Florida Prairie-clover
(Dalea carthagenensis var. floridana)

Status Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Southeast Region
Florida Ecological Services Field Office
Vero Beach, Florida

July 2023

5-Year Status Review

Florida Prairie Clover (*Dalea carthagenensis* var. *floridana*)

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Florida Ecological Services Field Office

Review Authors: David Bender, Florida Ecological Services Field Office and Shelby M. Bauer and Casey Morrow, University of Georgia

Reviewers:

Lead Regional Office: Atlanta Regional Office, Carrie Straight (404) 679-7226.

Date of original listing: October 06, 2017 (82 FR46691)

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The authors evaluated the biology, habitat, and threats of the Florida prairie-clover to inform this status review. In conducting this 5-year review, the authors relied on the best available information pertaining to historical and current distributions, life history, ecology, and habitat of this species. Much of the information is detailed in the listing rule (U.S. Fish and Wildlife Service (Service) 2017). Other sources for this status review include published and unpublished reports, field observations, and personal communications from recognized experts in the field. The Service published an announcement in the Federal Register requesting information on the Florida prairie-clover and other species on May 13, 2022 (87 FR 29364) and a 60-day comment period was opened. We did not receive any public comments that we incorporated into this review.

FR Notice citation announcing the species is under active review:
May 13, 2022 (87 FR 29364)

Species' Recovery Priority Number at start of 5-year review (48 FR 43098):
6. The Recovery Priority Number of "6" indicates that it is a subspecies with high degree of threat and low recovery potential.

Review History: This is the first formal 5-year status review for this species.

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature:
The current accepted taxonomy for this variety remains *Dalea carthagenensis* var. *floridana* according to Integrated Taxonomic Information System (2022). The most current taxonomy accepted by experts in the southeast have elevated this variety to full species status, *Dalea floridana,* because of its isolated range and distinct morphology (Diggs and Weakley 2017, Weakley and Southeastern Flora Team 2022). This updated nomenclature does not impact our assessment of the listed entity, and it is still considered a valid entity by the Service. Until we finalize a technical correction of the name, we will continue to reference the species using the name as it was listed.

Distinct Population Segment (DPS)
The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listing of a DPS to only vertebrate species. Because the species under review is not a vertebrate, the DPS policy is not applicable.

Recovery Criteria

Recovery Plan or Outline:
At the time of this review, there is no finalized recovery plan for the species.

Biology and Habitat Summary

Florida prairie-clover is a shrub in the pea family (Fabaceae) with a woody base that typically grows in pine rockland, rockland hammock, marl prairie, and coastal berm habitats, specifically in open, well-lit areas maintained by disturbance. It is also noted that Florida prairie-clover may also occur along roadsides within the aforementioned habitats (Service 2017). Seedling recruitment success can vary, however, due to continued habitat loss and fragmentation, population numbers continue to decline (Service 2017). Pollinators for this species are unknown. Seeds often fall to the ground but can be dispersed short distances by wind. Larger plants can produce over 500 seeds. Seedling recruitment varies widely from year to year, with lower recruitment in drier years. While the species is a short-lived plant, they produce a large quantity of seeds, providing a significant seed bank.

The Service recognizes that dynamics of temperature and soil moisture have a noteworthy impact on seedling survival in Florida prairie-clover (Service 2017). Specifically, “low winter temperature coupled with average rainfall resulted in high seedling recruitment … However, if rainfall followed cold winter temperatures, seedling mortality was high” (Service. 2017). Prescribed fire is also important for maintaining healthy Florida prairie-clover habitat to prevent hardwood encroachment and shading out by other plant species. Pine rocklands and marl prairies as a whole are dependent on frequent fires in order to prevent their succession into fully hardwood habitats (Bradley and Gann 1999; Florida Natural Areas Inventory (FNAI) 2010; Everglades National Park (ENP) 2015; Service 2017).

At the time of listing there were 15 known occurrences of Florida prairie-clover, six of which were categorized as extirpated. At the time of this review, thirteen (13) occurrences of the Florida prairie-clover predominantly found in Miami-Dade County are still considered extant and the species-wide number of individuals is estimated to be around 980 plants (Table 1; Lange et al. 2018). One notable change since listing, the Everglades National Park (ENP) occurrence that was previously thought to be extirpated, was rediscovered by an amateur naturalist in 2018. Although this is likely a small population, it occurs in three distinct locations within the park.

Abundance has increased since the species listing in 2017 for some populations, including ENP, R. Hardy Matheson Preserve, Crandon Park, Strawberry Fields Hammock, and the Florida Department of Health. Abundances at Big Cypress National Park appear to be in decline with only 40 plants found in 2018 compared to 253 individuals found across all occurrents in the Park in 2014 (Lange et al., 2018). In January 2020, Possley et al. (2020) monitored Florida prairie clover populations in all regions of the 400+ acre Deering Estate where the species had previously been recorded. According to the report most locations where plants were found documented a range in the number of reproductive, seedling, and non-reproductive plants and all surveys along the southern edge of the property have failed to produce any plants since 2011. Overall counts of Florida prairie clover on the property have fluctuated significantly with approximately 50 individuals found in 2003, 500 in 2008, and about 300 in 2019 (Possley et al. 2020).

In both 2019 and 2020, Florida prairie clover counts at Crandon Park were at their lowest. Only 99 individuals were counted both years and were dominated by seedlings. However, numbers over the last 15 years have fluctuated widely at the location (Possley et al. 2021). The 2021 surveys saw an increase in abundance to 143 individuals the majority of which were again seedlings (Possley et al., 2021). Of additional note was the prairie-clover's response to a prescribed burn at R. Hardy Matheson Preserve. The preserve received a prescribed burn in the winter of 2020 and by the fall hundreds of robust plants were present at this site (Possley et al. 2021).

The Florida prairie-clover is currently restricted to pine rocklands and similar habitats in Miami-Dade and Monroe counties. The species was once found and is now extirpated from Palm Beach County, but it is currently extirpated. The spatial distribution since the listing rule has increased with the rediscovery of the species in ENP. Even with this increase, the species is still a narrow endemic.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act, including: Factor A: the present or threatened destruction, modification, or curtailment of its habitat or range; Factor B: overutilization for commercial, recreational, scientific, or educational purposes; Factor C: disease or predation; Factor D: the inadequacy of existing regulatory mechanisms; Factor E: other natural or manmade factors affecting its continued existence. A summary of this assessment is detailed below.

The primary threat to Florida prairie-clover populations are habitat loss and habitat fragmentation (Factor A). Habitat loss results from land use changes, introduction of invasive species, and succession of habitats to conditions inhospitable for Florida prairie-clover. Habitat and plants can also be directly impacted from off-road vehicle use (Bradley and Gann 1999). Continued land use changes also result in habitat fragmentation due to a variety of land developments increases population isolation.

Table 1. Summary of known occurrences for the Florida prairie-clover. Occurrences in bold indicate the 13 occurrences presumed extant at the time of this writing.

Occurrence	Land ownership	Most recent population estimate (year of estimate)
Big Cypress National Park, North of Oasis Visitor Center	National Park Service	236 individual plants (2014); 40 individuals found in 2018
Big Cypress National Park, Pinecrest region, along Loop Road	National Park Service	17 individual plants (2014); no plants found in 2018
Big Cypress National Park, 11-Mile Road	National Park Service	Extirpated
Everglades National Park (cumulative)	National Park Service	100 individual plants (2018)*
Everglades National Park, road to Mahogany Hammock	National Park Service	at least one individual plant (2018)
Everglades National Park, Rowdy Bend	National Park Service	at least one individual plant (2018)
Everglades National Park, road to water treatment plant	National Park Service	at least one individual plant (2018)
Deering Estate (cumulative)	Miami-Dade County	372 individual plants (2020)
Deering Estate, north pine rock-land	Miami-Dade County	291 individual plants (2020)
Deering Estate, south addition pineland	Miami-Dade County	81 individual plants (2020)
Deering Estate, southern edge	Miami-Dade County	Presumed extant; however, no plants observed (2020)
R. Hardy Matheson Preserve	Miami-Dade County	327 individual plants (2020) Hundreds of robust plants (2021)
Crandon Park	Miami-Dade County	143 individual plants (2021)
Virginia Key	City of Miami	Likely extirpated
Strawberry Fields Hammock (next to Natural Forest Community), Cutler Bay	Private	35 individual plants (2018)
Florida Department of Health and Rehabilitation Services, Cutler Bay	Private	173 individual plants (2018)
Florida Power and Light property (very near to the Deering Estate)., Cutler Bay	Private	Presumed extant; however, no plants observed (2018)
Coral Gables Area	Private	Extirpated
Cox Hammock Preserve	Miami-Dade County	Extirpated
Pineland South of Miami River	Private	Unknown
Palm Beach County	Private	Extirpated

*The species as assumed extirpated from Everglades National Park at the time of listing in 2017).

As isolation and habitat fragmentation increases, the species' ability to emigrate and immigrate amongst populations decreases. This results in reduced genetic exchange and increases the probability that any one isolated population may be extirpated, increasing the species probability of extinction. For example, pollination limitation has been strongly linked to habitat fragmentation due to increasing distance between fragments. Isolation of fragments also leads to decreased genetic variability due to an increase in the spatial distance leading to decreased opportunity for establishment of new plants (Newman et al. 2013). Invasive plant species also pose a moderate threat to Florida prairie-clover because they increase competition for space, nutrients, and sunlight.

While no studies have been done to demonstrate Florida prairie-clover's relationship with fire, the species has shown positive response to prescribed fire and it is well documented that fire is a crucial component to maintaining pine rockland habitat without which the habitat will transition into a community likely inhospitable for Florida prairie-clover (Snyder et. al 1990, Bradley and Gann 1999; Maschinski et al. 2003 and references therein; FNAI 2010; ENP 2015). In addition, the establishment of dense patches of the non-native plants like *Neyraudia neyraudiana* and *Schinus terebinthifolius* have increased the intensity and burning periods of fires by providing additional fuels and increasing density and continuity of fuels to spread fire, which have negatively impacted pineland habitats (Loope and Dunevitz 1981, Zouhar et al. 2008; Service 2017). These longer duration more intense fires may result in plant death and reduced viability of seeds and roots in the soil minimizing the species' ability to recover from the fire. One method that is used to control woody encroachment or for maintenance in Florida prairie-clover habitat is mowing. Mowing can decrease competition with other plants. However, plants growing on mown sites were shorter, which may affect fruiting magnitude. While mowing did not usually kill adult plants, it could delay reproduction if it occurred prior to plants reaching reproductive status (Maschinski et al. 2007). Repeated mowing of this type could result in extirpation of the individuals at the site.

It is not believed that overutilization of the species for commercial, recreational, scientific, or educational purposes is a threat (Factor B). It is possible that disease or predation could pose a potential threat (Factor C), although there is insufficient data to support this at this time. Scale insects in the family Coccoidea have been known to parasitize Florida prairie-clover (Maschinski et al. 2015). Damage to leaves by these insects can be destructive to young plants but it is not considered to be a primary risk at this time. Love vine, *Cassytha filiformis*, a parasitic plant, is also considered a potential threat owed to its overlapping range with Florida prairie-clover (Maschinski et al. 2015).

Although Florida prairie-clover is afforded some level of protection where it occurs on public conservation lands, especially Federal lands, existing regulatory mechanisms vary in strength and scope, and do not provide substantive protection of habitat at this time (Factor D; Service 2017). They have not led to a sufficient reduction of threats posed to the species to alleviate significant threats. State and federal regulations provide a low level of protection for Florida prairie-clover, but such regulations either do not apply to National Park Service activities or allow for a person to acquire a permit to destroy, harvest, transport, or sell species.

Several studies have noted potential climatic changes that could impact species like the Florida prairie-clover, including variability in precipitation and temperature that can cause shifts in vegetation types, increases in freezing conditions, and increase in intensity and frequency of fire events (Wanless et al. 2008; Wear and Greis 2012). Additionally, there is expected to be an increased frequency and duration of severe storms. "Hurricanes and tropical storms can modify

habitat (e.g., through storm surge) and have the potential to destroy entire populations, physically washing them away or leaving soil too saline for them to persist" (McLaughlin et al. 2002; Cook et al. 2004). Direct losses of pine rockland plant populations are expected due to habitat loss and modification from SLR through 2100. Additionally, changes in regional hydrology designed to help restore the Everglades ecosystem (e.g., inundation or increased hydroperiods) may have impacts on the pine rockland habitats. Increased and longer-duration hydroperiods in the areas inhabited by endangered pine rockland species may lead to a "reduction in the amount of suitable habitat, a potential reduction in the area occupied, and a reduction in the number of individuals found in ENP and BCNP" (Gann 2015).The small populations of Florida prairie-clover makes the species particularly susceptible to negative impacts from climate change (Factor E) due to their limited ability to recover following a catastrophic climate event (e.g., hurricanes, flooding, etc.).

Climate change threatens to further restrict the pine rockland habitat through sea level rise, hurricanes, and drought. South Florida has seen 5 inches of SLR in the last 18 years, and various models have predicted anywhere from 1 to 8 feet in SLR by 2100 (Vargas-Moreno and Flaxman 2010, Zhang et al. 2011, Park and Sweet 2015, Rahmstorf et al. 2015; University of Florida Geoplan Center 2015). As the sea level rises, the habitat is expected to become wetter and more saline, change the plant community, and eventually become mangrove habitat. More frequent storms and king tides will further threaten their habitat (Saha et al. 2011, Bradley et al. 2013). As a result, pine rockland habitats will likely slowly shift into mangrove and buttonwood ecosystems as the sea level rises (Saha et al. 2011). Climate change is also predicted to alter rainfall and raise temperatures in North America by the end of the century, increasing chances of drought and wildfire (Intergovernmental Panel on Climate Change 2021). Temperatures have already risen more than 2°F since the beginning of the 20th century with projected increases in extreme precipitation events as well as extreme drought (Runkle et al. 2022). Florida prairie-clover is at heightened risk to stochastic weather events due to their reduced and fragmented populations. Unusual storm, tide, or freezing events have the potential to extirpate populations and result in strong genetic drift.

Populations are small, isolated from one another, and often occur in degraded habitat. Individual populations are vulnerable to stochastic or catastrophic events because of limitations of dispersal, cross-pollination (i.e., genetic exchange and maintenance of genetic diversity), and recovery following a catastrophic event, which increases the likelihood of species extinction or population extirpations.

Synthesis

Florida prairie-clover is a shrub in the pea family (Fabaceae) with a woody base that is endemic to the pine rockland, rockland hammock, marl prairie, and coastal berm habitats of southern Florida. The species is restricted to fifteen (15) populations found primarily in Miami-Dade County with some populations found in Monroe County. Although it has been extirpated from Palm Beach County, a population previously thought extirpated in Everglades National Park was rediscovered in 2018. Habitat loss and fragmentation poses the single most significant threat to Florida prairie-clover populations, as increased spatial distance between populations leads to reduced genetic diversity and decreased opportunity for pollination, as pollinator species are also subject to the effects of habitat fragmentation. Habitat fragmentation is anticipated to continue as overall land development progresses. In addition to fragmentation habitat may be lost through land-use changes, in appropriate fire management, and impacts from invasive species. The low population numbers of the species exacerbate threats, as opportunities for survival and recruitment are significantly lower in small populations. Without significant human intervention in the form of better fire management

and reintroduction programs, it is likely that Florida prairie-clover faces further declines in the foreseeable future. We, therefore, recommend it remain listed as endangered.

RECOMMENDED FUTURE ACTIVITIES

Recovery Activities

This species does not have a final recovery plan. In the course of this status review, we have identified the following potential recovery activities which are included below.

- Continue regular fire prescriptions (every 3-7 years) at R. Hardy Matheson Preserve.
- Identify other occurrences which may be candidates for prescribed fire.

Monitoring / Research Activities

In addition to the continued monitoring of known occurrences, new occurrences ought to be sought out either through broadscale surveys or restoration.

- Identify new occurrences through broadscale surveys for extant Florida prairie clover populations. This effort may be aided by education. By teaching the public to identify and report this species through widely available platforms like iNaturalist new occurrences may be identified.

Restoration efforts should work to identify new mechanisms of management and areas of potentially suitable habitat.

- Identify methods to mimic prescribed fire where the application of fire is impractical, like publicly owned conservation lands embedded within urban communities.
- Identify open mesic to xeric shrub communities (pine rockland, marl prairie, coastal strand, and ecotones between each of these habitats and rockland hammocks) with a high probability of persistence given sea-level rise projections. Pursue the sustained restoration and preservation of these sites be they preserves, parks, or private property.
    - One such location may be the Richmond Pine Rockland (Serivice 2017).

REFERENCES

Bradley, K.A. and G.D. Gann. 1999. Status summaries of 12 rockland plant taxa in southern Florida. Report submitted to U.S. Fish and Wildlife Service, Vero Beach, Florida. The Institute for Regional Conservation. Miami, Florida.

Bradley, K.A., G.D. Gann, and C. Heiden. 2013. Status survey of Everglades bully and Florida pineland crabgrass in the Big Cypress National Preserve, Florida. Draft report submitted to the South Florida Ecological Services Office. Institute for Regional Conservation. Miami, Florida. March 4, 2013.

Cook, E.R., C.A. Woodhouse, C.M. Eakin, D.M. Meko, and D.W. Stahle. 2004. Long-term aridity changes in the western United States. Science 306:1015–1018.

Diggs, J.T., and A.S. Weakley. 2017. *Dalea floridana*, a narrowly endemic species of southern Florida. In Weakley, A.S., D.B. Poindexter, R.J. LeBlond, B.A. Sorrie, C.H. Karlsson, P.J. Williams, E.L. Bridges, S.L. Orzell, B.R. Keener, A. Weeks, R.D. Noyes, M. Flores-Cruz, J.T. Diggs, G.D. Gann, and A.J. Floden. 2017. New combinations, rank changes, and nomenclatural and taxonomic comments in the vascular flora of the southeastern United States. II. Journal of the Botanical Research Institute of Texas 11: 291-325.

Everglades National Park (ENP). 2015. Fire Management Plan, Environmental Assessment. National Park Service, Everglades National Park. Homestead, Florida. Downloaded from: https://parkplanning.nps.gov/document.cfm?parkID=374&projectID=19541&documentID=69416

Florida Natural Areas Inventory (FNAI). 2010. Guide to the natural communities of Florida: 2010 edition. Florida Natural Areas Inventory, Tallahassee, Florida.

Gann, G.D. 2015. Vascular Plant Species of Management Concern in Everglades National Park. Final Report. Submitted by The Institute for Regional Conservation, Miami, Florida to Everglades National Park, Homestead, Florida.

Integrated Taxonomic Information System. 2022. Report *Dalea carthagenensis* var. *floridana* (Rydb.) Barneby. https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=527659. Accessed November 6, 2022.

Intergovernmental Panel on Climate Change. 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. 39 pp.

Lange, J., J. Possley, and B. Harding. 2018. Conservation of South Florida Endangered and Threatened Flora: 2017-2018 Program at Fairchild Tropical Botanic Garden. Final report under Contract #024442, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

Loope, L. L. and V.L. Dunevitz. 1981. Impact of fire exclusion and invasion of *Schinus terebinthifolius* on limestone rockland pine forests of southeastern Florida. National Park Service South Florida Research Center Report T-645.

Maschinski, J., D. Powell, J. Possley, J. Lange, and V. Pence. 2015. Conservation of South Florida Endangered and Threatened Flora: 2013-2014 Program at Fairchild Tropical Botanic Garden. Final Report Contract #21010. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

Maschinski, J., S.J. Wright, K. Wendelberger, and A. Muir (ed.) 2003. Conservation of South Florida Endangered and Threatened Flora (ETFLORA) Project. Contract #007182. Final report to Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Florida. October 2003.

Maschinski, J., S.J. Wright, K.S. Wendelberger, J. Possley, D. Walters, J. Roncal, J. Stolt, C. Walters, and J. Fisher. 2007. Conservation of south Florida endangered and threatened flora: 2006–2007 Program at Fairchild Tropical Garden. Final Report Contract #011299. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Florida. Fairchild Tropical Botanic Garden, Miami, Florida. July 2007.

McLaughlin, J.F., J.J. Hellmann, C.L. Boggs, and P.R. Ehrlich. 2002. Climate change hastens population extinctions. Proceedings of the National Academy of Science 99:6070–6074.

Newman, B. J., P. Ladd, M. Brundrett, and K.W. Dixon. 2013. Effects of habitat fragmentation on plant reproductive success and population viability at the landscape and habitat scale. Biological Conservation 159:16-23. https://doi.org/10.1016/j.biocon.2012.10.009

Park, J. and W. Sweet. 2015. Accelerated sea level rise and Florida Current transport. Ocean Science 11:607-615.

Possley, J., L. Cuni, S. Wintergerst, J. Lange, and B. Harding. 2020. Conservation of South Florida Endangered and Threatened Flora: 2019-2020 program at Fairchild Tropical Botanic Garden. Final report for Contract #026286, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

Possley, J., L. Cuni, S. Wintergerst, J. Lange, and B. Harding. 2021. Conservation of South Florida Endangered and Threatened Flora: 2020-2021 program at Fairchild Tropical Botanic Garden. Final report for Contract #027132, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

Rahmstorf, S., J.E. Box, G. Feulner, M.E. Mann, A. Robinson, S. Rutherford, and E.J. Schaffernicht. 2015. Exceptional twentieth-century slowdown in Atlantic Ocean overturning circulation. Nature Climate Change 5:475-480.

Runkle, J., K.E. Kunkel, S.M. Champion, R. Frankson, B.C. Stewart, W. Sweet, and S. Rayne. 2022. Florida State Climate Summary 2022. NOAA Technical Report NESDIS 150-FL. NOAA/NESDIS, Silver Spring, MD, 5 pp. https://statesummaries.ncics.org/chapter/fl/

Saha, S, K. Bradley, M. S. Ross, P. Hughes, T. Wilmers, P. L. Ruiz, and C. Bergh. 2011. Hurricane effects on subtropical pine rocklands of the Florida Keys. Climate Change 107:169-184.

Snyder, J.R., A. Herndon, and W.B. Robertson, Jr. 1990. South Florida rockland. Pages 230–278 in R.L. Myers and J J. Ewel, editors. 1990. Ecosystems of Florida. University of Central Florida Press, Orlando, Florida.

U. S. Fish and Wildlife Service (Service). 2017. Endangered and Threatened Wildlife and Plants; Endangered Species Status for *Dalea carthagenensis* var. *floridana* (Florida Prairie-clover), and Threatened Species Status for *Sideroxylon reclinatum* ssp. *austrofloridense* (Everglades Bully), *Digitaria pauciflora* (Florida Pineland Crabgrass), and *Chamaesyce deltoidea* ssp. *pinetorum* (Pineland Sandmat). Federal Register 83(193):46697-46711.

University of Florida GeoPlan Center. 2015. Testing and enhancement of the Florida Sea Level Scenario Sketch Planning Tool. Final report submitted to the Florida Department of Transportation Office of Policy Planning, Tallahassee, Florida. University of Florida GeoPlan Center, Gainesville, Florida.

Vargas-Moreno, J.C and M. Flaxman. 2010. Addressing the challenges of climate change in the Greater Everglades landscape. Project Sheet, November 2010. Massachusetts Institute of Technology, Department of Urban Studies and Planning; Cambridge, Massachusetts.

Wanless, H.R., S. Leatherman, J.R. Bethea, A. Cantillo, D. Cornley, W. Drennan, D. Enfield, P. Harlem, J.S. Klaus, O. Lavassas, J.F. Meeder, G. Tachiev, J. Van Leer, and D. Yoder. 2008. Statement on sea level in the coming century. Miami-Dade County Climate Change Task Force, Science and Technology Committee, Miami, Florida. January 17, 2008.

Weakley, A. and the Southeastern Flora Team. 2022. Flora of the Southeastern United States. University of North Carolina at Chapel Hill Herbarium (NCU), North Carolina Botanical Garden, University of North Carolina at Chapel Hill. 2022 pp.

Wear, D.N. and J.G. Greis, editors. 2012. The Southern Forest Futures Project: Summary report. General Technical Report SRS-168. U.S. Department of Agriculture, Forest Service, Southern Research Station, Asheville, North Carolina. 54 p.

Zhang, K., J. Dittmar, M. Ross, and C. Bergh. 2011. Assessment of sea level rise impacts on human population and real property in the Florida Keys. Climate Change 107:129–146.

Zouhar, K., J. Kapler Smith, S. Sutherland, and M.L. Brooks. 2008. Wildland fire in ecosystems: fire and nonnative invasive plants. Gen. Tech. Rep. RMRS-GTR-42-vol. 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 355 p.

RESULTS / SIGNATURES

U.S. FISH AND WILDLIFE SERVICE
Status Review of *Dalea carthagenensis var. floridana*

Status Recommendation:
On the basis of this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist *(Indicate reasons for delisting per 50 CFR 424.11)*:
____ *The species is extinct*
____ *The species does not meet the definition of an endangered or threatened species.*
____ *The listed entity does not meet the statutory definition of a species.*
__X_ No change needed

FIELD OFFICE APPROVAL:

Division Manager, Florida Ecological Services Field Office, Fish and Wildlife Service

Approve LOURDES MENA Digitally signed by LOURDES MENA Date: 2023.07.18 07:45:34 -04'00' Adobe Acrobat version: 2023.003.20215

LEAD REGIONAL OFFICE APPROVAL:

Acting for: **Assistant Regional Director – Ecological Services, Fish and Wildlife Service**

Approve AARON VALENTA Digitally signed by AARON VALENTA Date: 2023.07.14 09:19:11 -04'00'