Interim Core Map Documentation for Georgia Rockcress

Version 1

Review Completed: November 2026

Core Map Developer: EPA's Office of Pesticide Programs

Species Summary

The Georgia rockcress (*Arabis georgiana*, Entity ID 6672) is a threatened terrestrial plant (dicot). The U.S. Fish and Wildlife Service (FWS) has designated a critical habitat for the Georgia rockcress. Known occurrences of the Georgia rockcress are found along river systems in Alabama and Georgia. This species typically grows in a variety of dry mesic to mesic soils, including shallow soil accumulations on rocky bluffs, ecotones of sloping rock outcrops, and sandy loam along eroding riverbanks. The species occurs in soils that are typically circumneutral to slightly basic (pH 6.5 to 7.5). Elevations of sites with known populations range from 24 to 98 m (78 to 322 ft). Additional information on the species is provided in **Appendix 1**.

Description of Core Map

The core map for the Georgia rockcress is biological information type based on occupied locations and species habitat. EPA used the species critical habitat layer from the FWS (last updated in 2014) as the starting point (outer extent) for developing the core map. Location data for a single population that is not included in the critical habitat layer was then added based on population boundaries outlined on page 884 of the 2014 Fort Benning Integrated Natural Resource Management Plan.

Figure 1 depicts the resulting interim core map for the Georgia rockcress. The size of his core map is approximately 885 acres.

The core map developed for the Georgia rockcress is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Georgia rockcress. This core map incorporates information developed by FWS and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate species expert feedback from FWS. This interim core map has an "average" (3) best professional judgment classification to describe major uncertainties/limitations. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

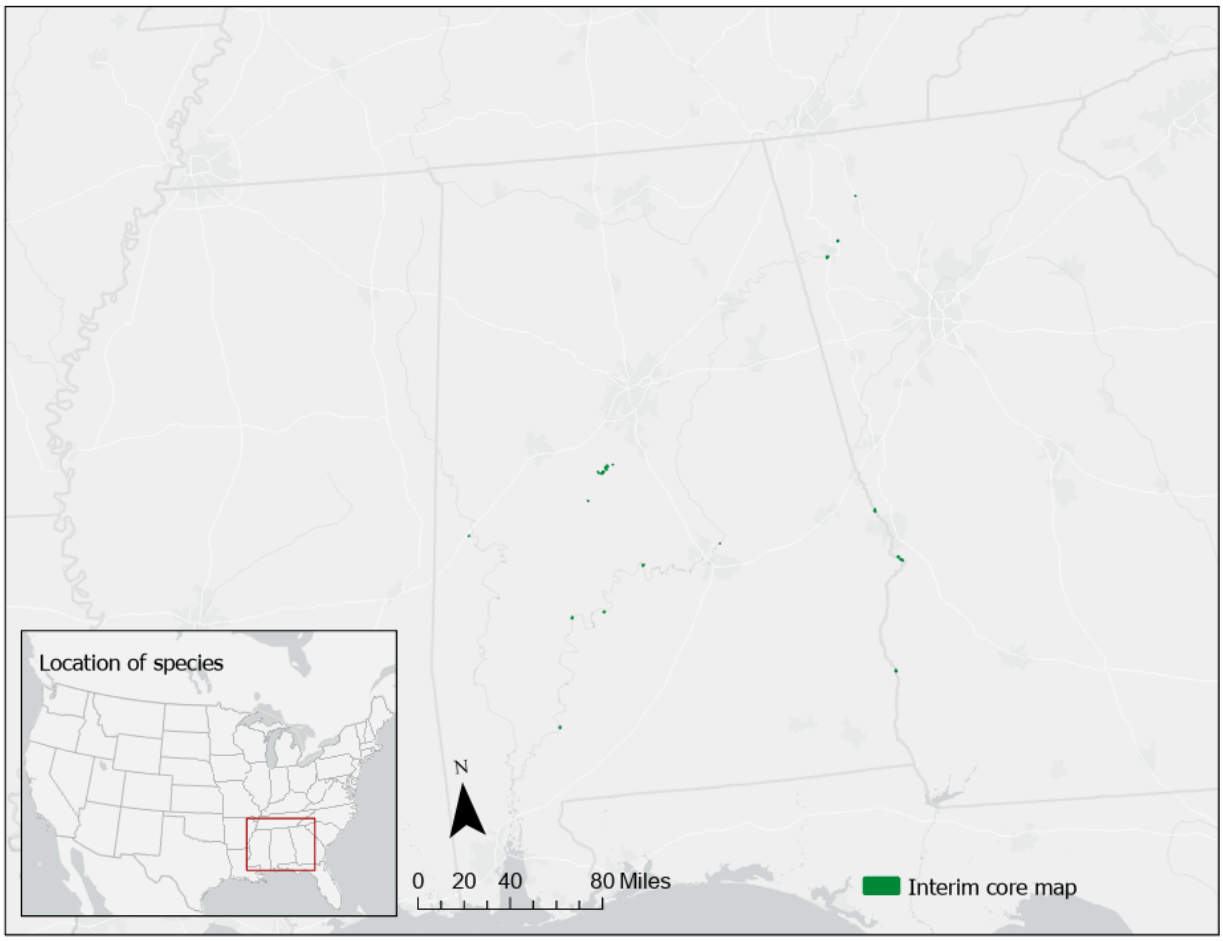

Figure 1. Interim core map for the Georgia rockcress.

Table 1. Percentage of Interim Core Map Represented by National Land Cover Database (NLCD)[1] Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover
Forestry	Deciduous Forest (41)	35
Forestry	Evergreen Forest (42)	12
Forestry	Mixed Forest (43)	20
Agriculture	Pasture/Hay (81)	1
Agriculture	Cultivated Crops (82)	0
Mosquito adulticide, residential	Open space, developed (21)	4
Mosquito adulticide, residential	Developed, Low intensity (22)	1
Mosquito adulticide, residential	Developed, Medium intensity (23)	0
Mosquito adulticide, residential	Developed, High intensity (24)	0
Invasive species control	Woody Wetlands (90)	8
Invasive species control	Emergent Herbaceous Wetlands (95)	0
Invasive species control	Open water (11)	14
Invasive species control	Grassland/herbaceous (71)	2
Invasive species control	Scrub/shrub (52)	3
Invasive species control	Barren land (rock/sand/clay; 31)	0
Total Acres	**Interim Core Map Acres**	**~ 885**

Evaluation of Known Location Information

There are four datasets with known location information:

- Descriptions of locations provided by FWS
- Occurrence locations in iNaturalist
- Occurrence locations in NatureServe
- Occurrence locations in the Global Biodiversity Information Facility (GBIF)

EPA evaluated these four sets of data before selecting the type of and developing the core map.

Approach Used to Create Core Map

The core map was developed using the "Process EPA Uses to Develop Core Maps for Draft Pesticide Use Limitation Areas for Species Listed by the U.S. Fish & Wildlife Service (FWS) and their Designated Critical Habitats"[2] (referred to as "the process"). EPA developed the core map using the 4 steps described in the process document:

[1] Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, https://doi.org/10.5066/P9JZ7AO3

[2] Dated 2024, available online at: https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas

1. Compile available information for a species
2. Identify core map type
3. Develop the core map for the species
4. Document the core map

For step 1, EPA compiled available information for the Georgia rockcress from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the Georgia rockcress is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occurrences and known locations of Georgia rockcress.

For step 2, EPA used the compiled information to identify the core map type including species range and known location information. In the 2021 5-year review, FWS identified 24 known populations of Georgia rockcress. Of these populations, 17 were considered extant, with the remaining considered historical populations that were no longer extant. Therefore, EPA based the core map on the known locations identified by FWS for extant populations. The entire range of the species was not used as the core map because the range contains areas where the species is unlikely to occur. A critical habitat was available for the species but did not include all known locations with an extant population, so the critical habitat was also not used as the sole basis of the core map.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in the process document. For this core map, EPA used descriptions of known locations of Georgia rockcress populations from the 2021 5-year review, along with refined population location information from the critical habitat and the 2014 Fort Benning Integrated Natural Resource Management Plan (INRMP). Appendix 2 provides more details on the Geographic Information System (GIS) analysis and specific data used to generate the core map.

Appendix 1. Information Compiled for the Georgia Rockcress

1. **Recent FWS documents/links and other data sources**
    - Five Year Review (2021) (https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/941.pdf)
    - Recovery Outline (2014) (https://ecos.fws.gov/docs/recovery_plan/hairy%20rattleweed%20rp.pdf)
    - Species Status Report (2021) (https://iris.fws.gov/APPS/ServCat/DownloadFile/196989)
    - Fort Benning Integrated Natural Resource Management Plan (2014) (https://www.benning.army.mil/Garrison/dpw/emd/Content/PDF/4%20-%20Fort%20Benning%202014%20INRMP%20Revision_Final%20Draft.pdf)

2. **Background information**
    - **Status:** Federally listed as threatened in 2014.
    - **Resiliency, redundancy, and representation (the 3Rs)**
        - Resiliency: Overall, nine populations (38 percent) currently exhibit excellent or good resilience, indicating that they are likely to persist in their current condition or better for the foreseeable future (at least 20-30 years). Five populations (24 percent) have fair resilience, indicating that they will likely require conservation actions in order to remain in the current condition for the foreseeable future; otherwise they will be expected to decline. Roughly a third of the populations fall in the bottom two categories with either poor resilience (14 percent) and face a high risk of extirpation, or no resilience (extirpated or historical; 24 percent). Seven of the 17 extant populations (41 percent) are protected but only 3 (18 percent) of those (Black's Bluff, Goat Rock and Fort Benning) receive management as part of a formal plan. Populations are usually at least partially degraded by invasive species or a legacy of previous land uses which create the continual threat of establishment and worsening of invasive species coverage. The species has been able to flourish where land is managed consistent with Georgia rockcress persistence (e.g., soils remain thin, or invasive plants are limited/reduced). Population augmentation has occurred at Resaca Bluff and Goat Rock. However, it is difficult to know to what degree this work has increased resiliency. (Species Status Report, 2021)
        - Redundancy: The Georgia rockcress is endemic to Alabama and Georgia. Populations of Georgia rockcress are restricted to small patches of suitable habitat associated with large river bluffs with steep and/or shallow soils that are subject to localized disturbances that limit the accumulation of leaf litter and competition, underlain with granite, sandstone, or limestone. The habitat specificity for this species has resulted in limited and fragmented suitable habitat resulting in low redundancy; therefore, Georgia rockcress may be at a higher risk for extinction from habitat loss or degradation associated with localized events (manmade or natural). (Species Status Report, 2021)
        - Representation: Resilient Georgia rockcress populations do not occur within all representative units.
            - The North Georgia representative unit contained four known populations; however, none are currently resilient. The Cave Spring and Black's Bluff populations of North Georgia are historical and extirpated,

respectively. Fortunately, safeguarding efforts have established a reintroduction site within the population boundary of the recently extirpated Black's Bluff population, using Black's Bluff material propagated ex-situ from one plant (Moffett 2007, p. 6). Plant material collected from Black's Bluff has also been used in an introduction to a new site. (Species Status Report, 2021)

- The extirpation of the Omaha type locality (Stewart County, Georgia), and the inability to reliably monitor the Fort Gaines population makes maintaining representation in the South Georgia unit particularly difficult. (Species Status Report, 2021)
- The Alabama representative unit contains many small current and historical populations or element occurrences (EOs). Approximately half of the extant populations in the Alabama representative unit are currently resilient (Table 4). Five of the populations in this unit are on protected lands (three are resilient) (Figure 3), but none these populations benefit from management actions. The population with the highest resilience occurs on unprotected private land (Marshalls Bluff). In general, there appears to be a strong need to re-survey most, if not all, of the populations in Alabama. Populations initially described by Allison (1999) could not be relocated in 2015 due to accessibility limitations (Rickard 2019), even though some of these populations had been assessed in 2010 (Schotz 2010). (5-year Review, 2021)

- **Habitat (from 2021 5-Year Review)**
  - Georgia rockcress often occurs along major river courses and grows in a variety of dry mesic to mesic soils, including shallow soil accumulations on rocky bluffs, ecotones of sloping rock outcrops, and sandy loam along eroding riverbanks.
  - Georgia rockcress will not persist in heavily shaded conditions. This species is adapted to high or moderately high light intensities, generally with a mature canopy providing partial shading; the habitat supports a relatively closed to open canopy.
  - This species occurs on soils that are circumneutral to slightly basic (pH between 6.5 and 7.5) in the Ridge and Valley, Piedmont, and Southeastern Plain ecoregions.
  - Georgia rockcress occurs in locations between 24 – 98 meters (78 – 322 feet) in elevation (Schotz 2010) that are underlain or otherwise influenced by limestone or granite-gneiss. The soils at these locations are well drained, with low to moderate water retention capacity (Schotz 2010).
  - Climatological data collected from 1981 to 2010 by the National Climatic Data Center of the United States were compiled for the northern and southern limits of the Georgia rockcress range in Alabama (Jackson and Birmingham, respectively). These data include a tight range of average maximum daytime summer (June through August) temperatures, from 31 to 33 degrees C (88 to 91 degrees F). Winters are mild with occasional low temperatures below freezing; the average daily winter temperature is between 7 to 11 degrees C (44 to 51 degrees F) from December to February, the coldest part of the year. The average annual precipitation ranges between 1.5 and 1.4 meters (59.9 and 54.6 inches); droughts are rare and dry spells are not severe (adapted from Schotz 2010).

- **Pollinator/reproduction**
    - The life stages of a perennial plant such as Georgia rockcress consist of the dispersing and germinating seed, basal rosette, vegetative plant, and reproductive plant. Georgia rockcress possesses a thick rootstock that may live for many years (Schotz 2010) but is considered a short-lived perennial (Garcia 2012). (5-Year Review, 2021)
    - Trends in *Arabis* evolution indicate species tend to shift from perennial to biennial growth forms with a decrease in elevation (alpine to montane, respectively; Koch et al. 2017); Georgia rockcress may be intermediate in this trait. (5-Year Review, 2021)
    - Georgia rockcress needs small-scale disturbances with slightly increased light, limited competition for water, and exposed soils for seed germination. (5-Year Review, 2021)
- **Taxonomy**
    - Terrestrial Plant
- **Relevant Pesticide Use Sites**
    - The 2021 5-year review notes that Georgia rockcress populations are in proximity to timber harvesting and quarrying populations.
    - Several populations are also in the vicinity of residential areas and roads and utility rights of way. (5-Year Review, 2021)
- **Recovery Criteria/Objectives (2021 recovery outline)**
    - Georgia rockcress does not currently have a final, approved recovery plan. Currently, only the Recovery Outline is available to guide the recovery of Georgia rockcress.
- **Recovery Initial Action Plan (from 2021 recovery outline)**
    - Recovery needs for the Georgia rockcress include continued surveys and monitoring, threat abatement, and research:
        - Continue public outreach to provide education and explore opportunities to work on private property.
        - Develop and implement management strategies for the species to include aspects like invasive species control.
        - Conduct regular monitoring at all accessible sites.
        - Conserve and manage existing populations and habitat.
        - Establish methods to effectively reintroduce and monitor Georgia rockcress.
        - Enhance the suitability of known sites and potential reintroduction sites.
        - Conserve germplasm (genetic material; e.g. seed) and promote genetic diversity.
        - Conduct studies of genetic variation within and between known sites.
        - Determine the minimum number of populations required to ensure survival of Georgia rockcress.
        - Define population regulation factors.
        - Look for opportunities to protect existing occurrences through acquisition, easements and/or management agreements.
        - Develop and implement management strategies for the GA rockcress, initially with the two State parks in Alabama.

3. Description of Species Range

- Figure A1-1 depicts the FWS range for the Georgia rockcress. The range was last updated on 08/23/2022. The total area of the range is approximately 4,848,817 acres.

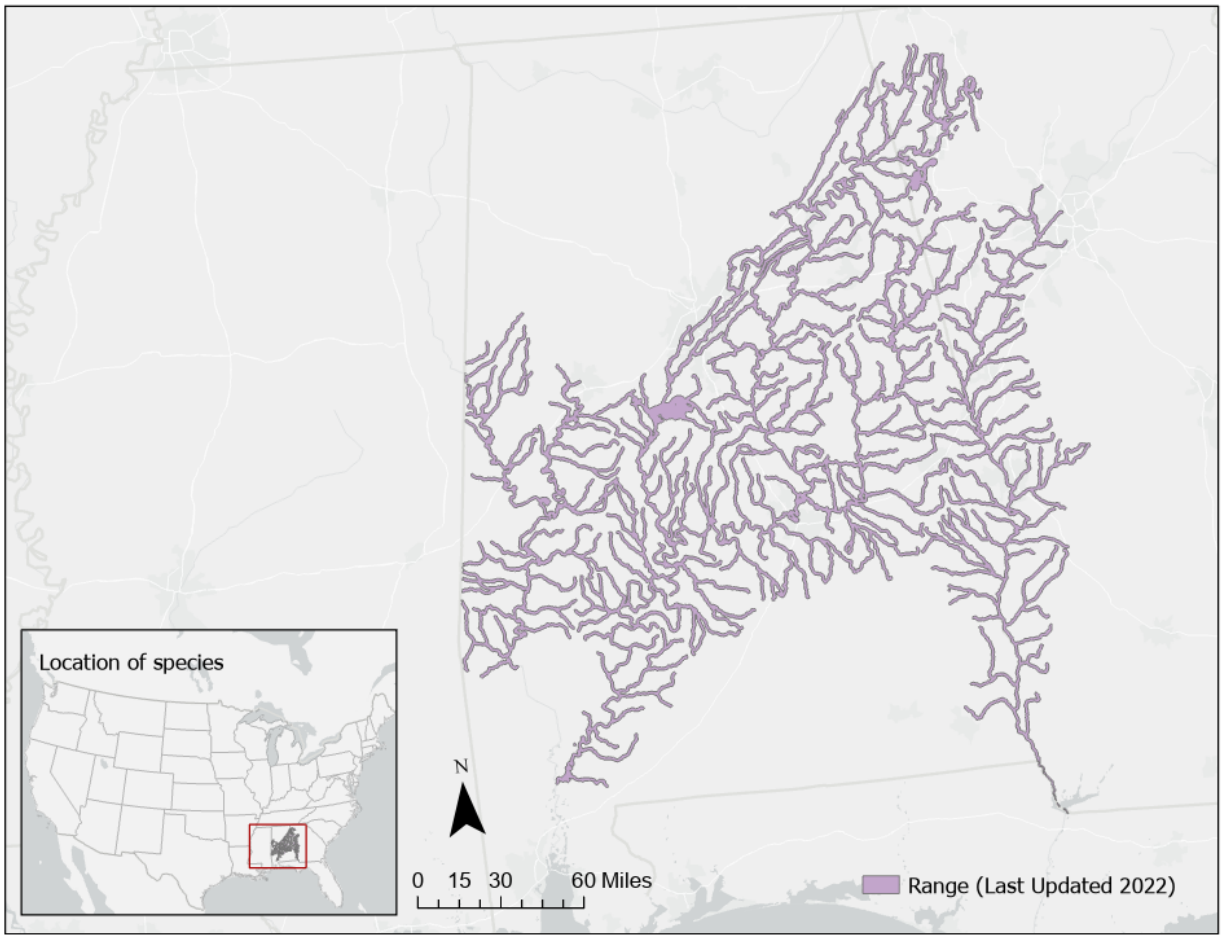

Figure A1-1. FWS range for the Georgia rockcress. The total area of the range is around 4,848,817 acres.

4. **Critical Habitat**
    - Figure A1-1 depicts the FWS critical habitat for the Georgia rockcress. The critical habitat was last updated on 09/12/2014. The total area of the critical habitat is approximately 734 acres.

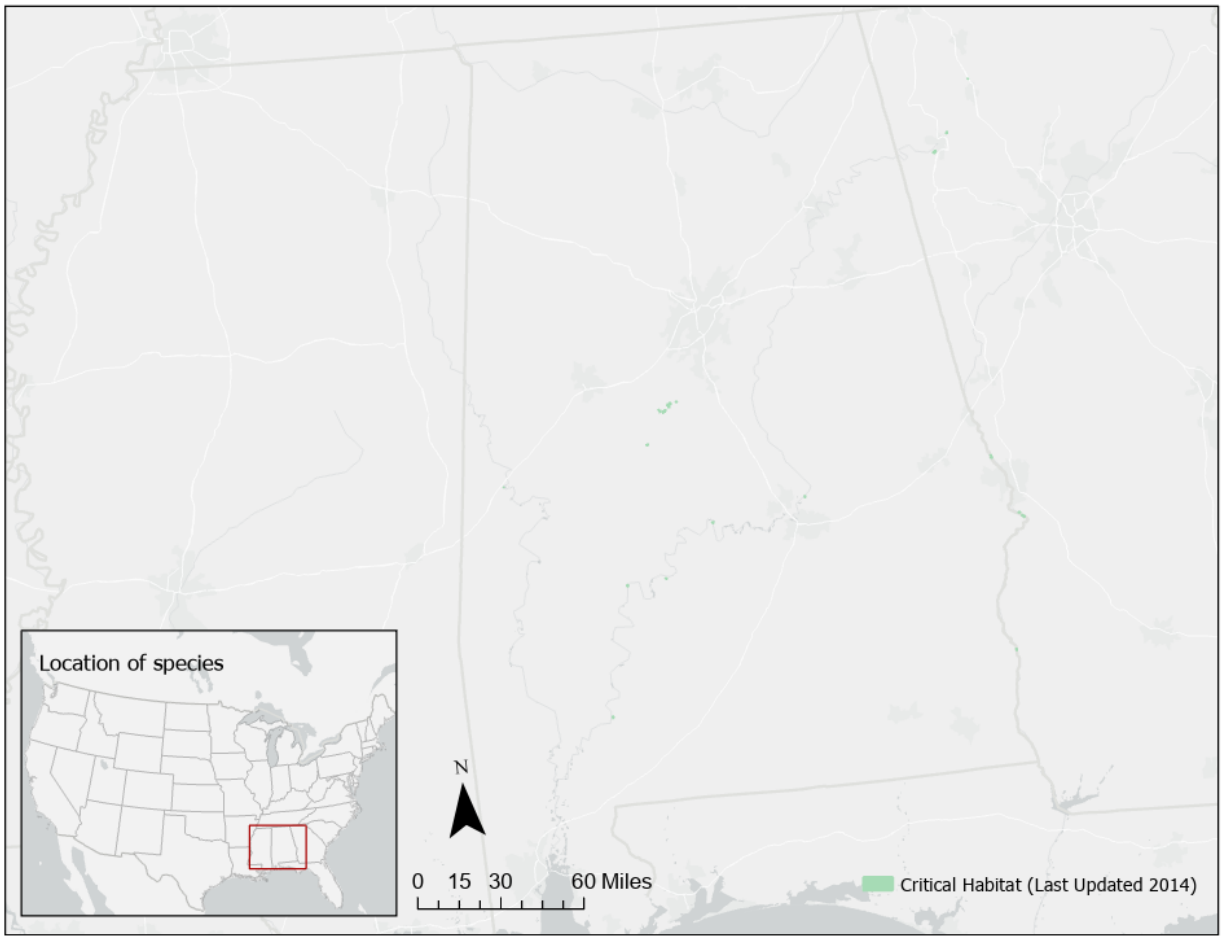

Figure A1-2. FWS critical habitat for the Georgia rockcress. The total area of the critical habitat is around 734 acres.

5. **Known locations**
    - Known Locations Described in FWS Recovery Documents
        - The 2021 5-year review describes 24 known populations (17 extant) of Georgia rockcress. Table 2 of the 2021 5-year review, showing location information for each population is reproduced below in Table A1-1

Table A1-1. List of Georgia rockcress populations and the EOs that comprise them. The associated river system, county/state, and extant status for each population is also included. (reproduced from Table 2 of the 2021 5-year review)

Population	Population #	River System	County/State	Extant	Number of EOs
Marshalls Bluff	1	Alabama	Monroe/AL	Yes	1
Fort Gaines Bluff	2	Chattahoochee	Clay/GA	Yes	1
Omaha- Type Locality	3	Chattahoochee	Stewart/GA	No	1 extirpated
Prarie Bluff	4	Alabama	Wilcox/AL	Yes	1
Portland Landing	5	Alabama	Dallas/AL	Yes	1
Fort Benning	6	Chattahoochee	Chattahoochee/GA,	Yes	2

Population	Population #	River System	County/State	Extant	Number of EOs
			Russell/AL		
Durant Bend	7	Coosa	Dallas/AL	Yes	1
Fort Toulousse	8	Coosa	Elmore/AL	Yes	1
Goat Rock	9	Chattahoochee	Harris, Muscogee/ GA	Yes	4
Fort Tombecbee	10	Tombigbee	Sumter/AL	Yes	1
Murphy's Bluff	11	Cahaba	Bibb/AL	Yes	1
Pratts Ferry	12	Cahaba	Bibb/AL	Yes	6 total. 5 extant
Pratt's Ferry Road	13	Cahaba	Bibb/AL	No	1 historical
Creekside Glades	14	Cahaba	Bibb/AL	Yes	1
Fern Glades	15	Little Cahaba	Bibb/AL	Yes	4 total. 2 extant
Pratt's Ferry (2.3 miles NW)	16	Cahaba	Bibb/AL	No	1 historical
Brown's Dam Glades	17	Little Cahaba	Bibb/AL	Yes	2 total. 1 extant
Limestone Park	18	Little Cahaba	Bibb/AL	Yes	1
Cave Spring	19	Coosa	Floyd/GA	No	1 historical
Black's Bluff Preserve	20 (25 & 26*)	Coosa	Floyd/GA	No*	3 total. 1 extirpated, *1 introduction and 1 reintroduction extant
Whitmore's Bluff	21	Coosa	Floyd/GA	Yes	1
Resaca Bluff	22	Oostanaula	Gordon/GA	Yes	1
Pratt Glade West	23	Cahaba	Bibb/AL	No	1 historical
4 Mile Creek	24	Little Cahaba	Bibb/AL	No	1 historical
	Populations = 24 (17 extant)				**EOs = 37 natural (26 extant), 2 safeguarding**

- EPA queried iNaturalist, GBIF, and NatureServe. Collectively, the occurrence data are consistent with the FWS location data used to identify the core map.
- iNaturalist (available here) had 6 research grade observations for this species. Location data for these observations were in the vicinity of the locations used for the core map; however, the positional accuracy of the points does not allow EPA to determine if these occurrences fall within the area covered by the core map.
- GBIF (available here) included 92 occurrences and human observations. Location data for these observations were in the vicinity of the locations used for the core map; however, the positional accuracy of the points does not allow EPA to determine if these occurrences fall within the area covered by the core map.
- Occurrences in NatureServe (available here) are consistent with other occurrence data. Location data for these observations were in the vicinity of the locations used for the core map; however, the positional accuracy of the points does not allow EPA to determine if these occurrences fall within the area covered by the core map.

Collectively, the public occurrence information does not support expanding the core map.

Appendix 2. GIS Data Review and Method to Develop Core Map

This core map was created based on biological information, including occupied locations and species habitat. EPA used the species critical habitat layer from the FWS (last updated in 2014) as the starting point (outer extent) for developing the core map. Location data for a single population that is not included in the critical habitat layer was then added based on population boundaries outlined on page 884 of the 2014 Fort Benning Integrated Natural Resource Management Plan.

- Dataset References and Software
    - Software used: ArcGIS Pro 3.3.0
    - FWS Species Critical Habitat (available here) – last updated on 09/12/2014
    - Reference for boundaries of Fort Benning populations:
        - Integrated Natural Resource Management Plan. 2014. Fort Benning Georgia. 1048 pp.
- Datasets Used in Core Map Development
    - All datasets used in core map development are described in EPA's process document.
- Core Map Development
    - EPA started with the most recent FWS critical habitat map (last updated in 2014) which was used as the outer extent of the core map.
    - Boundaries for the populations near Fort Benning, GA were drawn based on Figure 2 of Appendix E6 of the 2014 Fort Benning Integrated Natural Resource Management Plan (page 884)
        - Under Edit tab select "Create"
        - Under "Create Features" select core map layer
        - Select "Polygon"
        - Draw vertices of polygons to reproduce 2 polygons from Fort Benning INRMP
        - Select "Save"