Hairy Rattleweed
(*Baptisia arachnifera*)

5-Year Status Review:
Summary and Evaluation

Photo Credit: Alan Cressler

U.S. Fish and Wildlife Service
Southeast Region
Georgia Ecological Services Field Office
Athens, Georgia

July 2025

5-YEAR STATUS REVIEW
Hairy Rattleweed (*Baptisia arachnifera*)

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Georgia Ecological Services Field Office, J. Mincy Moffett, Jr., 706-535-2112.

Review Author(s): J. Mincy Moffett, Jr., 706-535-2112.

Reviewers:

Lead Regional Office: Southeast Region, Carrie Straight.

Cooperating Field Office(s): South Carolina Ecological Services Field Office, Melissa Chaplin, 843-906-7991.

Date of original listing: May 27, 1978 (43 FR 17909; April 26, 1978)

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 best available information about hairy rattleweed's (*Baptisia arachnifera*'s) biology, habitat, and threats to inform this status review.

The Service announced initiation of this review in the Federal Register on May 11, 2023 (88 FR 30324-30328) with a 60-day comment period and received no comments. The primary sources of information used in this analysis were the 2014 and 2019 5-year reviews and 1984 recovery plan, agency reports, unpublished survey data and reports, and personal communication with recognized experts. This review was completed by the U.S. Fish and Wildlife Service, Georgia Ecological Services Field Office, Athens, Georgia. All literature and documents used for this review are on file at the Field Office. All recommendations resulting from this review are the result of thoroughly reviewing the best available information on the hairy rattleweed. All recommendations resulting from this review are the result of thoroughly reviewing the best available information on the hairy rattleweed.

FR Notice citation announcing the species is under active review:
May 11, 2023 (88 FR 30324-30328).

Species' Recovery Priority Number at start of 5-year review (48 FR 43098):
Hairy ratttleweed was assigned a recovery priority of 5, based on a high degree of threat, and a low potential of achieving recovery.

Review History: Previous 5-year reviews recommending no change in status were published on: December 8, 1983 (Service 1983); July 22, 1985 (Service 1985); November 6, 1991 (Service 1991); December 01, 2011 (Service 2011); and August 30, 2019 (Service 2019).

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature
We are not aware of any changes to the taxonomy of this entity, and it is still considered valid by the Service.

Distinct Population Segment (DPS) (61 FR 4722)
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 a not a vertebrate, the DPS policy does not apply.

Recovery Criteria

Recovery Plan or Outline

Recovery Plan for Hairy Rattleweed, March 19, 1984 (Service 1984).

Recovery plans are not regulatory documents and 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).

Delisting Criteria:

1. There are at least eight self-sustaining populations secured and maintained within its historic or current range.

2. The number of individuals in the various populations has reached an optimum level of cover percentage and frequency occurrence, as established by management studies.

3. Its biology is sufficiently understood to allow perpetuation of the species should circumstances require immediate or drastic alteration of populations and/or sites.

4. Continuing protection and management after delisting are assured.

We have delineated population boundaries by using a default 2 km separation distance of occurrences (Elemental Occurrences (EOs); NatureServe 2020) yielding five (5) distinct population units (see Figure 1). In the absence of formal genetic and population ecology studies, it is difficult to know the degree and extent of connectivity and gene flow between occurrences (EOs) and identify exact population boundaries. At this time, the Service does not believe that these recovery criteria have been met.

Biology and Habitat Summary

No new information pertaining to the species taxonomy, life history, or ecology is available since the publication of the last 5-year review in 2019 (Service 2019). Hairy rattleweed is a long-lived perennial legume, bush-like in habit, reaching 32 inches in height (40 – 80 cm), with yellow, pea-flowered inflorescences. It reproduces both asexually and sexually, likely requiring cross-pollination by insects. Seed dispersal is predominately by tumble-weed action of broken stems (and even entire senesced plants) blowing across the landscape (Chafin 2020).

It is found in sandy soils of open-to-moderately-shady pine flatwoods. Much of its habitat is within commercial or managed timberlands and along road and powerline rights-of-way. Conversion of land for silviculture and other development has destroyed or degraded habitat. Silvicultural focus on short-rotation forestry with frequent site-prep, tree planting disturbance, dense shade resulting from overstocking, and non-selective herbicide use have been particularly harmful (NatureServe 2024).

This species is shade intolerant and will be outcompeted under a dense tree canopy, exhibiting a steady decline in vegetative robustness, flowering, and fruiting until perishing completely. It is also quickly outcompeted by shrub growth, primarily from gallberry (*Ilex glabra*), saw palmetto (*Serenoa repens*), fetterbush (*Lyonia lucida*), and blueberries (*Vaccinium spp*.). Fire suppression, in general, and specifically in commercial/managed timberlands, has been deleterious. Fire is needed to reduce woody competition, expose bare mineral soil for germination, and possibly promote germination. Habitat management on the few protected conservation lands has shown to be beneficial (NatureServe 2024).

Distribution and Abundance

Hairy rattleweed is a Georgia endemic with a very narrow range; known from the border areas of Brantley and Wayne counties covering about 30,000 hectares (115 square mile area). It is found intermittently within this area as its habitat is restricted by wetlands and areas of poor drainage. Suitable habitat is closer to 19,000 hectares (73 square miles; NatureServe 2024). There are 35 known extant and historical EOs of this species as currently mapped by the Georgia Natural Heritage Program (GNHIP 2024), which we have grouped into the five (5) general populations (Figure 1). As of 2025, our current understanding of the populations are:

- 19 extant occurrences. Known as still occurring based on surveys during the summers of 2023 and 2024.
- 12 extirpated or historical occurrences. EOs have not been observed in over 20 years.
- 4 unknown occurrences. EOs that have been observed within the last 20 years, but not seen or surveyed since 2019. (GNHIP 2024; Horan 2025a and b; Leonard 2025a and c).

The global population size was estimated at 6,500 individuals in 2021 (NatureServe 2024), although the total number of individuals observed at all occurrences since 1994 is fewer than 2,000 plants combined. See Figures 1 and 2. (GNHIP 2024; Horan 2025a and b; Leonard 2025a and c). Only 26 percent of the current occurrences (19) are considered large (300 or more stems) or moderate (100-299 stems) (large N=2 and moderate N =3; Table 1; Figures 1 and 2).

Note: For site/EO cross-walking, see Table 1 and Figures 4, 5, and 6 in Appendix A. Table 1 contains detailed EO numbers, site names, and abundance data. Figures 4, 5, and 6 provide fine-scale maps of EOs.

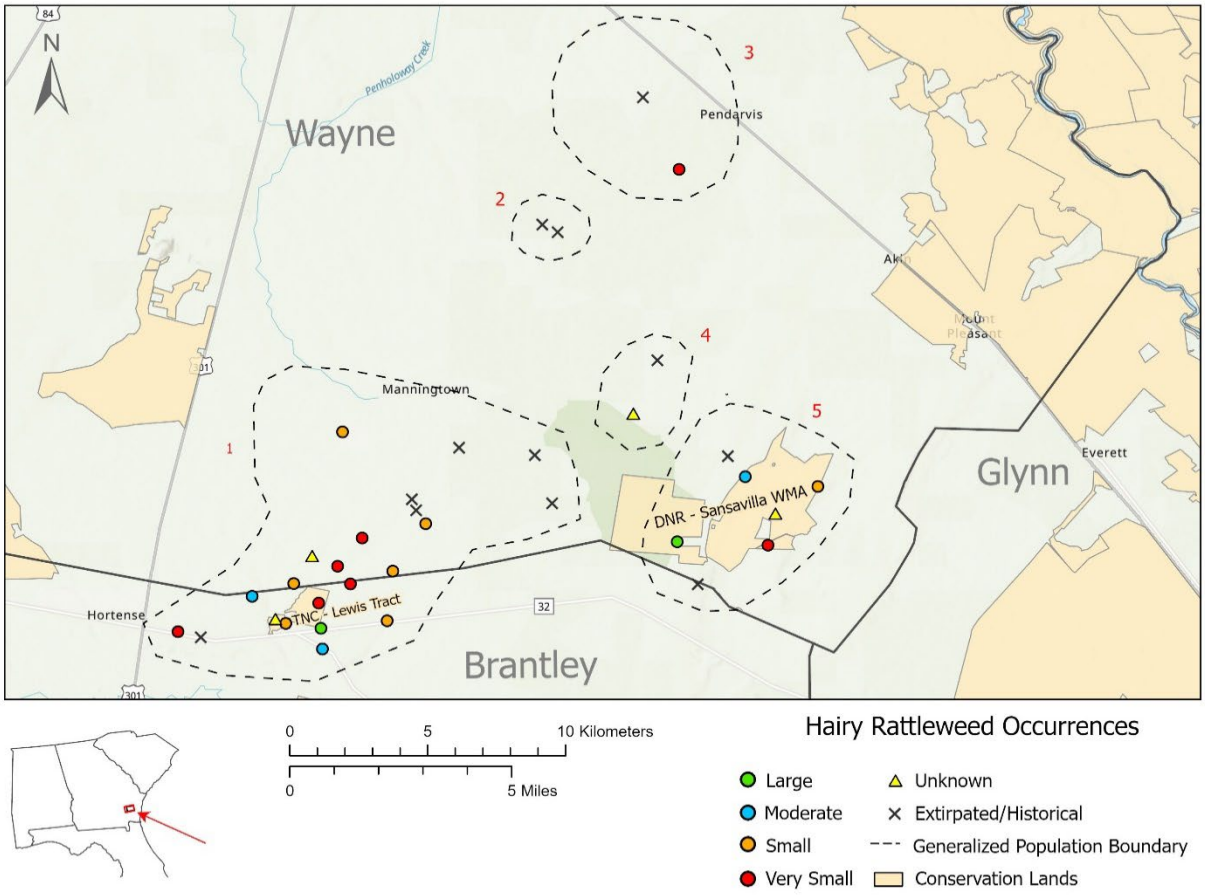

Figure 1. Range map of hairy rattleweed (*Baptisia arachnifera*) in Brantley and Wayne counties, southeast Georgia. Map shows centroid locations of 35 known and historical occurrences and their proximity to protected conservation lands. Occurrences are categorized by their date of last observation and their abundance. Occurrences observed since the last 5-Year Review in 2019 are considered current and are coded by abundance of observed plants/stems as follows: Large = 300+ stems; Moderate = 100-299 stems; Small = 10-99 stems; and Very Small = 1-9 stems. Occurrences last observed 20 or more years ago (pre-2004) are considered historical/extirpated. Occurrences last observed between the current and historical/extirpated cut-off dates (2004-2018) are considered of unknown status. The dotted lines delineate five (5) hypothetical populations using a 2 km separation distance per NatureServe's Habitat-based Plant Element Occurrence Delimitation Guidance (NatureServe 2020).

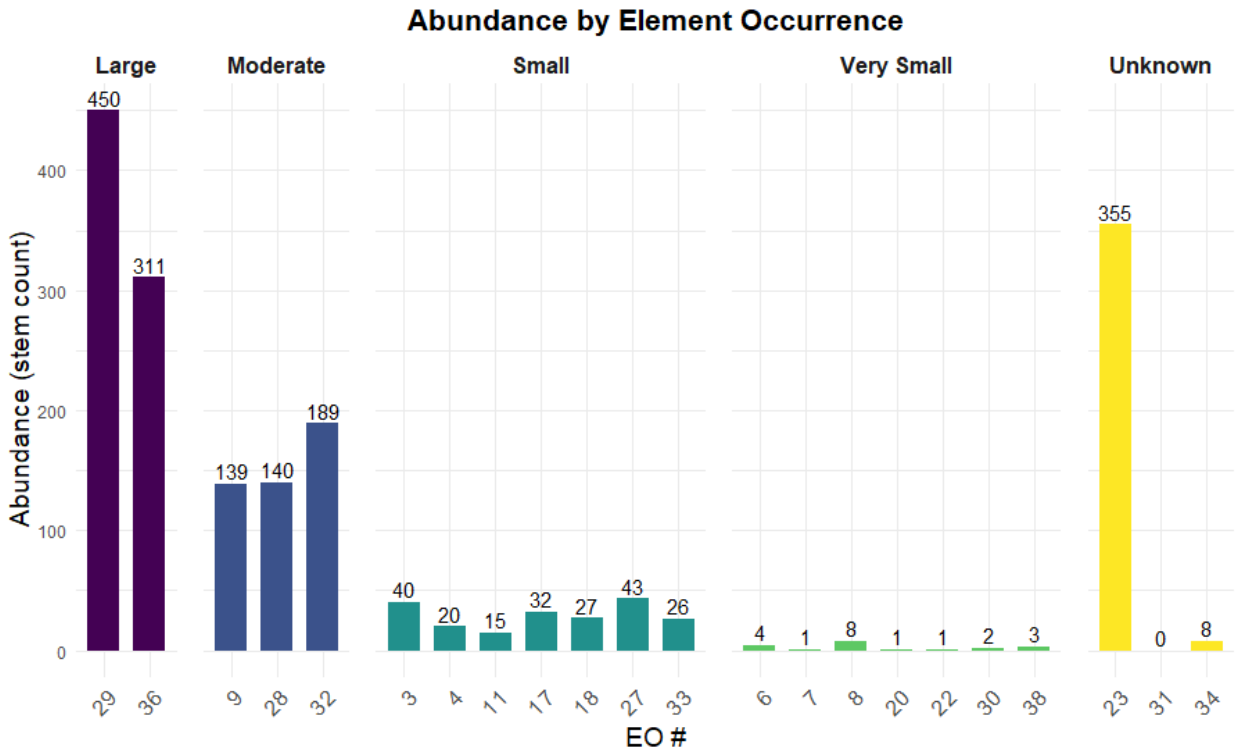

Figure 2. Bar graph showing the level of abundance (numbers of visible stems) for each current occurrence, as well as for the occurrences of unknown status (if data are available), on the last observation. Unknown occurrences provide last known abundance levels which predate the last 5-Year Review (Service 2019). Occurrences are organized by abundance categories (*i.e.*, Large, Moderate, Small, and Very Small) corresponding to those in Figure 1. Occurrence designations (EO numbers) are found on the x-axis. Exact abundance totals as of last observation are displayed on top of bars.

Conservation Profile and Activities

Currently, 8 of the 35 known occurrences (about 23 percent) are fully or partially protected on conservation lands: Lewis Tract - The Nature Conservancy (TNC); and the Sansavilla Wildlife Management Area (WMA) - Georgia Department of Natural Resources (GDNR) (Figure 3). This percentage increased from the last 5-year review (from 10 to 23 percent) reflecting a new acquisition (Baptisia Tract) to the existing Sansavilla WMA.

Six (6) additional occurrences are located along powerline and/or state road rights-of-way (ROW) that may provide opportunities for conservation management and restoration (Figure 3). Five (5) of the six (6) are found in the southwestern portion of the range near the unincorporated communities of Hortense and Needmore. They are associated with various combinations of the Georgia Department of Transportation's (GDOT) State Routes 32 and 110; Georgia Power Company's (GPC) Offerman-Thalman transmission lines; and Georgia Transmission Corporation's (GTC) Offerman-County Farm Road transmission line. Another occurrence is located at the northern extent of the species' range along GPC's Hatch and Jesup transmission

lines, possibly extending onto US-341/US-25 near the unincorporated Pendarvis community. See Figures 4, 5, and 6.

However, most of the occurrences are located on private lands without protection or management. Over 80 percent of the private property is pine plantation, with most of it commercially owned by Rayonier, Inc., and to a lesser extent by the Weyerhaeuser Company, W.C. Hopkins and Sons, LLLP, and the Westervelt Company (qPublic 2024a and b).

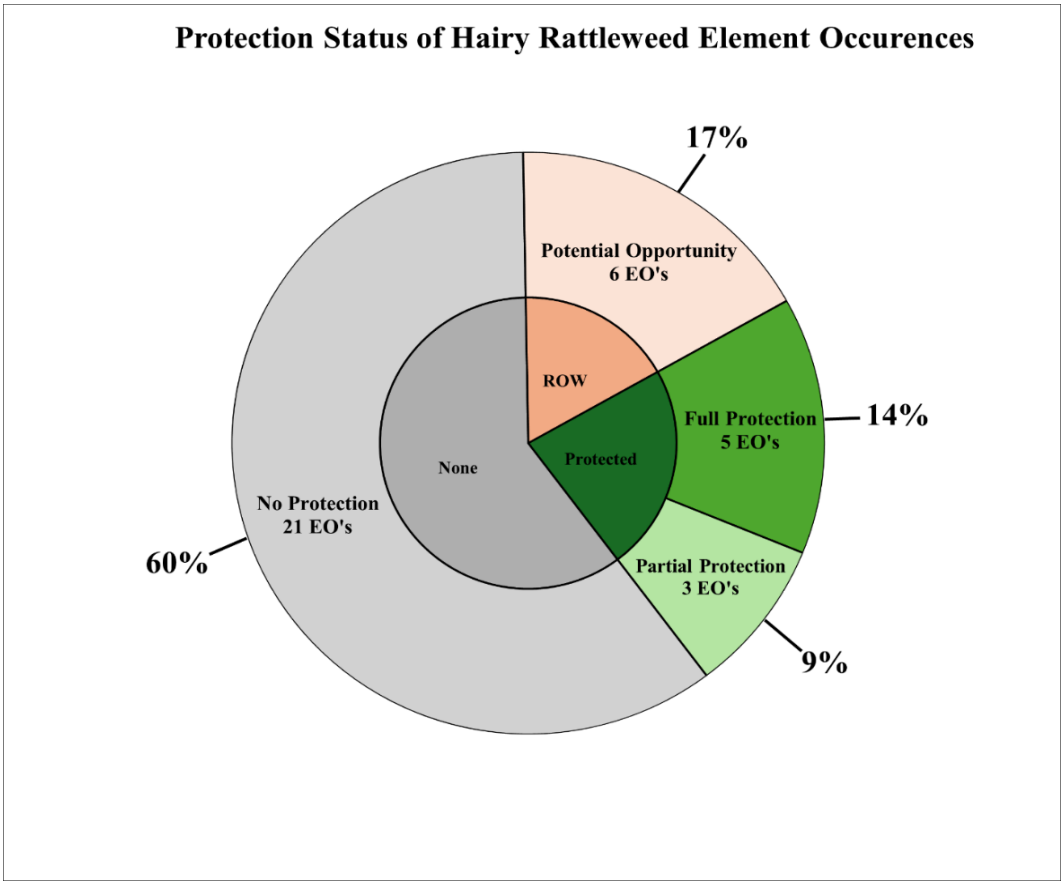

Figure 3. Pie-Donut chart indicating the number and extent (full vs. partial) of known and historical occurrences (*i.e.*, EOs) protected on conservation lands (state-owned and land trusts). Also shown are occurrences on GDOT, GPC, and GTC rights-of-way (ROW) with conservation management opportunities.

Seed Collection/Seed Testing/Germination Trials/Propagation
Seeds were collected from select occurrences (EO numbers: 1, 3, 11, 22, 27, 28, 31, 32, 34, and 36) in 2021, 2022, 2023, and 2024 by GDNR and members of the GPCA. More than 4,000 seeds were collected during all efforts combined. Collection events in 2021, 2022, and 2024 were part of a Recovery Challenge Grant to GDNR. Additional collection efforts in 2023 represented an independent effort by GDNR to obtain propagules for the Altama WMA Native Groundcover Nursery (GDNR 2022, 2023, and 2024; Leonard 2025d).

These seeds were collected from over 200 maternal lines. Seeds were germinated at SBG and Atlanta Botanical Garden (ABG) for germination trials. Successful plants were delivered to partners for *ex situ* safeguarding collections (ABG 2021; GDNR 2022; Biggers 2025; Leonard 2025b). One *ex situ* collection at SBG, being maintained in above-ground pots, succumbed to a two-week period of abnormally cold temperatures in December 2022, with a single low temperature of -10.6˚C (13˚F) (GDNR 2023). About 200 seeds were sent to the USDA-National Seed Laboratory in Dry Branch, Georgia, for viability testing using x-ray analysis and tetrazolium testing. A portion of seeds were sent to ABG for cold storage seedbanking (Alley *et al*. 2024/25).

Results from seed germination and viability testing indicated that as many as 1/2 to 2/3rds of the seeds from a given plant may be inviable. Specifically, x-ray analysis showed shriveled or undeveloped embryos in 51 percent of "fat" seeds and 63 percent of "skinny" seeds. Tetrazolium testing indicated dead embryos (non-respiring) in 38 percent of the seeds (Alley *et al*. 2024/25; Alley 2025). The possibility of a high percentage of inviable seed being produced across the range has serious implications for both *ex situ* and *in situ* conservation and recovery.

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. A summary of this assessment is detailed below.

A. Present or threatened destruction, modification or curtailment of its habitat or range:

Threats to habitat continue to negatively impact the species and its habitat including incompatible silvicultural practices, development, fire suppression, and non-selective herbicide application within powerline and road rights-of-way (ROWs) (Service 2011, 2019). Silvicultural practices focusing on short rotation forestry with high impact site-prep, overstocking, and non-selective herbicide use that are unsuitable for hairy rattleweed, dominate a large extent of the native range. Examples of such practices include tilling and bedding, where each occurrence on timberlands has appeared to reduce the re-emergence of hairy rattleweed (*i.e*., abundance and vigor) year to year (Ceska 2025b and c). This may be contributed to by the observed change in fungal biodiversity in tilled conditions which changed soil properties (Orrù *et al*. 2021).

Recent years have seen a surge of large-scale photovoltaic power station (*i.e*., solar energy installation) developments across Georgia. Georgia ranks third behind Florida and North Carolina in the southern states for solar power (Young 2023). An increase of private investment interest in solar energy has resulted in the scale of projects reaching nearly ten thousand acres. Many of these solar developments are in relatively rural, undeveloped areas where the existing natural landscape must be altered or destroyed to accommodate development. When combined with the relatively low cost per acre of sandhill habitat (on which hairy rattleweed and other rare endemic species depend), a serious threat has emerged (Elliott 2025). Several recently approved Habitat Conservation Plans involve sandhill habitat (Stantec 2022; Stantec 2024; Tetra Tech 2024). With over 80% of known occurrences of hairy rattleweed being on private lands,

conversion to non-compatible habitat types and lack of habitat management (for most populations) continues to threaten the species.

B. Overutilization for commercial, recreational, scientific, or educational purposes:
Not currently known to threaten hairy rattleweed.

C. Disease or predation
As presented in the 2019 5-year review, the genista broom moth (*Uresiphita reversalis*) and Say's weevil (*Trichapion rostrum*) negatively impact hairy rattleweed. Both species of insect use hairy rattleweed as a host plant. The genista moth caterpillars are herbivores, feeding on leaf and stem tissue as they develop. Their silken, web-like, strands and masses can also damage stems. The Say's weevil oviposits its eggs directly into seed pods or onto developing flowers with the resulting larvae becoming seed predators. Both species can severely damage or reduce the reproductive output of individual plants.

Although not seen in wild populations, damping-off has been observed with this species under greenhouse conditions, which can impact *ex situ* conservation efforts. Damping-off is a weakening and eventual death of a germinant or seedling caused by soilborne fungi like Pythium, Rhizoctonia, and Fusarium that thrive in cool, wet conditions often associated with cultivation. This is currently an issue for the young plants that GDNR is actively trying to grow and a frequent problem in greenhouse-grown plants (Russ 2015).

D. Inadequacy of existing regulatory mechanisms:
Since over 80 percent of the species' known occurrences exist, at least partially, on private land, recovering this species continues to be a challenge because plants receive little protection on private land under federal laws, including the Endangered Species Act. The species is protected by the State of Georgia under the Georgia Wildflower Preservation Act on State land (Georgia Wildflower Preservation Act of 1973, Georgia Code §12-6-170). This law protects State-listed plant species by regulating their removal from State-owned lands. It further requires that any removal of State-protected plants from private land be with the written permission of the landowner, and it also regulates any traffic in these plants by requiring both transport tags and permits to sell or collect in Georgia. Existing regulations have been inadequate at preventing threats to the species.

E. Other natural or manmade factors affecting its continued existence:
Results from seed germination trials and seed viability testing by ABG, SBG, and the U.S. Department of Agriculture (USDA)-National Seed Lab indicate that a high percentage of seed produced are inviable – perhaps greater than 50 percent. The reasons for this are unknown. The 2019 5-year review identified Megachilid bees in the genus Megachile as the principal pollinators of hairy rattleweed, with contributions by *Polistes* wasps and Halicted bees. It has been hypothesized that perhaps genetics, lack of suitable pollinators, or even stigma-clogging dust from either agricultural/silvicultural operations or from vehicular traffic on dirt roads might be interfering with successful pollination and fertilization (Ceska 2025a).

Genetics studies using allozymes (Ceska *et al*. 1997) indicated relatively low genetic diversity across all occurrences/populations of hairy rattleweed as would be expected

with a narrow endemic. Additionally, what diversity was present occurs mainly within, as opposed to among, occurrences and populations. Study results indicated Hardy-Weinberg equilibrium, which suggested outcrossing and showed evidence of gene flow (at least historically). This study, coupled with details of the gradual fragmentation of the habitat between the 1940s and 1980's by Wilbur Duncan (Service 2011), who discovered and described the species, suggests that while the original range of the species was likely always small, it was likely largely continuous and had a more continuous gene pool. Habitat fragmentation may play a role in low seed viability.

The southeast and Georgia is expected to become warmer with more frequent extreme weather events (*e.g.*, storms, flooding, droughts). Average temperatures in Georgia are expected to rise between 1.7 – 3.9˚C (3-7˚F) with frequent severe droughts by the year 2100 (Climate Change Resources 2020; USGS 2021; Frankson *et al.* 2022; GTech 2025). Droughts with loss of soil moisture, due to rising temperatures, poses a substantial risk to hairy rattleweed populations directly through physiological desiccation and drought-related death, reduced fitness of plants, and/or a reduction in flowering or fruiting (Ahluwalia *et al.* 2021). The species could also be harmed indirectly by impacts to pollinators (Gérard et al. 2020), or changes to habitat including intensification of fire regimes (Grau-Andrés et al. 2024).

Synthesis

Hairy rattleweed is a long-lived perennial legume that reproduces both asexually and sexually. It is a narrow endemic, found in sandy soils of open-to-moderately-shady pine flatwoods in just two counties in southeastern Georgia. There are currently 35 known hairy rattleweed occurrences, 19 of which are known extant. Eight (8) occurrences are located, either fully or partially, on protected conservation lands. However, a majority of occurrences are on private land. Much of its habitat is within commercial or managed timberlands and along road and powerline rights-of-way. Conversion of land for silviculture and other development has destroyed or degraded habitat. Silvicultural focus on short-rotation forestry with frequent site-prep, tree planting disturbance, dense shade resulting from overstocking, and non-selective herbicide use have been particularly harmful. The species is shade intolerant and suffers under dense tree canopies, particularly those found in pine plantations. Fire suppression activities and regimes have proven especially damaging, regardless of land use. New threats from solar energy development and drought are likely to increase in the future. While some conservation activities are proceeding and some progress has been made with commercial timber companies regarding access and management, overall, the condition of the species has been in a slow, steady decline due to habitat conversion, fragmentation, and degradation since the 1940s. Based on the best available information, hairy rattleweed continues to meet the definition of an endangered species.

RECOMMENDED FUTURE ACTIVITIES

A detailed discussion of recovery actions and criteria are presented in the Recovery Plan (Service 1984). During this status review, new and/or targeted potential recovery activities were identified and are included below.

Recovery Activities

- Prioritize occurrences for protection and/or land acquisition to facilitate permanent protection for the recovery of hairy rattleweed populations.
- Partner with private landowners to secure hairy rattleweed populations along rights-of way.
- Work with timber companies on alternative management strategies that will promote hairy rattleweed populations, such as creating buffers along roadsides where populations occur.
- Communicate with public about hairy rattleweed
    - Work with local landowners to promote conservation easements.
    - Work with public and private schools in Wayne and Brantley counties to educate the youth about the endangerment of hairy rattleweed and to foster future recovery.
    - Interact with the local communities to communicate the presence of hairy rattleweed.
    - Increase local knowledge of hairy rattleweed through outreach. A tri-fold pamphlet created by the State Botanical Garden of Georgia is an example of an outreach resource.
- Reintroduce fire on select industrial timberland sites.
- Create demonstration sites to establish effective hairy rattleweed habitat management (reflective of management guidelines that will be established and further researched).
- Investigate and provide incentives for hairy rattleweed management on private lands (*e.g.*, appropriate mowing regimes or other management options).

Monitoring and Research Activities

- Survey unknown populations within and outside of private properties.
- Reassess EO "delimitation" to ensure a more accurate representation of: 1) the number of EOs, 2) the size and extent of populations, and 3) gene flow and connectivity.
- Re-survey long-term monitoring plots and GPS each site to document status across the range of hairy rattleweed.
- Create a consistent sampling regime for hairy rattleweed including plots on private land.
- Determine relationship(s) of canopy cover to plant vigor and reproduction.
- Characterize the vegetation and habitat requirements of hairy rattleweed.
- Conduct additional inventory/surveys to predict the size of occupied polygons and the distribution of the species more accurately.
- Compile and track all active efforts to produce hairy rattleweed.
- Characterize hydrology of hairy rattleweed sites.
- Explore methods to reduce the predation that occurs on younger plants and seeds.
- Create incentives for research with this endangered plant.

Research Needs

- The relationship of light to plant growth needs to be studied further. Research is also needed on mechanical vegetation removal versus prescribed fire. Biological research

needs for the species include: 1) general life history study including reproductive system and pollinators; 2) the effect of Says weevil (*Apion rostrum)* on hairy rattleweed populations; 3) specific habitat requirements for healthiest populations; 4) population viability; 5) conditions which limit this species to a small overall range; 6) effects of herbicide on hairy rattleweed growth, survival, and reproduction; 7) impacts of increasing temperature, and drought frequency and intensity on physiology, pollination, and reproduction; and 8) genetic diversity study to inform population delineations and ex *situ* and *in situ* conservation actions.

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RESULTS / SIGNATURES

U.S. Fish and Wildlife Service
Status Review of Hairy Rattleweed

Status Recommendation:

On the basis of this review, we recommend the following status for this species (50 CFR § 424.11). 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:
____ *The species is extinct*
____ *The species is recovered.*
____ *New information indicates 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:
Field Supervisor, Georgia Ecological Services Field Office, Fish and Wildlife Service

Approve PETER MAHOLLAND Digitally signed by PETER MAHOLLAND Date: 2025.07.27 09:23:00 -04'00'

APPENDIX A. SUPPORTING DOCUMENTATION

Table 1. Table providing element occurrence (EO) information: EO Number (#), Site Name, Date of Last Observation, and Population Size (Abundance as measured by numbers of stems/plants observed during last observation). N/A indicates missing or vague information. Occurrences on protected conservation lands are shown and the owner/land manager identified. Potential Protection through management and/or proactive conservation of powerline and/or roadside rights-of-way is also shown. Protection level on conservation lands (F = Full; Pa = Partial; N = None; Pt = Potential) reflects whether the occurrence is contained wholly or partially within protected land boundaries. Rows with no fill indicate occurrences with a historical/extirpated status; light grey fill indicates an unknown status; **bold text** indicates an occurrence that is extant and current.

EO #	Site Name	Last Observation	Occurrence Size (#'s of individuals)	Protected/ Conservation Lands	Level of Protection (F/Pa/N/Pt)
1	Sansavilla WMA – Wire Rd. North	6/1/1987	N/A		N
2	Browntown Rd.	6/1/1987	N/A		N
3	**Needmore Flatwoods**	**7/22/2024**	**40**	**GPC Powerline ROW**	**Pt**
4	**Lower Long Branch**	**7/22/2024**	**20**		**N**
5	Upper Long Branch	7/28/2006	N/A		N
6	**Lower crooked Rd.**	**7/22/2024**	**4**		**N**
7	**Straight Rd.**	**7/22/2024**	**1**		**N**
8	**Upper crooked Rd.**	**7/22/2024**	**8**		**N**
9	**Philadelphia Church Flatwoods/Sawgrass Rd.**	**9/10/2024**	**139**		**N**
10	Hortense Hwy. 32 No. 1	6/13/2001	0	GTC Powerline and Road ROW	Pt
11	**Mckinnon/Oil Well Rd.***	**07/00/2024**	**15**		**N**
12	Oil Well /Fending Intersection	6/1/1987	N/A		N
13	32 Rd. No. 1	6/1/1987	N/A		N
14	Penholoway Bay	6/1/1987	N/A		N
15	Hanger Rd.	6/1/1987	N/A		N
16	32 Rd. No. 2	6/1/1987	N/A		N
17	**32 Rd. No. 3**	**7/22/2024**	**32**		**N**
18	**NE of Needmore**	**7/22/2024**	**27**		**N**

EO #	Site Name	Last Observation	Occurrence Size (#'s of individuals)	Protected/ Conservation Lands	Level of Protection (F/Pa/N/Pt)
19	Palmetto Island	6/1/1987	N/A		N
20	**Strickland Island/Pendarvis Rd.**	**9/10/2024**	**1**		**N**
21	Pendarvis	1/1/1980	N/A	GPC Powerline ROW	Pt
22	**Hortense Hwy. 32 No. 2**	**8/26/2024**	**1**	**GTC Powerline and Road ROW**	**Pt**
23	Paul Lewis Property	7/1/2013	355	TNC-Lewis Tract	F
24	Hopkin's Property	8/28/1994	5		N
26	E of Honey Camp Branch	8/28/1994	20		N
27	**At GA 32 Crossing of Mill Branch**	**7/22/2024**	**43**	**GPC and GTC Powerline and Road ROW**	**N**
28	**Hwy. 110**	**8/22/2024**	**140**	**GDOT ROW (and interested private landowner)**	**N**
29	**Wire Rd.**	**7/00/2024**	**450**	**DNR-Sansavilla WMA (Wire Rd Tract)**	**F**
30	**Lewis Property**	**7/22/2024**	**2**	**TNC – Lewis Tract**	**F**
31	Ten Mile Road	8/13/2014	0	DNR-Sansavilla WMA (Baptisia Tract)	F
32	**Mt Pleasant Road**	**8/8/2024**	**189**	**DNR-Sansavilla WMA (Baptisia Tract)**	**P**
33	**Ten Mile Road**	**10/18/2023**	**26**	**DNR-Sansavilla WMA (Baptisia Tract)**	**P**
34	Browntown Rd.	1/1/2017	8		N
36	**GA 110W | Needmore Powerline**	**7/22/2024**	**311**	**TNC – Lewis Tract and Powerline/Road ROW**	**P**
38	**Belle Vista**	**10/18/2023**	**3**	**DNR-Sansavilla WMA (Baptisia Tract)**	**F**

*****EO 11 McKinnon/Oil Well Rd – 2024 survey was limited but indicates EO is extant. Occurrence size is from 2017 survey.

Figures 4, 5, and 6. Maps of the delineated populations. Occurrences are categorized by their date of last observation and their abundance. Occurrences observed since the last 5-Year Review in 2019 are considered current and are coded by abundance of observed plants/stems as follows: Large = 300+ stems; Moderate = 100-299 stems; Small = 10-99 stems; and Very Small = 1-9 stems. Occurrences last observed 20 or more years ago (pre-2004) are considered historical/extirpated. Occurrences last observed between the current and historical/extirpated cut-off dates (2004-2018) are considered of unknown status. The dotted line population boundary is hypothetical and was developed using a 2 km separation distance per NatureServe's Element Occurrence Delimitation Guidance. NatureServe's Habitat-based Plant Element Occurrence Delimitation Guidance (NatureServe 2020).

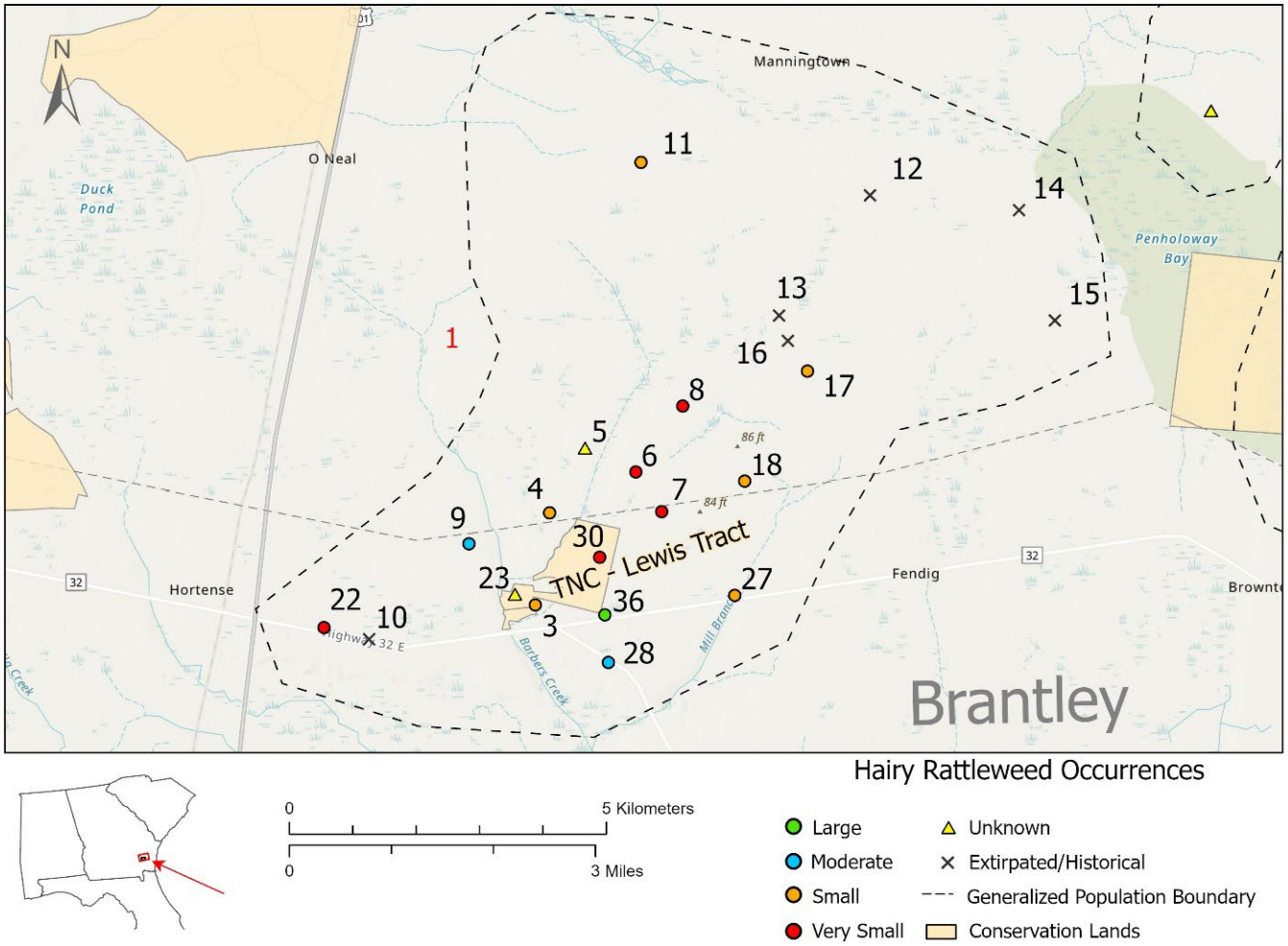

Figure 4. Fine scale map of the hairy rattleweed (*Baptisia arachnifera*) hypothetical population number (#) 1 in the southwestern portion of the range in Brantley and Wayne counties. Map shows centroid locations of 22 known and historical occurrences and their proximity to protected conservation lands.

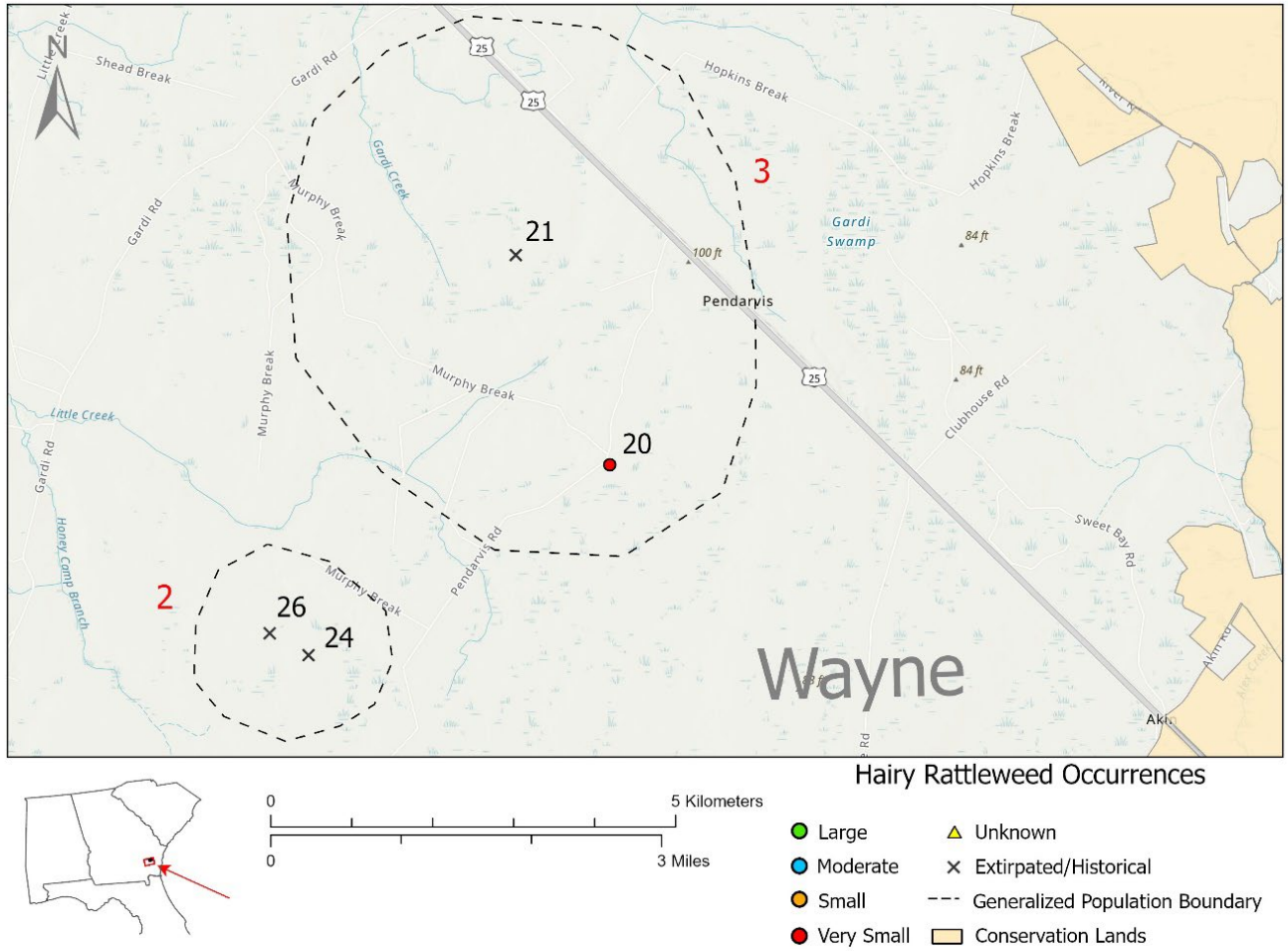

Figure 5. Fine scale map of the hairy rattleweed (*Baptisia arachnifera*) hypothetical populations number (#) 2 and #3 in the northern portion of the range in Wayne county. Map shows centroid locations of four (4) known and historical occurrences and their proximity to protected conservation lands.

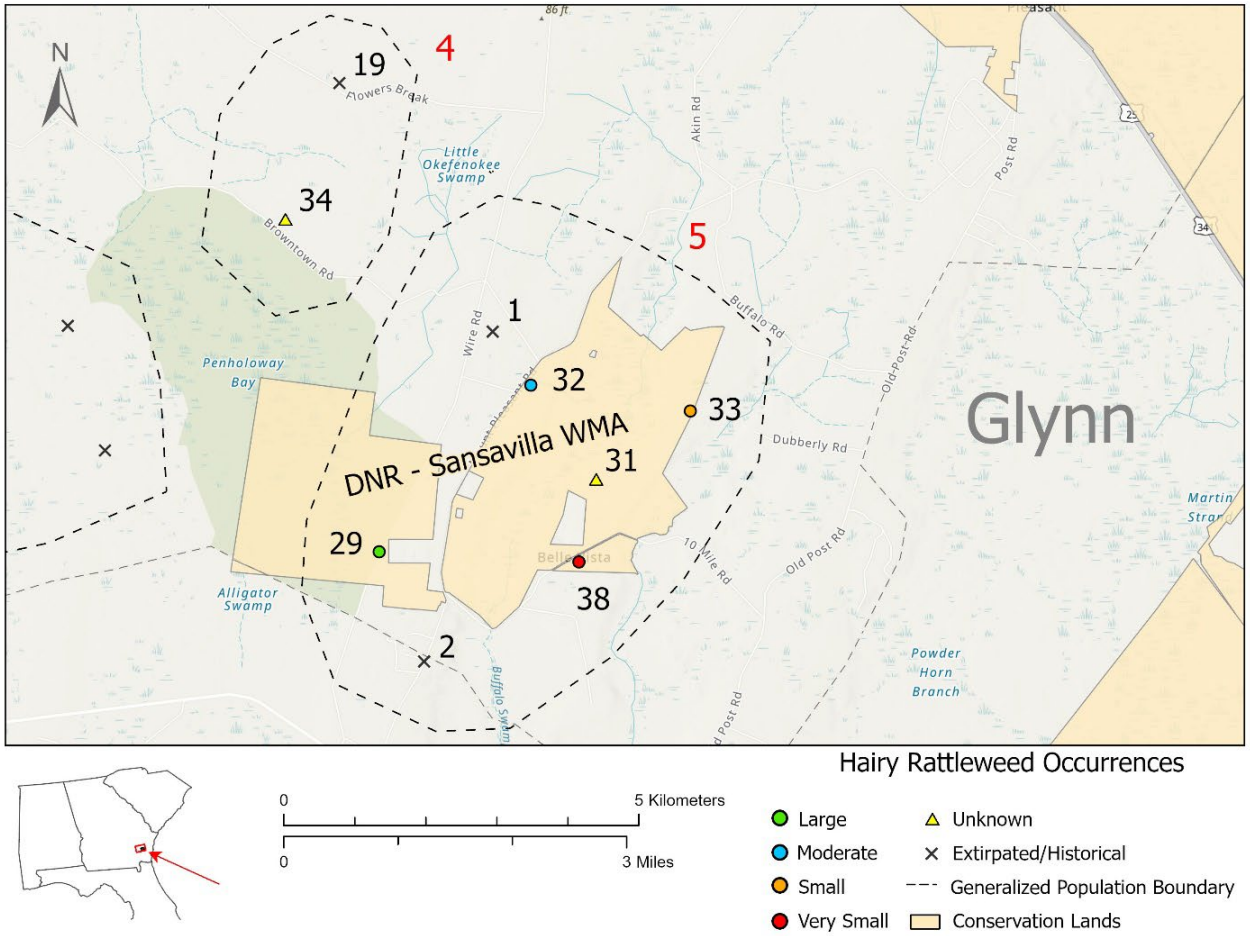

Figure 6. Fine scale map of the hairy rattleweed (*Baptisia arachnifera*) hypothetical populations number (#) 4 and #5 in the central and southeastern portion of the range in Brantley and Wayne counties. Map shows centroid locations of nine (9) known and historical occurrences and their proximity to protected conservation lands.