wildlife Service (Service), Southeast Region
Lead Field Office:	South Florida Ecological Services Field Office (SFESO)
Contact Biologist:	David Bender, 772-562-3909, <a href="mailto:David_Bender@fws.gov">David_Bender@fws.gov</a>

## II. RECOVERY STATUS ASSESSMENT

### A. Biology/Threats Assessment

[*Note: For a more detailed description of this plant's biology and an assessment of the listing factors as they relate to the plant, please see September 4, 2014 (79 FR 52567).*]

The Florida brickell-bush is endemic to pine rocklands on the Miami Rock Ridge outside of Everglades National Park, in central and southern Miami-Dade County, Florida. The species was historically known from approximately Coconut Grove to Florida City. Its range has since contracted

more than 30 percent, and the plant is currently distributed from approximately Kendall to Florida City. The number of extant occurrences of Florida brickell-bush is somewhat uncertain due to the lack of complete and recent survey information, which is primarily a function of the number of populations that occur on private lands, making them difficult to survey. In addition, the species can be extremely difficult to identify when not in flower, making it difficult to confidently determine when a population has been extirpated. Based on the best available data, populations of Florida brickell-bush are believed to occur on 17 sites and may possibly occur on up to another 5 sites, although most of these latter sites have been searched in recent years without the species being found. Based on the 17 populations considered to be extant, the total population estimate in 2013 was between 515 and 4,935 plants, although the actual number of individuals is probably closer to between 2,150 and 3,700. From this estimate, the total population of Florida brickell-bush has apparently declined by approximately 50 percent since 1999.

Sea level rise will be the largest challenge to coastal and low-lying areas of South Florida over the next 100 years. Sea level rise will cause the loss of coastal habitat, and the modification of upland habitats, including pine rocklands. Florida brickell-bush occurs in habitats near sea level in areas of south Florida where considerable habitat is projected to be lost to sea level rise by 2100 and be increasingly vulnerable to storm surge.

Because a relatively small number of Florida brickell-bush populations remain, the species is imminently threatened by the combined influences of habitat destruction, modification or fragmentation, including development, inadequate fire management, non-native invasive plants, and sea level rise.

## **B. Conservation Actions**

The Florida brickell-bush is listed by the State of Florida as endangered. In 1999, the Service recognized the Florida brickell-bush as a candidate species, with a Listing Priority Number (LPN) of 5 (i.e., magnitude of threats was high but not imminent). In 2005, we changed the species' LPN from a 5 to an 8 (i.e., threats were moderate but immediate), which reflected the occurrence of 13 of the 17 known populations on conservation lands, which were being managed appropriately with prescribed fire and control of invasive nonnative species. At the time of listing, all occurrences of the Florida brickell-bush were affected by some degree of inadequate fire management, with the primary threat being shading by hardwoods. While management of some conservation lands includes regular burning, other such lands are severely fire-suppressed. Even in areas under active management, some portions are typically fire-suppressed, thereby threatening populations of this species. To date, conservation actions related to the Florida brickell-bush have primarily focused on protecting pine rocklands from development, and restoring and managing pine rocklands, to benefit the suite of species endemic to this habitat. In addition, limited efforts are underway to restore and create pine rockland corridors and stepping-stone habitat within the urban landscape, and introduce Florida brickell-bush to these and other areas. These conservation actions are summarized below.

In 1979, Miami-Dade County established the Environmentally Endangered Lands (EEL) Covenant Program, to reduce taxes for private landowners of natural forest communities (NFCs; pine rocklands and tropical hardwood hammocks). Under the EEL Covenant Program, landowners who agree not to develop their property and to manage it for a period of 10 years, with the option to renew for additional 10-year periods. As of 2012, Miami-Dade County had approximately 59 pine rockland

properties enrolled in this voluntary program, preserving 69.4 ha (172 ac) of pine rockland habitat. The vast majority of these properties are small—only three are larger than 2 ha (5 ac)—and many are in need of habitat management such as prescribed fire and removal of nonnative invasive plants. Of the 59 pine rockland properties, 3 have known populations of Florida brickell-bush. Two of these, a 1.3-ha (3.3-ac) parcel and a 5.7-ha (14-ac) parcel, are in good overall condition. The other, a 5.75-ha (14.2-ac) parcel, has heavy cover by exotics, and illegal clearing of NFC vegetation was observed during a 2013 site inspection.

In 1990, Miami-Dade County voters approved a 2-year property tax to fund the acquisition, protection, and maintenance of environmentally endangered lands. The EEL (Acquisition/Fee Title) Program identifies and secures these lands for preservation. Under this program, Miami-Dade County has acquired a total of approximately 313 ha (775 ac) of pine rockland. In addition, approximately 314 ha (777 ac) of pine rockland are owned and cooperatively managed by the County's EEL Program and the Natural Areas Management Division of Miami-Dade County's Parks, Recreation and Open Spaces; managed areas include some of the largest remaining areas of pine rockland habitat on the Miami Rock Ridge outside of ENP (e.g., Larry and Penny Thompson Park, Zoo Miami pinelands, and Navy Wells Pineland Preserve). However, not all pinelands owned by Miami-Dade County are protected from future development. For example, there is currently a proposal to develop portions of the largest remaining pine rockland site in Miami-Dade County, the Richmond pine rocklands, including critical habitat for Florida brickell-bush.

Since 2005, the Service has funded the Institute for Regional Conservation (IRC) to facilitate restoration and management of privately owned pine rockland habitats in Miami-Dade County. These programs included prescribed burns, nonnative plant control, light debris removal, hardwood management, reintroduction of pines where needed, and development of management plans. One of these programs, called the Pine Rockland Initiative, includes 10-year cooperative agreements between participating landowners and the Service/IRC to ensure restored areas will be managed appropriately during that time. Although most of these objectives have been achieved, IRC has not yet been able to conduct the desired prescribed burns, due to logistical difficulties and prohibitive costs.

Fairchild Tropical Botanic Garden (FTBG), with the support of various Federal, State, local, and nonprofit organizations, has established the "Connect to Protect Network." The objective of this program is to encourage widespread participation of citizens to create corridors of healthy pine rocklands by planting stepping-stone gardens and rights-of-way with native pine rockland species, and restoring isolated pine rockland fragments. By doing this, FTBG hopes to increase the probability that pollination and seed dispersal vectors can find and transport seeds and pollen across developed areas that separate pine rockland fragments to improve gene flow between fragmented plant populations and increase the likelihood that these plants will persist over the long term.

*Ex situ* conservation is critical to the overall recovery strategy for Florida brickell-bush because living collections and seed banking provide backup for genetic diversity that may be lost in the wild due to threats or natural occurrences. FTBG maintains Florida brickell-bush in their living collections, and conducts research on seed germination, storage, and cultivation requirements to help safeguard this plant from extinction. FTBG made collections from two wild locations and multiple *ex situ* plants comprising 21 maternal lines. FTBG has provided a total of 1,589 Florida brickell-bush seeds to the National Center for Genetic Resources Preservation for long-term storage. Experimental results

indicate that seed storage may be a useful strategy for future reintroductions and supplementation of existing populations to increase the numbers and sizes of populations of this species. As part of FTBG's Connect to Protect Network, reintroduction of endemic pine rockland plants such as Florida brickell-bush is planned in corridors they hope to create.

In 2007, the Service funded IRC to implement conservation activities associated with the Florida brickell-bush on privately owned pine rockland fragments in Miami-Dade County. This project was initiated in 2008 and included reintroduction of Florida brickell-bush in an effort to establish new occurrences of these plants and increase population sizes. Eight Florida brickell-bush were planted at one private site, and three of these remained in May 2009. However, the property was foreclosed on in 2011, and IRC has not been able to access the site to determine the status of these plants.

### **III. PRELIMINARY RECOVERY STRATEGY**

#### **A. Recovery Priority Number with Rationale**

The Florida brickell-bush is assigned a recovery priority of 5, which indicates the species faces a high degree of threat and has a low recovery potential. Recovery potential is considered low for the Florida brickell-bush based on the small number and distribution of extant populations, only some of which are on conservation lands, and the overall low potential for restoration of pine rocklands and adequate fire management in Miami. A lack of adequate fire management within the pine rocklands in portions of the current and historical ranges of this plant, may prevent natural recolonization, limit success of future reintroductions, and otherwise conflict with recovery goals and objectives.

#### **B. Recovery Strategy**

The current range of the Florida brickell-bush consists of pine rocklands on the Miami Rock Ridge outside of Everglades National Park in central and southern Miami-Dade County. Five occupied critical habitat units (Nixon Smiley Pineland Preserve and surrounding areas; Richmond Pinelands and surrounding areas; Quail Roost Pineland and surrounding areas; Camp Owaissa Bauer and surrounding areas; and Navy Wells Pineland Preserve and surrounding areas), and two unoccupied units (Trinity Pineland and surrounding areas; and U.S. Department of Agriculture Subtropical Horticultural Research Station and surrounding areas) are designated for the species.

Because of the plant's restricted range, our initial recovery strategy will be to maintain, protect, and monitor the known populations of the Florida brickell-bush within Miami-Dade County. These actions will be concurrent with initiation and continuation of habitat restoration efforts within the species' current and historical ranges. From the onset, our recovery strategy will include working with the National Oceanic and Atmospheric Association (NOAA), U.S. Coast Guard (USCG), Miami-Dade County, FTBG, IRC, and other partners to establish management plans for the Florida brickell-bush. Management plans will include a suite of restoration activities (e.g., prescribed burns, removal of nonnative invasive plants, mechanical clearing including thinning of pines where appropriate), that will be reviewed and adjusted, as needed, to maintain or increase the distribution of the Florida brickell-bush throughout extant pine rockland habitats. Wherever feasible, restoration activities should include fire to obtain the maximum benefits to the species such as stimulation of, and increased, flowering.

We will work with our partners in Miami-Dade County to protect remnant patches of pine rocklands and establish a wide network of stepping-stone habitats to potentially establish additional populations of the species (through natural recolonization or reintroduction) and to provide habitat for the plant's pollinators, thereby helping to increase seed production, pollen dispersal, genetic variability, and ultimately population viability of the Florida brickell-bush. Where possible, we will work with our partners to protect (through fee-simple acquiring or purchasing conservation easements) and manage larger tracts of degraded (e.g., fire-suppressed, cleared, scraped) pine rockland which have a high restoration potential. Protection and restoration of larger-scale lands in the pine rocklands will be important for the recovery of the Florida brickell-bush.

Beyond habitat restoration, other concurrent steps will include continuing to monitor extant populations of the Florida brickell-bush and conducting surveys to find new populations of the plant, including surveys of historically occupied sites. To date, very little research has been done to understand the demography, reproductive biology, or genetics of the species. We will work with our partners to conduct studies on aspects of Florida brickell-bush ecology, as needed, to better inform recovery efforts. These studies may include conducting population viability analyses of the extant populations (and historical populations, if sufficient information is available), which would be required to determine appropriate minimum abundance of Florida brickell-bush at locations throughout its current and historical ranges. Additional studies may focus on dispersal, identification of specific pollinators, and evaluation of reintroduction techniques. Recovery efforts will include seed collection encompassing broad genetic representation from all extant populations. We also will work with our partners to expand our efforts to increase public awareness of the Florida brickell-bush and other imperiled pine rockland species unique to South Florida that we are working to recover.

### **C. Initial Action Plan**

*Anticipated Recovery Actions in relation to our recovery strategy described above:*

1. Work with Miami-Dade County to facilitate prescribed fire in pine rockland sites to establish consistent fire-return-intervals (3 to 7 years);
2. Conduct intensive surveys of all known Florida brickell-bush populations within Miami-Dade County;
3. Conduct seed collections from individuals within all extant Florida brickell-bush populations to ensure broad genetic representation and maximum genetic variability of future reintroductions and in long term seed storage;
4. Conduct surveys of pine rockland fragments throughout the Florida brickell-bush's historical range in Miami-Dade County to further determine the species' distribution and abundance, and to evaluate the potential of these areas for restoration and/or reintroduction;
5. Develop a reintroduction plan and conduct reintroduction and augmentation of Florida brickell-bush populations in suitable pine rockland habitat, and evaluate reintroduction techniques to maximize success;
6. Identify species-specific pollinators and dispersal vectors, and evaluate the dispersal abilities of the Florida brickell-bush within and across extant populations;
7. Identify and conduct studies of Florida brickell-bush ecology that are needed to support recovery efforts;
8. Protect, enhance, and manage remnant pine rocklands to establish a wide network of stepping-stone habitats that may support additional populations of the Florida brickell-bush and provide habitat for the plant's pollinators;

9. Use partnerships to protect, restore, and manage degraded or historical pine rockland which have a high restoration potential;
10. Develop population viability analyses of Florida brickell-bush populations to determine appropriate minimum population abundance for the species at locations throughout its range.

#### IV. PREPLANNING PROCESS

A Species Status Report (SSA) and a recovery plan will be prepared for Florida brickell bush. The SSA will assess Florida brickell bush's biological condition and will provide a summary of the species needs, the current species' condition, and the future species condition. The recovery plan will include objective and measurable criteria which, when met, will ensure the conservation of the plant. Recovery criteria will address all meaningful threats to the species. The plan as well will estimate the time and the cost to achieve recovery. The SSA and the recovery planning effort will be led by the SFESO in coordination with our partners. The Service anticipates either writing the recovery plan or appointing a recovery team to help us effectively draft a recovery plan for the Florida brickell-bush. If a team is formed, individuals on the recovery team would advise the Service and could include experts on the plant and other relevant areas; team members would be capable of sharing information on recovery population thresholds and important short and long term actions for species recovery.

During the recovery planning process, input, comments and review will be sought from multiple stakeholders within the State of Florida. These will include State, Federal and local agencies, industrial and agricultural groups, universities, conservation organizations, and others. Many of these stakeholders are currently cooperating in on-going conservation efforts for pine rocklands, and imperiled species that use pine rocklands, in southern Florida. Primary authorship of the Recovery Plan will be the responsibility of Service staff, though State partners will be heavily involved in all phases of the planning and implementation processes. Throughout the listing process, we worked closely with our State (FDACS), Federal (USCG, NOAA), and local (Miami-Dade County) partners regarding possible conservation efforts, as well as the need for timely consultations between Federal agencies in the event of future actions which might affect the Florida brickell-bush. We are developing guidance internally to be shared soon with other Federal (e.g., U.S. Army Corps of Engineers, U.S. Coast Guard) and non-Federal partners (e.g., Miami-Dade County) to help clarify new regulations, improve compliance, and help safeguard the plant and its habitat through sections 7 and 10 of the ESA. This relates to helping partners with the final listing and critical habitat rules themselves, explaining critical habitat, and developing consultation standard operating procedures and standard conservation measures for this plant species.

The draft recovery plan should be finalized and sent to the Regional Office for review by April 2018. The final recovery plan should be sent to the Regional Office for review by April 2019. These timelines may be affected by available resources and regional priorities.

Approve:   
Assistant Regional Director, Region 4

Date: 6/24/16

## REFERENCES CITED

- U.S. Fish and Wildlife Service. 2013. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Brickellia mosieri* (Florida Brickell-bush) and *Linum carteri* var. *carteri* (Carter's Small-flowered Flax); Proposed Rule. Federal Register 78: 61293-61320.
- U.S. Fish and Wildlife Service. 2014. Endangered and Threatened Wildlife and Plants; Endangered Species Status for *Brickellia mosieri* (Florida Brickell-bush) and *Linum carteri* var. *carteri* (Carter's Small-flowered Flax); Final Rule. Federal Register 79: 52567-52575.