Florida Bonamia
(*Bonamia grandiflora*)

5-Year Status Review:
Summary and Evaluation

Lake McLeod National Wildlife Refuge, Polk County. Photo Todd Mecklenborg

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

February 2023

STATUS REVIEW
Florida Bonamia (*Bonamia grandiflora*)

GENERAL INFORMATION

Current Classification: Threatened

Lead Field Office: Florida Ecological Services Field Office, Todd Mecklenborg 727-892-4104

Reviewers:

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Date of original listing: November 2, 1987 (52 FR 42068)

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 (50 CFR 424.11). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the Florida Bonamia (*Bonamia grandiflora*) to inform this status review.

We announced initiation of this review in the Federal Register on May 13, 2022 (87 FR 29364) with a 60-day comment period. We did not receive any public comments related to this species during the comment period. The primary sources of information used in this analysis were the 1987 final listing rule (52 FR 42068), the *Recovery Plan for Nineteen Florida Scrub and High Pineland Plant Species* (1996), *South Florida Multi-Species Recovery Plan* (1999), previous 5-year reviews, research project reports, peer reviewed scientific publications, unpublished field observations, and personal communications. This review was completed by the Service's Florida Ecological Services Field Office, Gainesville, Florida. All literature and documents used for this review are on file. All recommendations resulting from this review are the result of thoroughly reviewing the best available information on *B. grandiflora*.

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): 8. The "8" indicates a species with a moderate degree of threat and high recovery potential.

Review History: Previous 5-year reviews were completed in 1991, 2008, 2017, all of which recommended no change in status.

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature

The taxonomy of the listed entity is still valid (Integrated Taxonomic Information System 2022). The species is currently identified as *Bonamia grandiflora* (A. Gray) Hallier f. - Florida Bonamia, Florida lady's nightcap. We are unaware of any taxonomic issues with this species.

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 fish and wildlife. The definition limits listing DPS to vertebrate species of fish and wildlife and because this species is a plant, the DPS policy does not apply.

Recovery Criteria

Recovery Plans

Bonamia grandiflora is included in the following Recovery Plans:

- Recovery Plan for Nineteen Florida Scrub and High Pineland Plant Species, June 20, 1996,
- South Florida Multi-Species Recovery Plan (identifies recovery contributions for the South Florida Ecological Service's Field Office area of responsibility), May 18, 1999.

Recovery plans are not regulatory documents and are intended to provide guidance to the Service, states, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act (84 FR 45020).

Recovery Plan for Nineteen Florida Scrub and High Pineland Plant Species

The 1996 Recovery Plan is a revision and expansion of the 1990 plan to include additional species and update recovery criteria. The nineteen species have different life histories and require different population sizes to be secure and all species need to be represented at enough sites to assure against losses from disaster. The plan identified *B. grandiflora* as a

relatively widespread species with the main threat of habitat loss or degradation. Reclassification and/or delisting was considered feasible with additional habitat protection and demographic monitoring. The 1996 plan states that generally, a species can be considered recovered, and delisted when about 20 distinct, viable populations are protected at more than five separate, secure properties representing the range of the species (Service 1996). The three delisting (recovery) criteria are specific to *B. grandiflora* and a discussion of each are provided below:

1. *The species is secure in Ocala National Forest (Marion County). Low-intensity monitoring must continue after delisting.*

   The Service believes that this recovery criterion has been met. Based on observations from USFS the species is widespread in Ocala National Forest. "*Bonamia* is so widespread we don't really have any data on it because it is in every scrub stand essentially" (Jay Garcia, USFS pers. comm.). "This is a good habitat by proxy species. As long as we don't pave the scrub those seeds are just waiting in the mature stands for decades for the next disturbance to germinate" (Carrie Sekerak, USFS pers. comm.).

2. *Secure and monitor at least three (3) sites in Highlands County, at least three (3) in Polk County, and at least two (2) in other counties.*

   The current population distribution per county on secure sites include: Highlands (5), Polk (16), Lake (5), Orange (5), Manatee (3), and Marion (21). Refer to Table 1 below. The sites listed in Table 1 all occur on secure conservation lands with various degrees of monitoring. In addition to these known populations on protected lands, there are likely additional populations as discussed below, especially in Ocala National Forest. Of the sites in this criterion three in Highlands County, thirteen in Polk County, ten in Marion County, and one in Lake County have excellent or good condition classification viability rankings (Table 1). Because of these rankings and that all conservation lands have management plans with the vast majority having a prescribed fire component, the intent of this criterion has been achieved.

3. *Provide at least 5 years of demographic monitoring for each site, coupled with prescribed fire.*

   Monitoring and population status surveys for *B. grandiflora* is conducted on various properties based on need and availability of personnel. Prescribed fire is rotated between parcels to create a mosaic of suitable habitat for a suite of species endemic to scrub and sandhill habitats. For example, surveys are conducted on Lake Wales Ridge State Forest in Polk County by Florida Forest Service staff. There are over 1,500 *B. grandiflora* points documented on Lake Wales State Forest. The most recent efforts occurred in 2020 on four of their parcels (Arbuckle, Babson, Boy Scout, Walk-in-Water) to aid with habitat management decisions. Only a portion of the known points were surveyed during this effort (11.3%). The total percent occupancy for the 171 points surveyed among the different parcels was 72.51% (53.8%, 83.95%, 81.25%, 60.42% respectively), and is correlated with time since fire within the management

units of the various parcels. Arbuckle's relatively low occupancy is attributed to three of the six units having not been burned in more than 12 years and two units having not burned in over 20 years. Recently burned units (< 3 years) had the highest percentage of reproductive plants (Boy Scout 69.23%). Currently, there is insufficient monitoring data to determine if this criterion has been met; however, as noted above, most conservation lands described in this plan undergo periodic prescribed fire to maintain suitable habitat.

South Florida Multi-Species Recovery Plan

Although the South Florida Recovery Plan (1999) does not identify new recovery criteria for *B. grandiflora*, it does provide additional information about recovery objectives.

> "The South Florida Recovery objective can be achieved when: sites, within the historic range of *B. grandiflora*, are adequately protected from habitat loss, degradation, and fragmentation; when these sites are managed to maintain the seral stage of xeric oak scrub communities to support B. grandiflora; and when monitoring programs demonstrate that these sites support the appropriate numbers of self-sustaining populations, and those populations are stable throughout the historic range of the species. Currently, most protected *B. grandiflora* individuals are protected on the Ocala National Forest. To adequately conserve the species, protected sites are needed throughout its entire range, including South Florida" (Service 1999, p. 4-819).

Biology and Habitat Summary

Biology

Details of the life history and biology on *B. grandiflora* can be found in past 5-year reviews, recovery plans, and listing rules. We provide a summary of information below pertinent to the species' current status.

Bonamia grandiflora is a relatively long-lived perennial vine (three or more years) flowering from spring to summer (May through August). It has long prostrate stems a meter or more in length, leathery ovate leaves up to 4 centimeters (cm) in length, solitary flowers, and a long slender tap root. The funnel-shaped flowers are deep blue or bluish purple with a white center up to 10 cm long and 8 cm across. The flowers open in the mornings and wilt by early afternoon. The capsule fruit normally contains four pale brown or greenish-brown seeds (Service 1999).

The vine has a mixed mating system: it is highly self-compatible, can self-pollinate, and can produce seeds without fertilization. Pollinators are essential to ensure substantial seed production by self- and cross-fertilization. *Bonamia grandiflora* shows some inbreeding depression in selfed fruits and seeds (Romano 1999). Fire stimulates seed production and germination as well as regrowth from clonal stems. The first season after fire, clonal stem production is greatest and then declines. Seed production is greatest during the second season after a fire (Hartnett and Richardson 1989, Menges and Hawkes 1998). Seedlings germinate throughout summer until September. Fire management is a necessary component of

maintaining early successional conditions in scrub and sandhill habitats and occurs in the vast majority of the managed conservation lands in Florida.

Habitat and Distribution

This scrub and sandhill endemic of central Florida prefers open sandy areas with an open canopy in full sunlight occurring on white and yellow sands. In Ocala National Forest, *B. grandiflora* is abundant in scrub and sandhill communities (including stand condition classes of sand pine: regeneration, seedling and sapling, immature poletimber, mature poletimber), and along roadsides and rights-of-ways. "*Bonamia* is so widespread we don't really have any data on it because it is in every scrub stand essentially" (Jay Garcia, USFS pers. comm.). "This is a good habitat by proxy species. As long as we don't pave the scrub those seeds are just waiting in the mature stands for decades for the next disturbance to geminate" (Carrie Sekerak, USFS pers. comm.).

Bonamia grandiflora formerly occurred in central Florida peninsula counties from Volusia and Marion south to Highlands and Charlotte as shown in Figure 1. (Wunderlin et al. 1980). The Florida Natural Areas Inventory's (FNAI) Element of Occurrence Records (EO) database listed 95 populations from nine counties in 2022 (e.g., Hardee, Highlands, Hillsborough, Lake, Manatee, Marion, Orange, Osceola, and Polk). An EO is considered a distinct population that is separated from another EO by a distance of 1 kilometer or greater.

When assessing the species, there are currently 55 extant populations in six counties where they occur on managed, conservation lands (e.g., Highlands, Lake, Manatee, Marion, Orange, and Polk). Populations (i.e., EOs) in private ownership, historical EOs, extirpated EOs, or failed to find EOs are not included in the following table.

Each EO is ranked by experts when they visit a population. These quality rankings are an estimate of viability of the EO (e.g., A = Excellent, B = Good, C = Fair, D = Poor, E = Extant, F = Failed to Find, H = Historical, NR = Not Ranked, and X = Extirpated). Based on the FNAI data, 17 of these EO have been ranked as having an excellent estimated of viability and 24 EO with a good estimate of viability (Table 1). According to this same data, 24 EOs have been categorized as either historical (16), extirpated (4) or failed to find (4).

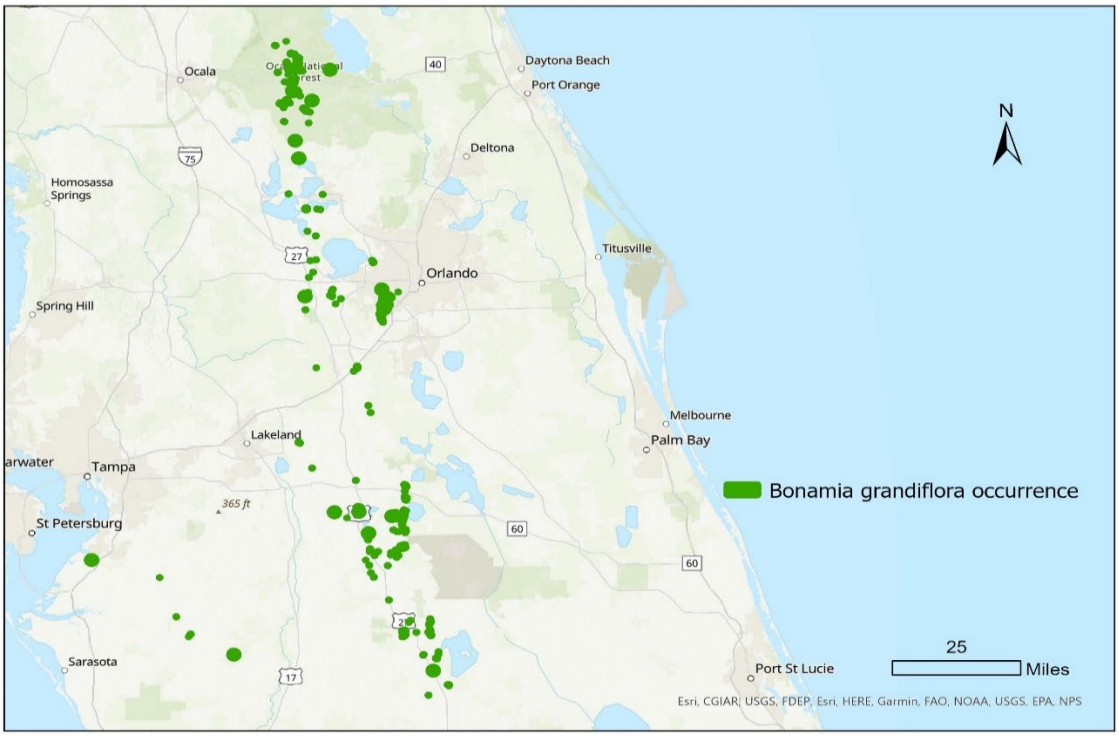

Figure 1. *Bonamia grandiflora* populations (Element Occurrence Records) distribution.

Approximately 21 of the EOs occur in Ocala National Forest; however, this is an extreme underestimate of the actual number of populations in the Forest, since not all known occurrences have been reported to the FNAI database. Table 1 is a list of the populations on secure lands that meet the above criteria including: the managing entity or owner, site name, county where they occur, EO number and most recent viability ranking.

Table 1. *Bonamia grandiflora* populations on managed conservation lands and their most recent viability ranking (A = Excellent, B = Good, C = Fair, D = Poor, E = Extant, F = Failed to Find, H = Historical, NR = Not Ranked, and X = Extirpated or a combination of rankings).

CONSERVATION LAND	SITE	COUNTY	EO	Ranking
Lake Wales Ridge National Wildlife Refuge	Flamingo Villas NWR	Highlands	54	D
Lake Wales Ridge – WEA (FWC)	Lake Apthorpe	Highlands	81	A
Lake Wales Ridge – WEA (FWC)	Carter Creek - Bass Ranch	Highlands	97	BC
Lake Wales Ridge – WEA (FWC)	Royce Ranch	Highlands	99	AB
Lake Wales Ridge – WEA (FWC)	Holmes Avenue	Highlands	111	AB
Lake County Water Authority	Crooked River, Palatlakaha River Park	Lake	38	AB
Florida Forest Service - Seminole State Forest	Warea Tract (Flat Lake)	Lake	51	BC
LWR Ecosystem – Warea Archipelago	Ferndale Ridge	Lake	66	BC

CONSERVATION LAND	SITE	COUNTY	EO	Ranking
FL Dept. of Environmental Protection	Lake Louisa State Park	Lake	82	BC
FL Dept. of Transportation	US 441 at Jct 19A	Lake	91	D
FL Dept. of Environmental Protection	Beker-Wingate Creek State Park	Manatee	95	CD
Manatee County	Duette Preserve	Manatee	143	E
Manatee County	Moody Branch WEA (FWC)	Manatee	144	E
U.S. Forest Service	Ocala National Forest	Marion	8	B
U.S. Forest Service	Ocala National Forest	Marion	17	BC
U.S. Forest Service	Ocala National Forest	Marion	98	C
U.S. Forest Service	Ocala National Forest	Marion	108	B
U.S. Forest Service	Ocala National Forest	Marion	113	C
U.S. Forest Service	Ocala National Forest	Marion	114	D
U.S. Forest Service	Ocala National Forest	Marion	115	B
U.S. Forest Service	Ocala National Forest	Marion	117	BC
U.S. Forest Service	Ocala National Forest	Marion	119	BC
U.S. Forest Service	Ocala National Forest	Marion	120	BC
U.S. Forest Service	Ocala National Forest	Marion	121	CD
U.S. Forest Service	Ocala National Forest	Marion	122	A
U.S. Forest Service	Ocala National Forest	Marion	129	B
U.S. Forest Service	Ocala National Forest	Marion	130	B
U.S. Forest Service	Ocala National Forest	Marion	131	B
U.S. Forest Service	Ocala National Forest	Marion	132	B
U.S. Forest Service	Ocala National Forest	Marion	134	A
U.S. Forest Service	Ocala National Forest	Marion	135	AB
U.S. Forest Service	Ocala National Forest	Marion	136	AC
U.S. Forest Service	Ocala National Forest	Marion	138	AB
U.S. Forest Service	Ocala National Forest	Marion	139	B
Orange County	Shadow Bay Park	Orange	27	?
City of Orlando	Bill Fredrick Park at Turkey Lake	Orange	50	C
Water Conservation II - Site 1 and Site 2	no managed name given	Orange	124	C
Orange County National Golf Center	Conservation Area Phase I	Orange	125	C
City of Orlando	Eagle Nest Park	Orange	128	C
Polk County	Hickory Lake Scrub Park	Polk	1	A
Lake Wales Ridge State Forest (FFS)	Sullivan Tract	Polk	9	A
Lake Wales Ridge – WEA (FWC)	Mountain Lake Cutoff	Polk	18	BC
Lake Wales Ridge State Forest (FFS)	Livingston Creek Scrub	Polk	19	AB
Lake Wales Ridge – WEA (FWC)	Sun Ray Scrub - Hickory Lake South	Polk	21	AB
Lake Wales Ridge State Forest (FFS)	Ready Creek Scrub	Polk	22	A
Lake Wales Ridge – WEA (FWC)	Lake Blue	Polk	24	B
Lake Wales Ridge State Forest (FFS)	Hesperides West - Flaming Arrow Scrub	Polk	26	A
Upper Lake Marion Creek (SFWMD)	Horse Creek Scrub	Polk	32	B
Upper Lakes Basin Watershed (SFWMD)	Snell Creek Scrub	Polk	39	BC

CONSERVATION LAND	SITE	COUNTY	EO	Ranking
Lake Wales Ridge State Forest (FFS)	Hesperides	Polk	61	A
Lake Wales Ridge National Wildlife Refuge	Lake McLeod NWR	Polk	63	B
Lake Wales Ridge State Forest (FFS)	Walk-in-the-Water	Polk	103	B
FL Dept. of Environmental Protection	Jahna Ranch Conservation easement	Polk	106	B
Lake Wales Ridge State Forest (FFS)	Arbuckle Tract	Polk	110	B
The Nature Conservancy	Saddle Blanket Scrub Preserve	Polk	145	AC

WEA = Wildlife Management Area
FFS = Florida Forest Service
FWC = Florida Fish and Wildlife Conservation Commission
NWR = National Wildlife Refuge
SFWMD = South Florida Water Management District

Prior to species listing, state and federal programs began to acquire and protect natural landscapes and their endemic species inhabitants along the central ridges of peninsular Florida. Primarily through the State of Florida's Preservation 2000 and its successor Florida Forever acquisition programs, The Lake Wales Ridge Ecosystem targeted critical natural lands in Lake, Osceola, Polk, and Highlands counties. Since 1985, over 45,000 acres of undeveloped lands on the Lake Wales Ridge have been acquired, secured, and managed to complement existing conservation lands within this region. Many of these acquisitions contain scrub and sandhill (high pinelands) communities that support a large guild of listed endemics including *B. grandiflora*.

Including Marion County where it is extremely abundant (>21 populations) within Ocala National Forest (ONF), the species occurs on many secure, managed conservation lands in the following counties (number of populations): Highlands (5), Polk (16), Lake (5), Orange (5), and Manatee (3). Populations are present and flourishing on publicly managed lands including federally-owned National Forest and National Wildlife Refuges (NWR) (e.g. ONF, Flamingo Villas NWR, and Lake McLeod NWR), along with numerous state, county, and city properties (parks, forests, conservation areas, preserves, transportation rights-of-way, and water authorities).

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.

Factor A. Habitat destruction, modification, and degradation still threatens populations on private lands. Fire suppression and habitat conversion to urban uses continues to negatively

affect the species in non-protected habitat. The overwhelming majority of populations on public lands are being managed to benefit this species and other early successional scrub and sandhill community species. Considering the number of populations occupying protected and managed habitat, this factor is no longer a threat to the long-term persistence of the species.

Factor E. The Service is not aware of any climate change information specific to the habits or habitat of *B. grandiflora* that would indicate what potential effects climate change and increasing temperatures and rainfall, or extended drought conditions may have on this species.

The National Climate Assessment (Melillo et al. 2014) reports that the average precipitation has decreased in central Florida since 1900; however, heavy downpours are increasing in frequency and intensity since 1970. Future projected precipitation changes in seasonality for central Florida indicate 0 to +10% in winter, 0 to -10% in spring, -10 to -20% in summer, and +10 to +20% in fall will occur. Statewide annual rainfall is projected to increase from 0 to +20% by 2100. Sea level rise resulting from a warming climate and hotter water temperatures will not affect this species since it occurs on ancient, relict beach dunes in noncoastal areas.

Consecutive dry days are expected to increase 10 to 20% for most of Florida. Predictions of increased drought frequency, intensity, and duration could result in plant losses due to prolonged drought conditions. However, this plant and other scrub species are relatively drought-resistant, but seasonality changes may affect seedling recruitment and general phenology of the species. Although Florida's coastal areas will likely be influenced by sea level rise, based on our understanding of current sea level rise models and the species occurrences inland on well drained soils (e.g., ancient ridges mainly in central Florida), we believe that sea level rise does not currently pose a threat to this species. The Service has no evidence that climate changes observed to date have had any adverse impact on the species, or its habitat nor is there information suggesting that the species, will not be able adapt to predicted changes in drought conditions.

There is no indication that Factors B, C and D pose significant threats for the species. Factors A and E threats remain ongoing, but the severity has been greatly reduced with the acquisition, protection and management for 55 populations on secure, managed properties throughout the species range.

Species Status Summary (3Rs)

The Species Status Assessment (SSA; https://www.fws.gov/project/species-status-assessment) Framework is an analytical approach developed by the Service to deliver foundational science for informing all decisions under the Act. Part of the SSA framework is to assess the listed entity's ability to sustain populations over time. To sustain populations over time, a species must have the capacity to withstand:

(1) environmental and demographic stochasticity and disturbances (Resiliency),
(2) catastrophes (Redundancy), and
(3) novel changes in its biological and physical environment (Representation).

Although this species does not have a formal SSA, we have briefly and initially assessed Resiliency, Redundancy, and Representation below to support the recommendation of this review.

Resiliency is the ability of a species to withstand environmental stochasticity (normal, year-to-year variations in environmental conditions such as temperature, rainfall), periodic disturbances within the normal range of variation (fire, floods, storms), and demographic stochasticity (normal variation in demographic rates such as mortality and fecundity).

Bonamia grandiflora is a long-lived perennial and can self-pollinate and produce seeds without fertilization, which affords the species some natural ability to withstand year-to-year variation in conditions. The distribution of the species includes 55 populations over 6 counties on lands that are managed for appropriate habitat. Many of these populations are within contiguous tracts of land that provide for connectedness between populations. In one study habitat disturbance (e.g., fire and mechanical) resulted in greater plant density, stem densities, seedling recruitment, flowering, and seed production than in habitat that had not been disturbed recently and that was considered successionally mature (Hartnett and Richardson 1989). Because of the disturbance-dependence of this species, some level of environmental stochasticity may not be detrimental and may actually be beneficial to the species. We believe these characteristics provide the species with sufficient and inherent resiliency.

Redundancy is the ability of a species to withstand catastrophes. Catastrophes are stochastic events that are expected to lead to population collapse regardless of population health and for which adaptation is unlikely.

As described in the information above, the species is known to occur in 55 managed, secured populations across six counties in the state. In addition to known, managed populations, there are an additional 16 populations on unsecured or unmanaged lands. In addition to the known populations, the species' condition in Ocala National Forest was described by USFS personnel as "widespread … it is in every scrub stand essentially" (Jay Garcia, USFS pers. comm.). This indicates to the Service that the species is likely much more widespread than we know and may be similarly more widespread on other protected and private lands. Because of the widespread nature of the species and its general biological characteristic, a single catastrophic event is unlikely to impact all individuals in all populations. and should have sufficient redundancy to be viable in the foreseeable future.

Representation is the genetic diversity found in the species allowing it to adapt to both near-term and long-term changes in its physical (climate conditions, habitat conditions, habitat structure, etc.) and biological (pathogens, competitors, predators, etc.) environments.

Bonamia grandiflora is a scrub and sandhill endemic of central Florida. Because the species occurs in a limited range of habitats in central Florida, it may limit the species ability to adapt to changing conditions and therefore limit its representation. The species'

ability to seed without fertilization and self-pollinate may also limit genetic diversity. However, the self-pollination and setting seeds without fertilization allows the species to persist during times or in areas where additional plants will be unavailable for cross-pollination. *Bonamia grandiflora* has low genetic variability compared to other plants endemic to scrub in Florida, which is likely the result of a small initial gene pool and/or strong selection in the harsh scrub environment (Romano 1999). Habitat fragmentation and population isolation in some cases may contribute to limitations in genetic diversity (Romano 1999). The mode of dispersal is undocumented for this species, but seeds may be dispersed by animals (e.g., herbivores or insects), wind, or water dispersal as seen in other members of the morning glory family (Convolvulaceae; Austin 1997). In one study seed density in the soil of disturbed site (i.e., site was previously disked or plowed) was closely linked to the proximity of adult plants and in other sites (e.g., undisturbed or burned sites) seed density was not related to proximity to adult plants (Hartnett and Richardson 1989). Some of these characteristics may limit the species' representation but also allow it to persist when there are few nearby plants for cross-pollination. However, we do not feel that these characteristics will impact the species' viability in the foreseeable future.

Synthesis

Bonamia grandiflora is a vine in the morning-glory family with large showy blue flowers occurring on xeric sandy soils in scrub and sandhill habitats endemic to central Florida ridges. It occurs in six counties within the central portion of its historic range with 55 populations on protected, managed conservation lands including ownership on federal, state, county, and city properties. These metrics exceed the target numbers, distribution, and management of the species' populations described in the recovery plan. Seventeen of these populations have been ranked as having an excellent estimated of viability and another 24 populations were documented with a good estimate of viability. Although past reviews have discussed the threat of habitat loss and the need for fire management (Factor A), there are 55 populations occurring in six counties that are protected from land use changes (e.g., development) and are being managed to maintain suitable habitat for this species. The distribution of these protected populations also minimizes the risk of any single catastrophic event impacting all populations. Currently there is no available information to indicate that climate change (i.e., sea level rise, precipitation changes or extreme weather events) threatens the persistence of the species. Although some residual threats will continue in the future, specifically on nonprotected or unmanaged properties, these threats no longer pose a significant threat to the species. As a result of this review, *B. grandiflora* no longer meets the definition of a threatened or endangered species under the Act and should be considered for delisting. A detailed species status assessment is recommended to assess future scenarios to inform future rulemaking.

RECOMMENDED FUTURE ACTIVITIES

- Collaboration with conservation land managers to increase habitat suitability of occupied habitat by promoting beneficial management options to increase population persistence wherever additional opportunities present themselves.

- Encourage landowners whose populations are under a habitat management plan to monitor occupied habitat for increased data of long-term trends.

RESULTS / SIGNATURES

U.S. Fish and Wildlife Service
Status Review of Florida Bonamia (*Bonamia grandiflora*)

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
_x_ Delist:
____ *The species is extinct*
_x_ *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*
___ No change needed

FIELD OFFICE APPROVAL:

Field Supervisor, Florida Ecological Services Field Office, Fish and Wildlife Service

Approve LOURDES MENA Digitally signed by LOURDES MENA Date: 2023.02.24 11:11:37 -05'00' Adobe Acrobat version: 2022.003.20310

LEAD REGIONAL OFFICE APPROVAL:

Assistant Regional Director – Ecological Services, Fish and Wildlife Service

Approve CATHERINE PHILLIPS CZARNECKI Digitally signed by CATHERINE PHILLIPS CZARNECKI Date: 2023.03.02 10:04:48 -05'00'

REFERENCES

Austin, D. F. 1997. Convolvulaceace (Morning Glory Family). http://ag.arizona.edu.herbarium/personnel/daustin/convolv.html. Accessed January 26, 2023

Florida Natural Areas Inventory [FNAI]. 2022. Element occurrence GIS database, September 2022.

Hartnett, D.C. and D.R. Richardson. 1989. Population Biology of *Bonamia grandiflora* (Convolvulaceae): Effects of Fire on Plant and Seed Bank Dynamics. American Journal of Botany 76:361-369.

Integrated Taxonomic Information System. 2022. http:/www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN& search_value=30826#null. Accessed September 2022.

Medillo, J.M., T.C. Richmond, and G.W. Yole, Eds. 2014. Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program. 841 pp. doi:10.7930/J0Z31WJ2.

Menges, E.S. and C.V. Hawkes. 1998 Interactive Effects of Fire and Microhabitat on Plants of Florida Scrub. Ecological Applications 8(4): 935-946.

Romano, G.B. 1999. Reproductive Biology and Population Molecular Genetics of the Scrub Morning Glory *Bonamia grandiflora*. PhD. dissertation, University of Florida, Gainesville.

U.S. Fish and Wildlife Service [Service]. 1996. Recovery Plan for Nineteen Florida Scrub and High Pineland Plant Species. Atlanta, Georgia. 134 pp.

U.S. Fish and Wildlife Service [Service]. 1999. South Florida Multi-Species Recovery Plan. Atlanta, Georgia.

U.S. Fish and Wildlife Service [Service]. 2008. Florida Bonamia (*Bonamia grandiflora*) 5-Year Review: Summary and Evaluation. Jacksonville, Florida 20 pp.

U.S. Fish and Wildlife Service [Service]. 2017. Florida Bonamia (*Bonamia grandiflora*) 5-Year Review: Summary and Evaluation. Jacksonville, Florida 20 pp.

Wunderlin, R.P., D. Richardson, and B. Hansen. 1980. Status Report on *Bonamia grandiflora*. Unpublished report prepared under contract to U.S. Fish and Wildlife Service, Jacksonville, Florida. 22 pp.