Recovery Plan for the endangered *Amorpha crenulata* (crenulate lead-plant), *Chamaesyce deltoidea* ssp. *deltoidea* (deltoid spurge), *Galactia smallii* (Small's milkpea), and *Polygala smallii* (tiny polygala)
https://www.fws.gov/verobeach/MSRPPDFs/Crenulate.pdf
https://www.fws.gov/verobeach/MSRPPDFs/Deltoid.PDF
https://www.fws.gov/verobeach/MSRPPDFs/Small.PDF
https://www.fws.gov/verobeach/MSRPPDFs/TinyPoly.PDF

Original Approved: May 18, 1999
Original Prepared by: Dave Martin

DRAFT AMENDMENT 1

We have identified the best available information that indicates the need to amend recovery criteria for the *Amorpha crenulata* (crenulate lead-plant), *Chamaesyce deltoidea* ssp. *deltoidea* (deltoid spurge), *Galactia smallii* (Small's milkpea), and *Polygala smallii* (tiny polygala) since the recovery plan was completed. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and provide the rationale supporting the proposed recovery plan modification. The proposed modification is shown as an addendum that supplements the South Florida Multi-Species Recovery Plan (MSRP; USFWS 1999) by adding delisting criteria which were not developed at the time this recovery plan was completed. The recovery objectives and the step-down outline are described on pages 4-789 to 4-799, 4-845 to 4-849, 4-1029 to 4-1034, 4-1135 to 4-1147 of the MSRP for *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii*, respectively. Recovery plans are non-regulatory documents that provide guidance on how best to help recover species.

For
U.S. Fish and Wildlife Service
Region 4
Atlanta, GA

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METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

The proposed amendments to the recovery criteria are based on recent studies with these species, and information in prior 5-year reviews (Service 2007, 2010a, 2010b, 2010c) and newer information gathered for the revised 5-year reviews of these species initiated in 2018. The most recent and best available information was discussed and synthesized by 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 these 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) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five listing factors.

Recovery Criteria

The MSRP (USFWS 1999) only provides downlisting criteria for *Amorpha crenulata* (p. 4-789; https://www.fws.gov/verobeach/MSRPPDFs/Crenulate.pdf), *Chamaesyce deltoidea* ssp. *deltoidea* (p. 4-839; https://www.fws.gov/verobeach/MSRPPDFs/Deltoid.PDF), *Galactia smallii* (p. 4-1023; https://www.fws.gov/verobeach/MSRPPDFs/Small.PDF), and *Polygala smallii* (p. 4-1143; https://www.fws.gov/verobeach/MSRPPDFs/TinyPoly.PDF).

Synthesis

Amorpha crenulata, Chamaesyce deltoidea ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* were listed as endangered in 1985 (50 FR 29345) primarily due to habitat loss, drainage, fire suppression, and invasive exotic species.

Amorpha crenulata

The current and historical range of *A. crenulata* encompasses only a 20 square-mile (52 km^2) area from Coral Gables to Kendall (Service 1999) within Miami-Dade County. Two of the four known historical *A. crenulata* populations (Matheson Hammock and Coral Pines Parks) are extirpated. Five *A. crenulata* populations, including three that are reintroduced, remain. The total population size of *A. crenulata* is approximately 649 individuals (Possley, Fairchild Tropical Botanic Gardens [FTBG], pers. comm. 2017a; Lange, FTBG, pers. comm. 2017; Lange *et al*. 2018).

Chamaesyce deltoidea ssp. *deltoidea*

Chamaesyce deltoidea ssp. *deltoidea* is only known from the pine rocklands of Miami-Dade County. The remaining *C. d.* ssp. *deltoidea* populations occur entirely within a narrow region of pine rockland fragments that includes 17 sites – 16 public and 1 private (Institute for Regional Conservation [IRC] 2006; Bradley, IRC, pers. comm. 2010a; Lange, pers. comm. 2017; Possley, pers. comm. 2017a, 2017b). Three of the largest extant populations (Larry and Penny Thompson Park, Martinez Pineland, and Zoo Miami), which consist of approximately 16,000 plants (Lange, pers. comm. 2017; Possley, pers. comm. 2017a) occur within the Richmond Pine Rocklands, portions of which are being developed or are being considered for future projects. Ongoing or additional development within this area will reduce habitat for these species and may complicate land managers' ability to conduct conservation activities (*e.g*., prescribed fire) based on the proximity of or adjacency to residential and commercial properties. Four populations on

County-managed conservation lands (Deering Estate at Cutler, Ludlum Pineland, Pine Shore Preserve, and Ned Glenn Nature Preserve) retain moderately-sized populations ranging from 200 to 800 individuals. The ten additional sites have fewer than 100 individual plants per population. Five of the recently extirpated populations occurred on County-owned conservation lands and were lost due to inadequate land management.

Galactia smallii

Galactia smallii is only known from the pine rocklands of Miami-Dade County. The remaining *G. smallii* populations occur entirely within a narrow region of pine rockland fragments that includes 24 sites – 8 public and 16 private (Bradley, 2010b; Lange, pers. comm. 2017; Possley, pers. comm. 2017) across a 6.5-mile (10.5 km) area within Miami-Dade County. However, a single population at Homestead Air Reserve Base (HARB), contains up to 100,000 individuals (Bradley 2009). Miami-Dade County owns seven of the public sites, purchased for conservation purposes, and is working to restore and manage these lands through their Environmentally Endangered Lands (EEL) program. The final public site, HARB, is seeking to develop their lands, however, they are also coordinating with the Service and IRC to retain and manage the population at this site. *G. smallii* populations on the 16 private sites range in size from 3 to 1,000 individuals per site (Bradley, 2010b; Lange, pers. comm. 2017; Possley, pers. comm. 2017a).

Polygala smallii

The historical range of *P. smallii* is not well known. When this species was listed, it was known from sandy pine rockland and Florida scrub vegetation in Miami-Dade and Broward Counties (the Miami and Fort Lauderdale metro areas, respectively). Additional surveys have indicated the species occurs locally as far north as St. Lucie County (Bradley and Gann 1995).

Polygala smallii is extant on a total of nine sites in Miami-Dade, Palm Beach, St. Lucie, and Martin Counties, with the highest density of sites located in southern Miami-Dade County (Wendelberger and Frances 2004; Woodmansee *et al*. 2007; Maschinski, pers. comm. 2010; Florida Natural Areas Inventory [FNAI] 2010a; Lange, pers. comm. 2017; Possley, pers. comm. 2017a). Clusters of sites are separated by an average of 38 miles (61 km). Eight of nine known occurrences are on publicly owned lands, and all the sites are currently being managed for conservation of *P. smallii*. The species is known to have been extirpated from at least five historical locations, including three in Miami-Dade County and single populations in Broward and St. Lucie Counties.

Five sites are known from Miami-Dade County. These include the publicly owned Zoo Miami and adjacent U.S. Coast Guard (USCG) property, both located within the 2,100-acre Richmond pinelands (Lange, pers. comm. 2017; Possley, pers. comm. 2017). Possley pers. comm. (2017a) indicates the *P. smallii* population size within Zoo Miami has fluctuated from 13 to over 1,000 individuals in the past decade. The USCG site contains the largest population, which was estimated at over 10,000 plants during a 2008 survey (Lange, pers. comm. 2017; Possley, pers. comm. 2017a); no recent estimates are available for the species at this site. The three remaining *P. smallii* sites within Miami-Dade County each retain populations of ten individuals or less (Lange, pers. comm. 2017; Possley, pers. comm. 2017a).

In Palm Beach County, the *P. smallii* abundance at two known locations fluctuates dramatically from year to year (Woodmansee *et al*. 2007). At Jupiter Ridge Natural Area, *P. smallii* abundance has fluctuated from 86 (2005) to 8 (2017) (Buck, pers. comm. 2017). The Limestone Creek Natural Area population has ranged from 3 to 60 since being discovered in 2002, with 5 encountered during 2017 (Woodmansee *et al*. 2007; Shearer, pers. comm. 2017). In southern Martin County, *P. smallii* is known to occur in Jonathan Dickinson State Park (JDSP). Surveys of the site have recorded between 6 and 64 individuals (Woodmansee *et al*. 2007; FNAI 2010a). Woodmansee *et al*. (2007) indicated that while the species appears to be in decline at JDSP, it is expected that plant numbers will increase in the long run, provided fires are administered. In St. Lucie County, a small population (14 plants) of *P. smallii* occurs at the privately owned Lynn University (Woodmansee *et al*. 2007).

Amorpha crenulata, Chamaesyce deltoidea ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* are currently threatened by Factors A, D, and E (USFWS 2007). The predominant threats described at the time these species were listed as endangered have each been reduced, but not eliminated. In addition, studies indicate that the influence of climate change and sea level rise, as well stochastic events (storms), on these species is greater than initially known at the time of listing.

The pine rockland community of south Florida is critically imperiled globally (FNAI 2010b). In Miami-Dade County, development and agriculture have reduced pine rockland habitat by 90 percent. Continued habitat loss (Factor A) and fragmentation threaten the existence of these species, and less than 1 percent of the original acreage of pine rockland habitat remains outside of ENP (Herndon 1998). Populations on private sites remain threatened with destruction or habitat modification due to improper or lack of management (Factors A and E).

Currently, regulatory mechanisms (Factor D) provide limited protections for *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii*. The Florida Department of Agriculture and Consumer Services designated these species as endangered under Chapter 5B-40, Florida Administrative Code. This law regulates the taking, transport, and sale of listed plants. This law does not prohibit private property owners from destroying listed plants nor does it require them to manage habitats to maintain populations. The Natural Forest Communities (NFC) program was established by Miami-Dade County to encourage but not require private landowners to protect forested lands by making it necessary to apply for a permit with the County prior to working in designated NFCs (*i.e.*, pinelands, hammocks).

Fire suppression and invasion by exotic plant species continue to affect *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* (Factor E). Historically, frequent (approximately twice per decade), lightning-induced fires were a vital component in maintaining native vegetation and ecosystem functioning within south Florida pine rocklands. A period of just 10 years without fire may result in a marked decrease in the number of herbaceous species due to the effects of shading and litter accumulation (FNAI 2010b). The majority of extant populations of these species are affected by some degree of inadequate fire management, with the primary threat being shading by hardwoods (Bradley and Gann 1999; Bradley and Gann 2005).

Nonnative invasive plants compete with native plants for space, light, water, and nutrients, and make habitat conditions unsuitable for the *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* which prefer open conditions (Factor E). Bradley and Gann (1999) indicated that the control of nonnative plants is one of the most important conservation actions for the pine rockland species and a critical part of habitat maintenance. Nonnative plants have significantly affected pine rocklands and negatively impacted all occurrences of these species to some degree (Bradley and Gann 1999; Bradley 2006; Bradley and Saha 2009; Bradley and van der Heiden 2013).

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 *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants (Lists). Downlisting is the reclassification of a species from endangered to threatened. 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. 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*.

Herein, we provide delisting criteria for the *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* as the recovery plan for these species only developed downlisting criteria as discussed above. The recovery criteria presented below represent our best assessment of the conditions that would most likely result in a determination that delisting of *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and

Polygala smallii 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 factors.

Downlisting Recovery Criteria

We are not amending the existing downlisting criteria, refer to pages 4-795, 4-845, 4-1029, and 4-1143 of the MSRP for *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii, and Polygala smallii* (USFWS 1999), respectively.

Amended Delisting Recovery Criteria

We are proposing that the *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea*, *Galactia smallii*, and *Polygala smallii* will be considered for delisting when the following criteria are met:

1. Existing natural populations (ranging from 5 to 24, based on species) achieve and maintain a stable or increasing trend, evidenced by natural recruitment and multiple age classes. (addresses Factors A and E)
2. A network of new populations (5 for *Amorpha crenulata* and *Galactia smallii* and 6 for *Chamaesyce deltoidea* ssp. *deltoidea* and *Polygala smallii*) are either discovered or reintroduced that exhibit a stable or increasing trend, evidenced by natural recruitment and multiple age classes. (addresses Factors A and E)
3. All populations (criteria 1 and 2) are protected by a conservation mechanism. (addresses Factors A, D, and E)
4. Threats have been reduced or eliminated to the degree that these species will remain viable for the foreseeable future. (addresses Factors A, D, and E)

Justification for Amended Recovery Criteria

Criterion 1: Existing natural populations that achieve and maintain a stable or increasing trend, natural recruitment and multiple age classes will demonstrate that the populations are secure and will be resilient to stochastic events (Factors A and E). For *Amorpha crenulate, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* it is believed that the existing 5 to 24 extant populations (5, 17, 24, and 9 for *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea*, *Galactia smallii*, and *Polygala smallii*, respectively) exhibiting these traits are necessary to ensure these species will no longer require protection under the Act. Recovery actions, such as population monitoring, habitat restoration and creation, and *ex situ* collection are ongoing at each of these locations.

Criterion 2: To ensure that these species will not become threatened with extinction in the future a sufficient number of populations should be distributed throughout their historical ranges. To achieve this, in addition to criterion #1, it is necessary for a network of additional populations (either discovered or reintroduced) to occur throughout the historical ranges of these species. Expanding the network of populations with 5 to 6 new populations (5 for *Amorpha crenulata* and

Galactia smallii and 6 for *Chamaesyce deltoidea* ssp. *deltoidea* and *Polygala smallii*) within the historical ranges of these plants will increase their resiliency, representation, and redundancy, and reduce threats due to curtailment of range (Factor A) and stochastic events (Factor E).

Criterion 3: Conservation mechanisms will be evaluated to ensure each addresses development, fire management and invasive species control, and other conservation-related actions such that that all populations (criteria 1 and 2) continue to exhibit a stable or increasing trend, natural recruitment and multiple age classes into the foreseeable future (Factors A, D, and E).

Criterion 4: Abatement of threats will allow populations to become stable and contribute to the viability of these species (Factors A, D, and E). The predominant threats described at the time *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* were listed were habitat loss, drainage, fire suppression, and invasive exotic species. Subsequently, the influence of climate change and sea level rise, as well stochastic events (storms), are known threats. None of these threats has been eliminated, however, many have been reduced or are being addressed in order to achieve and maintain resilient populations of these species.

Rationale for Amended Recovery Criteria

The existing criteria on pages 4-789, 4-839, 4-1023, and 4-1143, for *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii*, respectively, in the MSRP (USFWS 1999) (https://ecos.fws.gov/docs/recovery_plan/sfl_msrp/SFL_MSRP_Species.pdf) included only downlisting criteria. With these proposed 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 the species. In achieving these criteria, we expect *Amorpha crenulata, Chamaesyce deltoidea* ssp. *deltoidea, Galactia smallii,* and *Polygala smallii* to have a low probability of extinction for the foreseeable future and have 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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