United States Department of the Interior
Fish and Wildlife Service
Alabama Ecological Services

Alabama

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Standing Analysis for the Alabama Determination Key

Prepared by

The Alabama Ecological Services Field Office

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1 INTRODUCTION

1.1 PURPOSE OF STANDING ANALYSIS

This standing analysis provides an optional, streamlined consultation process for federal action agencies and project proponents to address potential effects of future actions, pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et seq.), to the species and critical habitats listed in Table 1. The U.S. Fish and Wildlife Service (Service) developed this standing analysis to streamline the process of reviewing actions that would result in a "may affect, not likely to adversely affect" (NLAA) determination for the subject species and critical habitats. This standing analysis also provides proactive technical assistance to federal action agencies in making a "No Effect" (NE) determination.

This standing analysis provides an optional consultation process that is available to federal agencies and project proponents for federal actions that meet the criteria described below and delivered through a Determination Key (DKey) in the Service's Information for Planning and Consultation (IPaC) application. To obtain consultation documents, including technical assistance for NE and concurrence with NLAA determinations, federal agencies must use the associated DKey in IPaC to answer questions about the proposed action. By screening the project through the DKey, all or part of the standing analysis is adopted by the federal action agency and supports their NLAA determination. It also provides technical information to help agencies determine whether an action will have no effect on the species or critical habitat. Formal consultation under Section 7(a)(2) of the Act is required for actions that "may affect" (MA) a

listed species and/or critical habitat, unless the Service concurs in writing that actions "may affect but are not likely to adversely affect" listed species and critical habitat. Actions which an action agency determines will have "no effect" on species or critical habitat do not require review by the Service.

By providing specific information requested by the DKey, the action agency may receive a letter of concurrence with a NLAA determination for eligible projects, a technical assistance acknowledgement of the action agency's NE determination for eligible projects, or a recommendation to consult with the Service for the action agency's MA determination.

Throughout the remainder of this document, statements regarding this standing analysis refer to both the standing analysis and the associated DKey.

Species and habitats covered by the Alabama DKey include the federally listed species and critical habitats that occur within the state (Table 1)[1].

Table 1. Species and critical habitats covered in the standing analysis for the Alabama DKey, including their listing status under the Endangered Species Act where T = threatened, E = endangered, FCH = final critical habitat, CH = critical habitat, NEP = nonessential experimental population, DPS = distinct population segment, and C = Candidate. The DKey Species Groups are introduced in Section 5.2.2.

Taxon	Common Name	Scientific Name	ESA Status	Critical habitat
Mammal	Gray bat	*Myotis grisescens*	E	No CH in AL
Mammal	Alabama beach mouse	*Peromyscus polionotus ammobates*	E	FCH
Mammal	West Indian manatee	*Trichechus manatus*	T	No CH in AL (FCH FL only)
Bird	Rufa red knot	*Calidris canutus rufa*	T	Proposed
Bird	Piping plover	*Charadrius melodus*	T	FCH
Bird	Eastern black rail	*Laterallus jamaicensis ssp. jamaicensis*	T	No CH
Bird	Red-cockaded woodpecker	*Picoides borealis*	E	No CH
Reptile	Alabama red-bellied turtle	*Pseudemys alabamensis*	E	No CH
Reptile	Flattened musk turtle	*Sternotherus depressus*	T	No CH
Reptile	Gopher tortoise (Western DPS)	*Gopherus polyphemus*	T	No CH
Reptile	Green sea turtle (North Atlantic DPS)	*Chelonia mydas*	T	No CH in AL (FCH Puerto Rico; Proposed FL)
Reptile	Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	No CH in AL (Proposed FL Etc.)
Reptile	Hawksbill sea turtle	*Eretmochelys imbricata*	E	No CH in AL (FCH Puerto Rico)

[1]T = threatened, E = endangered, FCH = final critical habitat, CH = critical habitat, NEP = nonessential experimental population, DPS = distinct population segment, C = Candidate.

Taxon	Common Name	Scientific Name	ESA Status	Critical habitat
Reptile	Leatherback sea turtle	*Dermochelys coriacea*	E	No CH in AL (FCH U.S. Virgin Islands)
Reptile	Loggerhead sea turtle (Northwest Atlantic Ocean DPS)	*Caretta caretta*	T	FCH
Reptile	Black pinesnake	*Pituophis melanoleucus lodingi*	T	FCH
Reptile	Eastern indigo snake	*Drymarchon couperi*	T	No CH in AL
Amphibian	Dusky gopher frog	*Rana sevosa*	E	No CH in AL (FCH in MS)
Amphibian	Black warrior (=Sipsey Fork) waterdog	*Necturus alabamensis*	E	FCH
Fish	Gulf sturgeon	*Acipenser oxyrinchus (=oxyrhynchus) desotoi*	T	FCH
Fish	Alabama sturgeon	*Scaphirhynchus suttkusi*	E	FCH
Fish	Blue shiner	*Cyprinella caerulea*	T	No CH
Fish	Cahaba shiner	*Notropis cahabae*	E	No CH
Fish	Palezone shiner	*Notropis albizonatus*	E	No CH
Fish	Boulder darter	*Etheostoma wapiti*	E	No CH
Fish	Rush darter	*Etheostoma phytophilum*	E	FCH
Fish	Slackwater darter	*Etheostoma boschungi*	T	FCH
Fish	Trispot darter	*Etheostoma trisella*	T	FCH
Fish	Vermilion darter	*Etheostoma chermocki*	E	FCH
Fish	Watercress darter	*Etheostoma nuchale*	E	No CH
Fish	Goldline darter	*Percina aurolineata*	T	No CH
Fish	Pygmy sculpin	*Cottus paulus (=pygmaeus)*	T	No CH
Fish	Spring pygmy sunfish	*Elassoma alabamae*	T	FCH
Mussel	Alabama lampmussel	*Lampsilis virescens*	E	No CH
Mussel	Alabama moccasinshell	*Medionidus acutissimus*	T	FCH
Mussel	Alabama pearlshell	*Margaritifera marrianae*	E	FCH
Mussel	Canoe Creek clubshell	*Pleurobema athearni*	E	FCH
Mussel	Chipola slabshell	*Elliptio chipolaensis*	T	FCH
Mussel	Choctaw bean	*Obovaria choctawensis*	E	FCH
Mussel	Coosa moccasinshell	*Medionidus parvulus*	E	FCH
Mussel	Cracking pearlymussel	*Hemistena lata*	E	No CH
Mussel	Cumberlandian combshell	*Epioblasma brevidens*	E	FCH
Mussel	Dark pigtoe	*Pleurobema furvum*	E	FCH
Mussel	Fanshell	*Cyprogenia stegaria*	E	No CH
Mussel	Finelined pocketbook	*Hamiota altilis*	T	FCH
Mussel	Finerayed pigtoe	*Fusconaia cuneolus*	E	No CH
Mussel	Fluted kidneyshell	*Ptychobranchus subtentus*	E	FCH
Mussel	Fuzzy pigtoe	*Pleurobema strodeanum*	T	FCH
Mussel	Georgia pigtoe	*Pleurobema hanleyianum*	E	FCH
Mussel	Gulf moccasinshell	*Medionidus penicillatus*	E	FCH
Mussel	Heavy pigtoe	*Pleurobema taitianum*	E	No CH
Mussel	Inflated heelsplitter	*Potamilus inflatus*	T	No CH
Mussel	Longsolid	*Fusconaia subrotunda*	T	FCH
Mussel	Narrow pigtoe	*Fusconaia escambia*	T	FCH
Mussel	Orangenacre mucket	*Hamiota perovalis*	T	FCH
Mussel	Oval pigtoe	*Pleurobema pyriforme*	E	FCH
Mussel	Ovate clubshell	*Pleurobema perovatum*	E	FCH

Taxon	Common Name	Scientific Name	ESA Status	Critical habitat
Mussel	Oyster mussel	*Epioblasma capsaeformis*	E	FCH
Mussel	Pale lilliput (pearlymussel)	*Toxolasma cylindrellus*	E	No CH
Mussel	Pink mucket (pearlymussel)	*Lampsilis abrupta*	E	No CH
Mussel	Purple bankclimber	*Elliptoideus sloatianus*	T	FCH
Mussel	Purple bean	Villosa perpurpurea	E	FCH
Mussel	Rabbitsfoot	*Quadrula cylindrica cylindrica*	T	FCH
Mussel	Rough pigtoe	*Pleurobema plenum*	E	No CH
Mussel	Round ebonyshell	*Reginaia rotulata*	E	FCH
Mussel	Round hickorynut	*Obovaria subrotunda*	T	FCH
Mussel	Sheepnose mussel	*Plethobasus cyphyus*	E	FCH
Mussel	Shiny pigtoe	*Fusconaia cor*	E	No CH
Mussel	Shinyrayed pocketbook	*Hamiota subangulata*	E	FCH
Mussel	Slabside pearlymussel	*Pleuronaia dolabelloides*	E	FCH
Mussel	Snuffbox mussel	*Epioblasma triquetra*	E	FCH
Mussel	Southern clubshell	*Pleurobema decisum*	E	FCH
Mussel	Southern combshell	*Epioblasma penita*	E	No CH
Mussel	Southern kidneyshell	*Ptychobranchus jonesi*	E	FCH
Mussel	Southern pigtoe	*Pleurobema georgianum*	E	FCH
Mussel	Southern sandshell	*Hamiota australis*	T	FCH
Mussel	Spectaclecase (mussel)	*Cumberlandia monodonta*	E	FCH
Mussel	Tapered pigtoe	*Fusconaia burkei*	T	FCH
Mussel	Triangular kidneyshell	*Ptychobranchus greenii*	E	FCH
Mussel	White wartyback (Pearlymussel)	*Plethobasus cicatricosus*	E	No CH
Snail	Anthony's riversnail	*Athearnia anthonyi*	E	No CH
Snail	Armored snail	*Marstonia pachyta*	E	No CH
Snail	Cylindrical lioplax (snail)	*Lioplax cyclostomaformis*	E	No CH
Snail	Flat pebblesnail	*Lepyrium showalteri*	E	No CH
Snail	Interrupted (=Alabama) (=Georgia) rocksnail	*Leptoxis foremani*	E	FCH
Snail	Lacy elimia (snail)	*Elimia crenatella*	T	No CH
Snail	Painted rocksnail	*Leptoxis taeniata*	T	No CH
Snail	Plicate rocksnail	*Leptoxis plicata*	E	No CH
Snail	Rough hornsnail	*Pleurocera foremani*	E	FCH
Snail	Round rocksnail	*Leptoxis ampla*	T	No CH
Snail	Slender campeloma	*Campeloma decampi*	E	No CH
Snail	Tulotoma snail	*Tulotoma magnifica*	T	No CH
Plant	American chaffseed	*Schwalbea americana*	E	No CH
Plant	Gentian pinkroot	*Spigelia gentianoides*	E	No CH
Ferns and Allies	Alabama Streak-sorus fern	*Thelypteris pilosa var. alabamensis*	T	No CH
Ferns and Allies	American Hart's-tongue fern	*Asplenium scolopendrium var. americanum*	T	No CH
Plant	Georgia rockcress	*Arabis georgiana*	T	FCH
Plant	Little amphianthus	*Amphianthus pusillus*	T	No CH
Ferns and Allies	Louisiana quillwort	*Isoetes louisianensis*	E	No CH
Plant	Alabama canebrake pitcher plant	*Sarracenia rubra ssp. alabamensis*	E	No CH
Plant	Green pitcher plant	*Sarracenia oreophila*	E	No CH

Taxon	Common Name	Scientific Name	ESA Status	Critical habitat
Plant	Alabama leather flower	*Clematis socialis*	E	No CH
Plant	Fleshy-fruit gladecress	*Leavenworthia crassa*	E	FCH
Plant	Fringed campion	*Silene polypetala*	E	No CH
Plant	Kral's water-plantain	*Sagittaria secundifolia*	T	No CH
Plant	Leafy prairie-clover	*Dalea foliosa*	E	No CH
Plant	Lyrate bladderpod	*Lesquerella lyrata*	T	No CH
Plant	Mohr's Barbara's buttons	*Marshallia mohrii*	T	No CH
Plant	Morefield's leather flower	*Clematis morefieldii*	E	No CH
Plant	Pondberry	*Lindera melissifolia*	E	No CH
Plant	Price's potato-bean	*Apios priceana*	T	No CH
Plant	Relict trillium	*Trillium reliquum*	E	No CH
Plant	Tennessee yellow-eyed grass	*Xyris tennesseensis*	E	No CH
Plant	White fringeless orchid	*Platanthera integrilabia*	T	No CH
Plant	Whorled sunflower	*Helianthus verticillatus*	E	FCH

1.2 Benefits of the Standing Analysis

For those federal actions that the Service has accumulated significant knowledge in analyzing previously, the Service is able to develop a standing analysis to streamline the consultation process for eligible federal actions. The streamlined process facilitated by this standing analysis will reduce the amount of Service staff time necessary to review actions and provide federal agencies, consultants, and other project proponents a predictable, consistent, and timely response for qualified actions. In addition, development of a standing analysis to assess the impacts of individual projects enhances the Service's ability to track multiple independent actions on listed species and critical habitat.

1.3 Eligibility for use of the Standing Analysis

A standing analysis does not convey concurrence with NLAA determinations for individual projects. Rather, it serves as a streamlining tool. Action agencies may use it to develop their request for concurrence from the Service and support their finding that the action is not likely to adversely affect species and critical habitat. The standing analysis also allows the Service to quickly evaluate an action agency's analysis of effects to listed species and critical habitat. If the action agency's proposed action is consistent with covered[2] area and covered activities, including any required conservation measures in the standing analysis, the Service will concur that the action will have insignificant, discountable, or completely beneficial effects on the relevant listed species and critical habitat (i.e., NLAA).

The standing analysis may also provide technical information to help agencies identify actions that will have no effect to the listed species and critical habitat. For projects that do not qualify to

[2] The term "covered" is used throughout this document to define the limits of use of a standing analysis. However, although the area, activities, and species are "covered" by the standing analysis, the future activities themselves are not "covered" by the standing analysis; there are additional steps (with or without a DKey) that take place for an action agency to utilize the information in the standing analysis and to request FWS concurrence that their proposed action is NLAA for listed species and critical habitat.

use the standing analysis, action agencies/project proponents should coordinate directly with the Alabama ESFO and address any consultation requirements.

1.4 Ensuring Accurate Determinations

As is true in all consultation procedures, the Service relies on complete and accurate information provided by federal action agencies during consultation. To apply this standing analysis to a project, it is the responsibility of the action agency/project proponent to provide information that is truthful and accurate and that fully represents the entire scope of the project to comply with the Act.

1.4.1 Delineating the Project Area (i.e., Action Area)

Under the Endangered Species Act, the Action Area (also referred to as Project Area in the DKey) includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action". A detailed account and analysis of all project activities is necessary to encompass all temporary and permanent changes to "land, water, and air" caused by activities that would not occur but for the proposed action and are reasonably certain to occur. The Action Area also includes areas that are used to help offset project impacts (e.g., areas where species are to be relocated, mitigation areas, etc.).

For Endangered Species Act Section 7 consultation, action agencies shall consider the whole action area, which may be larger than the project footprint or activities in the action agency's jurisdictional area (Figure 1).

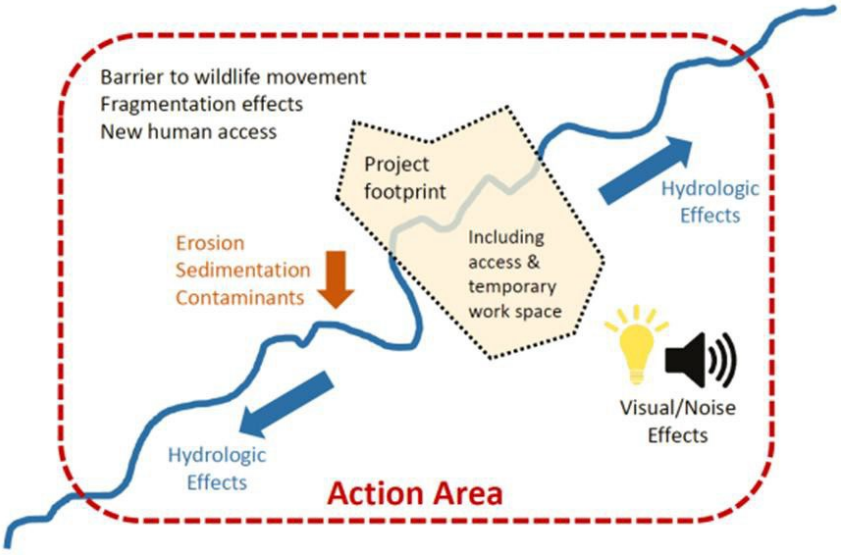


Figure 1. Diagram of the action area, which includes the project footprint and all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. Image credit: Service.

Under the "Small Project Handle" policy, the U.S. Army Corps of Engineers will consider direct and indirect effects to listed species and their critical habitats (if designated), as well as interrelated or interdependent actions associated with the project. The action area should include

both jurisdictional waters and upland habitat on the site, as well as downstream impacts associated with project actions (e.g., increased stormwater runoff, sediment and contaminant movement from the site, bank erosion due to riparian removal).

1.4.2 Evaluating Suitable Habitat within the Project Area

Action agencies and project proponents should next determine whether habitat within the Project Area (i.e., Action Area) can support listed species. For each species identified on an official species list, use the best available information (available from sources such as Alabama Department of Conservation and Natural Resources, Alabama Natural Heritage Program, Five-Year Reviews and other information available on the Service species profile pages, as well as habitat assessments/surveys) to determine whether the Project Area contains suitable environmental conditions to support feeding, breeding, sheltering, or essential dispersal corridors. Habitat assessments or surveys must be conducted by a qualified professional during appropriate survey times. Survey reports and supporting documents should be uploaded through the DKey and users will be prompted to do so. Handling or research on endangered plants and animals is a regulated activity, requiring State and federal permits.

- If you can confirm habitat is absent within the Project Area, document what source(s) of information you consulted and justification for this conclusion.
- If you determine that habitat may be present or are uncertain whether habitat may support listed species, a detailed habitat assessment is recommended.
- If habitat occurs within the Project Area, species surveys are recommended (see section 1.4.3). Document that suitable habitat is present along with the source(s) of information you consulted and justification for this conclusion. Upload any survey reports through the DKey.
- If habitat occurs within the Project Area but surveys are not conducted, include this information in your project review package. It may be necessary to assume presence for species in these circumstances and consider implementing appropriate avoidance and minimization measures, accordingly.

1.1.1 Evaluating Presence of Listed Species within the Project Area

It may be necessary to conduct targeted surveys for listed species that may occur within the action area. Surveys that require capture, trapping, handling, or harassment of listed species are regulated through the section 10 permitting process. Surveys requiring section 10 authorization should be conducted by biologists carrying current State and Federal permits. Prior to conducting surveys, survey plans should be submitted to the Alabama Field Office for review and approval. Species survey reports and supporting documents should be uploaded through the DKey and users will be prompted to do so.

1.5 DETERMINATIONS OF THIS DKEY

While this DKey is an effort to streamline consultations, we first and foremost want to help action agencies ensure accurate determinations:

- A “no effect” [3] conclusion would be appropriate if the proposed action – or other activities that are caused by the proposed action – would have no consequences to listed species or critical habitat. Concurrence from the Service is not required.
- A ‘may affect’ determination would be appropriate if the proposed action – or other activities that are caused by the proposed action – may have consequences to listed species or critical habitat.
- If a “may affect” determination is made for a species, please include all conservation measures proposed to avoid, minimize, or mitigate for potential impacts. This will help you determine if a may affect determination is “likely to adversely affect” or “not likely to adversely affect” the species.
- A proposed action warrants a "may affect, not likely to be adversely affect" finding when its effects – and the effects of other activities that are caused by the proposed action – are wholly beneficial, insignificant or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and include those effects that are undetectable, not measurable, or cannot be evaluated. Discountable effects are those extremely unlikely to occur. These determinations require informal consultation and written concurrence from the Service.
- A proposed action warrants a “may affect, likely to adversely affect” finding when the proposed action – or other activities caused by the proposed action – will have negative consequences to listed species or resources. These determinations require formal consultation and written concurrence from the Service.

An action agency should always reach out if a different determination than what is generated using this DKey seems more appropriate. **This standing analysis is not to be construed as assuming the authority to make determinations provided to action agencies in the Act.**

1.6 UPDATES TO THE STANDING ANALYSIS

This standing analysis will be reviewed annually and updated as needed to ensure the analysis contains the best scientific and commercial data available. This update process will include regular reviews to ensure that the analysis is accurate and valid, and that the standing analysis still meets the Act’s requirements. All updates will also ensure that the logic is sound, and determinations are appropriate for covered activities. Updates will be signed under an updated cover.

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[3] A “no effect” determination is appropriate when either the species is not present in the action area or is not exposed to any possible stressors or impacts from the proposed action, or the proposed action would not result in any physical, chemical, biotic changes to the environment that are reasonably certain to occur and would not occur but for the action (i.e., no action area can be defined). This footnote needs to be changed because this is not accurate. A no-effect determination is also appropriate if it would not result in any physical, chemical, biotic changes to the environment that are reasonably certain to occur and would not occur but for the action (i.e., no action area can be defined).

Projects reviewed under this standing analysis must rely on the version that is current on the date consultation is completed. For reference, both current and previous versions of the standing analysis will be maintained by the Alabama ESFO.

If we revise the standing analysis and determine reinitiation is required for any ongoing activities that used the previous standing analysis, the Service will contact the respective action agency and advise them of their need to reinitiate.

2 COVERED AREA

This standing analysis applies within the entire state of Alabama. To qualify to use this standing analysis and the associated DKey, a project's action area must fall completely within the covered area.

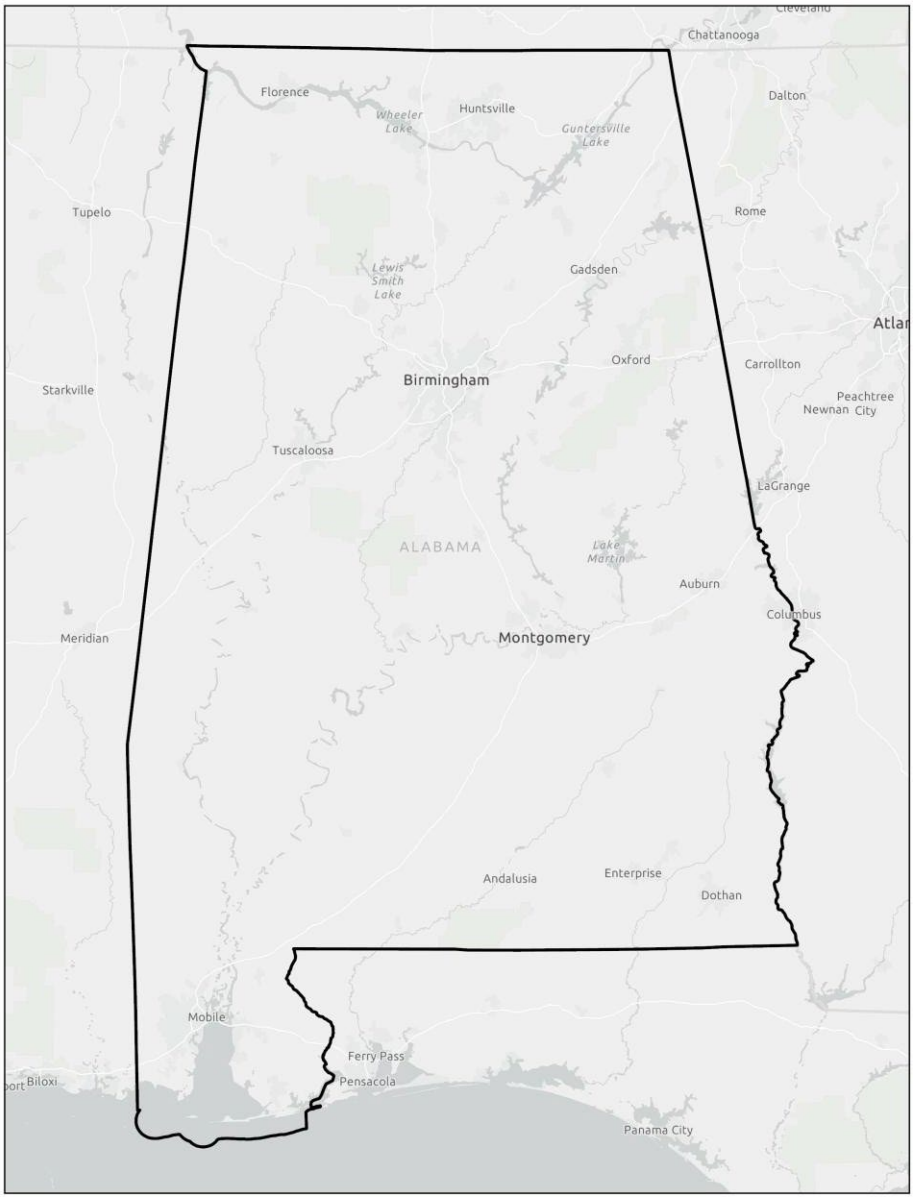


Figure 1. This standing analysis covers the entire state of Alabama and Mobile Bay.

3 COVERED ACTIVITY DESCRIPTION

The activities described herein include all activities addressed in this standing analysis. The activity description, conservation measures, and covered area inform the standing analysis and describe which specific activities are appropriate for NE or NLAA outcomes under this analysis. The description of activities and their inclusion in the standing analysis should not be construed to indicate that these activities will always result in effects to the species or its critical habitat, nor is it meant to cover activities that fall outside of the analysis as described below. Action agencies are not required to use this standing analysis; they continue to have the option to request

individual consultation on a project; however, in most cases, we anticipate use of the standing analysis will substantially decrease consultation timeframes.

Regarding critical habitat, note that older designations used the term "primary constituent elements" (PCEs) to identify the DKey components of critical habitat that are essential to its conservation and may require special management considerations or protection. Revisions to the critical habitat regulations in 2016 (81 FR 7214–7440, 50 CFR 424) discontinued our use of the term PCEs and substituted the term "physical and biological features" (PBFs) to refer to these components. For consistency, the term PBF will be used for the remainder of this document except within section 4, Covered Species and , where either PBF or PCE is used according to final critical habitat designations as written within the Federal Register.

3.1 Eligible Actions and Activities

Eligible actions and activities represent a compilation of many different types of projects that, depending on their size and specific location, often are not likely to adversely affect federally listed threatened or endangered species or critical habitats in Alabama. Common project types include, but are not limited to, the following:

- Vegetation management, including mowing, a subset of forestry activities, prescribed burning, and harvest
- Construction, maintenance, operation, and/or removal of:
    - Roads and trails
    - Transmission and utility lines
    - Bridges
    - Water supply lines
- Commercial, residential, and recreational developments
- Agricultural activities
- Site/habitat restoration/enhancement
- Shoreline protection and beach nourishment
- Military operations

Vegetation management is the practice of controlling and managing plant growth. Vegetation management can include the use of equipment or hand tools to remove or modify vegetation through cutting, pulling, grinding, burning or other methods.

Construction, maintenance, operation and/or removal of objects includes the use of equipment, tools or hands to build, create, attach or remove elements, materials, structures or pieces of equipment.

Commercial, residential, and recreational development includes creating new buildings or structures for business, residential, and recreational uses. Development encompasses various types of properties like office buildings, retail spaces, industrial facilities, family homes, apartments, facilities and for recreational spaces.

Agricultural activities encompass a wide range of practices involved in cultivating crops and raising livestock, including soil preparation, planting, irrigation, weeding, harvesting, mowing, and storage.

Site and habitat restoration or enhancement involves rehabilitating degraded ecosystems to restore their ecological function and diversity. Restoration efforts can include removing invasive species, planting native vegetation, and restoring natural waterways through in-stream or riparian activities.

Shoreline protection involves measures to reduce coastal erosion and mitigate the impacts of storms on shorelines. This can include both structural and non-structural approaches, such as building seawalls or groins, or using living shorelines with vegetation and natural materials. Beach nourishment involves adding sand or sediment to beaches to combat erosion and increase beach width.

Military operations encompass a wide range of organized activities. Operations can range from large-scale combat to humanitarian assistance and disaster relief and can involve various branches of the military. Military operations may include the movement of people or equipment, use of incendiary devices, use of projectiles or firing ranges, use of explosives, use of smoke or obscurants, use of aircraft, use of vehicles in road or off-road environments, maneuver, bivouac and field training exercises, climbing or survival exercises and/or subterranean training.

3.2 Limitations for Use of the Standing Analysis

To assist action agencies and project proponents in determining whether their project meets the requirements of this standing analysis, the Service will provide a series of questions (Appendix A). These questions include screening criteria that allow the action agency or project proponent to determine whether this standing analysis may apply to their individual project. This standing analysis applies only to projects that meet those screening criteria. Actions that include certain activities, occur in certain geographic areas, or meet one or more context-dependent conditions will not be eligible to use the standing analysis. Any actions that do not qualify under the screening criteria for this standing analysis will require separate individual consultation with the Alabama ESFO. This will also be the case if project details cannot be accurately captured through questions included in the DKey.

This standing analysis does not cover actions under the following context-dependent conditions:

- Actions that are already covered by a biological opinion. Also, actions where the action agency is following all conservation measures, project design criteria, best management practices, and reasonable and prudent measures as outlined in a biological opinion.
- Reinitiations of consultation, or requests for an extension on the timeline of an already existing formal consultation.

- Actions that are already covered by a Section 10 permit.[4]
- Actions that do not consider effect to the entirety of the action area, which may be larger than the project footprint or activities in the action agency's jurisdictional area.

For projects pertinent to this SA, additional questions provide for assessment of whether the action is not likely to adversely affect (NLAA) listed species or critical habitat. NLAA findings may occur because the impacts are either unable to be meaningfully measured, detected, or evaluated and, therefore, insignificant; or extremely unlikely to occur and, therefore, discountable. Any actions that are likely to adversely affect a listed species or critical habitat do not qualify under this standing analysis.

3.2.1 Activity-Based Limits/Sideboards

Based on experiences from passed consultations, certain actions and activities have a greater likelihood of interacting negatively with certain listed organisms that occur with Alabama. If the following actions and activities overlap with pertinent listed species, the Service will be unable to provide technical assistance acknowledgement of an action agency's NE, nor will we be able to provide concurrence for a NLAA determination.

- Construction or operation of wind turbines.
- New communication tower, transmission lines, or any other type of towers or poles with or without guy wires that may pose a collision risk to birds. The Alabama ESFO developed a separate DKey for these types of actions.
- New point source discharge into a stream or change to an existing point source discharge (e.g., outfalls; leachate ponds) from a facility other than a water treatment plant.
- Projects requiring contaminants in the environment (e.g., leachate pond, pits containing chemicals that are not compliant with NSF/ANSI Standard 60: Drinking Water Treatment Chemicals – Health Effects);
- Activities that contribute measurable nonpoint source pollution to streams (e.g., sediment, nutrients, etc.);
- Stream impacts that require an Individual Permit under Section 404 of the Clean Water Act;
- Activities that alter stream flow, such as hydropower energy production, impoundments, intake structures, diversion structures, and/or turbines;
- Dredging or in-stream gravel mining;
- Modification or construction of warm-water or freshwater discharges into manatee-accessible waters (e.g., from industrial sites, power plants, water treatment facilities, natural springs or artesian wells);
- Resource extraction (e.g., mining, oil/gas, logging) or associated exploration activities.

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[4] Section 10 of the ESA outlines activities that are exceptions to the activities prohibited in Section 9 of the Act. The exceptions most relevant to Section 7 consultations are takings allowed by two kinds of permits issued by the Services: (1) "take" permits for scientific purposes or to enhance populations; and (2) takes of listed species that occur incidental to otherwise legal activities. The ESA defines any attempt to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a listed species as a "take".

- Blasting or other detonation activity (e.g., for channel deepening and/or widening, geotechnical surveys or exploration, bridge and structure removals, movies, military shows, or special events), with the exclusion of fireworks displays;
- New or increased use of public recreational off-highway vehicles (OHV) trails;
- Activities that cause long-term or permanent damage, fragmentation, or conversion of suitable eastern black rail habitat;
- Activities occurring within 0.5mile of a known cave;
- Activities occurring within 0.5mile of a known gray bat record;
- Activities occurring within 0.5mile of a known gray bat hibernaculum and/or roosting site;
- Action areas containing features that could potentially provide undocumented hibernacula and/or roosting habitat for gray bats (i.e. bridges, culverts, undocumented caves, karst geology).
- Projects involving drilling or boring activities (preliminary surveys shall be conducted to ensure karst voids or other voids are unlikely to be encountered prior to drilling or boring and supporting documentation shall be provided to Alabama ESFO for review.)
- Projects including activities associated with maintenance, alteration, and/or removal of an existing structure(s) (bridges, culverts, buildings, bunkers, etc.)
- Purposeful take of a listed animal (e.g., capture and handling for surveys or research) is not covered under this SA. Covered activities in this SA are limited to those where take is not the purpose of carrying out an otherwise lawful activity.

For projects requiring consultation (i.e., that "may affect" listed species or critical habitats) due to one or more of these exclusions, action agencies/project proponents must contact the Alabama ESFO directly to complete their consultation requirements.

3.2.2 Location-Based Limits

As outlined in section 2, Covered Area, this standing analysis will apply only within the state of Alabama. Projects in the following areas do NOT qualify for evaluation through this DKey:

- Areas located within a unit designated pursuant to the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.)
- Sea turtle or fish habitat in marine waters, as those are outside of the Service's jurisdiction and administered by the National Oceanic and Atmospheric Administration's Fisheries Division (NOAA Fisheries).

3.2.3 Species-Based Limits

Table 1 (Section 1.1) lists the species and critical habitats that are covered by this DKey. In contrast, some species are excluded from the DKey analysis, as follows:

- Excluded due to limited range
  - Perdido key beach mouse (*Peromyscus polionotus trissyllepsis*; E)
  - Red Hills salamander (*Phaeognathus hubrichti*; T)
  - Alabama cavefish (*Speoplatyrhinus poulsoni*; E)
  - Alabama cave shrimp (*Palaemonias alabamae*; E)

- Slenderclaw Crayfish (*Cambarus cracens*; E)
- Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*; E)

· Extinct
- Flat pigtoe (*Pleurobema marshalli*)
- Southern acornshell (*Epioblasma othcaloogensis*)
- Stirrupshell (*Theliderma stapes*)
- Turgid blossom (*Epioblasma turgidula*)
- Upland combshell (*Epioblasma metastriata*)

· Covered in other determination keys
- Indiana bat (*Myotis sodalis*; E)
- Northern long-eared bat (*Myotis septentrionalis*; E)
- Tricolored bat (*Perimyotis subflavus*; Proposed E)

· Not in Alabama (extirpated and NEP yet to be affected in AL)
- Black clubshell (*Pleurobema curtum*; E)
- Birdwing pearlymussel (*Lemiox rimosus*; E; NEP yet to be affected in AL)
- Cumberland bean, (*Villosa trabalis*; the Cumberland bean [*V. trabalis*] population believed to be in AL is now described as purple bean [*V. perpupurea*])
- Clubshell (*Pleurobema clava*; E; NEP yet to be affected in AL)
- Cumberland monkeyface (pearlymussel) (*Theliderma intermedia*; E; NEP yet to be affected in AL)
- Dromedary pearlymussel, (*Dromus dromas*; E; NEP yet to be affected in AL)
- Fat threeridge mussel (*Amblema neislerii*; E)
- Littlewing pearlymussel (*Pegius fabula*; E),
- Orangefoot pimpleback (*Plethobasus cooperianus*; E),
- Purple cats paw (*Epioblasma obliquata obliquata*; E, NEP yet to be affected in AL)
- Ring pink (*Obovaria retusa*; E),
- Spotfin chub (*Erimonax monachus*; T; NEP yet to be affected in AL)
- Winged mapleleaf (Quadrula fragosa; E; NEP yet to be affected in AL)

2.1.1 Experimental population limits

In 2001, the Service designated the free-flowing reach of the Tennessee River downstream of Wilson dam as a non-essential experimental population for 16 freshwater mussel species and one freshwater snail species (66 FR 32250). Biological populations are not present in this reach for these species and therefore, the NEP is yet to be affected. Some of the species included in this designation no longer occur in Alabama and are included in the list above. Other species included in this NEP designation occur elsewhere in the state. This standing analysis does evaluate the designated NEP below Wilson Dam for the following species:

Alabama lampmussel (*Lampsilis virescen*s)

Cracking pearlymussle (*Hemistema lata*)

Finerayed pigtoe (*Fusconaia cuneolus*)

Oyster mussel (*Epioblasma capsaeformis*)

Shiny pigtoe (*Fusconaia cor*)

Anthony's riversnail (*Athearnia anthonyi*).

Also in 2001, the Eastern migratory range of the whooping crane (*Grus americana*) was designated as a non-essential experimental population (66 FR 33903). The entire State of Alabama was included in this designation. In Alabama, the species is primarily known to occur on Wheeler National Wildlife Refuge. The range-wide population was estimated at <300 in the 2012 5-year review conducted by the Service. Because of the limited extent of known occurrences and low population estimates, this standing analysis does not evaluate the designated Eastern migratory range of the whooping crane.

In 2005, the Service designated approximately 13.5 miles (22 kilometers) of Shoal Creek from the mouth of Long Branch in Tennessee to Goose Shoals in Alabama and the lower five kilometers of tributaries to Shoal Creek between these points as a non-essential experimental population for the boulder darter and spotfin chub (70 FR 17916). This standing analysis does not evaluate this designated NEP.

4 COVERED SPECIES AND CRITICAL HABITAT

The following section includes a summary of relevant background information on the species and critical habitats addressed in this standing analysis. This overview is included to inform the reader of the species prior to the analysis of the effects of the action presented below. It briefly describes the relevant biology of the species that may be exposed to the stressors identified in the proposed action, as well as required habitat conditions and general information about the species presence in the Covered Area. Species and critical habitats within a project's action area that may be affected by the proposed action, but are not covered by this standing analysis, will require individual consultation with the Alabama ESFO.

In addition to various references provided within species summaries, a link to the Service's species profile web page is provided for each species. Those profile pages contain additional information regarding the species, including extensive links to Federal Register publications, recovery documents and where applicable, critical habitat documents. Where the Service's species profile for a given species is referenced in the text, it will be cited as "Service Profile". Additional Service web resources referenced within the species descriptions include the Service's *In Focus* pages, cited as "Service Focus". All web pages that are referenced were accessed between November and December, 2025. For each species with designated critical habitat, a hyperlink to a pertinent Federal Register publication is provided.

4.1 MAMMALS

Gray bat (Myotis grisescens)

The gray bat was listed as 'endangered' across its range in 1976 (41 FR 17736). It generally occupies limestone karst areas of the southeastern and midwestern United States (Service 1982).

Populations are known or believed to occur in Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Mississippi, Missouri, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Virginia, West Virginia (Service Profile).

Gray bats migrate seasonally between winter hibernacula and summer maternity caves. They may migrate up to 300 miles between summer and winter caves (Solari 2018). Adults mate upon arrival at the wintering caves in Fall. Males arrive at the hibernacula first (mainly about September and October) to mate with the females before females enter hibernation (Service 2009, Green & Robbins 2020). The female bats begin hibernation immediately following mating; males and juveniles remain active longer, but will enter hibernation by early November. The females emerge from hibernation about late March to early April. At that time, pregnant females will disperse to maternity caves, where they form summer maternity colonies that are near foraging locations (Tuttle 1976b, Service 2009). They give birth to a single pup about late May or early June (Service 2009). Male and juvenile gray bats emerge shortly after the females and disperse to bachelor caves (Tuttle 1976a). The bachelor males will segregate into separate aggregations (several caves along a water source) within an overall colony home range area (Tuttle & Kennedy 2005).

Gray bats occupy the ceilings of caves or cave-like structures year-round for roosting and hibernating. They require caves that meet very specific seasonal temperature, humidity and structural conditions. In the summer, the maternity colonies will occur in relatively warm (14°-25°C) caves (or have restricted rooms that can trap the body heat of clustered bats) near a water source. Female bats that are raising young in maternity colonies require these elevated temperatures. In contrast, caves used for hibernation in winter are typically deep, vertical caves that trap large volumes of cold air (with temperatures between 43 to 52 °F [1°-9°C]); such caves are naturally rare. Gray bats require consistently cold temperatures to maintain hibernation and conserve energy in the winter months (Service 1982, 2009; Service Focus). They may show strong site fidelity to caves (Arroyo-Cabrales and Timm 2008, Solari 2018). In addition to caves, they may also use non-cave sites including concrete box culverts and crevices under bridges, mines, quarries and dams (Keely and Tuttle 1999, Cervone et al. 2016, Service 1982, 2009).

Gray bats emerge from summer roosts early in the evening and forage along rivers, streams, ponds, lakes, and reservoirs adjacent to forested areas (Tuttle 1976a, Service 2009). Gray bats typically change their diets throughout the season consuming the insects most readily available at the time. They will feed on aquatic insects associated with water or wetland vegetation such as flies, beetles, caddisflies, stoneflies, and mayflies in late spring and into the summer. Later in the summer as the maternity roost disperses, they include other insects from the orders of moths, bees, wasps, ants, and leafhoppers in their diet (Lacki et al. 2007). Because they are highly dependent on aquatic insects, intact riparian zones and good water quality are important to the foraging success of gray bats.

Gray bats have been documented traveling from a few miles to twenty or more miles between their day roosts and nightly foraging areas (Lacki et al. 2007). Gray bats will fly from their roost through slightly open foraging sites while on the commute to reach streams and rivers. During long foraging trips from the main roost, gray bats often choose to roost for the night, multiple

nights, or for only a few hours in an alternate roost. Females and flying pups will travel longer distances to forage than lactating females who may stay closer to the maternity roost (Lacki et al. 2007). However, the distance between roost caves and foraging sites can impact growth, percent of low-weight young, and mortality of newly flying young when the distance is relatively excessive (Tuttle 1976a). Critical habitat has been designated for this species.

At the time of listing, the main historical threats to the gray bat were human disturbance to roosting bats, environmental contamination, impoundment of waterways and roost modification or destruction. Such roost modifications include cave entrance or mine sealing and other modifications of the internal environment and entrances. The species is also negatively impacted by cave commercialization, improper gating, cave-ins and flood events. Emerging threats, like interactions with wind turbines and climate change are additional threats since gray bats were first federally listed. Because they roost on the ceilings of caves (as opposed to species that roost high up in trees), gray bats are particularly sensitive to human disturbance (e.g., physical contact, noise and artificial lighting) via cave entry and exploration. Some populations that reside within unprotected sites continue to suffer from repeated human disturbance (Service Focus, Service 2009). White-nose syndrome, caused by the fungus *Pseudogymnoascus destructans*, is a growing threat (Service 2009).

Service's profile page for gray bat: https://ecos.fws.gov/ecp/species/6329.

Alabama beach mouse (Peromyscus polionotus ammobates)

Alabama beach mouse was originally listed as endangered in 1985 (50 FR 23872). It is one of several subspecies of oldfield mice (*Peromyscus polionotus*) that are found living only in coastal sand dune areas along the Alabama and Florida coastline. The range of the Alabama beach mouse historically extended from Ono Island to Fort Morgan, and included much of the Fort Morgan Peninsula on the Alabama Gulf Coast. The current range is split into two populations: the Fort Morgan population, which extends from the tip of Fort Morgan peninsula to the west side of Little Lagoon Pass, in the City of Gulf Shores; and the Gulf State Park population, which is mainly located in Gulf State Park and limited adjacent areas in the City of Gulf Shores and Orange Beach, Alabama (Service Focus).

Alabama beach mice are monogamous (mate for life), live 5 to 9 months, and can reproduce throughout the year in good habitat (with fall and spring being peak periods for reproduction). The parents spend equal time caring for the young. Beach mice can have up to eight young, called pups or pinkies. Average births in the laboratory setting are about four young. It is believed that only about one or two of these young survive to adults. Females can become pregnant following birth of young, a trait known as postpartum estrus. Adult beach mice are 4 to 5 inches (10 to 13 cm) in length including the tail. They have slender body, bicolor fur, a tapered or pointed nose, small rounded ears and black eyes Adults average 0.46 ounces (13 grams) and pregnant females can exceed 0.71 ounces (20 grams). (Service Focus).

Being nocturnal, beach mice have large eyes and big ears to assist them as they leave their burrows at dusk and remain active at night. However, they are less active on full moonlit nights in order to avoid predators (Service Focus).

The Alabama beach mouse makes its home in coastal dunes, including primary, secondary, and tertiary and interior scrub dunes; these areas provide sites for burrows, food and water. Primary dunes generally consist of sand-covered slopes with patches of sea oats, other grasses, and herbs. When primary and secondary dunes are temporarily impacted or lost during and immediately following tropical storm events, more inland, scrubby dunes of the tertiary and interior categories provide refuge. Beach mice residing in scrub dunes will recolonize the primary and secondary dunes when they reform and are capable of supporting the population. Connectivity between these dune areas allow mice to move freely in search of food or burrow sites, and contribute to maintenance of genetic diversity needed for the long-term survival of the species. Thriving beach mouse populations are an indicator of healthy dune ecosystems which help protect coastal habitats, especially during hurricanes (Service Focus).

Beach mice build complex burrows which are dug into the sloping sides of these sand dunes. The burrow contains three main parts, an entrance tunnel, which extends down an incline, a nest chamber which is usually 2 to 3 feet underground, and an escape tunnel that rises from the nest chamber to within about an inch of the surface. Beach mice can quickly pop open this plug of sand and escape if threatened or disturbed. Within their home range, a beach mouse family will often use and maintain as many as 10 burrows (Service Focus).

Alabama beach mice diets consist of various plant seeds and insects. They depend on an assortment of foods throughout the year, including almost any native dune plant seeds or fruits such as sea oats, sea rocket, beach pea, bluestem grass, acorns (from oak trees growing in interior scrub), and insects (Service Focus).

The Alabama beach mouse faces several natural and human-made threats including severe weather events, invasive species, coastal development (including habitat loss, degradation and fragmentation) and predation by both native and non-native species (e.g., feral cats) (Service Focus).

Service's profile page for Alabama beach mouse: https://ecos.fws.gov/ecp/species/6956.

Alabama beach mouse (Peromyscus polionotus ammobates) critical habitat

Critical habitat for the Alabama beach mouse was designated in 2007 (72 FR 4330).

Five critical habitat units were designated, all within Baldwin County, Alabama. Unit 1 is at Fort Morgan, consisting of 446 ac (180 ha) at the extreme western tip of the Fort Morgan Peninsula. Unit 2 is at Little Point Clear, consisting of 268 ac (108 ha) on the Fort Morgan Peninsula. Unit 3 is at Gulf Highlands, consisting of 275 ac (111 ha) on the Fort Morgan Peninsula. Unit 4 is at Pine Beach, consisting of 30 ac (12 ha) on 27 inholdings within the Perdue Unit of the Bon Secour National Wildlife Refuge. Unit 5 is east of the City of Gulf Shores at Gulf State Park, consisting of 192 ac (78 ha).

The PCEs for the Alabama beach mouse are:

1. A contiguous mosaic of primary, secondary, and scrub vegetation and dune structure, with a balanced level of competition and predation and few or no competitive or predaceous

nonnative species present, that collectively provide foraging opportunities, cover, and burrow sites.
2. Primary and secondary dunes, generally dominated by sea oats (*Uniola paniculata*), that despite occasional temporary impacts and reconfiguration from tropical storms and hurricanes, provide abundant food resources, burrow sites, and protection from predators.
3. Scrub dunes, generally dominated by scrub oaks (*Quercus* spp.), that provide food resources and burrow sites, and provide elevated refugia during and after intense flooding due to rainfall and/or hurricane-induced storm surge.
4. Functional, unobstructed habitat connections that facilitate genetic exchange, dispersal, natural exploratory movements, and recolonization of locally extirpated areas.
5. A natural light regime within the coastal dune ecosystem, compatible with the nocturnal activity of beach mice, necessary for normal behavior, growth, and viability of all life stages.

Critical habitat does not include manmade structures (such as buildings, aqueducts, airport runways, roads, other paved areas, and piers) and the land on which they are located existing within the legal boundaries on the effective date of this rule (March 1, 2007).

West Indian manatee (Trichechus manatus)

The West Indian manatee is a large, herbivorous marine mammal. It was listed as endangered in 1967 (32 FR 4001). There are two subspecies, the Florida manatee (*T.m. latirostris*) and the Antillean manatee (*T.m. manatus*). Antillean manatees are found along the Mexican Gulf of America coastline, down through Central America, and continuing to Brazil's northeastern Atlantic coastline, as well as in the Caribbean Basin. The Florida manatees' range is generally restricted to the southeastern United States (Service Profile). The range of the threatened Florida manatee subspecies extends into Alabama waters. However, it is possible that the Antillean manatee subspecies could also occur in Alabama waters. Intolerance to cold waters limits their distribution in North America; they cannot tolerate temperatures below 68 degrees Fahrenheit for extended periods of time (Service Focus). Florida manatees winter in Florida, and during the warmer months expand as far west as Texas and north to Massachusetts (more typically Louisiana to South Carolina; Service Focus). Because they are a sub-tropical species with little tolerance for cold, they return to natural springs and other warm-water sites in peninsular Florida as water temperatures decrease in the fall, and remain in the vicinity of warm-water sites through the winter.

Manatees are found in freshwater, brackish and marine environments. Specific habitat types/use areas include foraging and drinking sites, resting areas, travel corridors and others (Service Profile). Those needs are variously attained in coastal and inland habitats including slow-moving tidal rivers and streams, canals, mangrove swamps, estuaries, freshwater springs, and seagrass beds.

Manatees use springs and freshwater runoff sites for drinking water; secluded canals, creeks, embayments, and lagoons for resting, cavorting, mating, calving and nurturing their young; and open waterways and channels as travel corridors. During the winter months, Florida manatees use warm water sites generally characterized as natural springs, industrial plants with thermal outfalls (such as power plants), and passive thermal basins (Service Profile).

Manatees feed opportunistically on a wide variety of marine, estuarine, and freshwater plants, including submerged, floating, and emergent vegetation. Common forage plants include smooth cordgrass, alga, turtle grass, shoal grass, manatee grass, eel grass, and other submerged and emergent plant types. Preferred habitats include areas near the shore featuring submerged aquatic vegetation like seagrass and eelgrass. They feed along grass bed margins with access to deep water channels, where they may flee when threatened (Service Focus). Calves initially suckle and may start feeding on plants when they are a few months of age. Manatees also require freshwater, obtained from both natural and anthropogenic sources (Service Profile). The imported exotic plant, *Hydrilla sp.* (which has replaced native aquatic species in some areas), has become an important food source at wintering sites.

Historically, this sub-species has sought out natural, warm-water sites, including springs, deep water areas, and areas thermally influenced by the Gulf Stream, as refuges from the cold. In the early 1900s, industrial plants, including power plants, paper mills, and other industrial plants, were built along coastal and riverine shoreline areas. Plants discharging large volumes of heated discharge water into areas accessible to manatees have attracted large numbers of wintering manatees to these warm-water sites ever since (Service Profile).

The health and survival of the West Indian manatee is threatened by human-related impacts such as collisions with watercraft, habitat loss (both the loss of forage and warm water), entanglements in fishing gear and other marine debris, entrapments due to high water events, crushing in navigation locks or other water control structures, as well as cold snaps and red tide events (Service Focus). Critical habitat, limited to within the state of Florida, was designated in 1976 and revised in 2024 (89 FR 78134)

Service's profile page for West Indian manatee: https://ecos.fws.gov/ecp/species/4469.

4.2 Birds

Piping plover (Charadrius melodus)

The piping plover was federally listed as endangered in the Great Lakes watershed, and threatened elsewhere in its range in 1985 (50 FR 50726). It is a small, stocky, and light-colored migratory shorebird. Its distribution is divided into three North American breeding populations: the Great Lakes, the Northern Great Plains, and the Atlantic Coast. It does not breed in Alabama; however, individuals from all three breeding populations are present during spring and fall migrations and winter along the Atlantic and Gulf coasts from North Carolina to Texas. After leaving their breeding grounds they can arrive to the coast as early as July, with late nesting birds arriving in September. They may spend 7 to 8 months in their wintering areas. A few birds may be present year-round, but sightings are rare in late May, June, and early July.

In most areas, wintering piping plovers are dependent on a mosaic of sites distributed throughout the landscape, because the suitability of a particular site for foraging or roosting is dependent on local weather and tidal conditions. In general, piping plovers require low, sparsely vegetated beaches juxtaposed with abundant moist foraging substrates along the Gulf or Atlantic coasts. They forage for invertebrates in a variety of ephemeral or dynamic habitats with no or very sparse emergent vegetation. Habitats include intertidal beaches (bay shorelines and ocean-facing

beaches), intertidal substrates (e.g., mudflats, sand flats, algal flats, exposed sea grass beds and oyster reefs), ephemeral pools, shorelines along the mouths of rivers, spits, salterns, and wash-over passes (areas where breaks in the sand dunes result in an inlet), and spoil sites. They aggregate on beaches (for roosting and foraging) when back bay flats are tidally inundated. They roost in unvegetated or sparsely vegetated areas, which may have debris, detritus, or micro-topographic relief that offers refuge from high winds and cold weather. They also forage and may roost in wrack (seaweed or other marine vegetation) deposited on beaches. While they move among sites as environmental conditions change, studies have indicated that they often remain within a 2-mile area. Individual plovers tend to return to the same wintering sites year after year.

Major past and ongoing threats include the loss and degradation of habitat due to development, disturbance by humans and pets, and predation. Oil spills (and associated clean-up responses) and storms (and shoreline stabilization efforts that tend to follow) have the potential to exacerbate ongoing threats from habitat loss and human recreational disturbance locally and regionally. Additional threats include harmful algal blooms or "red tides", sea-level rise, and severe cold weather events.

Service's profile page for piping plover: https://ecos.fws.gov/ecp/species/6039.

Piping plover (Charadrius melodus) critical habitat

Critical habitat on the wintering grounds was first designated in 2001 (66 FR 36038). There are 3 critical habitat units designated in Alabama. These areas contain the essential physical and biological features for the conservation of wintering piping plovers, and the physical features necessary for maintaining the natural processes that provide appropriate foraging, roosting, and sheltering habitat components.

The primary constituent elements for piping plover are found in geologically dynamic coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide. Specific primary constituent elements (essential physical and biological features) include:

1. Intertidal sand beaches (including sand flats) or mud flats (between the MLLW and annual high tide) with no, or very sparse, emergent vegetation for feeding. In some cases, these flats may be covered or partially covered by a mat of blue-green algae.
2. Unvegetated or sparsely vegetated sand, mud, or algal flats above annual high tide for roosting. Such sites may have debris or detritus and may have micro-topographic relief (less than 20 in (50 cm) above substrate surface) offering refuge from high winds and cold weather.
3. Surf-cast algae for feeding.
4. Sparsely vegetated backbeach, which is the beach area above mean high tide seaward of the dune line, or in cases where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road. Backbeach is used by plovers for roosting and refuge during storms.
5. Spits, especially sand, running into water used for foraging and roosting.

6. Salterns, or bare sand flats in the center of mangrove ecosystems that are found above mean high water and are only irregularly flushed with sea water.
7. Unvegetated washover areas with little or no topographic relief for feeding and roosting. Washover areas are formed and maintained by the action of hurricanes, storm surges, or other extreme wave actions.
8. Natural conditions of sparse vegetation and little or no topographic relief mimicked in artificial habitat types (e.g., dredge spoil sites).

Rufa red knot (Calidris canutus rufa)

The rufa red knot is a robin sized, migratory shorebird, and one of six subspecies of red knot (*Calidris canutus*). The Service published a final rule listing the *C. canutus rufa* subspecies as a threatened species under the ESA in 2014 (effective January 12, 2015; 79 FR 73705). The rufa red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions including the Southeast U.S., the Northeast Gulf of America, northern Brazil, and Tierra del Fuego at the southern tip of South America. The red knot breeds about June through mid-July and can be found in Alabama during spring and fall migrations and the winter months, typically from September to April.

Coastal habitats used by rufa red knots in migration and wintering areas are similar in character, generally coastal and estuarine habitats with large areas of exposed intertidal sediments. In nonbreeding habitats, they require sparse vegetation and open landscapes to avoid predation. They forage for invertebrates in a variety of ephemeral or dynamic habitats with no or very sparse vegetation. Wintering habitats include both high-energy ocean- or bay-front areas, as well as tidal flats in more sheltered bays and lagoons. Preferred wintering and migration habitats are muddy or sandy coastal areas, specifically, bays and estuaries, tidal flats, and unimproved tidal inlets. Additional habitats include sand spits, islets, shoals, sandbars, and wash-over areas, features often associated with inlets. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important. In many wintering and stopover areas, quality high tide roosting habitat (i.e., close to feeding areas, protected from predators, with sufficient space during the highest tides, free from excessive human disturbance) is limited. In general, typical red knot wintering habitat in Alabama includes those coastal areas that support intertidal beaches and flats and associated dune systems and flats above annual high tide.

Red knots feed on invertebrates, especially small clams, mussels, and snails, but also crustaceans, marine worms, and horseshoe crab eggs. The spring migration is timed to coincide with the spawning season for the horseshoe crab (*Limulus polyphemus*). Horseshoe crab eggs provide a rich, easily digestible food source for migrating birds. On the breeding grounds, knots mainly eat insects.

Major threats to this subspecies along the Gulf of America include the loss and degradation of habitat and reduced prey availability due to erosion, shoreline stabilization, and development, and disturbance by humans and their pets. Rufa red knot was originally listed as threatened in 2015. The magnitude and imminence of the primary (high severity) threats to the rufa red knot (including sea level rise, coastal engineering/development, arctic ecosystem change, reduced

food availability, and timing asynchronies) are increasing. Only one secondary threat (subsistence hunting) has decreased since listing, while all other secondary threats (invasive vegetation, aquaculture, predation in nonbreeding areas, human disturbance, wind energy development, harmful algal blooms, and oil spills) are continuing and increasing in magnitude, singly and cumulatively contributing to reduced rufa red knot survival.

Critical habitat has not been designated for this species in Alabama, but was proposed by the Service in 2023 (88 FR 22530).

Service's profile page for rufa red knot: https://ecos.fws.gov/ecp/species/1864.

Eastern Black Rail (Laterallus jamaicensis ssp. jamaicensis)

Eastern black rail is a subspecies of black rail that was listed under the ESA as threatened in 2020 (85 FR 63764). It is a sparrow-sized, secretive marsh bird that occurs in salt, brackish, and freshwater wetlands in the eastern United States (east of the Rocky Mountains), Mexico, Brazil, Central America, and the Caribbean. The eastern black rail was historically present during breeding months at inland and coastal locations throughout southeastern coastal states including North Carolina, South Carolina, Georgia, Florida, Tennessee, Mississippi, Alabama, Louisiana, and Texas (Watts 2016). Georgia, Tennessee, Mississippi, Alabama, and Louisiana either do not have a history of supporting eastern black rails consistently or are considered to be on the peripheries of known breeding areas (Watts 2016).

Eastern black rails are dependant on wetlands with emergent aquatic vegetation that provides dense overhead cover, and moist to saturated (occasionally dry) soils, typically interspersed with or adjacent to very shallow water (≤ 1.2 inches [≤ 3 cm]). They occupy areas along gentle wetland-to-upland gradients. They require a mosaic (i.e., wetland-upland complex) of dense cover to survive high water events, due to the propensity of juveniles and adults to walk and run rather than fly, and chicks' inability to fly. Their location across this gradient may vary with shifts in the extent of shallow inundation (sheet water). These dynamic (tidally or non-tidally influenced) wetlands provide reliable foraging and refuge habitat, especially during high water events, when the birds, particularly flightless chicks, rely on adjacent higher ground with dense cover.

Habitat suitability is more influenced by vegetation structure than plant species composition, and successful nesting requires well-concealed sites over moist soil or shallow water. Flooding is a major threat to nest success, making stable, low water levels critical during nesting. Optimal foraging and chick-rearing conditions are found in shallow pools 0.4 –1.2 in deep. At coastal sites they are often associated with cordgrass (*Spartina spp.*). Flooding is a frequent cause of nest failure for eastern black rails; therefore, water levels must be lower than nests during egg-laying and incubation for nests to be successful. Shallow pools (≤ 1.2 inches [≤ 3 cm] deep) may be the most optimal for foraging and for chick-rearing. Eastern black rails consume invertebrates and seeds.

The primary threats to the Eastern black rail derived from habitat degradation and fragmentation with conversion of marshes and wetlands to agricultural lands or urban areas. Additional threats

include altered hydrology; mosquito control activities including marsh draining and ditching; ground-and surface-water withdrawals; incompatible vegetation management such as poorly timed prescribed fire, grazing, or mechanical treatments; extreme weather events and sea level rise; environmental contaminants including oil and chemical spills; disease; altered food webs and predation; and human disturbance. Negative impacts are especially likely at sensitive times, such as the breeding season or the flightless molt period. Flooding is a major threat to nest success.

The Service published a rule under ESA that specifies prohibitions that are tailored to the specific threats and conservation needs of this subspecies and provides conservation measures to support the species (85 FR 63764). However, critical habitat has not been designated (85 FR 63764), because doing so would specify locations of this subspecies, which is vulnerable to disturbance.

Service's profile page for eastern black rail: https://ecos.fws.gov/ecp/species/10477.

Red-cockaded woodpecker (Picoides borealis)

The red-cockaded woodpecker (RCW) is restricted to the southeastern United States. It was listed as endangered in 1970, and downlisted to threatened status in 2024 based on a review which indicated that the species' status has improved such that it is not currently in danger of extinction throughout all or a significant portion of its range (89 FR 85294).

RCWs occupy old growth longleaf pine (*Pinus palustris*) with a mostly grassy understory. They require open pine woodlands and savannahs with large mature pines for nesting and roosting, and foraging habitat. Nesting and roosting pine trees must be in open stands with little or no hardwood midstory and few or no overstory hardwoods, a condition maintained by frequent fires. Cavity trees are used for nesting and roosting. While other woodpeckers bore out cavities in dead trees where the wood is rotten and soft, the RCW is the only woodpecker species that excavates cavities exclusively in living pine trees. They favor older pines that suffer from a fungus called red heart disease, which attacks the center of the trunk causing the inner wood (heartwood) to become soft. Longleaf, loblolly and shortleaf pine trees that are older (60 years or more) and have a minimum 10-inch diameter at breast height (dbh) are preferred as nesting cavities.

RCW also require abundant foraging habitat. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or no overstory hardwoods, and abundant native bunchgrass and forb groundcovers. RCW require savannah or open pine forests with widely spaced older trees, which are maintained by periodic fires to control undergrowth.

Cavity trees being actively used by woodpeckers have numerous small resin wells which exude sap, giving the tree a waxy candle appearance. RCWs exploit the ability of live pines to produce large amounts of resin by causing the cavity tree to exude resin through wounds, known as resin wells, that the birds keep open. The resin helps to protect cavities from predators. Longleaf pine is a preferred tree species for cavity excavation because it produces more resin, and for a longer

period of time, than other southern pines. Older pines have a higher incidence of the heartwood decay that facilitates cavity excavation. Excavation of a cavity generally takes from 1 to 3 years.

RCW is a cooperatively breeding species, living in family groups that typically consist of a breeding pair with or without one or two male helpers. RCW groups roost and nest in clusters of 1 to 30 pines with cavities; habitat in these areas consist of cavities that are under construction, in use, or abandoned.

The primary threats to RCW viability are associated with the lack of suitable habitat. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. RCW requires open mature pine woodlands and savannahs maintained by frequent fire, and there is very little of this habitat remaining when compared to historical levels. On public and private lands, both the quantity and quality of RCW habitat are impacted by past and current fire suppression and detrimental forestry practices. Threats stemming from this lack of suitable habitat include: insufficient numbers of cavities and continuing net loss of cavity-bearing trees; habitat fragmentation and its effects on genetic variation, dispersal, and demography; lack of foraging habitat of an adequate quality; and fundamental risks of extinction inherent to critically small populations from random demographic, environmental, genetic, and catastrophic events. These threats continue to be addressed via short and long-term habitat and population management programs (e.g., prescribed burning, artificial cavity installation, and translocations).

Service's profile page for red-cockaded woodpecker: https://ecos.fws.gov/ecp/species/7614.

4.3 Turtles and Tortoises

Alabama red-bellied turtle (Pseudemys alabamensis)

The Alabama red-bellied turtle is a large, primarily aquatic turtle that is diurnal and spends most of the day either foraging in vegetated areas or basking. It is one of a group of turtle species commonly called cooters. Alabama red-bellied turtle was listed as endangered in 1987 (52 FR 22939). The range is limited to portions of southern Mississippi and Alabama. Alabama counties in which they are known or believed to occur include Baldwin, Clarke, Mobile and Washington.

Several longevity records indicate that Alabama red-bellied turtles live at least 11 to 14 years. Alabama red-bellied turtles are generally active from March through November with the peak of activity occurring from April through September. Nesting begins in late April and continues into mid-August. Nesting is typically nocturnal but daytime nesting has been observed. Data on the number of eggs laid per individual clutch range from 4 to17 eggs, and females can lay multiple clutches in a season (Service 2019a, 2021).

The Alabama red-bellied turtle lives in broad, vegetated expanses of shallow water in backwater areas of bays, in and along river channels, in oxbow lakes, and in fresh to brackish marshes. Snags and dense beds of submerged and emergent aquatic vegetation provide them with a substrate for cover, predator avoidance, food, and structure for basking and thermoregulation. Although regarded as a freshwater species, the occasional presence of barnacles on Alabama red-

bellied turtle shells indicates that the turtle is tolerant to low levels of salinity (probably less than 5 parts per thousand) (Service 2019a, 2021).

Submerged aquatic vegetation is the major component of its diet, but the turtle also eats shrimp and likely other invertebrates such as isopods, aquatic snails, and insects. Turner (2001) found that when available, Alabama red-bellied turtles will feed heavily upon *Hydrilla verticillata*, (water thyme). Floyd (1995) observed Alabama red-bellied turtles in Mississippi feeding upon *V. americana* and *Sagittaria kurziana* (springtape or strap-leaf sagittaria).

There are limited data on natural Alabama red-bellied turtle nesting habitats. The two concentrated nesting areas known in Alabama are human-altered sites created from local dredge spoil. Due to heavy predation at these sites, they may act as population sinks. Nesting in small pockets of appropriate habitat is probably the historical norm and likely offers more protection from predation. Observations in Mississippi indicated nests were located most frequently under tree canopies in partial shade, receiving less than 50% sunlight. Nests were located in diverse habitats, with most located within 200 m of river shoreline or marsh (Service 2019a, 2021).

Analyses of the past, current, and future risks to long-term viability of the Alabama red-bellied turtle revealed that they primarily related to habitat changes, particularly loss of wetlands and associated submerged aquatic vegetation, from development and sea level rise. Many of the threats present at the time of listing still remain. The reduction in submerged aquatic vegetation as a result of declining water quality, hurricanes and sea level rise, is still considered a threat today. Heavy predation at nest sites and low juvenile recruitment in Alabama are ongoing. Artificial rearing sites (i.e. spoil sites) continue to function as population sinks. “Recreational” shooting of turtles continues and an increasing amount of human use of occupied nesting and foraging habitat for boating, other recreational uses, and development are having direct and indirect effects on Alabama red-bellied turtle populations. The importance of water quality degradation likely influences aquatic vegetation, critical for feeding, sheltering, and basking (Service 2021).

Service’s profile page for Alabama red-bellied turtle: https://ecos.fws.gov/ecp/species/1494.

Flattened musk turtle (Sternotherus depressus)

The flattened musk turtle was listed as threatened in 1987 (52 FR 22418). It is a small aquatic turtle that is endemic to and limited to the upper Black Warrior River system in Alabama. They have a distinctly flattened carapace (upper shell), up to about 4.7 inches (11.93 cm) long. It has been estimated that they currently inhabit about 25 to 30 percent of the historic range in the upper Black Warrior river system. The turtle is active about the months of April to October. They are primarily nocturnal, with juveniles more likely than adults to exhibit some daytime activity (Service Focus).

Optimum habitat of the flattened musk turtle appears to be free-flowing large creeks or small rivers with vegetated shallows about 2 feet (0.61 meters) deep alternating with pools 3.6 to 5 feet (1.1 to 1.52 meters) deep. These pools have a detectable current and an abundance of crevices and submerged rocks. Habitats with high amounts of sand are suitable as long as plenty of

bedrock, boulder and cobble substrate and suitable food supply exist. In impounded systems, the turtle can be found in the headwaters and around the margins of lakes. Turtles in lake habitats often prefer areas along the bank that have an abundance of shelf-like rocks. While little is known about nesting preference of the flattened musk turtle, it is thought that they nest within 100 feet from the river bank. Other factors that indicate good habitat quality for this turtle include abundant snails and mussels, low silt load and deposits, low nutrient and bacterial counts, moderate temperature and minimal pollution (Service Focus).

The diet consists primarily of mollusks, including aquatic snails, mussels and clams, and aquatic insects. The diet includes the non-native, Asiatic clam. Juveniles, turtles that are less than 2.75 inches (6.99 centimeters), primarily prey upon softer-bodied aquatic insects (Service Focus).

Female flattened musk turtles reach sexual maturity at 6 to 8 years of age, while males require only four to six years to reach sexual maturity. Females lay two clutches of eggs per year, with clutch size ranging from one to three eggs. The nesting season is May through September. Ovulation occurs in May, for the first clutch, and in June, for the second clutch. Eggs in the first clutch are usually laid in May, while eggs in the second clutch are laid in the middle of June through early July. The incubation period is not known, although, one natural nest that contained two eggs took at least one and a half months to hatch.

Siltation has been reported to be the biggest threat to populations of flattened musk turtles. Habitat has also been lost to impoundments and development. Over-collecting for the pet trade is an additional threat to the species (Service Focus).

Service's profile page for flattened musk turtle: https://ecos.fws.gov/ecp/species/6961.

Gopher tortoise (Gopherus polyphemus) – Western Distinct Population Segment

The gopher tortoise is a long-lived, burrowing species, and the only native tortoise of the southeastern United States (including Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina). The overall range of the species largely aligns with the historic range of the open, fire-maintained longleaf pine ecosystem (Service Project). The western population (from the Tombigbee and Mobile Rivers in Alabama west to southeastern Louisiana on the lower Gulf Coastal Plain) was listed as threatened in 1987 (52 FR 25376). The western population is far smaller than the eastern Distinct Population Segment and is comprised by smaller, more isolated populations with lower resiliency and greater vulnerable to catastrophic events. Populations in the western portion of the range have a smaller clutch size, lower hatch rate, and larger home range, likely related to clay soils and poorer habitat quality in the western portion of the range (Service Project).

Typical gopher tortoise habitat consists of an open canopy with a diverse array of groundcover vegetation occurring on well-drained, sandy soils with widely spaced trees and shrubs. In the range of the overall species, these traits are generally found in dry uplands such as sandhills and scrub, longleaf pine savannas, upland hammocks, pine flatwoods, dry prairie, coastal grasslands and dunes, mixed hardwood-pine communities, and a variety of disturbed plant communities (Service Focus). Historically, typical gopher tortoise habitat consisted of open, frequently burned

longleaf pine or longleaf pine/scrub oak uplands and flatwoods on moderately well drained to dry (xeric) sandy soils. Such habitat provided adequate sunlight reaching the forest floor to stimulate the growth and development of herbaceous groundcover for forage, with sufficient warmth for basking and the incubation of eggs. Gopher tortoises prefer "open" longleaf pine-scrub oak communities that are thinned and burned every few years. The general physical and biotic features thought to characterize suitable tortoise habitat are: 1) presence of well-drained, sandy soils, which allow easy burrowing; 2) an abundance of herbaceous ground cover; and 3) generally open canopy and sparse shrub cover, which allows sunlight to reach the ground (Cox et al. 1987).

Gopher tortoises occur in a variety of habitat types in the Dkey area of influence in Alabama. Habitat in upland forests include stands of longleaf pine, pine-scrub oaks, as well as sufficiently open sites converted to loblolly pine and slash pine production. They may also occur in areas such as open ROWs (e.g., for roads, gas and electric utilities) and pastures.

Tortoises mostly forage on foliage, seeds, and fruits of grasses and forbs, generally in an area of about 150 feet surrounding each burrow (McRae et al. 1981; Diemer 1992). They feed extensively on broadleaf grasses, wiregrass, asters, legumes, and fruit, but are known to eat more than 300 species of plants, and may also include some insects and carrion. Juvenile gopher tortoises tend to forage on fewer plant species, eat fewer grasses, and select more forbs, including legumes, than adults (Service Project).

Females usually lay five to seven eggs from mid-May through the end of June in the soil of the apron at the burrow entrance (Butler and Hull 1996; Smith et al. 1997) and egg incubation lasts 80 - 110 days (Diemer 1986; Smith et al. 1997).

The primary threats to the gopher tortoise are fragmentation, destruction, and modification of its habitat, including urbanization. Other threats include: mortality due to vehicle strikes; effects of climate change including increased drought and extreme high temperatures, sea level rise, and migration of human populations from inundated coastal areas; nonnative invasive species, disease, and predation (mainly on nests and hatchlings). Increased drought and high temperatures also reduce the number of days that prescribed fire can be used for habitat management, which leads to further degradation and loss of habitat (Service Project).

Service's profile page for gopher tortoise: https://ecos.fws.gov/ecp/species/6994.

4.4 Sea Turtles

Alabama's coastal beaches are known to serve as nesting grounds for three sea turtle species: green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and loggerhead (*Caretta caretta*) sea turtles. The leatherback (*Dermochelys coriacea*) may nest in Alabama. The hawksbill (*Eretmochelys imbricata*) is not likely to nest in Alabama. As federal trust resources, federal jurisdiction of sea turtles are shared by the Service and NOAA Fisheries. The Service has jurisdiction of sea turtles on land, while NOAA Fisheries has jurisdiction of these species in coastal and offshore waters. This standing analysis does not evaluate sea turtle habitat in marine waters, because that is under the jurisdiction of NOAA Fisheries. The information on this page

largely reflects Service data for sea turtles in Alabama; for information regarding NOAA Fisheries actions such as critical habitat designations or recovery planning, please visit the NOAA Fisheries endangered species website.

Sea turtles generally share a life history pattern that includes three basic ecosystem zones: (1) Terrestrial zone (supralittoral) - the nesting beach where both oviposition and embryonic development occur; (2) Neritic zone - the nearshore (including bays and sounds) marine environment (from the surface to the sea floor) where water depths do not exceed 200 meters, including the continental shelf; and (3) Oceanic zone - the vast open ocean environment (from the surface to the sea floor) where water depths are greater than 200 meters.

Sea turtles are long-lived, slow-growing predominantly marine animals. In the southeastern United States, overall sea turtle nesting is encompassed within March to October, and incubation lasts about 40 to 75 days. The species share similarities in nesting behaviors, such as a preference for sandy, ocean-facing areas with adequate substrates, in which the eggs are passively incubated. Suitable substrates allow for humidity as well as sufficient gas exchange and temperatures conducive to embryo development. Green, hawksbill, leatherback, and loggerhead sea turtles are solitary night-time nesters. Kemp's ridley sea turtles often nest during the day and in large groups. Nests incubate for variable periods of time, and length of the incubation period is inversely related to nest temperature. Sea turtle hatchlings pip and escape from their eggs and then move upward and out of the nest over a period of several days. Hatchlings usually emerge from their nests *en masse*, at night or in the early morning, but can also emerge during the day. Immediately after hatchlings emerge from the nest, they crawl to the surf. Hatchlings first use visual cues, orienting to the brightest horizon, which is over the ocean on natural beaches without artificial lighting. After reaching the surf, hatchlings swim away from the beach and are swept through the surf zone and proceed further toward open water. For all species of sea turtle that nest on Alabama's beaches, the nesting season is May-September, and the hatching season is June through October.

Categories of activities that may impact sea turtle habitats and its physical or biological features and may require special management considerations or protection to reduce threats to sea turtle species include: (1) recreational beach use; (2) beach maintenance; (3) predation; (4) beach sand placement; (5) in-water and shoreline alterations; (6) coastal development; (7) lights on land or in adjacent water, which can deter nesting and disorient hatchlings and nesting females. This includes direct or indirect lighting visible from the nesting beach, such as skyglow and bonfires, particularly artificial lighting with unshielded lamps and wavelengths below 540 nm; (8) beach access; (9) climate change; (10) habitat obstructions; (11) human-caused disasters and responses to natural and human-caused disasters; and (12) military testing and training activities.

Primary stressors to nesting female sea turtles, eggs, and hatchlings arise from disturbance to nesting habitat in coastal beaches or associated dunes. Coastal development and construction result in habitat loss and degradation of critical nesting beaches. Beach erosion, caused by both natural processes and human activities, also compromise the conditions necessary for successful nesting. The placement of erosion control structures, such as seawalls, can alter natural environments, rendering them less suitable for nesting. Practices like beach sand placement and

sand extraction modify beach profiles, ultimately decreasing nesting success. High tides and washouts can flood nests. Human activities, including vehicular and pedestrian traffic, can also lead to the destruction of nests and disturb the nesting process. Additionally, artificial lighting on beaches deters nesting females and disrupts their natural behaviors. The removal of native vegetation and the introduction of non-native plants also degrades nesting habitats. Turtles often return to the same area in subsequent years if habitat remains suitable. Beach development, illumination and other disturbances often make beaches unsuitable for successful nesting.

Hatchlings encounter a variety of threats as they emerge from nests and make their way to the ocean. Artificial lighting is a significant hazard, as it can disorient hatchlings and lead them away from the sea, increasing the likelihood of mortality. Predation by both native and non-native species, such as raccoons, birds, and feral pigs, poses a constant danger to eggs and hatchlings alike. Beach driving can also kill hatchlings and obstruct their path to the water. Debris left on beaches can trap hatchlings or impede their movement. Microplastic pollution affects the temperature and permeability of the sand, disrupting the incubation environment and potentially harming hatchlings during their transition to the ocean.

Green Sea Turtle (Chelonia mydas)

Green sea turtles grow to a maximum size of about 4 feet, they have a heart-shaped shell, small head, and single-clawed flippers. They are distributed around the globe, occurring primarily in tropical and subtropical waters. Green sea turtles were originally listed as endangered in 1978. In 2016, that listing was removed and instead the species was listed as Distinct Population Segments, including three endangered and eight threatened (81 FR 20058). Green sea turtles associated with the southeastern United States are attributed to the North Atlantic Distinct Population Segment, as threatened. The green sea turtle is known to nest on Alabama's beaches.

In Alabama, the nesting season for all sea turtle species is May–September and the hatching season is June and October. After emerging from the nest, hatchlings swim to offshore areas, where they live for several years in pelagic habitat. Juveniles eventually leave the open ocean habitat and travel to nearshore foraging grounds in shallow coastal habitats, where they mature to adulthood and spend most of their lives. Adults migrate from such coastal foraging areas every 2 to 5 years, travelling back to waters off the nesting beaches where they originally hatched to reproduce. That migration between their foraging grounds and nesting beaches encompasses hundreds to thousands of kilometers each way. In the United States, the breeding season begins in late spring. Males mate with females on foraging grounds, along migratory pathways, and off nesting beaches. They are solitary, night-time nesters. Green turtles lay about 110 eggs per nest and will nest every 2 weeks over several months before leaving the nesting area and returning to their foraging grounds.

Green sea turtles mostly nest on sandy, high-energy, ocean-facing barrier island and mainland beaches. Although specific characteristics vary between rookeries, green turtle nesting beaches tend to have intact dune structures and native vegetation. Sand can be coarse to fine and has little organic content; physical characteristics vary greatly in different regions. Clutches are typically laid at night at the base of the primary dune.

Green turtles are the only species of sea turtle that are largely herbivorous. They forage on seagrasses and marine algae, and may also forage on sponges, invertebrates, and discarded fish, depending on the location of their population.

In the North Atlantic DPS, nesting beaches continue to be degraded from activities including coastal development, construction, beachfront lighting, placement of erosion control structures and other barriers to nesting, placement of nearshore shoreline stabilization structures, vehicular and pedestrian traffic, beach erosion, beach sand placement, removal of native vegetation, and planting of non-native vegetation. Green sea turtles have been hunted for centuries for their meat and the gelatinous "calipee" that is made into soup. Hunting and egg gathering have reduced their number greatly in some parts of the species range.

Service's profile page for green sea turtle: https://ecos.fws.gov/ecp/species/6199.

Hawksbill sea turtle (Eretmochelys imbricata)

Hawksbill sea turtles were listed as endangered in 1970 (35 FR 8491). The hawksbill is a small- to medium-sized sea turtle (adults weigh 100 to 200 pounds [45-90 kilograms]). They have an elongated oval shell with overlapping scutes on the carapace, a relatively small head with a distinctive hawk-like beak, and flippers with two claws.

While hawksbill sea turtles use a variety of habitats during different stages of their life cycle, they spend much of their lives inhabiting the nearshore foraging grounds, often those that provide good habitat for sponge growth. Foraging grounds include healthy coral reef habitats, as well as other hard bottom habitats, seagrass beds, algal beds, rock formations, high energy shoals (sand bars in shallow water), and estuarine areas such as mangrove bays and creeks. The ledges and caves of coral reefs provide shelter for resting hawksbills during the day and at night.

Hawksbill turtles are omnivorous (feeding on both plants and animals), but their primary food in many areas is sea sponges. They will also eat marine algae, corals, mollusks, tunicates, crustaceans, sea urchins, small fish, and jellyfish. The shape of their mouth and their sharp beaks enable them to reach into small holes and crevices in reefs to find food.

Hawksbill sea turtles are not known to nest on Alabama's beaches.

Critical habitat has not been designated for the hawksbill sea turtle within any southeastern state, but has been designated for a couple areas in Puerto Rico (63 FR 46693).

Service's profile page for hawksbill sea turtle: https://ecos.fws.gov/ecp/species/3656.

Kemp's Ridley sea turtle (Lepidochelys kempii)

The Kemp's ridley sea turtle was listed as endangered in 1970 (35 FR 18319). It is the smallest of all sea turtles; mature individuals weigh only 80–100 pounds (36–45 kg) and reach only 27 to 32 inches (68 to 82 cm) in length. They have a triangular-shaped head with a somewhat hooked beak with large crushing surfaces (Service Profile). Nesting is concentrated in the beaches of the western Gulf of America, primarily in Tamaulipas, Mexico, with some nesting in Veracruz and few in Campeche, Mexico. Nesting occurs regularly in Texas and infrequently in other

southeastern U.S. states, including Alabama (National Marine Fisheries Service, Service and SEMARNAT 2011).

Adult female Kemp's ridley sea turtles usually return to nest on a beach in the general area where they hatched decades earlier. The Kemp's ridley engages in "arribada" nesting, where large groups of females gather offshore and come onto the beach to nest all at once, and many nests subsequently hatch at the same time. They are the only sea turtles that routinely nest during the day.

After emerging from the nest, hatchlings enter the water and swim rapidly offshore. Hatchlings orient seaward by moving away from the darkest silhouette of the landward dune or vegetation to crawl towards the brightest horizon. On undeveloped beaches, this is toward the open horizon over the ocean. Some hatchlings remain in currents within the Gulf of America while others may be swept out of the Gulf, around Florida, and into the Atlantic Ocean by the Gulf Stream. Juvenile Kemp's ridleys associate with floating Sargassum algae, using the Sargassum as an area of refuge, rest, and a place to feed on small animals and plants. This developmental drifting period lasts 1 to 2 years or until the turtle reaches a length of about 8 inches. After this oceanic phase, Kemp's ridleys migrate to nearshore areas of the Gulf of America or northwestern Atlantic Ocean (U.S. east coast, predominantly).

Depending on their breeding strategy, male Kemp's ridleys occupy many different areas within the Gulf of America. Some males migrate annually between feeding and breeding grounds, yet others may not migrate at all, mating with females encountered at their feeding grounds or near nesting beaches. Female Kemp's ridleys have been tracked migrating to and from nesting beaches in Mexico and south Texas. Females leave breeding and nesting areas and migrate to foraging areas ranging from the Yucatán Peninsula to southern Florida to the north-central Gulf of America. Some females take up residence in specific foraging grounds for months at a time and return to the same foraging grounds in subsequent years.

Kemp's ridley sea turtle nesting occurs on sandy beaches, with most having dunes or microtopographic relief of varying extent. Juvenile and adult Kemp's ridley sea turtles inhabit shallow coastal areas and are generally a shallow water benthic feeder with a diet consisting primarily of crustaceans (crabs and shrimp). They also consume clams, jellyfish, and fish, including by-catch.

Coastal development and rising seas lead to the loss of nesting beach habitat for sea turtles. Human-related changes associated with coastal development include beachfront lighting, shoreline armoring, and beach driving. Shoreline hardening or armoring (e.g., seawalls) can result in the complete loss of dry sand suitable for successful nesting. Artificial lighting on and near nesting beaches can deter nesting females from coming ashore to nest and can disorient hatchlings trying to find the sea after emerging from their nests. Beach driving is a threat to Kemp's ridley sea turtles and their nesting habitat. Driving on nesting beaches can injure or kill nesting turtles, eggs, and hatchlings. Beach driving also degrades the nesting habitat by causing sand compaction and creating ruts and ridges in the sand that pose obstacles to nesting turtles and hatchlings attempting to reach the ocean, resulting in an extended period of travel or

entrapment. The destruction and consumption of eggs and hatchlings by non-native and native predators, such as feral pigs, coyotes, raccoons, birds, and crabs is also a threat to Kemp's ridley sea turtles.

In Alabama, the nesting season for all sea turtle species is May–September and the hatching season is June and October.

Service's profile page for Kemp's Ridley sea turtle: https://ecos.fws.gov/ecp/species/5523.

Leatherback sea turtle (Dermochelys coriacea)

The leatherback sea turtle was listed as endangered in 1970 (35 FR 8491). Leatherbacks are the largest turtle in the world and the only sea turtle that lacks scales and a hard shell. They have the widest global distribution of any reptile. Nesting beaches are primarily located in tropical latitudes around the world. The leatherback sea turtle is not known to nest on Alabama's beaches.

Leatherback sea turtles undertake the longest migrations between breeding and feeding areas of any sea turtle, with some averaging 3,700 miles each way. Female leatherbacks return to nest about every 2 to 4 years. Leatherbacks can dive to depths of approximately 4,000 feet and can stay down for up to 85 minutes. They eat soft-bodied open ocean prey such as jellyfish and salps.

While coastal development and rising seas from changing environmental conditions are leading to the loss of nesting beach habitat for leatherback turtles this species is not known to nest in the Alabama.

Service's profile page for leatherback sea turtle: https://ecos.fws.gov/ecp/species/1493.

Loggerhead sea turtle (Caretta caretta) - Northwest Atlantic Ocean Distinct Population Segment

Loggerhead sea turtles are the most abundant species of sea turtle that nests in the United States. They are long-lived and may live to 80 years or more. Female loggerheads reach maturity at about 35 years of age. The loggerhead sea turtle was listed as threatened in 1978 throughout its worldwide range. A new listing was published in 2011, with the determination that the loggerhead is composed of 9 distinct population segments (76 FR 58868). Four DPSs were listed as threatened and five as endangered. All but two of those DPSs are wholly foreign species. The loggerheads that nest in Alabama are attributed to the Northwest Atlantic Ocean Distinct Population Segment (DPS), and listed as threatened. Turtles included in this population forage throughout the North Atlantic Ocean; however, specific foraging locations may differ depending on the life stage of the turtle. North Atlantic Ocean females nest primarily on beaches along the southeastern United States and in the wider Caribbean Region.

In the southeastern United States, mating occurs about March to July, with eggs laid April to September. Loggerheads nest every 1 to 7 (often about 2–3) years and display strong nest-site fidelity, often returning to the same beach to nest if habitat remains suitable. During a single nesting season, adult females lay one to nine (often two to six) clutches or more, spaced at two week intervals. Successive nesting within the same season generally occurs at the same beach or

within a few kilometers. Between nesting events, females usually remain in shallow, nearshore waters directly off the nesting beaches. Each nest contains about 45 to 200 eggs. The sex of hatchlings is determined by the temperature of the sand—cooler temperatures produce males and warmer temperatures produce females. The eggs incubate for about 42 to 75 days before hatching.

Loggerhead hatchlings and juveniles spend the first 7 to 15 years of their lives in the open ocean. Then they migrate to nearshore coastal areas where they will forage and continue to grow for several more years. Adult loggerhead turtles migrate hundreds to thousands of kilometers from their foraging grounds to their nesting beaches. After emerging from their nests at night, hatchlings crawl toward the ocean, using visual cues to navigate. They embark on a 24 to 36-hour swim frenzy, orienting themselves into currents and imprinting the location of their natal beaches for future nesting.

Loggerheads are solitary, night-time nesters on barrier island and mainland beaches. They generally prefer high energy, relatively narrow, steeply sloped, coarse-grained beaches for nesting; such sites may be prone to high rates of erosion. They usually nest on open sandy beaches above the high-tide mark, seaward of well-developed dunes, and with gradually sloped offshore approaches. Maximum hatching success and hatchling size occur when sand moisture level is about 25 percent. In Alabama, the nesting season for all sea turtle species is May–September and the hatching season is June and October.

Loggerheads were named for their relatively large heads, which support powerful jaws and enable them to feed on hard-shelled prey, such as whelks and conch. Loggerheads are carnivores, only occasionally consuming plant material. During their open ocean (pelagic) phase, they feed on a wide variety of floating items. Juveniles and adults in coastal waters eat mostly bottom dwelling (benthic) invertebrates such as whelks, other mollusks, horseshoe crabs, and other crabs.

Loggerhead nesting beaches face numerous threats that undermine successful nesting, incubation, and hatchling emergence. These threats include natural and anthropogenic erosion, coastal development, artificial lighting, and beach debris. Erosion is exacerbated by coastal structures that interfere with natural processes, leading to habitat loss. Additionally, artificial lighting can deter nesting females and disrupt hatchlings' ability to orient toward the sea, causing survival rates to diminish. Coastal development has been shown to degrade nesting habitats, while human activities such as beach driving can further disrupt both nesting and the transit of hatchlings to the ocean.

Service’s profile page for loggerhead sea turtle: https://ecos.fws.gov/ecp/species/1110.

Loggerhead sea turtle (Caretta caretta) critical habitat

Critical habitat was designated in 2014 (79 FR 39756). There are 88 areas in 4 major units of critical habitat for the Northwest Atlantic DPS of loggerhead sea turtles. In Alabama, those include 3 areas of shoreline comprising 42.0 km (26.1 miles) of critical habitat within the

Northern gulf of America Unit. Those fall within Baldwin County, at Mobile Bay-Little Lagoon Pass, Gulf State Park-Perdido Pass, and Perdido Pass-Florida-Alabama line.

The physical and biological features essential to the conservation of the loggerhead sea turtle include:

1. Suitable nesting beach habitat that has (a) relatively unimpeded nearshore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings and (b) is located above mean high water to avoid being inundated frequently by high tides.
2. Sand that (a) allows for suitable nest construction, (b) is suitable for facilitating gas diffusion conducive to embryo development, and (c) can develop and maintain temperatures and a moisture content conducive to embryo development.
3. Suitable nesting beach habitat with sufficient darkness to ensure nesting turtles are not deterred from emerging onto the beach and hatchlings and post-nesting females orient to the sea.
4. Natural coastal processes or artificially created or maintained habitat mimicking natural conditions. This includes artificial habitat types that mimic the natural conditions described in PCEs 1 to 3 above for beach access, nest site selection, nest construction, egg deposition and incubation, and hatchling emergence and movement to the sea. Habitat modification and loss occurs with beach stabilization activities that prevent the natural transfer and erosion and accretion of sediments along the ocean shoreline. Beach stabilization efforts that may impact loggerhead nesting include beach nourishment, beach maintenance, sediment dredging and disposal, inlet channelization, and construction of jetties and other hard structures. However, when sand placement activities result in beach habitat that mimics the natural beach habitat conditions, impacts to sea turtle nesting habitat are minimized.

Prominent stressors to loggerhead sea turtle habitat include: recreational beach use; beach driving; predation; beach sand placement activities; in-water and shoreline alterations; coastal development; lights on land or in the adjacent water, including skyglow and bonfires, particularly artificial lighting that has an unshielded lamp and a short wave length (below 540 nm); habitat obstructions (tree stumps, fallen trees, and other debris on the beach; nearshore sand bars; and ponding along beachfront seaward of dry beach); human-caused disasters and response to natural and human-caused disasters; and military testing and training activities.

4.5 Snakes

Eastern indigo snake (Drymarchon couperi)

The Eastern indigo snake is a large, diurnal, and non-venomous species that was listed as threatened in 1978 (43 FR 4026). Mature adult eastern indigo snakes weigh from 2 pounds to over 10 pounds. This is the longest species of snake native to the United States and reaches up to 8.6 feet. Historically, the eastern indigo snake occurred throughout Florida and in the coastal plain of Georgia, Alabama, and Mississippi. The current distribution for the eastern indigo snake

has contracted from its historical distribution; they are no longer found in Mississippi (Service Focus).

The species prefers upland habitat types (e.g. longleaf pine sandhills, scrub, pine flatwoods, tropical hardwood hammocks, and coastal dunes) but also uses a variety of lowland and human-altered habitats. In the northern portion of their range, the species may move seasonally between upland and lowland habitats. Eastern indigo snakes use below-ground shelter sites for refuge, breeding, feeding and nesting throughout their range, and may depend on gopher tortoise burrows in xeric sandhill habitats for overwintering shelter sites.

The eastern indigo snake eats a wide variety of prey, including turtles, lizards, frogs, toads, fish, small birds, mammals, and eggs. It consumes other snakes, including venomous ones, as it is immune to the venom of the North American rattlesnakes. While eastern indigo snakes depend on gopher tortoises for their burrows, they are also known to eat small tortoises (Service Focus).

Adult eastern indigo snakes move long distances and have very large home ranges; from several hundred to several thousand acres (tens to over a thousand hectares). Eastern indigo snakes may live for 8 to 12 years in the wild, become sexually mature around 3.5 years of age and breed about October through January.

In Alabama, the eastern indigo snake declined as its habitat was converted into agricultural and developed lands, natural fire regimes were suppressed, and gopher tortoise populations declined.

Service's profile page for Eastern indigo snake: https://ecos.fws.gov/ecp/species/646.

Black pinesnake (Pituophis melanoleucus lodingi)

The black pinesnake is a large, stocky, egg-laying, non-venomous constrictor. It was listed as threatened in 2015 (80 FR 60467). Black pinesnakes are different than other pinesnakes in that they are rather uniformly black or dark brown on the upper and lower parts of their bodies (Service Focus; Service Profile). Because of its coloration, they may be mistaken for the eastern indigo snake or the black racer (*Coluber constrictor*). However, have strongly keeled scales while those other species have smooth scales (Hart 2002). Some black pinesnakes can have russet snouts, white scales on their necks, or faint blotches on the hindbody or tail. Adults average from 48-64 inches (122-163 cm). The record is 89 inches (226 cm). The black pinesnake occurs in south Mississippi and southwest Alabama. Alabama counties with records of the snake include Clarke, Mobile, and Washington. Records exist for the snake in Washington Parish, Louisiana, but it likely no longer persists there (Service Focus; Service Profile).

Black pinesnakes are closely associated with xeric uplands or sandy hilltops, ridges, and upper slopes supporting well-drained sandy or sandy-loam soils and open longleaf pine-scrub oak associations with a substantial herbaceous (non-woody) ground cover (Duran 1998, Hart 2002). They may be located below ground approximately 65 percent of the time, and tend to use underground pine stump holes and root tunnels, and less commonly gopher tortoise burrows (Mississippi populations; Duran 1998). At the landscape scale, black pinesnakes selected evergreen forests in upland areas lacking cultivated crops, pasture and hay fields, developed

areas, and roads. At the home range scale, they were found closer to scrub/shrub habitat and open areas than expected. Compared to historical sites with no recent records, recently occupied sites were characterized by significantly less canopy cover, basal area, and midstory cover. Ground cover contained greater percentages of grass, bare soil, and forbs, and less shrubs and litter. Recently occupied sites had a history of more recent burn than sites with no recent records (Mississippi populations; Baxley et al. 2011). A diverse herbaceous understory plant community provides food for the Baird's pocket gopher (Geomys breviceps), an important prey of the pinesnake.

The black pinesnake is threatened because of the loss of its habitat, particularly historical and continued fragmentation of longleaf pine (*Pinus palustris*) forests (Baxley et al. 2011; Service Focus). Populations are small and isolated, and at risk from random events (e.g., snake fungal disease) and inbreeding (i.e., genes in essence become too similar, causing serious health problems). Also, as human populations grow in areas where the snake lives, the species faces threats from vehicle strikes and people killing the snakes intentionally. Severe weather events such as droughts and hurricanes can also impact and/or reduce longleaf pine habitat, essential to the species (Service Focus).

Service's profile page for black pinesnake: https://ecos.fws.gov/ecp/species/452.

Black pinesnake (Pituophis melanoleucus lodingi) critical habitat

Critical habitat for the black pinesnake was designated in 2020 (85 FR 11238). In total, approximately 324,679 acres (131,393 hectares) were designated in one Alabama and nine Mississippi counties. Units 7 and 8 are within Alabama (Clarke County). Unit 7 encompasses approximately 33,395 ac (13,515 ha) of private land. This unit is bordered by Salitpa Creek to the south, Tallahatta Creek to the north, and Harris Creek to the west. It is located approximately 2.7 mi (4.3 km) southeast of Campbell and 1.1 mi (1.8 km) north of the intersection of Old Mill Pond Road and Reedy Branch Road. Unit 8 encompasses approximately 5,943 ac (2,405 ha) on State and private land. Over 60 percent of the unit (3,843 ac (1,555 ha)) is on State lands, with the remainder of the unit (2,100 ac (850 ha)) on private land. This unit is located between Sand Hill Creek and the Tombigbee River, is approximately 1 mi (1.6 km) north of Carlton, and is 1.0 mi (1.6 km) south of the intersection of County Road 15 and Christian Vall Road. The southern two-thirds of this unit is on the Fred T. Stimpson Special Opportunity Area.

The physical or biological features essential to the conservation of black pinesnake consist of the following components:

1. Tract size and habitat structure. A pine forest, historically dominated by longleaf pine and maintained by frequent fire, primarily having the following characteristics:
    a. An open canopy that sustains a reduced woody mid-story (cover) and abundant, diverse, native herbaceous groundcover (at least 40 percent cover); and
    b. Minimum of 5,000 ac (2,023 ha) of mostly unfragmented habitat.
2. Refugia sites. Naturally burned-out or rotted-out pine stumps and their associated root system tunnels, in pine forests historically dominated by longleaf pine.
3. Soils. Deep, sandy, well-drained soils characteristic of longleaf pine forests:

a. No flooding or ponding;
b. <15 percent medium and course gravel fragments
c. >60 in (152 cm) depth to seasonal high water table;
d. >60 in (152 cm) depth to the hardpan;
e. Textural components equaling >30 percent sand and
f. A slope <15 percent.

Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on March 27, 2020. In addition, State and Department of Defense lands covered under the Camp Shelby Integrated Natural Resources Management Plan (INRMP) are not considered critical habitat in Unit 3; nor are U.S. Forest Service lands within the Camp Shelby Impact Area Buffer Zone.

4.6 AMPHIBIANS

Dusky gopher frog (Rana sevosa)

The dusky gopher frog was listed as endangered in 1973 (66 FR 62993), with the scientific name *Rana capito sevosa* and the common name Mississippi gopher frog, as a distinct population segment of the dusky frog. It is now recognized as a distinct species, *Rana sevosa*, with the common name dusky gopher frog (77 FR 35118).

Historically, it is believed to have occurred in at least nine counties or parishes across Louisiana, Mississippi, and Alabama, ranging from east of the Mississippi River in Louisiana to the Mobile River delta in Alabama (66 FR 62993). At the time of listing, it was known from only one site in Harrison County, Mississippi (66 FR 62993). As of 2021, there was only one known wild population, and seven reintroduced populations in Mississippi. Several areas in Mississippi and one area in Alabama remain as targets for additional translocations and reintroductions (Service 2021b).

Dusky gopher frog habitat includes both upland sandy sites (generally these were forested with longleaf pine historically), and isolated temporary wetland breeding sites embedded within the forested landscape. Frequent fires are necessary to maintain the open canopy and groundcover vegetation in the aquatic and terrestrial habitats. Adult frogs spend most of their lives underground in forests with an open canopy and abundant ground cover. They use active and abandoned gopher tortoise burrows, abandoned mammal burrows and holes in and under stumps as their underground retreats. Breeding sites are small, relatively shallow, isolated (not connected to any other water body), depressional ponds that dry completely on a cyclic basis. Emergent herbaceous vegetation is important for egg attachment; thus, ponds with a closed canopy are not used for breeding. The dominant source of water to the ponds is rainfall within small, localized watersheds. Substantial winter rains are needed to ensure that ponds fill sufficiently to allow hatching, development, and metamorphosis of larvae. The timing and frequency of rainfall are critical to the successful reproduction and recruitment of dusky gopher frogs. Breeding typically occurs from December to April (Richter et al. 2003).

The 1973 listing reported that the greatest threat to the last known population was the low number of adult frogs in the population and their vulnerability to environmental stressors, both natural and human induced. Human-induced threats included habitat destruction and degradation in the area adjacent to the frog's only known breeding site (66 FR 62993). Habitat destruction and modification remain significant threats to the species and have resulted in the small, isolated populations observed today. These small populations continue to be threatened by disease and drought that have limited, and remain as limiting factors to, the viability of the species (Service 2021b).

Dusky gopher frog critical habitat was designated in 2012 (77 FR 35118), to include areas in Louisianna and Mississippi, with none designated in Alabama (designated critical habitat in Louisiana was vacated by Consent Decree in 2019).

Service's profile page for dusky gopher frog: https://ecos.fws.gov/ecp/species/5600.

Black warrior (=Sipsey Fork) waterdog (Necturus alabamensis)

The Black Warrior waterdog as listed as endangered in 2018 (83 FR 257). It is a large, aquatic salamander that permanently retains larval characteristics such as external gills. It has a flattened head and body, laterally compressed tail and four toes on each of its four feet. Larval length ranges about 1 to 2 inches (28 to 48 millimeters), sub-adult length is about 1.5 to 4 inches (40 to 100 mm) and adult length reaches to about 9.5 inches (240 mm) (Service Focus). They are only found in streams within the Black Warrior River Basin in Alabama. The species is currently known from medium to large streams in the Black Warrior River Basin in Sipsey Fork, Brushy Creek, Rush Creek, Locust Fork, Gurley Creek, Yellow Creek and Brown Creek (Service Focus).

Occupied streams typically contain sites with intact physical characteristics like clay or bedrock substrate with little sand. Most of these sites also contain abundant rock crevices and rock slabs, as well as other factors that are considered key physical and biological features. Black Warrior waterdogs depend on specific stream substrates for life processes such as breeding, rearing, protection of young, and protection of adults when threatened, foraging and feeding. Preferred substrates are dominated by clay or bedrock with little sand, also containing abundant rock crevices and rock slabs for shelter, and areas for egg laying (Service Focus).

Larval and adult Black Warrior waterdogs are assumed to be opportunistic carnivores, but prey taken in the wild has not been described. Adults are attracted to traps baited with fish-flavored cat food. Captive Black Warrior waterdogs have eaten small fish and earthworms. Crayfish, isopods, amphipods, freshwater clams and insects, including mayflies, caddisflies, dragonflies, beetles and midges have been reported as prey items in Gulf Coast waterdogs, a similar species (Service Focus).

Extensive areas of flowing water (lotic habitat) in the mainstem of the Black Warrior River and the Sipsey Fork was lost in the 19th century to heavy modification due to construction of locks and dams. Loss and continued degradation of habitat and water quality attributed to adjacent land use continue to threaten the species throughout its range. Ongoing threats include habitat

modification, in the form of degraded water quality and quantity, and disturbance of stream structure. Water-quality degradation results from contaminated water runoff, which in turn is exacerbated by increases in impervious surface cover (e.g., tarmac, pavement and concrete) associated with urbanization. Amphibians with permeable skin and external gills are very sensitive to declines in water quality. Heavy siltation could reduce cover and food, and smother nests and eggs (Service Focus). Increased impervious cover leads to various stressors on stream systems, including increased frequency and magnitude of high flows in streams, increased sedimentation, increased contamination and toxicity, and changes in stream morphology and water chemistry. Urbanization can also affect aquatic species by decreasing their invertebrate prey-base. Hazardous material spills also risk contaminating water bodies and groundwater. Climate change may increase the frequency of extreme drought, extreme storm events, and alter flow regimes. Information on the genetics of the species indicates that there is low genetic diversity along with low abundance and lack of connectivity among populations. Furthermore, low abundances and genetic diversity exacerbates risks to population demographics of the species and limit natural recovery.

Service's profile page for black warrior waterdog: https://ecos.fws.gov/ecp/species/5426.

Black Warrior (=Sipsey Fork) waterdog (Necturus alabamensis) critical habitat

Critical habitat for the black warrior waterdog was designated in 2018 along with its listing as endangered. Designated critical habitat for the species occurs in four units, on public and private property totaling 673 kilometers (420 miles) of streams and rivers in Blount, Etowah, Jefferson, Lawrence, Marshall, Tuscaloosa, Walker, and Winston Counties, Alabama. More than a quarter of those areas (127 miles [204 kilometers]) overlap with critical habitats delineated for a variety of listed mussels (83 FR 257).

Within these areas, the physical or biological features essential to the conservation of the Black Warrior waterdog, which describe a riverine system with habitat to support all life history stages of the Black Warrior waterdog, consists of the following components:

1. Geomorphically stable, medium to large streams (typically 4 meters (m) (13 feet (ft)) wide or greater) with:
    a. (A) Substrate consisting of clay or bedrock with little sand, and containing abundant rock crevices, rock slabs, and leaf packs;
    b. (B) Moderate water velocity; and
    c. (C) Prey base of aquatic macroinvertebrates.
2. Water that lacks harmful levels of pollutants, including inorganic contaminants such as copper, arsenic, mercury, and cadmium; organic contaminants such as human and animal waste products; endocrinedisrupting chemicals; pesticides; nitrogen, potassium, and phosphorus fertilizers; and petroleum distillates.
3. Appropriate water quality parameters to support Black Warrior waterdog and primary prey base, including:
    a. Water temperature not exceeding 85° F;
    b. Dissolved oxygen 5.5 milligrams per liter (mg/L) or greater;

c. Turbidity of an average monthly reading of 15 nephelometric turbidity units above background readings;
d. 115 mg/L of total suspended solids or less; and
e. A specific conductance of no greater than 225 microsiemens (mS) per centimeter at 80 °F.

4.7 Fish

4.7.1 Sturgeons: Gulf (Acipenser oxyrinchus (=oxyrhynchus) desotoi) and Alabama (Scaphirhynchus suttkusi) sturgeons

Gulf sturgeon (Acipenser oxyrinchus (=oxyrhynchus) desotoi)

Gulf sturgeon is a subspecies of the Atlantic sturgeon, and listed as threatened in 1991 (56 FR 49653). The Service and NOAA Fisheries are joint lead Federal agencies responsible for managing this species; the Service manages the species on inland waters, while NOAA Fisheries manages the species offshore. The historical range included Georgia as well as Louisiana, Mississippi, Alabama and Florida. Adults range from 4 to 8 feet with an average life expectancy of 20 to 25 years. The sturgeon is anadromous, spawning in freshwater during the warm months after migrating up large coastal rivers from marine and estuarine environments. Subadult and adult gulf sturgeons spend approximately the warmer months (about March through October) in coastal rivers from Louisiana to Florida. They spend the coolest months (about November through March) overwintering in estuaries, bays, and the Gulf of America. However, those less than two years old appear to remain in riverine habitats and estuarine areas throughout the year.

Suitable spring spawning habitat includes large free-flowing rivers. Adults move upstream (approximately between March and May) to spawn in areas of clean substrate, usually rock and rubble. Sturgeon eggs are sticky, and adhere in clumps to snags, rock, rubble, or other clean surfaces. Larval sturgeon move downstream as they develop; juvenile gulf sturgeons generally stay in or near the river mouth for the first 2-3 years of life. During the warm summer months, gulf sturgeon will congregate in deeper sandy and rocky areas of large free-flowing rivers. During winter months (about October to February), Gulf sturgeon live and forage in the shallow seagrass beds and muddy and sandy bottoms of the Gulf of America.

Gulf sturgeon are bottom (benthic) feeders, and eat primarily benthic macroinvertebrates, including brachiopods, mollusks, worms (annelids), and crustaceans. All foraging occurs in brackish or marine waters of the Gulf of America and its estuaries; adult sturgeon do not feed in riverine habitat. Ghost shrimp may be an important food for sturgeon greater than 3.3 feet (1 m) in length.

The majority of a gulf sturgeon's life is spent in freshwater, and major population limiting factors are considered to include barriers (dams) to historical spawning habitats, loss of habitat, poor water quality, and overfishing. Current threats continue to include the presence of control structures such as dams on the Pearl, Alabama, and Apalachicola rivers, as well as channel improvement and maintenance activities such as dredging and de-snagging, water quality

degradation, and contaminants. Climate change also has potential implications through alteration of habitat. It is very likely that increased frequency of heat waves, heat extremes, and heavy precipitation events over land as well as warmer water, sea level rise, and higher salinity levels could lead to accelerated changes in Gulf sturgeon habitat. Other threats include inadequate existing regulatory mechanisms which fail to prevent take of adult Gulf sturgeon due to fishing bycatch, the species' slow recolonization ability in areas from which extirpated, and the threat of hybridization with white sturgeon (*A. transmontanus*).

Service's profile page for Gulf sturgeon: https://ecos.fws.gov/ecp/species/651.

Gulf sturgeon (Acipenser oxyrinchus (=oxyrhynchus) desotoi) critical habitat

Critical habitat was designated in 2003 (68 FR 13370), including 14 geographic areas among the Gulf of America rivers and tributaries that encompass approximately 2,783 river kilometers (rkm) (1,730 river miles (rmi)) and 6,042 square kilometers (km2) (2,333 square miles (mi2)) of estuarine and marine habitat. Four of the units intersect Alabama: with three river systems, Escambia, Yellow and Choctawhatchee, and one estuarine unit, Lake Borgne.

The river reaches designated as critical habitat lie within the ordinary high-water line, which is defined on non-tidal rivers as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank. Regulatory jurisdiction in coastal areas extends to the line on the shore reached by the plane of the mean (average) high tide line. Gulf sturgeon critical habitat does not include existing developed sites such as dams, piers, marinas, bridges, boat ramps, exposed oil and gas pipelines, oil rigs, and similar structures or designated public swimming areas (68 FR 13370).

The PCEs (now PBFs) essential to the conservation of the Gulf sturgeon include the following:

1. Abundant prey items within riverine habitats for larval and juvenile life stages, and within estuarine and marine habitats and substrates for juvenile, subadult, and adult life stages;
2. Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone or hard clay;
3. Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, believed necessary for minimizing energy expenditures during freshwater residency and possibly for osmoregulatory functions;
4. A flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging; and necessary for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larvae staging;
5. Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;

6. Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and
7. Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g. a river unobstructed by any permanent structure, or a dammed river that still allows for passage).

Alabama sturgeon (Scaphirhynchus suttkusi)

The Alabama sturgeon was listed as an endangered species on May 5, 2000 (65 FR 26438). It is a slender freshwater fish that grows to about 30 inches (0.7 m) in length and weighs about 2-3 pounds as an adult. It is one of the rarest and most endangered fish in the nation and may be close to extinction.

The Alabama sturgeon's historical range included nearly 1,600 kilometers (km) (1,000 mi) of riverine habitat in the Mobile River Basin in Alabama and Mississippi. There are records of Alabama sturgeon from nearly all the major rivers in the Mobile River Basin at or below the Fall Line including the Black Warrior, Tombigbee, Alabama, Coosa, Tallapoosa, Mobile, Tensaw, and Cahaba Rivers. Recent collections have been restricted to the lower Alabama River below Millers Ferry Lock and Dam to the confluence of the Tombigbee River and in the lower Cahaba River near its confluence with the Alabama River. The presence of Alabama sturgeons were last detected in 2014-2015 using eDNA sampling in the Alabama and Tombigbee Rivers (Pfleger et al. 2016), but no living species have been documented since 2009 (Service 2025).

Very little is known of the habitat requirements of the Alabama sturgeon. Based on capture data, it inhabits the main channel of large coastal plain rivers of the Mobile River Basin. Most specimens have been taken in moderate to swift current at depths of 6 to 14 m, over sand, gravel or mud bottom. Similar preferences have also observed in shovelnose sturgeon. Most historical and recent sturgeon capture sites are at or near features that include rock walls, river channel training devices, deep pools, mussel beds, confluences with tributaries, and/or stable sand and gravel bottoms. The presence of mussel beds represents stable channel habitats that are likely important feeding areas for sturgeon, while deep pools and confluence areas with tributaries may be used as thermal refugia during times of low flow (Service Focus).

Alabama sturgeon are generally considered opportunistic bottom feeders that primarily eat aquatic insects, plant material, and mollusks. Commercial fisherman report that sturgeon have been captured on trotlines with a variety of bait, including poultry parts, fish, and commercially prepared bait. Juvenile shovelnose sturgeon prefer feeding in sandy substrates and actively avoid gravel areas, and juvenile Alabama sturgeon may share this feeding preference (Service Focus).

One Alabama sturgeon that was tagged and tracked was stationary, residing around the confluence of a small spring-fed stream called Sizemore Creek in the lower Alabama River during the summer months; water temperatures there were cooler than the broader Alabama River temperatures, suggesting the fish was using this area as a thermal refuge. Movement is greatest during the spring and may indicate that the fish was attempting to migrate upstream to spawn (Service Focus).

As with most riverine sturgeons, spawning is likely initiated by environmental cues such as temperature, photoperiod, and an increase in river discharge during the late winter and early spring. The development of numerous large-river impoundments in the Mobile Basin likely disrupted these cues (Service Focus).

The Alabama sturgeon has declined and has experienced significant curtailment of its range due to extensive habitat modifications to its' historical range (e.g., dam construction, changes in natural flow regimes, navigational channel dredging). The entire historical range of the Alabama sturgeon in the Mobile River basin is now controlled by a series of more than 25 large locks and/or dams (Service 2010). These man-made structures have resulted in a series of impoundments that are interspersed with short, free-flowing reaches. It is unlikely that Alabama sturgeon habitat and life cycle requirements can be met in reaches between impoundments, where decreased flows typically cause silt and other fine sediments to accumulate over bottom habitats, creating unsuitable conditions for spawning, feeding, and larval development. These structures also result in barriers to fish movements, preventing adults from reaching historical spawning locations and negatively impacting larval survival as they drift downstream. In addition, impoundments, mining, toxic chemical spills, siltation, agriculture, runoff and discharge of organic and inorganic pollutants, channelization, dredging, streambank erosion, and other forms of non-point source pollution continue to impact the Alabama sturgeon and its habitat. Many of these impacts typically occur during the summer and fall months when flows are at lower levels. Low stream flows tend to concentrate pollutants. Improvements on the landscape have worked toward reducing theses inputs such as best management practices used by the forest industry to protect overall water quality and habitat for aquatic organisms. The species is also likely impacted by decreases in survival of larval and young and adults associated with increases in water temperature and decreases in dissolved oxygen. Young have not been observed in 50 years (Service 2025).

Service's profile page for Alabama sturgeon: https://ecos.fws.gov/ecp/species/2552.

Alabama sturgeon (Scaphirhynchus suttkusi) critical habitat

Critical habitat was designated in 2009 (74 FR 26488)**.** The boundaries of the critical habitat designation encompass approximately 524 kilometers (326 miles) of river. The critical habitat includes portions of the Alabama and Cahaba Rivers in Autauga, Baldwin, Bibb, Clarke, Dallas, Lowndes, Monroe, Perry, and Wilcox Counties, in Alabama. PCEs for the Alabama sturgeon are:

1. A flow regime (i.e., the magnitude, frequency, duration, seasonality of discharge over time) necessary to maintain all life stages of the species in the riverine environment, including migration, breeding site selection, resting, larval development, and protection of cool water refuges (i.e., tributaries).
2. River channel with stable sand and gravel river bottoms, and bedrock walls, including associated mussel beds.
3. Limestone outcrops and cut limestone banks, large gravel or cobble such as that found around channel training devices, and bedrock channel walls that provide riverine spawning sites with substrates suitable for egg deposition and development.

4. Long sections of free-flowing water to allow spawning migrations and development of embryos and larvae.
5. Water temperature not exceeding 32 °C (90 °F); dissolved oxygen levels not less than 5 mg/L (5 ppm), except under extreme conditions due to natural causes or downstream of existing hydroelectric impoundments, where it can range from 5 mg/L to 4 mg/L (5 ppm to 4 ppm); and pH (a measure of acidity) within the range of 6.0 to 8.5.

4.7.2 Small, freshwater stream, river and spring fishes

The fish species addressed here inhabit freshwater systems and generally prefer clean, well-oxygenated waters with minimal siltation and abundant rocky substrates such as gravel and cobble. Many are found in riffles, runs, and pools with moderate to swift currents, and forage on various aquatic invertebrates, including mayflies and midges. Several occupy springs.

Species information is provided in the following table. The information in the table is derived from the Service's *Species Profile* and *In Focus* webpages or also documents referenced in those pages such as five-year species status reviews, recovery plans, species status assessments and Federal Register documents. The tables include hyperlinks to those *Species Profile* and *In Focus* webpages in the first (Common Name/Scientific Name) column. For each species, the hyperlink associated with the common name directs to the Service's *Species Profile* webpage, and the hyperlink associated with the scientific name directs to the Service's *In Focus* webpage for that species.

Counties listed in the AL counties column are those counties listed in the Service's *Species Profile* webpages for each respective species.

Table 2. Freshwater fish species covered in the standing analysis for the Alabama DKey, including their listing status under the Endangered Species Act where T=threatened, E=endangered, NEP=non-essential experimental population, and critical habitat (CH) status.

Common Name/ Scientific Name	Habitat	River, river system, or basin in AL	AL counties of occurrence	ESA Status/ critical habitat
Blue shiner *Cyprinella caerulea*	Primarily occupies second to fourth order, moderate gradient streams within the Ridge and Valley and Piedmont physiographic provinces. Most watersheds where it is found are predominately forested, and agriculture and urban development are minimal. It may be abundant in good habitat and rare or absent elsewhere, suggesting that it is habitat dependent. It prefers a sand or sand and gravel substrate sometimes with cobble, low to moderate velocity current, and a depth of about 0.15 to 1 meters (0.5 to 3 feet). Blue shiners are sometimes associated with submerged tree roots and fallen branches. They also occur near water willow (*Justicia americana*) beds, especially in eddy currents downstream from the beds. Lateral pools away from the main current, and backwaters with sandy substrates may be preferred. The diet is dominated throughout the year by terrestrial insects, indicating that the blue shiner is a visual, drift feeder.	Currently known to reside within three watersheds in AL, Choccolocco Creek, West Fork of the Little River and Weogufk Creek, and one in Georgia and Tennessee (Conasauga River).	Calhoun, Cherokee, Clay, Cleburne, Coosa, DeKalb, Talladega	T / No CH
Cahaba shiner *Notropis cahabae*	Inhabits the main channels of the Cahaba River and Locust Fork, where shoal microhabitats predominate. Typically found in microhabitats of quiet, shallow backwater, just below or adjacent to riffles and runs that lie primarily over clean sand-gravel substrates. They have also been collected from shallow water depths of 0.25 to 1.5 m (9.8 in to 59 in), and also from large shoals and from 2 or 3 cm (0.8 to 1.1 in) of water in water-willow (Justicia) beds adjacent to a swift riffle. Moves into the lower reaches of small tributaries during periods of rapidly rising water, and prefers the large shoal areas of the main channel and quieter waters below swift riffle areas.	Found in the Cahaba River and Locust Fork (of the Black Warrior River) Watersheds, near Birmingham, AL.	Bibb, Blount, Chilton, Etowah, Jefferson, Marshall, Shelby, St. Clair, Tuscaloosa, Walker	E / No CH
Palezone shiner *Notropis albizonatus*	Typically observed in flowing pools and runs of upland streams that have permanent flow, clear water, and substrates composed of bedrock, cobble, pebble, and gravel	AL, KY and TN. As of 2020, extant populations of the Palezone Shiner are believed to	Jackson, Madison, Marshall	E / No CH

Common Name/ Scientific Name	Habitat	River, river system, or basin in AL	AL counties of occurrence	ESA Status/ critical habitat
	mixed with clean sand. In the Paint Rock system, collected in pools (60-75 cm (2.4-2.9 in) depths) over fine to coarse gravel mixed with sand. In the Little South Fork system, they have been observed in shallow (30-45 cm, 1.2-1.8 in) runs and pools that were underlain by fractured bedrock and scattered gravel patches; in pools and runs with current velocities ranging from 0.6-4.5 cm/sec (0.02-0.15 feet/sec) and a mean depth of 59 cm (2.3 in) where substrates varied from sand mixed with fine and coarse gravel to bedrock; in pools and runs that had substrates composed of a mixture of cobble, gravel, and sand where water depths ranged from 30.5-76.2 cm (12-30 in); and most commonly in runs, but also observed in the upper and lower ends of pools, at an average depth of 30 cm (range of 12 to 63 cm), an average current velocity of 6 cm/sec (range of 0 to 24 cm/sec), over a variety of substrates including mixtures of sand, gravel, and pebble, with some areas containing cobble and bedrock, and some observed near gravel bars that were bordered by beds of water willow (*Justicia americana*).	be restricted to the Little South Fork and Paint Rock systems in KY and AL, respectively		
Boulder darter *Etheostoma wapiti*	Inhabits riverine environments with moderate to fast currents, over boulder/slab rock substrate in water over 2 feet deep. Spawning occurs in large boulder/slab rock habitat in areas with moderate to fast current.	Historically inhabited the Tennessee River and its larger tributaries in TN and AL, from the Paint Rock River in Madison County, AL, downstream to at least Shoal Creek in Lauderdale County, AL. Currently extirpated from Shoal Creek (a tributary to the Tennessee River) and limited to Elk River, Giles and Lincoln Counties, TN, and Limestone County, AL, and the lower reaches of Richland Creek, an Elk River tributary, in Giles County, TN. NEP in AL: Shoal Creek (from Shoal Creek mile 41.7 (66.7 km)) at the mouth of	Limestone; NEP: Lauderdale	E; NEP / No CH

Common Name/ Scientific Name	Habitat	River, river system, or basin in AL	AL counties of occurrence	ESA Status/ critical habitat
		Long Branch, Lawrence County, TN, downstream to the backwaters of Wilson Reservoir (Shoal Creek mile 14 (22 km)) at Goose Shoals, Lauderdale County, AL, including the lower 5 miles (8 km) of all tributaries that enter this reach.		
Rush darter *Etheostoma phytophilum*	Collected from various habitats, including root masses of emergent vegetation along the margins of spring-fed streams in very shallow, clear, cool, and flowing water, and from both small clumps and dense stands of bur reed (*Sparganium* sp.), coontail (*Ceratophyllum* sp.), watercress (*Nasturtium officinale*) and rush (*Juncus* sp.), in streams with substrates of silt, sand, sand and silt, muck and sand or some gravel with sand, and among bedrock. Appear to prefer springs and spring-fed reaches of relatively low gradient small streams. They have also been collected in wetland pools. Water depth at collection sites ranged from 3.0 cm to 0.5 m (1 -2 inches to 1.6 feet), with moderate water velocity in riffles and no flow or low flow in pools.	Black Warrior River Basin including Sipsey Fork and tributaries.	Blount, Cullman, Etowah, Franklin, Jefferson, Lawrence, Marshall, St. Clair, Walker, Winston	E / FCH
Slackwater darter *Etheostoma boschungi*	Inhabits two distinct habitat types: nonbreeding habitat and breeding habitat. For the-majority-of the year, they live in small (60 cm wide to 15 cm deep) to moderately large (12 m wide and up to 2 m deep) gravel-bottomed pools of creeks where current is usually slow. They prefer streams with slow current or “slack” water. In November they migrate to their breeding habitat, shallow water (5 to 10 cm deep), which originates in spring seeps, spring boils, or flooded fields that slowly run off into adjacent streams. In April to early May, juveniles migrate to the non-breeding habitat. Populations are entirely dependent upon connectivity between those two habitat types for successful recruitment.	As of 2024, occured in five systems of the middle Tennessee River: Cypress Creek watershed (Lauderdale Co., AL and Wayne Co., TN); Swan Creek watershed (Limestone Co., AL); Flint River watershed (Madison Co., AL and Lincoln Co., TN); Shoal Creek watershed (Lawrence Co., TN); and Buffalo River watershed (Lawrence Co., TN). The Alabama sites in Limestone County and Lauderdale County are currently the only	Lauderdale, Lawrence, Limestone, Madison, Morgan	T / FCH

Common Name/ Scientific Name	Habitat	River, river system, or basin in AL	AL counties of occurrence	ESA Status/ critical habitat
		confirmed spawning locations of this species in the state.		
Trispot darter *Etheostoma trisella*	Uses distinct breeding and non-breeding habitats. From about April to October, inhabits its non-breeding habitat, which consists of small to medium river margins and lower reaches of tributaries with slower velocities. It is associated with detritus, logs and stands of water willow and the substrate consists of small cobbles, pebbles, gravel, and a fine layer of silt. During low flow periods, darters move toward the main channel: edges of water willow beds, riffles and pools; mouths of tributaries. In the late fall, this migratory species shifts its habitat preference and moves toward spawning areas. These winter-spawning fish move from the main channels into tributaries and eventually reach seepage areas where they will congregate and remain from winter to spring. These breeding areas are intermittent seepage areas and ditches with little to no flow; shallow depths; moderate leaf litter covering mixed cobble, gravel, sand and clay; a deep layer of soft silt over clay; and emergent vegetation.	Coosa and Oostanaula Rivers/tributaries.	Blount, Calhoun, Cherokee, Etowah, Jefferson, St. Clair	T / FCH
Vermilion darter *Etheostoma chermocki*	Depend on specific bottom substrates for normal and robust life processes such as spawning, rearing, protection of young during life stages, protection of adults when threatened, foraging, and feeding. These bottom substrates are dominated by fine gravel, along with some sand, coarse gravel, cobble, and bedrock. Prefers small-sized gravel for spawning substrates, sometimes with small sticks and limbs on the bottom substrate and within the water column. Excessive fine sediments (small sands, silt, and clay), when embedded in the larger substrates, fills in the interstitial spaces between these structures causing loss of spawning and rearing areas, foraging and feeding sites, and escape sites. Dense, filamentous algae growth on the substrates may restrict or eliminate the usefulness of the interstitial spaces as well.	Found only in the Turkey Creek drainage, a tributary of the Locust Fork of the Black Warrior River.	Blount, Jefferson	E / FCH
Watercress darter *Etheostoma nuchale*	Inhabit deeper, slow-moving backwaters of springs with aquatic vegetation such as watercress (Nasturtium), and the	As of 2022, known from six springs in Jefferson County,	Jefferson	E / No CH

Common Name/ Scientific Name	Habitat	River, river system, or basin in AL	AL counties of occurrence	ESA Status/ critical habitat
	charophytes (a group of green algae), *Chara* sp. and *Spirogyra* sp. These sites provide for populations of aquatic insects, crustaceans, and snails which form this darter's diet. The vegetation also plays an important role as the substrate upon which the darter lays its eggs.	and comprise four genetically distinct populations.		
Goldline darter *Percina aurolineata*	Inhabits medium-sized rivers and large tributary streams. Preferred habitat is comprised of riffles and runs with swift current over gravel, cobble, bedrock and boulder substrate, often with patches of sand and riverweed (*Podostemum ceratophyllum*). Benthic macrophytes like the American water-willow (Justicia americana) and riverweed are components of high-quality shoal habitat, and have been declining over the past few decades.	Endemic to the Alabama River basin and currently occurs in the Cahaba River drainage in AL and the upper Coosawattee River drainage in GA.	Bibb, Chilton, Jefferson, Perry, Shelby, Tuscaloosa	T / No CH
Pygmy sculpin *Cottus paulus (=pygmaeus)*	Coldwater Spring and the spring run in Calhoun County, AL is impounded by a low weir dam to form a pool of over 0.4 hectares (1 ac), 0.6 to 1.2 m deep (2 to 4 ft). The spring run is up to 18 m (60 ft) wide and 152 m (500 ft) long to its confluence with Dry Creek. The average flow is 121 million liters (32 million gallons) per day with a fairly constant temperature of 16° to 18°C (61° to 64° F). The sculpins are observed over sand, boulder and pebble portions and also, less often, vegetated portions of the spring system.	Only known to occur in a single spring, Coldwater Spring, and its downstream spring run, in the Coosa River Watershed.	Calhoun	T / No CH
Spring pygmy sunfish *Elassoma alabamae*	Found in spring pools and spring runs. The species typically occurs in calm, clear water with abundant aquatic vegetation.	Occurs in two spring systems in northern Alabama: the Beaverdam Creek and Spring system and Blackwell Swamp.	Limestone, Madison	T / FCH

4.7.3 Small, freshwater stream, river and spring fish critical habitats

Critical habitats include high-quality water, stable stream morphology, and connectivity between suitable habitats that support their life cycles. Ecological threats such as urbanization, pollution, habitat alteration, and impoundment significantly impact these fish populations. Overall, the successful conservation of these species hinges on maintaining optimal water quality, preventing habitat degradation, and ensuring adequate flows and connectivity within their ecosystems.

Rush darter (Etheostoma phytophilum) critical habitat

Critical habitat for the rush darter was designated in 2012 (77 FR 63604). Designated critical habitat encompasses 44 river km (27 river mi) and 12 hectares (ha), all within Alabama.

Springs and spring-fed reaches of relatively low-gradient, geomorphically stable streams with emergent vegetation were specified to be an essential physical or biological feature for the rush darter. The connectivity of these habitats is essential in accommodating feeding, breeding, growth, and other normal behaviors of the rush darter and in promoting gene flow within the species.

Slackwater darter (Etheostoma boschungi) critical habitat

Critical habitat for the slackwater darter was designated in 1977 (42 FR 47840; 42 FR 45526). It was delineated in Lauderdale County Alabama, to include all permanent and intermittent streams with flowing water from December to June tributary to Cypress Creek and its tributaries upstream from the Junction of Burcham Creek, including Burcham Creek, excluding Threet Creek and its tributaries.

Trispot darter (Etheostoma trisella) critical habitat

Critical habitat for the trispot darter was designated in 2020 (85 FR 61619). It includes 175.4 river or stream miles (282.3 stream kilometers) and 9,929 acres (4,018 hectares) in six critical habitat units. All of those areas are in the Coosa River system in Alabama, Georgia, and Tennessee, with two of the units in Alabama. Physical or biological features of trispot darter critical habitat include:

1. Geomorphically stable, small to medium streams with detritus, woody debris, and stands of water willow (Justicia americana) over stream substrate that consists of small cobble, pebbles, gravel, and fine layers of silt; and intact riparian cover to maintain stream morphology and reduce erosion and sediment inputs.
2. Adequate seasonal water flows, or a hydrologic flow regime (which includes the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain appropriate benthic habitats and to maintain and create connectivity between permanently

flowing streams with associated streams that hold water from November through April, providing connectivity between the darter's spawning and summer areas.
3. Water and sediment quality (including, but not limited to, conductivity; hardness; turbidity; temperature; pH; ammonia; heavy metals; pesticides; animal waste products; and nitrogen, phosphorus, and potassium fertilizers) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages.
4. Prey base of aquatic macroinvertebrates.

The features essential to the conservation of the trispot darter may require special management considerations or protections to reduce the following threats:
1. Urbanization of the landscape, including (but not limited to) land conversion for urban and commercial use, infrastructure (roads, bridges, utilities), and urban water uses (water supply reservoirs, wastewater treatment);
2. nutrient pollution from agricultural activities that impact water quantity and quality;
3. significant alteration of water quality;
4. improper forest management or silviculture activities that remove large areas of forested wetlands and riparian systems;
5. culvert and pipe installation that creates barriers to movement;
6. changes and shifts in seasonal precipitation patterns;
7. other watershed and floodplain disturbances that release sediments or nutrients into the water or fill suitable spawning habitat; and
8. creation of reservoirs that convert permanently flowing streams and/or streams that hold water from November through April into lake or pond-like (lentic) environments.

Vermilion darter (Etheostoma chermocki) critical habitat

Critical habitat for the vermillion darter was designated in 2010 (75 FR 75913). It encompasses approximately 21.0 kilometers (13.0 miles) of stream in 5 units within the Turkey Creek watershed in Jefferson County, Alabama. The primary constituent elements of the physical and biological features essential to the conservation of the vermilion darter consist of four components:

1. Geomorphically stable stream bottoms and banks (stable horizontal dimension and vertical profile) in order to maintain bottom features (riffles, runs, and pools) and transition zones between bottom features, to promote connectivity between spawning, foraging, and resting sites, and to maintain gene flow throughout the species range.
2. Instream flow regime with an average daily discharge over 50 cubic feet per second, inclusive of both surface runoff and groundwater sources (springs and seepages) and exclusive of flushing flows.
3. Water quality with temperature not exceeding 26.7 °C (80 °F), dissolved oxygen 6.0 milligrams or greater per liter, turbidity of an average monthly reading of 10 NTU and 15mg/l TSS (Nephelometric Turbidity Units; units used to measure sediment discharge; Total Suspended Solids measured as mg/l of sediment in water) or less; and a specific conductance (ability of water to conduct an electric current, based on dissolved solids in the water) of no greater than 225 micro Siemens per centimeter at 26.7 °C (80 °F).

4. Stable bottom substrates consisting of fine gravel with coarse gravel or cobble, or bedrock with sand and gravel, with low amounts of fine sand and sediments within the interstitial spaces of the substrates along with adequate aquatic vegetation.

Critical habitat does not include manmade structures existing on the effective date of this rule and not containing one or more of the primary constituent elements, such as buildings, bridges, aqueducts, airports, and roads, and the land on which such structures are located.

Spring pygmy sunfish (Elassoma alabamae) critical habitat

Critical habitat for the spring pygmy sunfish was designated in 2019 (84 FR 24987). Approximately 10.9 kilometers (6.7 miles) of streams and 1,330 acres (538 hectares) in Limestone and Madison Counties, Alabama, were designated as critical habitat. PBFs essential to the conservation of the spring pygmy sunfish were defined as:

1. Spring system. Springs, and connecting spring-fed reaches and wetlands, that are geomorphically stable and relatively low-gradient. This includes headwater springs with spring heads (water source), spring runs, and spring pools that filter into shallow, vegetated wetlands.
2. Water quality. Yearly averages of water quality with optimal temperatures of 57.2 to 68 °F (14 to 20 °C); pH of 6.0 to 7.7; dissolved oxygen of 6.0 parts per million (ppm) or greater; low concentrations of free or suspended solids with turbidity measuring less than 15 NTU and 20 mg/l TSS.
3. Hydrology. A hydrologic flow regime (magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain spring habitats. The instream flow from groundwater sources (springs and seeps) maintains an adequate velocity and a continuous daily discharge from the aquifer that allows for connectivity between habitats. Instream flow is stable and does not vary during water extraction, and the aquifer recharge maintains adequate levels to supply water flow to the spring head. The flow regime does not significantly change during storm events.
4. Prey base, or food. Macroinvertebrates including *Daphnia* spp., amphipods, chironomids (non-biting midges), or small snails.
5. Vegetation. Aquatic, emergent and semi-emergent vegetation along the margins of spring runs and submergent vegetation that is adequate for breeding, reproducing, and rearing young; providing cover and shelter from predators; and supporting the macroinvertebrate prey base. Important species include: (a) Submergent filamentous vegetation such as *Ceratophyllum echinatum* (spineless hornwort), *Myriophyllum heterophyllum* (two-leaf water milfoil), and *Hydrilla verticillata* (native hydrilla); (b) Emergent vegetation such as *Sparganium spp*. (bur reed), *Polygonum spp*. (smartweed), *Nasturtium officinale* (watercress), *Juncus spp*. (rush), and *Carex spp*. (sedges); and (c) Semi-emergent vegetation such as *Nuphar luteum* (yellow pond lily), *Utricularia spp*. (bladderwort), and *Callitriche spp*. (water starwort).

4.8 FRESHWATER MUSSELS

The North American freshwater mussel fauna is the richest in the world and historically numbered around 300 species. Within North America, the southeastern United States is the hot spot for mussel diversity. However, many southeastern mussel species are highly imperiled (at least 65 percent) or extinct (about 30 species). In the past century they have become more imperiled than any other group of organisms (Haag and Williams 2014). There are 47 species of mussels included in this standing analysis. Like many other southeastern mussel species, they have undergone reductions in range size and abundance.

Adult mussels are sedentary. Native freshwater mussels typically need clean, free-flowing water and sufficient food sources. They require permanently flowing water with adequate quality (including temperature, turbidity, dissolved oxygen, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act, as amended (33 U.S.C. 1251 et seq.). Suitable habitat also includes a geomorphically stable stream channel (a channel that maintains its lateral dimensions, longitudinal profile, and spatial pattern over time without a consistent aggrading or degrading bed elevation) and predominantly sand, gravel, and/or cobble stream substrate with low to moderate amounts of silt and clay.

Sexes in freshwater mussels are usually separate. In terms of reproduction, freshwater mussels are all thought to have a similar process: sperm is released into the water by males and taken in by downstream females through their siphons during feeding and respiration (Figure 2; Cummings & Mayer 1992). Fertilization takes place inside the shell. The eggs are retained in the gills of the female until they develop into mature larvae called glochidia. Glochidia are then released by the female to latch onto the gills or fins of a host fish. Some species of freshwater mussels are host generalists, while other species use specific fish host species for their glochidia. The glochidia of most freshwater mussel species have a parasitic stage during which they must attach to the gills, fins, or skin of a fish to transform into a juvenile mussel. Depending on the mussel species, females may retain their glochidia in the marsupium until released, or release glochidia in masses known as conglutinates, or in one large mass known as a superconglutinate. Once the glochidia make contact with their associated host, the glochidia encyst on the fish and obtain oxygen and nutrients until they mature into juveniles and drop from the fish. The duration of the parasitic stage varies by mussel species, water temperature, and perhaps host fish species. When the transformation is complete, the juvenile mussels drop from their fish host and sink to the stream bottom where, given suitable conditions, they grow and mature into adults.

Mussel reproduction requires a stable, undisturbed habitat and a sufficient population of fish hosts to complete a mussel's glochidia development. The timing of breeding varies by species. Juvenile mussels may be particularly sensitive to water quality degradation or toxins, although all mussels are negatively impacted by pollution and degradation of the aquatic ecosystem.

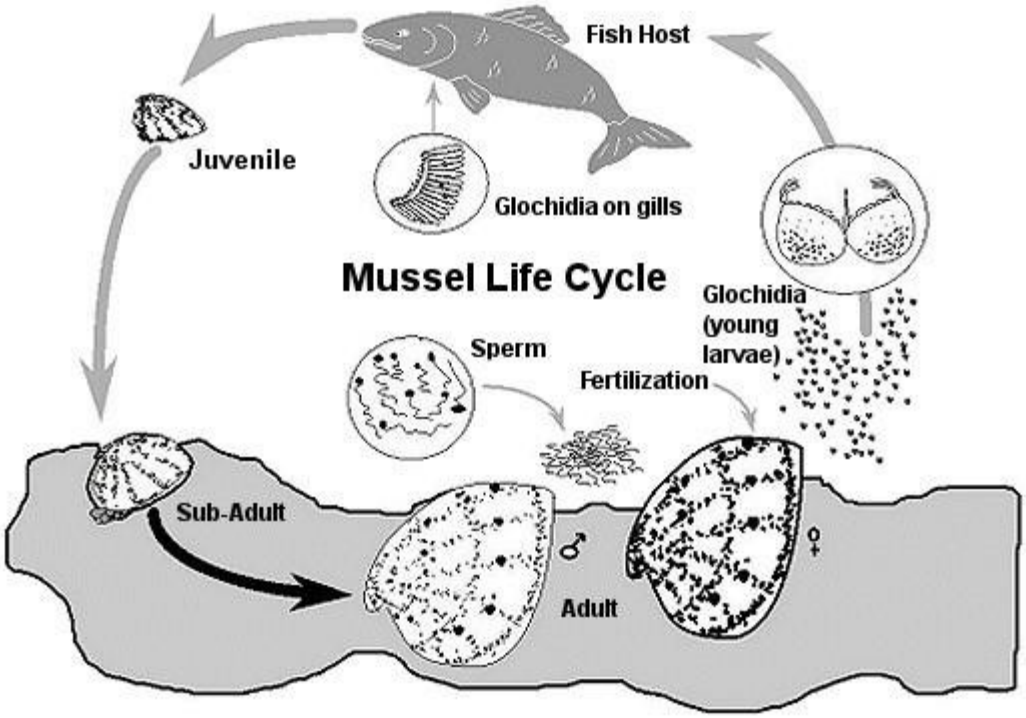


Figure 2. Life cycle of mussels (Service)

Freshwater mussels gather nutrients and food, such as detritus, plankton, and other microorganisms, by filter feeding. Freshwater mussels are suspension-feeders that siphon water and filter out food sources like suspended algae, bacteria, detritus, and microscopic animals (Gatenby et al. 1996, Strayer et al. 2004). Some adult mussels can also shift to deposit feeding using their foot with ciliary tracts, but mainly juveniles use this method of feeding (Yeager 1994, Yeager et al. 1994, Haag 2012).

In general, freshwater mussels require similar habitat characteristics to survive. These characteristics include:

- Geomorphically stable stream and river channels and banks.
- A flow regime necessary for normal behavior, growth, and survival of all life stages of mussels and their fish hosts in the river environment. An appropriate flow regime could include the magnitude, frequency, duration, and seasonality of discharge.
- Good water quality, including temperature, pH, hardness, turbidity, oxygen content, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages.
- Sand, gravel, and/or cobble substrates with low-to-moderate amounts of fine sediment, interstitial flow, low amounts of attached filamentous algae, and other physical and chemical characteristics necessary for normal behavior, growth, and viability of all life stages.
- Fish hosts, including adequate living, foraging, and spawning areas for those fish.

- Few or no competitive or predaceous nonnative species present.

The central reason for the decline of freshwater mussels is the modification and destruction of their habitat, especially from sedimentation, dams, and degraded water quality. Degradation of habitat and water quality result from pollution (e.g., toxic waste, excess nutrients) and excess sediment from things such as dredging and agricultural runoff. Instream activities such as bridge and road construction also have the potential to impact populations. Additional threats include dams, fluctuations in water temperature and invasive species (e.g., zebra mussels).

A major threat to the survival and recovery of freshwater mussel species is the small size, extent, and isolation of their remaining populations. These species were once widespread, found in a continuum of small streams to large rivers. Dams and their impounded waters present physical barriers to the natural dispersal of mussels by preventing movement of host fishes, effectively isolating surviving mussel populations to limited portions of drainages. Small isolated aquatic populations are subject to natural random events (droughts, floods), and to changes in human activities and land use practices (urbanization, industrialization, mining, certain agricultural activities and practices, etc.) that may severely impact aquatic habitats. Without avenues of emigration to less affected watersheds, mussel populations gradually disappear where land use activities result in deterioration of aquatic habitats. Local random events, and changes in human activities within watersheds are believed to have caused or contributed to the disappearance of mollusks from significant portions of isolated stream habitats, resulting in the extinction of many mussel species, as well as a number of freshwater snail species.

Table 3 briefly describes the relevant biology of each of the species that may be exposed to the stressors identified in the proposed action, their required habitat conditions, and general information about species presence in the Covered Area.

4.8.1 Freshwater mussel species (table)

The mussel species addressed here inhabit freshwater rivers and streams and prefer clean, well-oxygenated waters with minimal siltation over rocky or sandy substrates. Many are found in riffles, runs, and pools with moderate to swift currents.

Table 3. Freshwater mussel and snail species covered in the standing analysis for the Alabama DKey, including their listing status under the Endangered Species Act where T=threatened, E=endangered, NEP=non-essential experimental population, and critical habitat status. Hyperlinks in this table direct the reader to Service web-pages or documents outside of this document.

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
Alabama lampmussel *Lampsilis virescens*	Historically occurred in small creeks to large rivers; however, at present, it only seems to persist in small to moderate-sized streams in areas of slow to moderate current, within sand and gravel substrates. The lampmussel has also been found in areas with stands of water willow (Justicia americana).	Limited portions of the Paint Rock River system in Jackson County, AL. NEP in AL: The free-flowing reach of the Tennessee River from the base of Wilson Dam downstream to the backwaters of Pickwick Reservoir [about 12 RM (19 km)] and the lower 5 RM [8 km] of all tributaries to this reach in Colbert and Lauderdale counties.	Colbert, Jackson, Lauderdale, Limestone, Madison, Marshall. NEP: Colbert, Franklin, Lauderdale	E; NEP / No CH
Alabama moccasinshell *Medionidus acutissimus*	Occupies streams and small rivers with stable gravel substrate within riffles and runs, with moderate to strong currents. Lives completely embedded in stream bottoms for most of the year, except when gravid (October to June). Gravid females migrate to the surface of the stream bottom and anchor themselves to substrate using a byssal thread (protein thread), and display a black mantle lure to attract potential host fish.	Endemic to the Mobile River Basin (AL, MI, GA, TN). As of 2025, sub-basins (HUC-8 hydrologic units) with extant populations were known to include portions of the Conasauga, Lower Coosa River, Upper Tombigbee, Buttahatchee, Luxapalila, Middle Tombigbee, Sipsey River, Lower Black Warrior River, and Sipsey Fork. Status is unknown in portions of some major drainages.	Bibb, Blount, Chilton, Choctaw, Dallas, Elmore, Etowah, Fayette, Franklin, Greene, Hale, Jefferson, Lamar, Lawrence, Marengo, Marion, Marshall, Perry, Pickens, Shelby, St. Clair, Sumter, Tuscaloosa, Walker, Winston	T / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
Alabama pearlshell *Margaritifera marrianae*	Has been found in small headwater streams with slow to moderate current and substrates that consist of mixed sand, gravel or sandy mud. Most stream locations where they are found either have no aquatic vegetation or limited quantities of *Ludwigia* spp., *Justicia* spp., and or filamentous algae, and may be characterized by braided channeling or by stable pools and riffles.	Known from a few tributaries of the Alabama River and Conecuh River drainages in south central Alabama.	Conecuh, Crenshaw, Escambia, Monroe, Wilcox	E / FCH
Canoe Creek clubshell *Pleurobema athearni*	Prefers shoal habitat with clean gravel substrates, free from excessive fine sediments. Tricolor shiner (*Cyprinella trichroistia*) and Alabama shiner (*C. callistia*) have both been identified as primary fish hosts. Others may include striped shiner (*Luxilus chrysocephalus*).	Currently known only from the Big Canoe Creek Watershed, a western tributary to the Coosa River in St. Clair and Etowah counties.	Blount, Etowah, Jefferson, St. Clair	E / FCH
Chipola slabshell *Elliptio chipolaensis*	Generally found along creek banks with sand and silty sand substrates in slow to moderate current.	Large creeks and the main channel of the Chipola River.	Geneva, Houston	T / FCH
Choctaw bean *Obovaria choctawensis*	Inhabits large creeks and rivers where it is typically found in silty sand or sandy clay substrates. Appears to require high-quality streams with stable channels.	Records are known from the Escambia (Conecuh), Yellow, and Choctawhatchee River basins (AL and FL). Occurs throughout the three basins but is uncommon and appears to have been extirpated from multiple historical sites.	Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes, Monroe, Montgomery, Pike	E / FCH
Coosa moccasinshell *Medionidus parvulus*	Typically found in gravel substrate within riffles, with moderate to strong currents in	Historically reported from the Cahaba River, the Sipsey Fork of the Black Warrior River and the Coosa River, as well as their	Blount, Calhoun, Cherokee, Clay, Cleburne, Coosa,	E / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
	streams and small rivers. They stay buried throughout the year, except when females are gravid and migrate to the surface of the streambed to display a black mantle lure in order to attract potential host fishes.	tributaries in AL, GA and TN. As of 2025, extant populations were known to include portions of these sub-basins (HUC-8 hydrologic units): Cahaba River, Lower Coosa River, Middle Coosa River and Conasauga River. Releases have occurred at four reintroduction sites within its historical range: Yellowleaf Creek, AL, Little Cahaba River, AL, Big Canoe Creek, AL, and Armuchee Creek, GA.	Elmore, Etowah, Jefferson, Shelby, St. Clair, Talladega, Tallapoosa	
Cracking pearlymussel *Hemistena lata*	Inhabits cobble, gravel, sand and sometimes muddy substrates in medium to large rivers.	Historical range included AL, IL, IN, KY, OH, TN, VA. NEP in AL: The free-flowing reach of the Tennessee R. from the base of Wilson Dam downstream to the backwaters of Pickwick Reservoir [about 12 RM (19 km)] and the lower 5 RM [8 km] of all tributaries to this reach in Colbert and Lauderdale Counties.	Limestone. NEP in AL: Colbert, Franklin, Lauderdale	E, NEP / No CH
Cumberlandian combshell *Epioblasma brevidens*	Riffle and shoal areas in medium size streams to large rivers; coarse sand to gravel/ cobble/ boulder.	Known to persist in Bear Creek.	Colbert, Franklin; NEP in Colber, Franklin, Lauderdale	E, NEP / FCH
Dark pigtoe *Pleurobema furvum*	Inhabits sand/gravel/cobble shoals with moderate to strong currents in small to medium sized streams/rivers within the Mobile River Basin.	Historically restricted to the Black Warrior River system in northern Alabama.	Blount, Cullman, Fayette, Franklin, Jefferson, Lawrence, Marion, Morgan, Tuscaloosa, Walker, Winston	E / FCH
Fanshell *Cyprogenia stegaria*	Inhabits medium to large rivers, especially in shoals or riffles with gravel or gravel and sand substrates.	Known from rivers of the Ohio River system. In Alabama historically known from the Tennessee River.	Colbert, Lauderdale	E / No CH
Finelined pocketbook *Hamiota altilis*	Has been found in small creeks to large rivers with sand, gravel and gravel-cobble substrates without heavy silt deposits.	Historically known from the Alabama River and tributaries, AL; tributary rivers and streams of the Tombigbee and Black Warrior Rivers, MS and AL; Cahaba River and tributaries, AL; Tallapoosa River and	Autauga, Bibb, Blount, Calhoun, Chambers, Cherokee, Chilton, Clay, Cleburne, Coosa, DeKalb, Elmore,	T / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
		tributaries, AL, GA; and the Coosa River and tributaries, AL, GA and TN. In AL, as of 2021 considered extant in the Upper Cahaba River and the Little Cahaba River; Coosa River (Cherokee County) and its tributaries, Terrapin Creek and South Fork Terrapin Creek (Cleburne), Big Canoe Creek (St. Clair), Cheaha Creek (Talladega/Clay counties), Yellowleaf Creek and its tributary Muddy Prong (Shelby), Kelly Creek and its tributary Shoal Creek (Shelby/St. Clair), Shoal Creek (Clebume), and Tallasahatchee Creek (Talladega); and the Tallapoosa River (Cleburne) and tributaries, Uphapee Creek and Opintlocco Creek (Macon), Choctafaula Creek and Chewacla Creek (Macon/Lee), Cane and Little Cane Creeks and Muscadine Creek (Cleburne).	Etowah, Jefferson, Lee, Macon, Perry, Randolph, Russell, Shelby, St. Clair, Talladega, Tallapoosa, Tuscaloosa	
Finerayed pigtoe *Fusconaia cuneolus*	Associated with clean, fast-moving water with relatively stable cobble, gravel, and sand substrates free of siltation. Usually found buried in the substrate in shallow riffle, ford, and shoal areas but can also occur in deeper runs.	Restricted to the middle and upper Tennessee River system; has always been considered rare. One of five known populations is in AL, on the Paint Rock River. NEP in AL: Planned for reintroduction to the Free-Flowing Reach of the Tennessee River below the Wilson Dam, Colbert and Lauderdale Counties	Jackson, Madison, Marshall; NEP: Colbert and Lauderdale (planned)	E; NEP / No CH
Fluted kidneyshell *Ptychobranchus subtentus*	Primarily occupies shoal habitat in small to large rivers. Typically found in substrates with mixed sand and gravel, and occasionally found near or under cobble and boulders that have smaller substrates near the margins. Does not appear to do well in lentic habitats or areas	Endemic to the Cumberland and Tennessee River drainages of the Ohio River basin (historically reported from AL, KY, TN, and VA). As of 2021, remains extant in a few western tributaries of the lower Tennessee River (e.g., Duck [TN] and Elk ([AL, TN]),	Limestone	E / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
	with heavy deposits of fine material.			
Fuzzy pigtoe *Pleurobema strodeanum*	Important habitat features include stream channels with stable substrates, natural flow regimes, and intact riparian areas. Often occurs near logs and limbs in areas with deep, fast-flowing water and consolidated sediments that remain stable during high flows.	Records are known from the Escambia, Yellow, and Choctawhatchee River basins, AL and FL. Likely declining overall in the Escambia River basin, and exceedingly rare in the Yellow River basin. In the Choctawhatchee River basin, relatively abundant populations occur within a few high-quality reaches, but populations are declining elsewhere within the basin.	Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes, Monroe, Montgomery, Pike	T / FCH
Georgia pigtoe *Pleurobema hanleyianum*	Little is known about the habitat requirements or life history of the Georgia pigtoe; however, it is most often found in shallow runs and riffles with strong to moderate current and coarse sand-gravel-cobble bottoms.	Endemic to the Coosa River drainage of the Mobile River basin in AL, GA and TN. Currently known from a few isolated shoals in GA and TN; and in the Big Canoe and Little Canoe creeks in St. Clair and Etowah counties, AL. Single records have been documented from the Weiss Bypass of the Coosa River (2002) and from Hatchet Creek (2001).	Blount, Calhoun, Cherokee, Clay, Cleburne, Coosa, Etowah, Jefferson, Shelby, St. Clair, Talladega, Tallapoosa	E / FCH
Gulf moccasinshell *Medionidus penicillatus*	Inhabits channels of small to medium-sized creeks to large rivers with sand and gravel or silty sand substrates in slow to moderate current	Historically known in AL GA and FL from the main stems and tributaries throughout the Apalachicola-Chattahoochee-Flint River Basin and Econfina Creek	Geneva, Houston	E / FCH AL?
Heavy pigtoe *Pleurobema taitianum*	Occurs in rivers that are characterized by gravel and coarse sand substrates, and have a depth of more than 6 meters. This species historically also occurred in large creeks.	Historically found in the Tombigbee River from the mouth of Tibbee Creek near Columbus MS to Demopolis AL; the Alabama River at Claiborne and Selma AL; the lower Cahaba River AL; and possibly the Coosa River, AL. It has also been reported from the East Fork Tombigbee River and the Sipsey River, AL. Only four sites with suitable habitat remain, including localities in a bendway of the Tombigbee River, Sumter	Autauga, Dallas, Franklin, Greene, Lamar, Lowndes, Marengo, Marion, Perry, Pickens, Sumter, Wilcox	E / No CH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
		County, and the Sipsey River, Pickens and Greene Counties, AL.		
Inflated heelsplitter *Potamilus inflatus*	Often inhabits soft, stable stream bottoms in slow to moderate currents. It has been found in sand, mud, silt and sandy gravel. Occurrences in silt may due to having been established at a given site prior to deposition of the silt.	In AL, historically found in the Alabama, Coosa, Tombigbee and Black Warrior rivers. Range in the Mobile River Basin has expanded since listing. In the Black Warrior River, the range has been extended from its confluence with the Tombigbee River, upstream to Tuscaloosa, Tuscaloosa County, AL. In the Tombigbee River, the range has been extended from its confluence with the Alabama River, Mobile County, AL, upstream into the East Fork Tombigbee River, Itawamba County, MS. It has also been collected from the lower Sipsey River, Greene County, and from the lower Alabama River, Baldwin & Clarke counties, AL.	Baldwin, Choctaw, Clarke, Escambia, Fayette, Greene, Hale, Jefferson, Marengo, Marion, Mobile, Monroe, Pickens, Sumter, Tuscaloosa, Walker, Washington	T / No CH
Longsolid *Fusconaia subrotunda*	Shows a preference for sand and gravel in streams and small rivers, but also may be found in coarse gravel and cobble in larger rivers. In streams and rivers they can be found at depths less than two feet, but in large rivers can be commonly found at depths of 12 to 18 feet; but also at depths of over 20 feet.	Historically, the longsolid was found in four basins: the Great Lakes, Ohio, Cumberland, and Tennessee River basins. It is considered extirpated from the Great Lakes basin. Currently, it is found in the states of AL, KY, NY, NC, OH, PA, TN, VA, and WV, and is considered extirpated from GA, IN, and IL.	Colbert, Franklin, Jackson, Lauderdale, Lawrence, Limestone, Madison, Marshall, Morgan	T / FCH
Narrow pigtoe *Fusconaia escambia*	Found in higher abundance in slow-flowing areas of the lower Escambia and Yellow rivers.	Known from the Escambia River basin (AL and FL) and the Yellow River basin (FL). Overall, the species maintains low abundance at most locations and appears extirpated from multiple historical locations.	Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Escambia, Lowndes, Monroe, Montgomery, Pike	T / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
Orangenacre mucket *Hamiota perovalis*	Habitats ranging from medium creeks to large rivers of the western Mobile River Basin. Inhabit stable sand-gravel-cobble shoals with moderate to strong currents.	Historically known from the Alabama, Tombigbee, Black Warrior and Cahaba Rivers and their tributaries in AL and MS.	Autauga, Bibb, Blount, Chilton, Choctaw, Conecuh, Dallas, Etowah, Fayette, Franklin, Greene, Hale, Jefferson, Lamar, Lawrence, Lowndes, Marion, Marshall, Monroe, Perry, Pickens, Shelby, St. Clair, Sumter, Tuscaloosa, Walker, Wilcox, Winston	T / FCH
Oval pigtoe *Pleurobema pyriforme*	Small to medium-sized creeks to small rivers where it inhabits silty sand to sand and gravel substrates, usually in slow to moderate current.	Historically occurred in four major stream systems in AL, GA, and FL: Econfina, Apalachicola-Chattahoochee-Flint River system, Ochlockonee, and Suwannee.	Geneva, Houston	E / FCH
Ovate clubshell *Pleurobema perovatum*	Occurs in riffles, runs, and shoals of small creeks to large rivers, usually in sand and gravel substrates.	Endemic to the Mobile River Basin in AL and MS. Believed to be limiting to the Tombigbee River, Alabama River, and Cahaba River drainages at or below the fall line. As of 2025, extant populations were known to include portions of these sub-basins (HUC-8 hydrologic units): Buttahatchee, Luxapalila, Middle Tombigbee-Lubbub, Sipsey River, Middle Tombigbee-Chickasaw, Lower Alabama, Middle Alabama River, Lower Black Warrior River, and Cahaba. Status is unknown in portions of some major drainages. Historical records of ovate clubshell from the Coosa drainage are believed to be misidentified Georgia pigtoe, *Pleurobema hanleyianum*, and ovate clubshell records from the Upper Black Warrior are believed to	Bibb, Blount, Bullock, Calhoun, Chambers, Cherokee, Chilton, Choctaw, Clay, Cleburne, Coosa, Cullman, Dallas, DeKalb, Elmore, Etowah, Fayette, Franklin, Greene, Hale, Jefferson, Lamar, Lawrence, Lee, Macon, Marengo, Marion, Marshall, Monroe, Perry, Pickens, Russell, Shelby, St. Clair, Sumter, Talladega, Tallapoosa, Tuscaloosa, Walker, Wilcox, Winston	E / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
		be misidentified dark pigtoe, *Pleuorbema rubellum.*		
Oyster mussel *Epioblasma capsaeformis*	Small to medium rivers with coarse sand to boulder substrate and moderate to swift currents.	Endangered in AL, KY, MS, TN and VA. NEP in AL: The free-flowing reach of the Tennessee R. from the base of Wilson Dam downstream to the backwaters of Pickwick Reservoir [about 12 RM (19 km)] and the lower 5 river miles [8 km] of all tributaries to this reach in Colbert and Lauderdale Counties.	Colbert, Franklin, Jackson, Madison, Marshall; NEP in AL: Colbert, Franklin, Lauderdale	E / FCH
Pale lilliput (pearlymussel) *Toxolasma cylindrellus*	Historically occurred in small creeks to large rivers; currently seems to persist only in small to moderate sized streams in areas of slow to moderate current, usually in less than three feet of water, within sand and gravel substrates.	Currently in AL, populations of the pale lilliput are believed limited to the headwaters of the Paint Rock River.	Jackson, Madison, Marshall	E / No CH
Pink mucket (pearlymussel) *Lampsilis abrupta*	Medium to larger rivers with silt, gravel, sand, cobble, and boulder substrates and moderate to fast flow.	Historic range included AL, AR, IL, IN, KY, LA, MO, OH, PA, TN, VA and WV. In AL as of 2024, known from the Tennessee and Paint Rock Rivers, and re-introduced into the Elk River.	Colbert, Franklin, Jackson, Lauderdale, Lawrence, Limestone, Madison, Marshall, Morgan	E / No CH
Purple bean *Villosa perpurpurea*	Inhabits small headwater streams to medium-sized rivers, in moderate to fast-flowing riffles with sand, gravel, and cobble substrates. Rarely occurs in deep pools or slack water. Sometimes found out of the main current adjacent to water-willow beds and under flat rocks.	As of 2020, known population areas included Upper Clinch River and Indian Creek; Lower Clinch River and Copper Creek; Beech Creek; Emory River, Obed River, and Clear Creek; Hiwassee River; Paint Rock River; Nolichucky River and Little Chucky Creek; Powell River; and North Fork Holston River (AL, TN, KY). The endangered Cumberland bean [*V. trabalis*] population that was believed to be in AL was reclassified as purple bean [*V. perpupurea*]). A small population was also established in the Paint Rock River with captive-propagated individuals from Hiwassee River broodstock.	Jackson, Madison	E / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
Purple bankclimber *Elliptoideus sloatianus*	Inhabits small to large river channels in slow to moderate current over sand or sand mixed with mud or gravel substrates, often sand/limestone. Often in waters over 10 feet in depth.	In Alabama known from the Chattahoochee River. Species primarily occupies the Flint, Apalachicola, and Ochlockonee Rivers in Georgia and Florida.	Chambers, Lee	T / FCH
Rabbitsfoot *Quadrula cylindrica cylindrica*	Small to medium sized streams and some larger rivers. Usually occurs in shallow areas along the bank and adjacent runs and riffles with gravel and sand substrates where the water velocity is reduced. Specimens also may occupy deep water runs, having been reported in 2.7 to 3.7 m (9 to 12 feet) of water. Similar to other mussels, requires flow refuge areas, where shear stress (the stream's ability to entrain and transport bed material created by the flow acting on the bed material) is low and sediments remain stable during flood events.	Historically known from 140 small- to medium-sized streams and some larger rivers in the Lower Great Lakes and Lower Mississippi River sub-basins and Ohio, Cumberland, Tennessee, White, Arkansas, and Red River basins (AL, AR, GA, KS, KY, IL, IN, LA, MS, MO, OH, OK, PA, TN, and WV). As of 2012, believed to persist in 51 streams in 13 states, including Bear Creek, a southern tributary of the Tennessee River, in northwestern Alabama and northeastern Mississippi.	Colbert, Franklin, Jackson, Limestone, Madison, Marshall	T / FCH
Round ebonyshell *Reginaia rotulata*	Occurs in small to medium rivers, typically in stable substrates of sand, small gravel, or sandy mud in slow to moderate current.	Restricted to the main channel of the Conecuh (Escambia) River.	Butler, Conecuh, Covington, Crenshaw, Escambia, Lowndes, Monroe	E / FCH
Round hickorynut *Obovaria subrotunda*	Found in small streams to large rivers, particularly in sand and gravel riffle, run, and pool habitats, but also may be found in sandy mud. They can be found in shallow habitats with gentle flows at less than one foot	As of 2023 found in the Great Lakes, Ohio, Cumberland, Tennessee, and Lower Mississippi River basins, overlapping within the States of AL, IN, KY, MI, MS, OH, PN, TN, and WV. Considered extirpated from GA, IL, and NY. The round hickorynut also occurs within the Canadian Province of Ontario.	Jackson, Madison, Marshall	T / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
	with American water-willow, but in larger rivers are commonly found up to depths of 6.5 feet.			
Sheepnose mussel *Plethobasus cyphyus*	Sand and gravel substrate in larger streams, with shallow shoals and moderate to swift currents, or in larger rivers at deeper depths.		Colbert, Lauderdale, Madison, Marshall, Morgan	E / FCH
Shiny pigtoe *Fusconaia cor*	The shiny pigtoe is associated with clean, fast-moving water with relatively stable cobble, gravel, and sand substrates free of siltation. The mussel is usually found buried in the substrate in shallow riffle, ford, and shoal areas but can also occur in deeper runs.	Cumberlandian species restricted to the middle and upper Tennessee River system; it has always been considered rare. There are currently five known populations with one in the Paint Rock River in AL; NEP in AL: Free-Flowing Reach of the Tennessee River below the Wilson Dam	Jackson, Madison, Marshall; NEP in AL: Colbert and Lauderdale Counties	E; NEP / No CH
Shinyrayed pocketbook *Hamiota subangulata*	Small to medium-sized creeks, to rivers in sand/rock, sand/clay or sandy substrates, in slow to moderate current. Often found in the interface of stream channel and sloping bank habitats, where sediment particle size and current strength are transitional. May prefer small creeks and spring-fed rivers.	Endemic to the Apalachicola-Chattahoochee-Flint River system (AL, GA, FL). Historically occurred in 12 sub-basins and as of 2019 occupied the Upper Flint, Middle Flint, Lower Flint, Kinchafoonee-Muckalee, Ichawaynochaway, Spring, Middle Chattahoochee, Lower Chattahoochee, Chipola and Econfina sub-basins. May be extirpated in the upper Ochlockonee sub-basin and the Upper Chattahoochee sub-basin.	Geneva, Houston, Lee, Russell	E / FCH
Slabside pearlymussel *Pleuronaia dolabelloides*	Primarily occupies shoal habitat in large creeks to large rivers. Areas with sand, fine gravel, and cobble substrates and moderately strong current may be most suitable for the species. Not tolerant of lentic (standing	Endemic to portions of the Cumberland and Tennessee River systems of Alabama, Kentucky, Mississippi, Tennessee, and Virginia. Known from Paint Rock River (AL), Elk River (AL, TN), and Bear Creek (AL and MS), for which 3 critical habitat units for this species correspond.	Colbert, Franklin, Jackson, Limestone, Madison, Marshall	E / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
	water) habitats such as lakes or impoundments.			
Snuffbox mussel *Epioblasma triquetra*	Small to medium sized creeks with swift current and sand, gravel, or cobble substrate.		Jackson, Limestone, Madison, Marshall, Morgan	E / FCH (Proposed)
Southern clubshell *Pleurobema decisum*	Sand and gravel shoals and runs of small rivers and large streams.	Found only in the Mobile River Basin of AL, GA, MS and TN.	Bibb, Blount, Bullock, Butler, Calhoun, Cherokee, Chilton, Choctaw, Clay, Cleburne, Conecuh, Coosa, Crenshaw, Dallas, Elmore, Etowah, Fayette, Franklin, Greene, Jefferson, Lamar, Lee, Lowndes, Macon, Marion, Monroe, Montgomery, Perry, Pickens, Russell, Shelby, St. Clair, Sumter, Talladega, Tallapoosa, Tuscaloosa, Walker, Washington, Wilcox, Winston	E / FCH
Southern combshell (=penitent mussel) *Epioblasma penita*	Moderate to large rivers with moderate to swift current in riffle or shoal areas with stable sandy-gravel to gravel-cobble substrate.	In Alabama, known from the Buttatchee River with reintroductions into the Sipsey River and Cahaba River.	Bibb, Lamar	E / No CH
Southern kidneyshell *Ptychobranchus jonesi*	At locations that still support the species, clear, high-quality streams with stable substrates appear to be important habitat conditions. May be particularly sensitive to siltation. Its sticky conglutinates require clean, hard	Historically occurred in the Escambia and Yellow River basins (AL) and the Choctawhatchee River basin (AL, FL). When listed, it was considered extant only in the Choctawhatchee basin. A population was since found in Burnt Corn Creek (Lower Conecuh), providing the first record in the	Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes, Monroe, Montgomery, Pike	E / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
	surfaces like rocks to adhere to and be seen by host fish.	Escambia River basin since 1972. Currently known from one stream system in the Escambia River basin and four widely separated stream systems in the Choctawhatchee River basin, which may represent disjunct populations. Appears nearly extirpated in the Escambia River basin and declining in the Choctawhatchee basin.		
Southern pigtoe *Pleurobema georgianum*	The southern pigtoe occurs in riffles, runs, and shoals of medium creeks to large rivers in sand and gravel substrates.	Endemic to the Coosa River drainage of the Mobile River Basin, AL, GA, and TN. The most robust population lies in Shoal Creek (Cleburne County), in Talladega National Forest. Since listing, some new tributary occurrences have been documented in AL at Terrapin Creek (Calhoun), Yellowleaf Creek (Shelby) and Hatchet Creek (Coosa). As of 2025, extant populations were known to include portions of these sub-basins (HUC-8 hydrologic units): Lower Coosa River, Middle Coosa River, Oostanaula River and Conasauga River.	Blount, Calhoun, Cherokee, Chilton, Clay, Cleburne, Coosa, DeKalb, Elmore, Etowah, Jefferson, Randolph, Shelby, St. Clair, Talladega, Tallapoosa	E / FCH
Southern sandshell *Hamiota australis*	Important habitat characteristics include stream channels with stable substrates, natural flow regimes, and intact riparian areas. Often occurs near logs and limbs in areas with deep, fast-flowing water and consolidated sediments that remain stable during high flows. Occasionally found in lightly disturbed habitats, but only occurs in high abundance in high-quality stream systems.	Records known from the Escambia River basin, AL, and the Yellow and Choctawhatchee River basins, AL and FL.	Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes, Monroe, Montgomery, Pike	T / FCH

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
Spectaclecase (mussel) *Cumberlandia monodonta*	Firm/stable; coarse sand, gravel, and rock free from excessive silt; may include large rock slabs/boulders, and under tree roots. Occupy areas sheltered from the main force of the river current.	Firm/stable; coarse sand, gravel, and rock free from excessive silt; may include large rock slabs/boulders, and under tree roots.	Colbert, Lauderdale, Lawrence, Limestone, Madison, Marshall, Morgan	E / FCH
Tapered pigtoe *Fusconaia burkei*	Important habitat characteristics include stream channels with stable substrates, natural flow regimes, and intact riparian areas. Often occurs near logs and limbs in areas with deep, fast-flowing water and consolidated sediments that remain stable during high flows.	Historically, widely distributed throughout the Choctawhatchee River basin. There is no indication that the species' overall distribution has changed substantially since it was listed, though it remains extirpated in localized areas of the Upper Choctawhatchee subbasin, including the Little Choctawhatchee River system.	Barbour, Bullock, Coffee, Covington, Crenshaw, Dale, Geneva, Henry, Houston, Pike	T / FCH
Triangular kidneyshell *Ptychobranchus greenii*	Occurs in shoal habitats in small creeks to large rivers, usually in sand and gravel substrates.	Endemic to the Cahaba, Coosa, and Black Warrior River drainages (Mobile River Basin), above the fall line. As of 2025, extant populations were known to include portions of these sub-basins (HUC-8 hydrologic units): Sipsey Fork, Locust Fork, Cahaba River, Middle Coosa River, and Conasauga River. Populations on the mainstem middle Coosa River, Oostanaula River, and Coosawattee River appear extirpated.	Bibb, Blount, Calhoun, Cherokee, Chilton, Clay, Cleburne, Coosa, Elmore, Etowah, Fayette, Franklin, Jefferson, Lawrence, Marshall, Shelby, St. Clair, Talladega, Tallapoosa, Tuscaloosa, Walker, Winston	E / FCH
White wartyback (pearlymussel) *Plethobasus cicatricosus*		Recent records exist only from the lower Tennessee River Basin downstream of Wilson and Pickwick dams.	Colbert, Lauderdale	E / No CH

4.8.2 Freshwater mussel critical habitats

Alabama pearlshell (Margaritifera marrianae), Southern kidneyshell (Ptychobranchus jonesi), Choctaw bean (Obovaria choctawensis), fuzzy pigtoe (Pleurobema strodeanum), narrow Pigtoe (Fusconaia escambia), round ebonyshell (Reginaia rotulata), Southern sandshell (Hamiota australis) and tapered pigtoe (Fusconaia burkei) critical habitats

Critical habitat for the Alabama pearlshell, Southern kidneyshell, Choctaw bean, Fuzzy pigtoe, narrow pigtoe, round ebonyshell, Southern sandshell (*Hamiota australis*) and tapered pigtoe (*Fusconaia burkei*) were designated in 2012 (77 FR 61664). Overall, 2,404 km (1,494 miles) were designated, comprised of 9 units in Alabama, with 3 of those extending to Florida. In Alabama, critical habitat is designated in Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Monroe, and Pike Counties. The primary constituent elements of the physical or biological features essential to the conservation of these mussels include, but are not limited to:

1. Geomorphically stable stream and river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation);
2. Stable substrates of sand or mixtures of sand with clay or gravel with low to moderate amounts of fine sediment and attached filamentous algae;
3. A hydrologic flow regime (magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found, and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for habitat maintenance, food availability, and spawning habitat for native fishes;
4. Water quality, including temperature (not greater than 32 °C), pH (between 6.0 to 8.5), oxygen content (not less than 5.0 milligrams per liter), hardness, turbidity, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages;
5. The presence of fish hosts. Diverse assemblages of native fish species will serve as a potential indication of host fish presence until appropriate host fishes can be identified. For the fuzzy pigtoe and tapered pigtoe, the presence of blacktail shiner (*Cyprinella venusta*) will serve as a potential indication of fish host presence.

Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, dams, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on November 9, 2012, with the exception of the impoundments created by Point A and Gantt Lake dams (impounded water, not the actual dam structures).

Activities that, when carried out, funded, or authorized by a Federal agency, may affect critical habitat (e.g., cause destruction or adverse modification) and therefore should result in consultation for these eight mussel species include, but are not limited to::

1. Actions that would significantly alter channel geomorphology.
   Such activities could include, but are not limited to, channelization, impoundment, road and bridge construction, mining, dredging, desnagging, and destruction of riparian vegetation. These activities may lead to changes in water flows and levels that would degrade or eliminate the mussels or their fish host and/or their habitats. These actions can also lead to increased sedimentation and degradation in water quality to levels that are beyond the tolerances of the mussels or their fish host.
2. Actions that would significantly alter the existing flow regime.
   Such activities could include, but are not limited to impoundment, water diversion, water withdrawal, water draw-down, and hydropower generation. These activities could eliminate or reduce the habitat necessary for growth and reproduction of these mussels.
3. Actions that would significantly alter water chemistry, quality, or temperature.
   Such activities could include, but are not limited to, release of chemicals, biological pollutants, or heated effluents into the surface water or connected groundwater at a point source or by dispersed release (non-point source). These activities could alter water conditions to levels that are beyond the tolerances of the mussels or their fish host and result in direct or cumulative adverse affects to these individuals and their life cycles.
4. Actions that would significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth.
   Such activities could include, but are not limited to, construction projects, livestock grazing, timber harvest, and other watershed and floodplain disturbances that release sediments or nutrients into the water. These activities could eliminate or reduce habitats necessary for the growth and reproduction of these mussels by causing excessive sedimentation and burial of the species or their habitats, or nutrification leading to excessive filamentous algal growth. Excessive filamentous algal growth can cause reduced nighttime dissolved oxygen levels through respiration, and prevent juvenile mussels from settling into stream sediments.

Alabama moccasinshell (Medionidus acutissimus), Coosa moccasinshell (Medionidus parvulus), dark pigtoe (Pleurobema furvum), finelined pocketbook (Hamiota altilis), orange-nacre mucket (Lampsilis perovalis), ovate clubshell (Pleurobema perovatum), Southern clubshell (Pleurobema decisum), Southern pigtoe (Pleurobema alabamanum) and triangular kidneyshell (Ptychobranchus greenii) critical habitat

Critical habitat for the Alabama moccasinshell, Coosa moccasinshell, dark pigtoe, finelined pocketbook, orange-nacre mucket, ovate clubshell, Southern clubshell, Southern pigtoe and triangular kidneyshell was designated in 2004 (69 FR 40084), along with 2 other mussel species in the Mobile River Basin. Overall, the critical habitat designations included a total of approximately 1,760 kilometers (1,093 miles) of river and stream segments comprising 26 units in the Mobile River Basin in Alabama, Georgia, and Tennessee. Critical habitat includes portions of the Tombigbee River drainage in Mississippi and Alabama; portions of the Black Warrior River

drainage in Alabama; portions of the Alabama River drainage in Alabama; portions of the Cahaba River drainage in Alabama; portions of the Tallapoosa River drainage in Alabama and Georgia; and portions of the Coosa River drainage. Primary constituent elements essential for the conservation of these mussel species include the following:

1. Geomorphically stable stream and river channels and banks;
2. A flow regime (i.e., the magnitude, frequency, duration, and seasonality of discharge over time) necessary for normal behavior, growth, and survival of all life stages of mussels and their fish hosts in the river environment;
3. Water quality, including temperature, pH, hardness, turbidity, oxygen content, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages;
4. Sand, gravel, and/or cobble substrates with low to moderate amounts of fine sediment, low amounts of attached filamentous algae, and other physical and chemical characteristics necessary for normal behavior, growth, and viability of all life stages;
5. Fish hosts with adequate living, foraging, and spawning areas for them; and,
6. Few or no competitive or predaceous nonnative species present.

Georgia pigtoe (Pleurobema hanleyianum) critical habitat

Critical habitat for the Georgia pigtoe was designated in 2010 (75 FR 67512), along with critical habitat for. Two Georgia pigtoe critical habitat units occur in Alabama, both in Cherokee County. One includes the channel of Terrapin Creek from Alabama Highway 9, downstream to the confluence with the Coosa River. The other is along the Coosa River channel from Weiss Dam, downstream to a point 1.6 km (1 mi) below the confluence of Terrapin Creek. One other unit occurs in Georgia. The physical or biological features of Georgia pigtoe critical habitat include:

1. Geomorphically stable stream and river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation);
2. A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival;
3. Water quality, including temperature, pH, hardness, turbidity, oxygen content, and chemical characteristics necessary for normal behavior, growth, and viability of all life stages.
4. Sand, gravel, cobble, boulder, or bedrock substrates with low to moderate amounts of fine sediment and attached filamentous algae.
5. The presence of fish host(s) for the Georgia pigtoe (currently unknown). Diverse assemblages of native chubs, minnows, stonerollers, and other stream-adapted fish species will serve as a potential indication of presence of host fish.

Chipola slabshell (Elliptio chipolaensis), Gulf moccasinshell (Medionidus penicillatus), oval pigtoe (Pleurobema pyriforme), purple bankclimber (Elliptoideus sloatianus) and shinyrayed pocketbook (Lampsilis subangulata) critical habitat

Critical habitat for the Chipola slabshell, Gulf moccasinshell, oval pigtoe, purple bankclimber and shinyrayed pocketbook was designated in 2007 (72 FR 64286), along with 2 other mussel species. Overall, the total length of streams designated is approximately 1,185.9 river miles (river mi) (1,908.5 river kilometers (river km)). The critical habitat is located in Houston and Russell counties in Alabama, and additional counties in Florida and Georgia. In Alabama, critical habitat was designated for the Chipola slabshell (Chipola River), Gulf moccasinshell (Chipola River), oval pigtoe (Chipola River), and shinyrayed pocketbook (Chipola River, Uchee Creek), but none of the critical habitat designated for the purple bankclimber intersects Alabama.

The physical and biological features essential to the conservation of the species include, but are not limited to:

1. A geomorphically stable stream channel (a channel that maintains its lateral dimensions, longitudinal profile, and spatial pattern over time without a consistent aggrading or degrading bed elevation);
2. A predominantly sand, gravel, and/ or cobble stream substrate with low to moderate amounts of silt and clay;
3. Permanently flowing water;
4. Water quality (including temperature, turbidity, dissolved oxygen, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act (CWA) (33 U.S.C. 1251–1387); and
5. Fish hosts (such as largemouth bass, sailfin shiner, brown darter) that support the larval life stages of the seven mussels.

Activities that may destroy or adversely modify critical habitat are those that alter the PCEs to an extent that appreciably reduces the conservation value of critical habitat for the seven mussels. Such activities include but are not limited to:

1. Actions that would induce channel instability or significantly alter channel morphology,
2. Actions that would significantly decrease the proportion of coarse sediments (sand, gravel, cobble) in the stream bed;
3. Actions that would significantly alter the flow regime; and
4. Actions that would significantly alter physical and chemical water conditions.
5. Actions that would significantly reduce the density of host fishes.

Cumberlandian combshell (Epioblasma brevidens), oyster mussel (Epioblasma capsaeformis) and purple bean (Villosa perpurpurea) critical habitat

Critical habitat for the Cumberlandian combshell and oyster mussel was designated in 2004 (69 FR 53136), along with 2 other mussel species. Seven river and stream segments were designated as critical habitat for the combshell. These include 40 river km (25 miles)

of Bear Creek (Unit 2) in Alabama and Mississippi. Eight river and stream segments were designated as critical habitat for the oyster mussel. These include 40 river km (25 miles) of Bear Creek (Unit 2) in Alabama and Mississippi.

The PCEs essential for the conservation of these mussels include the following:

1. Permanent, flowing stream reaches with a flow regime necessary for normal behavior, growth, and survival of all life stages of the mussels and their host fish;
2. Geomorphically stable stream and river channels and banks;
3. Stable substrates, consisting of mud, sand, gravel, and/ or cobble/ boulder, with low amounts of fine sediments or attached filamentous algae;
4. Water quality necessary for the normal behavior, growth, and survival of all life stages of the mussels and their host fish; and
5. Fish hosts with adequate living, foraging, and spawning areas for them.

The critical habitat does not include existing features of the human-built environment such as water intakes and outfalls, low-level dams, bridge footings, piers and abutments, boat ramps, and exposed pipelines.

Fluted kidneyshell (Ptychobranchus subtentus) and slabside pearlymussel (Pleuronaia dolabelloides) critical habitat

Critical habitat for the fluted kidneyshell and slabside pearlymussel was designated in 2013 (78 FR 59556).

For the fluted kidneyshell, 24 units were designating covering approximately 1,899 rkm (1,181 rmi) of critical habitat in Limestone County, Alabama and additional counties in KY, TN, and VA. Thirteen critical habitat units were designated for the slabside pearlymussel in Alabama, Mississippi, Tennessee and Virginia, covering 1,561.8 river km (970.3 river miles) overall. In Alabama, 3 units occur, at Paint Rock River, Elk River (AL and TN), and Bear Creek (AL and MS). Those fall in Colbert, Jackson, Limestone, Madison, and Marshall counties in Alabama. Within these areas, the primary constituent elements of the physical or biological features essential to the conservation of fluted kidneyshell and slabside pearlymussel consist of five components each:

1. Riffle habitats within large, geomorphically stable stream channels (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation).
2. Stable substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and containing flow refugia with low shear stress.
3. A natural hydrologic flow regime (magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species is found, and connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for habitat maintenance, food availability for all life stages, and spawning habitat for native fishes.

4. Water quality with low levels of pollutants and including a natural temperature regime, pH (between 6.0 to 8.5), oxygen content (not less than 5.0 milligrams/liter), hardness, and turbidity necessary for normal behavior, growth, and viability of all life stages.
5. The presence of abundant fish hosts, which may include:
    - The barcheek darter, fantail darter, rainbow darter, redline darter, bluebreast darter, dusky darter and banded sculpin, necessary for recruitment of the fluted kidneyshell.
    - The popeye shiner, rosyface shiner, saffron shiner, silver shiner, telescope shiner, Tennessee shiner, whitetail shiner, white shiner, and eastern blacknose dace, necessary for recruitment of the slabside pearlymussel.

The critical habitat does not include manmade structures (such as buildings, aqueducts, dams, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on October 28, 2013.

Longsolid (Fusconaia subrotunda) and round hickorynut (Obovaria subrotunda) critical habitat

Critical habitat for the longsolid and round hickorynut was designated in 2023 (88 FR 14794). For the longsolid, approximately 1,115 river miles (1,794 river kilometers) fall within 12 units of critical habitat in Alabama, Pennsylvania, Kentucky, West Virginia, Virginia, and Tennessee. For the round hickorynut, approximately 921 river miles (1,482 river kilometers) fall within 14 units of critical habitat in Alabama, Mississippi Pennsylvania, Ohio, Indiana, Kentucky, West Virginia, and Tennessee. The PBFs essential to the conservation of these mussel species include the following:

1. Adequate flows, or a hydrologic flow regime (magnitude, timing, frequency, duration, rate of change, and overall seasonality of discharge over time), necessary to maintain benthic habitats where the species are found and to maintain stream connectivity, specifically providing for the exchange of nutrients and sediment for maintenance of the mussels' and fish host's habitat and food availability, maintenance of spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats. Adequate flows ensure delivery of oxygen, enable reproduction, deliver food to filter-feeding mussels, and reduce contaminants and fine sediments from interstitial spaces. Stream velocity is not static over time, and variations may be attributed to seasonal changes (with higher flows in winter/ spring and lower flows in summer/fall), extreme weather events (e.g., drought or floods), or anthropogenic influence (e.g., flow regulation via impoundments).
2. Suitable substrates and connected instream habitats, characterized by geomorphically stable stream channels and banks (i.e., channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffle-run- pool habitats that provide flow refuges consisting of predominantly silt-free, stable sand, gravel, and cobble substrates).
3. Water and sediment quality necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages, including (but not limited to): Dissolved oxygen (generally above 2 to 3 parts per million (ppm)), salinity (generally

below 2 to 4 ppm), and temperature (generally below 86°F (°F) (30 °Celsius (°C)). Additionally, water and sediment should be low in ammonia (generally below 0.5 ppm 44 total ammonia-nitrogen) and heavy metal concentrations and lack excessive total suspended solids and other pollutants (see Threats Analysis, above).

4. The presence and abundance of fish hosts necessary for recruitment of the longsolid (currently unknown, likely includes minnows of the family Cyprinidae and banded sculpin (*Cottus carolinae*)) and the round hickorynut (i.e., eastern sand darter (*Ammocrypta pellucida*), emerald darter (*Etheostoma baileyi*), greenside darter (*E. blennioides*), Iowa darter (*E. exile*), fantail darter (*E. flabellare*), Cumberland darter (*E. susanae*), spangled darter (*E. obama*), variegate darter (*E. variatum*), blackside darter (*Percina maculata*), frecklebelly darter (*P. stictogaster*), and banded sculpin).

Rabbitsfoot (Quadrula cylindrica cylindrica) critical habitat

Critical habitat for the rabbitsfoot was designated in 2015 (80 FR 24692). Overall, approximately 2,312 river km (1,437 river mi), divided among 31 critical habitat units across 12 states, was designated. One unit occurs in Alabama. It consists of 81.0 km (50.3 miles) of Paint Rock River (Unit RF17AL). The PCEs essential for the conservation of the rabbitsfoot include the following:

1. Geomorphically stable river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) with habitats that support a diversity of freshwater mussel and native fish (such as stable riffles, sometimes with runs, and mid-channel island habitats that provide flow refuges consisting of gravel and sand substrates with low to moderate amounts of fine sediment and attached filamentous algae).
2. A hydrologic flow regime (the severity, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients and sediment for maintenance of the mussel's and fish host's habitat, food availability, spawning habitat for native fishes, and the ability for newly transformed juveniles to settle and become established in their habitats.
3. Water and sediment quality (including, but not limited to, conductivity, hardness, turbidity, temperature, pH, ammonia, heavy metals, and chemical constituents) necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages.
4. The occurrence of natural fish assemblages, reflected by fish species richness, relative abundance, and community composition, for each inhabited river or creek that will serve as an indication of appropriate presence and abundance of fish hosts necessary for recruitment of the Neosho mucket. Suitable fish hosts for Neosho mucket glochidia include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and spotted bass (*Micropterus punctulatus*).
5. Competitive or predaceous invasive (nonnative) species in quantities low enough to have minimal effect on survival of freshwater mussels.

Activities that may affect critical habitat, when carried out, funded, or authorized by a Federal agency, should result in consultation for the rabbitsfoot. These activities include, but are not limited to:

1. Actions that would alter the geomorphology of their stream and river habitats. Such activities may include, but are not limited to, instream excavation or dredging, impoundment, channelization, sand and gravel mining, clearing riparian vegetation, and discharge of fill materials. These activities could cause aggradation or degradation of the channel bed elevation or significant bank erosion, result in entrainment or burial of these mollusks, and cause other direct or cumulative adverse effects to these species and their life cycles.
2. Actions that would significantly alter the existing flow regime where these species occur. Such activities may include, but are not limited to, impoundment, channelization, urban development, water diversion, water withdrawal, and tail water releases downstream of dams. These activities could eliminate or reduce the habitat necessary for growth and reproduction of these mollusks and their life cycles including fish hosts.
3. Actions that would significantly alter water chemistry or water quality (for example, temperature, pH, contaminants, conductivity, and excess nutrients). Such activities may include, but are not limited to, tail water releases downstream of dams, or the release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater at a point source or by dispersed release (nonpoint source). These activities could alter water conditions that are beyond the tolerances of these mussels or their fish hosts or both, and result in direct or cumulative adverse effects to the species and their life cycles.
4. Actions that would significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth. Such activities may include, but are not limited to, construction projects, gravel and sand mining, oil and gas development, livestock grazing, timber harvest, off-road vehicle use, and other watershed and floodplain disturbances that release sediments or contaminants into the water. These activities could eliminate or reduce habitats necessary for the survival, growth, and reproduction of these mollusks or their fish hosts or both by causing excessive sedimentation and burial of Neosho mucket and rabbitsfoot or their habitats, sublethal effects from sediment exposure that are not readily apparent, acute and chronic exposure to chemical contaminants resulting in sublethal and lethal effects, and nutrification leading to excessive filamentous algal growth. Excessive filamentous algal growth can cause reduced nighttime dissolved oxygen levels and prevent mussel glochidia from settling into stream sediments.

Critical habitat does not include manmade structures (such as dams, piers and docks, bridges, or other similar structures) within the legal boundaries on June 1, 2015.

~~***Sheepnose mussel (Plethobasus cyphyus) critical habitat (91 FR 22590).***~~

~~Critical habitat for the sheepnose mussel was designated in 2026~~

~~designate approximately 801 rmi (1,289 rkm) in 11 units as critical habitat for sheepnose~~;

Snuffbox mussel (Epioblasma triquetra) critical habitat

Critical habitat for the snuffbox mussel was designated in 2026 (91 FR 22590). The Service designated approximately 2,425 rmi (3,902 rkm) in 38 critical habitat units for the snuffbox mussel. The critical habitat units for the snuffbox mussel were designated in Jackson, Madison, and Marshall Counties, Alabama, and various counties in Arkansas, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia; and Wisconsin.

Within these areas, the physical or biological features essential to the conservation of the snuffbox mussel consist of the following components within waters and streambeds up to the ordinary high-water mark:

1. Adequate flows, or a hydrological flow regime (magnitude, timing, frequency, duration, rate of change, and overall seasonality of discharge over time), necessary to maintain benthic habitats where the species is found and to maintain stream connectivity.
2. Suitable substrates and connected instream habitats, characterized by geomorphologically stable stream channels and banks (i.e., channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) that support the snuffbox mussel and its host fishes. For the snuffbox mussel, suitable substrates are stable gravel and sand with moderate flow and aquatic vegetation in and adjacent to riffles and shoals.
3. Water and sediment quality necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages, including appropriate levels of dissolved oxygen (generally above 2 to 3 parts per million (ppm)), salinity (generally below 2 to 4 ppm), and temperature (generally below 86 °F (30 °C)). Additionally, concentrations of contaminants, including (but not limited to) ammonia, nitrate, copper, and chloride, are below acute toxicity levels for mussels.
4. The presence and abundance of host fishes necessary for recruitment of the snuffbox mussel (logperch (*Percina caprodes*) and darter and sculpin species).

Critical habitat does not include human-made structures (such as buildings, aqueducts, runways, roads, and other paved areas and existing inwater pilings, docks, and sea walls) and the land on which they are located existing within the legal boundaries on May 27, 2026.

Spectaclecase (Cumberlandia monodonta) critical habitat

Critical habitat for the spectaclecase was designated in 2026 (91 FR 22590). The Service designated approximately 1,140 rmi (1,835 rkm) in 12 critical habitat units for the spectaclecase. The critical habitat units for the spectaclecase were designated in Colbert, Lauderdale, Lawrence, Limestone, Madison, Marshall, and Morgan Counties, Alabama, and various counties in Arkansas, Illinois, Iowa, Kentucky, Minnesota, Mississippi, Texas, Missouri, Tennessee, Virginia, West Virginia and Wisconsin.

Within these areas, the physical or biological features essential to the conservation of spectaclecase consist of the following components within waters and streambeds up to the ordinary high-water mark:

1. Adequate flows, or a hydrological flow regime (magnitude, timing, frequency, duration, rate of change, and overall seasonality of discharge over time), necessary to maintain benthic habitats where the species is found and to maintain stream connectivity.
2. Suitable substrates and connected instream habitats, characterized by geomorphologically stable stream channels and banks (i.e., channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation) that support the spectaclecase and its host fishes. For spectaclecase, these substrates are firm or stable substrates of coarse sand and gravel, are free from excessive silt, and typically include large rock, slabs, or boulders.
3. Water and sediment quality necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages, including appropriate levels of dissolved oxygen (generally above 2 to 3 parts per million (ppm)), salinity (generally below 2 to 4 ppm), and temperature (generally below 86 °F (30 °C)). Additionally, concentrations of contaminants, including (but not limited to) ammonia, nitrate, copper, and chloride, are below acute toxicity levels for mussels.
4. The presence and abundance of host fishes necessary for recruitment of spectaclecase (mooneye (*Hiodon tergisus*) and goldeye (*Hiodon alosoides*)).

Critical habitat does not include human-made structures (such as buildings, aqueducts, runways, roads, and other paved areas and existing inwater pilings, docks, and sea walls) and the land on which they are located existing within the legal boundaries on May 27, 2026.

4.9 SNAILS

The snail species addressed here inhabit freshwater rivers and streams and prefer clean, well-oxygenated waters. Most species prefer conditions with minimal siltation over rocky or sandy substrates. However, the slender campeloma is known to occupy silty areas of streams. Many are found in riffles, runs, and pools with moderate to swift currents.

4.9.1

Common Name ***Scientific Name***	**Habitat**	**River, river system, or basin in AL**	**AL counties of occurrence**	**ESA Status/critical habitat (CH)**
Anthony's riversnail *Athearnia anthonyi*	Inhabits medium to large rivers with cobble or boulder substrates.	Endemic to the Tennessee River system. Historically known from the lower French Broad, Holston, and Clinch Rivers in east TN downstream to Muscle Shoals in AL, including some Tennessee River tributaries. As of 2023, known from two streams in TN and two (Tennessee River, Jackson County; Limestone Creek, Limestone County) in AL. NEP in AL: The free-flowing reach of the Tennessee R. from the base of Wilson Dam downstream to the backwaters of Pickwick Reservoir [about 12 RM (19 km)] and the lower 5 RM [8 km] of all tributaries to this reach in Colbert and Lauderdale counties.	DeKalb, Jackson, Limestone, Madison, Morgan; NEP in AL: Colbert, Franklin, Lauderdale	E, NEP / No CH
Armored snail (=armored marstonia) *Marstonia pachyta*	Inhabits, and appears to be most common, in submerged roots, leaves, and bryophytes along stream edges, submerged bryophytes growing on rocks in moderate current, and in water willow. Also found in areas of slow to moderate flow in the submerged detritus, leaves, and tree rootlets along pool edges.	Considered endemic to streams in the Limestone Creek and Piney Creek watersheds in northern AL. First documented in Limestone Creek, Limestone County, later surveys extended its range to Little Limestone, Piney, Little Piney, and French Mill Creeks (all in Limestone County). However, Limestone Creek and Piney Creek watersheds are believed to constitute the extent of its range.	Limestone, Madison	E / No CH

Cylindrical lioplax (snail) *Lioplax cyclostomaformis*	Unlike its relatives, this species lives in isolated mud deposits found under large rocks in the rapid flowing sections of stream and river shoals. Other *lioplax* spp. are usually found along the margins of rivers in exposed muddy substrates.	This species was historically known from the Coosa, Cahaba, Black Warrior and Alabama river basins in Alabama and Georgia.	Bibb, Jefferson, Shelby, Talladega, Tuscaloosa	E / No CH
Flat pebblesnail *Lepyrium showalteri*	Flat pebblesnails can be found attached to clean, smooth stones in rapid shoal currents, where they also lay their eggs.	Historically known from the mainstem Coosa River in Shelby and Talladega counties; the Cahaba River in Bibb and Dallas counties; and Little Cahaba River in Bibb County, AL. It has not been found in the Coosa River portion of its range since the construction of Lay and Logan Martin Dams, and recent survey efforts have failed to locate any surviving populations outside of the Cahaba River drainage. As of 2005 known from one site on the Little Cahaba River, Bibb County, and from a single shoal series on the Cahaba River above the Fall Line, Shelby County.	Bibb, Jefferson, Shelby, Tuscaloosa	E / No CH
Interrupted rocksnail *Leptoxis foremani*	Interrupted rocksnails live in shoals, riffles, and reefs (bedrock outcrops) of small to large rivers. Their habitats are generally subject to moderate currents during low flows and strong currents during high flows. These snails live attached to bedrocks, boulders, cobbles, and gravel and tend to move little, except in response to changes in water level.	The interrupted rocksnail was historically found in colonies on reefs and shoals of the Coosa River and several of its tributaries in AL and GA.	Cherokee, Elmore, Etowah	E / FCH
Lacy elimia (snail) *Elimia crenatella*	This gill-breathing snail is strongly associated with river or stream habitats characterized by flowing currents and hard, clean bottoms. It typically inhabits highly oxygenated waters on rock shoals and gravel bars where it grazes on algae and bacteria attached to benthic substrates.	Historically abundant in the main stem Coosa River and several of its tributaries, including Big Will's Creek, Kelley's Creek, Choccolocco Creek and Tallaseehatchee Creek. Currently, this species is only found in Cheaha, Emauhee and Weewoka creeks, which are tributaries of the Coosa River.	Clay, Talladega	T / No CH
Painted rocksnail *Leptoxis taeniata*	Painted rocksnails are gill breathing snails found attached to cobble, gravel, or other hard substrates in the strong currents of riffles and shoals.	Historically found from the Coosa River and tributaries from the northeastern corner of St. Clair County, downstream into the main stem of the Alabama River to Claiborne, and in the Cahaba River below the Fall Line. Currently	Calhoun, Chilton, Etowah, Shelby, St.	T / No CH

		known from the lower reaches of three Coosa River tributaries, including Choccolocco Creek, Buxahatchee Creek and Ohatchee Creek.	Clair, Talladega	
Plicate rocksnail *Leptoxis plicata*	Shallow gravel and cobble shoals in flowing waters.	Historically occurred in the Black Warrior River, Little Warrior River and the Tombigbee River. It is currently found in the Locust Fork of the Black Warrior River.	Blount, Jefferson, Walker	E / No CH
Rough hornsnail *Pleurocera foremani*	Primarily found on gravel, cobble, and bedrock in moderate currents. They have been collected at depths of 1 m (3.3 ft) to 3 m (9.8 ft). The species appears to tolerate low-to moderate levels of silt deposition.	Endemic to the Coosa River system in AL, with records from the Coosa and many tributaries. There are currently only five known populations: lower Yellowleaf Creek, lower Coosa River below Wetumpka Shoals, lower Weogufka Creek at Lay Lake; lower Walnut Creek; and lower Hatchet Creek.	Chilton, Coosa, Elmore, Shelby, Talladega	E / FCH
Round rocksnail *Leptoxis ampla*	Gill breathing snails that are found attached to cobble, gravel, or other hard substrates in the strong currents of riffles and shoals. Since it is not very mobile and is not thought to migrate within the stream, it is thought that females live and attach their eggs to the same habitat.	Historically found in the Cahaba River and its tributary the Little Cahaba River, and in the Coosa River and tributaries Big Canoe Creek, Kelly Creek, Ohatchee Creek, Yellowleaf Creek and Waxahatchee Creek. Currently known from a shoal series in the Cahaba River, from the lower reach of the Little Cahaba River, and from the lower reaches of Shade Creek and Six-mile Creek.	Bibb, Chilton, Jefferson, Shelby, Tuscaloosa	T / No CH
Slender campeloma *Campeloma decampi*	Typically found burrowing in soft sediment or detritus, and sometimes burrowing in gravel substrates, where it may occur anywhere from the margins to midstream. Often found burrowing at shallow depths in substrates composed of clay and mud or in relatively large patches of water willow (*Justica virginiana*).	Known to occur in the tributaries to the Tennessee River in northern AL, including Cypress Creek (Lauderdale County), and Round Island Creek, Piney Creek, and Limestone Creek (Limestone County).	Lauderdale, Limestone, Madison	E / No CH
Tulotoma snail *Tulotoma magnifica*	Restricted to cool, well-oxygenated, clean free-flowing waters of the Coosa and Alabama Rivers. Optimum habitat is characterized by a substrate with roughness values greater than 2, boulder densities greater than 2 per square meter, rocks of different sizes and currents fast enough to prevent the accumulation of silt. It is also believed that the availability of	Coosa River mainstem, the lower reaches of larger tributaries to the Coosa River, and the Alabama River. These recently include nine stream reaches within the Coosa and Alabama River drainages: the Coosa River, Ohatchee Creek, Choccolocco Creek, Kelly Creek, Yellowleaf Creek, Weogufka Creek, Hatchet Creek, Weoka Creek, and the Alabama River.	Autauga, Clarke, Coosa, Dallas, Elmore, Lowndes, Monroe, Montgomery, Shelby, St. Clair,	T / No CH

	cracks and crevices in the bedrock and/or boulders may help protect the species from predation. Although typically associated with shoals and shallower stream areas with moderate to strong currents, it inhabits rivers that rise and fall, and has been collected at depths more than 5 m (16.4 feet). Strongly associated with boulder, cobble, and bedrock stream bottoms and generally found clinging tightly to the underside of large rocks or between cracks in bedrock. Historical habitats included large coastal plain rivers, large high-gradient rivers, and multiple upland tributary streams.		Talladega, Wilcox	

4.9.2 Snail critical habitats

Interrupted rocksnail (Leptoxis foremani) and rough hornsnail (Pleurocera foremani) critical habitat

Critical habitat for the interrupted rocksnail and rough hornsnail was designated in 2010 (75 FR 67512), along with critical habitat for the Georgia pigtoe mussel. Those include the Coosa River channel from Weiss Dam, downstream to a point 1.6 km (1 mi) below the confluence of Terrapin Creek, in Cherokee County, Alabama, and the Coosa River channel from Jordan Dam, downstream to Alabama Highway 111 Bridge, in Elmore County, Alabama. One other unit occurs in Georgia.

There are two critical habitat units for the rough hornsnail, both in Alabama. One unit includes the Coosa River channel from Jordan Dam (569930.28E, 3609212.67N), downstream to the confluence of the Tallapoosa River (568995.14E, 3597805.93N), in Elmore County, Alabama. The other unit includes the channel of Yellowleaf Creek from the confluence of Morgan Creek (550285.41E, 3682865.13N), downstream to 1.6 km (1 mi) below Alabama Highway 25 (552296.38E, 3679287.87N), in Shelby County, Alabama.

The primary constituent elements required for both the interrupted rocksnail and the rough hornsnail critical habitat include:

1. Geomorphically stable stream and river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation).
2. A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival.
3. Water quality (including temperature, pH, hardness, turbidity, oxygen content, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act (33 U.S.C. 1251–1387).
4. Sand, gravel, cobble, boulder, or bedrock substrates with low to moderate amounts of fine sediment and attached filamentous algae.

Critical habitat does not include manmade structures existing on the effective date of this rule and not containing one or more of the PCEs, such as buildings, bridges, aqueducts, airports, and roads, and the land on which such structures are located.

4.10 PLANTS

4.10.1 Ferns

Alabama streak-sorus fern (Thelypteris pilosa var. alabamensis)

Alabama streak-sorus fern (Family: Thelypteridaceae) is a small evergreen fern, listed as threatened in 1992 (57 FR 30164). It is only found in Alabama, and currently known only from a 4.25 mile reach of the Sipsey in the Warrior River Basin, in the Bankhead National Forest (Service Focus). The type locale (location where the species was first described) was located approximately 5 miles downstream of the closest extant (still existing)

population, but was destroyed during construction of a bridge in 1960. The historical range is thought to have extended from the current extant range of the species to at least the type locale and possibly father downstream. Some populations of Alabama streak-sorus fern may have been extirpated when Smith Lake was impounded (Service Focus).

All known occurrences of the Alabama streak-sorus fern are found on exposed rock surfaces of Pottsville sandstone, where plants grow in crevices and rough surfaces on the roofs and floors of sandstone rockhouses formed along these cliffs (Watkins and Farrar 2002). The plants typically occur on moist, shady sites such as ceilings of rockhouses, ledges beneath sandstone overhangs, and on exposed cliff faces. Locations vary in slope aspect and shade coverage, from completely shaded to partially sunny on exposed bluff faces. Sites are usually directly above or a short distance from the river, are shaded to partially sunny, and have substrates that are kept moist by water vapor from the river and up-slope runoff over the sandstone (Service Focus). No critical habitat has been designated for this species.

Although the Bankhead National Forest provides for standards and protective measures for the fern, this species could be threatened by a rise in impoundment level of the downstream reservoir, as well as a loss of forest cover due to fire, timbering on the slopes overlooking the river or a loss of hemlock trees, which lead to changes in shade, humidity and moisture gradients in fern habitat. Development of private inholdings and recreational use of the river corridor could also be threats to this species (Service Focus).

Service's profile page for Alabama streak-sorus fern: https://ecos.fws.gov/ecp/species/3604.

American hart's-tongue fern (Asplenium scolopendrium var. americanum)

American hart's-tongue fern (Family: Aspleniaceae [Spleenworts]) was listed as threatened in 1989 (54 FR 29726). It is a variety of a widespread species that is most abundant in Europe and Eurasia. It is a perennial, evergreen fern, with life stages consistent with a typical fern life cycle—the leafy plant typically observed is the sporophyte phase. American hart's-tongue fern is distributed from central New York, through south central Ontario (most populations), and northern Michigan on glacially modified escarpments in areas of heavy lake-effect snowfall. Disjunct populations occur in sinkhole environments in Tennessee and Alabama. It is also known to occur in Mexico and Hispaniola. In Alabama and Tennessee, the only extant populations are small and susceptible to extirpation. As of 2019, there were 144 extant populations/ Environmental Occurrences, with 32 in the U.S. and 112 in Canada. Overall, there has been 177-recorded populations/ Environmental Occurrences, including 33 populations that no longer survive. Recent losses consist of three small populations in New York, Michigan, and Alabama, extirpated since the mid-2000s (Service 2019).

American hart's-tongue fern sporophytes have a crown of evergreen, strap-shaped fronds with entire margins up to 35 to 40 centimeters (cm) (14 to 16 inches [in]) long and up to 2 to 4.5 cm (0.8 to 1.8 in) wide. The fronds taper to an acute tip and are auriculate at their base. They arise from a vertical rhizome covered with cinnamon-colored scales. The brownish petiole is 3 to 12 cm (1.2 to 4.7 in) long and has cinnamon-colored scales (Service 2019).

American hart's-tongue fern is closely associated with cool, moist refugia on limestone bedrock under intact deciduous hardwood canopies with shallow soils and an open understory. The specialized habitats in which the American hart's-tongue fern occurs is buffered against climatic extremes. Its life history is closely tied to the calcium-rich bedrock and shaded moist, cool microclimates that provide habitat and nutritional requirements of all life stages. In general, American hart's-tongue fern occurs in areas of low herbaceous cover, in shallow soils

in close association with bryophytes and limestone bedrock, and in relatively low light conditions. In the southeast, American hart's-tongue fern is associated with Mississippian limestone exposed in sinkholes and cave entrances, generally known as karst features. These karst features exclusively provide the cool, moist microclimate on which the fern depends (Service 2019).

Sources of threats and related stressors include development, logging, quarrying and climate change (forest loss, invasives, drought, reduced snowpack), and illegal collection, observer impacts and recreation including recreational cave access (trampling, removal). However, invasive plant species do not appear to be a major threat for American hart's-tongue fern populations in Alabama, Tennessee, or Michigan at present. Logging, development, and quarrying have historically been the predominant issues with most known extirpations. While the majority of American hart's-tongue fern sites are on protected lands, many populations may not have an adequate buffer to prevent impacts to habitat from adjacent logging. Most of the populations in New York, Michigan, Alabama, and Tennessee are small and could not withstand any sort of collecting. Inappropriate collecting remains a threat to these populations (Service 2019).

Service's profile page for American hart's-tongue fern: https://ecos.fws.gov/ecp/species/4232.

4.10.2 Quillworts

Louisiana quillwort (Isoetes louisianensis)

Louisiana quillwort (Family: Isoetaceae) was listed as endangered in 1992 (57 FR 48741). It is a small, semi-aquatic, facultative evergreen plant. Louisiana quillwort is currently known from 20 populations in 3 states (Alabama, Louisiana, and Mississippi) distributed among 20 watersheds, 45 subwatersheds, and 15 counties. In Alabama it is known from the Upper Murder Creek watershed (Service 2024b).

Louisiana quillwort has spirally-arranged leaves (sporophylls) arising from a globose, two-lobed corm. The pliant, hollow leaves are transversely septate and measure 2-3 mm (0.12 in.) wide and up to 40 cm (16.0 in.) long. Spore-containing structures (sporangia) are embedded in the pale, broadened bases of the leaves (Service Focus).

Louisiana quillwort colonies in both Louisiana and Mississippi are typically located in shallowly entrenched or, toward the coast, perennial stream environments. At intermittent streams, plants senesce and became dormant when the channel dries up (typically late summer), but if streams remain wet the plants can remain green. Alabama colonies occur in habitats that do not resemble any known Louisiana or Mississippi habitats. One colony is located in a spring-like seepage with sandy-muck soil and bald cypress (Taxodium distichum) overstory that drained into a permanently flowing creek. The other colony is located along the margins of a grassy meadow and small hardwood swamp (Leonard 2011).

Habitat destruction and degradation from development and unchecked feral hog damage are onging threats to Louisiana quillwort. Prolonged inundation from beaver dams may have destroyed some Louisiana quillwort colonies in Mississippi, but the threat of beavers to the species' long-term persistence is likely limited, as beaver activities may also enhance habitat downstream of dams. Development and habitat conversion represent the most persistent threat to Louisiana quillwort, resulting in extirpated populations and range restriction. Excessive sedimentation from inadequate sediment abatement in adjacent uplands or during bridge or culvert construction or replacement may smother quillwort. Additionally, lack of adherence to appropriate streamside buffers/management zones during clearing degrades Louisiana quillwort habitat (Service 2024b).

Because Louisiana quillwort requires sufficient rainfall to promote favorable soil moisture and trigger periodic scouring of stream channels and floodplains (Leonard 2011), increased frequency, length, and or intensity of droughts due to climate change may reduce the availability of suitable habitats or lead to the elimination of populations. Likewise, increased accumulation of wind-throw from more frequent or intense hurricanes may promote excessive sedimentation within stream systems (Leonard 2011), thereby degrading Louisiana quillwort habitat and potentially smothering plants in these areas (Service 2024b).

Service's profile page for Louisiana quillwort: https://ecos.fws.gov/ecp/species/7756.

4.10.3 Flowering plants

Alabama canebrake pitcher plant (Sarracenia rubra ssp. alabamensis)

Alabama canebrake pitcher plant (Family: Sarraceniaceae [Pitcher plant]) was listed as endangered in 1989 (54 FR 10150). It is a clump-forming, herbaceous, carnivorous flowering plant; it traps and digests insects and other small arthropod prey in its pitchers (tubular leaves). Alabama canebrake pitcher-plant is endemic to wetland habitats in the Fall Line of central Alabama. This species has been reported from 27 sites, but at the time of listing was known to occur at only 11 sites (a 12th found subsequently) in three counties. As of 2023 the species was only found in Autauga and Chilton Counties and is considered extirpated in Elmore County, Alabama. Only 8 of the 12 populations were extant (including one small population consisting entirely of transplanted individuals and their progeny), and 4 were extirpated (Service 2023).

In addition to few extant populations, small population size remains a threat with most (5 of 8) populations having less than 100 plants. Only 3 populations have 100 or more plants and only 1 population has over 1,000 plants. Two populations occur on conservation lands; however, one of these protected populations is also the largest known population (encompassing nearly three-quarters of the species' entire known population in the wild). Active recruitment of the species is generally low, with recent observations noting seedlings at only 3 populations, and representing only a small fraction of individuals within each of these populations. Survey sites where the juvenile plants were found had the highest habitat integrity (i.e., highest plant species richness, diversity, and floristic quality and attributed this to active management (prescribed fire and/or hand clearing) relative to other sites (Yawn et al. 2023, Service 2023).

Of the 2 remaining protected populations, one occurs mostly on conservation lands owned and managed as a preserve by The Nature Conservancy [TNC] and one occurs on private lands protected under a Wetlands Reserve Program [WRP] (a conservation program administered by the Natural Resources Conservation Service) easement. These two protected populations are distributed evenly between the Upper Alabama and Lower Coosa subbasins with each subbasin having one protected population. (Service 2023).

Alabama canebrake pitcher plant arises from a rhizome. It produces two types of pitchers (tubular leaves) and occasional phyllodia (flattened leaves) each season. Spring pitchers, appearing with flowers, are 20-50 cm (7.9-19.7 in.) in length and recurved; the summer pitchers are larger (20-70 cm or 7.9-27.6 in. long) and erect. Flowers (about April through June) are maroon in color and borne singly on scapes up to 60 cm (2 ft.) tall. The fruit is a capsule (Service Focus).

Alabama canebrake pitcher-plant grows in seeps and other wet areas, along with grasses, sedges, sweetbay, poison sumac, bayberry and sparkleberry. Soils are typically acidic, deep peaty sands or clays with a high water table (Alabama Forestry Commission 2022). Most sites are characterized as hillside seepage bogs—

permanently saturated areas that attain their greatest development where an impervious layer of clay lies in close proximity to the ground surface. Precipitation, once reaching this clay zone, becomes restricted and gradually flows along a sloping gradient until surfacing further downslope. The other habitat type occurs in association with bottomland or streamside vegetation (Service Profile).

Fire exclusion has increased woody competition, causing pitcher plant populations to decline on several sites. They are sun loving, so fire can be beneficial by removing woody plants and shade. They are very dependent on moist soil conditions, so any activity that affects the water table or drainage of the site is potentially harmful and should be carefully planned. In forestry practices, that might include construction of firelines, site preparation, or harvesting. Other threats include habitat destruction, herbicide application and over-collecting by plant enthusiasts (Alabama Forestry Commission 2022).

Active and ongoing habitat management is needed to maintain the open conditions that the Alabama canebrake pitcher-plant requires, including control of competing vegetation and promotion of seedling recruitment. Together, habitat degradation and incompatible land management have led to the recent extirpations of two populations. Adjacent land uses, such as gravel mining and pasture, have degraded habitats via altered hydrology and nutrient inputs, and led to the recent extirpation of one protected population. Incompatible habitat management, such as herbicide application, has also likely resulted in the recent extirpation of a population and threatens part of another population. Continued habitat degradation due to inadequate management and encroachment of competing species remains a persistent threat, which can reduce seedling recruitment and overall vigor of populations (Service 2023).

Service's profile page for Alabama canebrake pitcher plant: https://ecos.fws.gov/ecp/species/1846.

Green pitcher plant (Sarracenia oreophila)

Green pitcher-plant (Family: Sarraceniaceae [Pitcher plant]) was listed as endangered in 1979 (44 FR 54922). It is a clump-forming, herbaceous, carnivorous flowering plant; it traps and digests insects and other small arthropod prey in its pitchers (tubular leaves). The species historical range included Alabama, Georgia, North Carolina, and Tennessee (Service Profile). As of 2025, there were 14 known extant, natural populations (there were 15 known as of 2014). Twelve of the 14 extant populations occur in Alabama (Cherokee, DeKalb, Etowah, and Marshall counties), while the remaining two populations occur in Georgia and North Carolina. Eight populations or portions of populations are found on public or non-governmental conservation lands and, as such, receive enhanced protections and conservation considerations. Seven of those 8 populations are located in Alabama: DeSoto State Park – 2, Little River Canyon National Preserve – 3, and preserves owned by The Nature Conservancy – 2 (Service 2025b).

Green pitcher-plants arise from moderately branched rhizomes that are 1-1.5 cm (0.4-0.6 in.) in diameter. Leaves are of two types: pitchers and phyllodia. The pitcher leaves, which appear in spring, are 20-75 cm (8-30 in.) long, 6-10 cm (2.4-4 in.) in circumference at the orifice, and gradually narrow from the orifice to the base. Pitchers are green to yellow-green with sunlit leaves sometimes maroon suffused, externally maroon veined, or, rarely, with a purple blotch at the orifice. A similarly colored hood arches over the orifice. Pitcher leaves wither by late summer and are replaced by falcate phyllodia (flattened leaves), which persist until the next season. Flowers are borne singly on scapes 45-70 cm (18-28 in.) long. The petals are yellow. The fruit is a tuberculate capsule 1.5-1.8 cm (0.6-0.7 in.) wide (Service Focus).

The plants grow in acidic soils in moist upland areas, rich woodlands, wet thickets, and along boggy sandy streams. For the seeds of this species to germinate and become established, they must fall on bare moist mineral soil. Though bare moist mineral soil naturally occurs in undisturbed bogs and other wet habitats, fire suppression and habitat degradation have made such conditions rare. For this reason, there is little seedling recruitment and most reproduction is asexual.

The threat of habitat loss continues, particularly on private, unprotected lands. Although poaching threats have lessened in recent years, due to its rarity, green pitcher plants still remain as a target for illegal collection and trade. Habitat degradation via inadequate and inconsistent habitat management and consequent encroachment of competing vegetation remains as a potential threat. Habitat management (e.g., prescribed fire, removal of competing vegetation) has contributed to the species' survival throughout its historic range. Continued habitat management is needed at all populations to maintain the open conditions that green pitcher plant requires, as well as to control competing vegetation and promote seedling recruitment. Conservation of the remaining populations requires continued support and cooperation of private landowners, without which, associated populations may decline and become extirpated.

Service's profile page for green pitcher plant: https://ecos.fws.gov/ecp/species/2896.

Alabama leather flower (Clematis socialis)

Alabama leather flower (Family: Ranunculaceae [Buttercup]) was listed as endangered in 1986 (51 FR 34420). Alabama leather flower is known only from Alabama and Georgia. As of 2022 there were 5 known, extant populations in Alabama (St. Clair, Cherokee and Etowah counties) and 2 in Georgia. Three of those isolated population fragments partially occur in right-of-ways.

It is a small, herb that is colonial (patch-forming), found in tight patches or sparsely scattered (Goertzen and Boyd 2007). Plants are believed to primarily reproduce clonally (Garrett 2004); however, the relative importance of clonal and sexual reproduction is unknown (Goertzen and Boyd 2007). Timmerman-Erskine and Boyd (1999) suggested that sexual reproduction in this species was limited by a combination of pollinator frequency, herbivory, low light levels, and post-maturation achene predation by mice.

Alabama leather flower may reach 0.3 m (12 in.) in height. The most distinctive feature of the species is the combination of a rhizomatous growth habit and the formation of dense clones of erect, low, one- to few-flowered shoots. Leaves are variable from the base to the apex of the stem. The lowermost leaves are scale-like, oblong or triangular in shape, and mostly under 1 cm (0.39 in.) long; median leaves are simple, mostly elliptic-linear in shape, 4-12 cm (1.6-4.7 in.) long, and 0.5-1 cm (0.2-0.39 in.) wide; and upper leaves are 3-5 foliate and shaped as in the median leaves. Flowers are solitary, located at the tips of slender stems, urn to bell-shaped, 2-3 cm (0.79-1.18 in.) long, and blue-violet in color. Fruits are aggregates of achenes that are densely pubescent and 2.5-3 cm (0.98-1.18 in.) in length (Service Focus). Flowering occurs from mid-April into May and is soon followed by fruit development, which extends into late July (Service Profile).

Populations are currently believed to be limited to areas disturbed by human activity. Natural habitats are believed to be open grass-seed-rush prairie areas and adjoining hardwood swamp forests subject to relatively frequent fire disturbance, natural prairie-like openings in the forest, canopy gaps in mature forests from dead trees, fire or grazing, or flatwood communities growing on calcareous, circum-neutral soils (Govus 1999, Kral 1982, Garrett 2004). Though plants are found in sunny and shaded conditions, they are more vigorous in full or partial sunlight where plant competition is low (Garrett 2004, Garrett and Schotz 2005).

Habitat destruction and conversion for agricultural and silvicultural purposes have reduced the available habitat for Alabama leather flower and extirpated populations, including the extirpation of one population in the past decade. Likewise, road improvements (widening and repaving) and use of heavy equipment for logging operations have damaged plants and degraded habitat at several sites in Alabama, while rutting caused by all-terrain vehicles and mowing equipment can also damage plants and degrade habitats (Service 2017). Inadequate habitat management, including lack of prescribed mowing, prescribed fire, and/or hand clearing of competing vegetation, remains a persistent concern for Alabama leather flower populations. Because the species requires open conditions to thrive, inadequate habitat management can lead to increased growth of competing vegetation, which can obscure plants and suppress plant growth, as has been observed at populations in Alabama. Continued cooperation with landowners, land managers, and rights-of-way managers is crucial for maintaining necessary, and avoiding incompatible, habitat management practices (e.g., incompatible mowing regimes, herbicide application) within populations (Service 2017).

Service's profile page for Alabama leather flower: https://ecos.fws.gov/ecp/species/6300.

Morefield's leather flower (Clematis morefieldii)

Morefield's leather-flower (Family: Ranunculaceae [Buttercup]) was listed as endangered in 1992 (57 FR 21562). It is a perennial vine. First collected from Round Top Mountain in Madison County, Alabama in the early 1980s, Morefield's leather-flower was later described by Kral (1987). Like other members of the Viornae subsection of the genus *Clematis*, it is a narrow endemic (Service Focus). It is endemic to open woodlands over limestone bedrock in the Plateau Escarpment ecoregion of Alabama, Georgia, and Tennessee. As of 2024, extant populations in Alabama included 2 in Jackson and 9 in Madison counties. Five of those 11 are on conservation lands. Twenty-five other populations occur in Tennessee and Georgia (Service 2024).

Morefield's leather-flower has urn-shaped flowers which occur singly or in few-flowered groups in leaf axils. The primary flower stalks (peduncles) are subtended by leafy bracts. *Clematis morefieldii* is closely related to *C. viorna*, a more variable species. It is distinguished from *C. viorna* by dense white hairs on its shoots, velvety lower leaf surfaces, and stouter, usually shorter (15 to 25 mm or 0.6-1 in. long) peduncles with sessile to nearly sessile bracts at the base. Morefield's leather-flower attains lengths up to 5 m (16 ft.) and has compound leaves reaching lengths of 20 cm (8 in.). Leaves have 9-11 leaflets and the terminal 1-3 leaflets form tendrils. The flowers, which are present from May to July, are pinkish in color and 20-25 mm (0.8-1 in.) long. Fruits are clusters of hairy achenes (Service Focus).

Morefield's leather-flower blooms from May to July. Pollinated flowers can produce abundant achenes (15 or more per flower) (Crabtree 2014). Little information on effective pollinators is available, but Crabtree (2011) observed bumblebees (*Bombus spp.*) visiting flowers of Morefield's leather-flower. Various studies and observations indicate that flower and fruit production are positively correlated with precipitation (Emanuel 2000; Boyd and Paris 2013; Crabtree 2014; Paris et al. 2015, 2016). Herbivory by vertebrates and insects is apparently common for Morefield's leather-flower (Boyd and Paris 2013; Paris et al. 2015, 2016) and can reduce a plants' flower and fruit production (Paris et al. 2015). Small flower buds are particularly vulnerable to herbivory by Lepidopteran larvae (Paris et al. 2016). Seeds may remain dormant during their first year after dispersal, with many seeds germinating in the second-year post-dispersal (Paris et al. 2016).

Plants occur at elevations of 700 - 1700 ft and are often found near seeps and springs in red cedar-hardwood forests, particularly within transitional zones between dry calcareous forests and mesic forests (Kral 1987; Weber 1991; Cook 2018; Service 1994a, 2018b).

In most (10 of 17) of the general population areas remaining, habitats are considered to be in fair to poor condition. Habitat degradation and destruction remain persistent threats to the species. Urban development within the species' range has resulted in populations reductions and extirpations, and development is expected to continue in upcoming decades. Although future development may have limited negative impacts on the species' remaining populations, as the plant is associated with terrain that is generally less suitable for development, additional development that does occur is expected to increase fragmentation of potentially suitable habitat for Morefield's leather flower. Mining (in Tennessee) as well as incompatible timber harvest and roadside management have caused the loss or decline of populations and remain persistent threats to some populations, particularly those not occurring on conservation lands. In addition, habitat degradation due to encroachment of competing and invasive vegetation is an ongoing threat that requires habitat management to control throughout the range. Browsing by deer may be a stressor for local populations (Service 2024).

Service's profile page for Morefield's leather flower: https://ecos.fws.gov/ecp/species/133.

American chaffseed (Schwalbea americana)

American chaffseed (Family: Orobanchaceae [Broomrape]) was listed as endangered in 1992 (57 FR 44703). American chaffseed falls into a monotypic genus, meaning that it is the only species occurring in that genus (*Schwalbea*) (Service Focus). It is a perennial, hemiparasitic herb adapted to frequent fire. Historically, this species occurred in coastal states from Massachusetts to Louisiana and inland states Kentucky and Tennessee. Currently, it occurs in the coast states of Massachusetts, New Jersey, North Carolina, South Carolina, Georgia, Alabama, Florida and Louisiana. American chaffseed was never considered to be common, but populations have declined, and the range has greatly contracted in recent decades (Service Focus).

American chaffseed is erect, with stems that branch only at the base. The leaves are alternate, estipulate, sessile and ascend in an overlapping spiral. The leaves, stems and flowers are villous-puberulent, meaning hairy throughout. The five-lobed flowers are reddish-purple and mature into dehiscent capsules that contain numerous linear, yellowish-tan seeds. The showy flowers have a high degree of bilateral symmetry, elaborated for pollination by bees. Flowering occurs from April to June in the southern part of its range, and from June to mid-July in the northern part of its range. Fruits start to mature in early summer in the south and October in the north (Service Focus).

American chaffseed is a hemiparasitic herb–in addition to photosynthetic activity, it acquires photosynthates via modified roots (haustoria) that connect to the vascular system of host species. Although American chaffseed can form haustorial connections with a wide variety of species, narrowleaf silkgrass (*Pityopsis graminifolia*) appears to be a favorable host species along with other composites and grasses (Glitzenstein et al 2001, 2016, 2021; Service Focus).

American chaffseed does not reproduce asexually via vegetative storage organs (e.g., rhizomes, bulbs, corms), so recruitment is solely dependent upon sexual reproduction. Because American chaffseed does not reproduce asexually and seeds do not survive long in the soil seedbank, soil disturbance via prescribed fire or other disturbances that expose bare soil and maintain open to partly-open conditions appears critical to the recruitment and survival of this species. Germination and seedling recruitment appear dependent upon disturbances that expose bare soil, such as prescribed fire, old fire plow lines and old logging roads, mowing, fluctuating water tables, pocket gopher activity, or earthworm castings (Service Focus).

American chaffseed occurs in fire-maintained longleaf pine flatwoods and savannas, which have open grass-sedge ground cover, typically in moist acidic sandy loams or sandy peat loams. It is often found in ecotonal areas between peaty wetlands and xeric sandy soils. Historically, the species probably existed on savannas and pinelands throughout the coastal plain and on sandstone knobs and plains inland where frequent, naturally occurring fires maintained these sub-climax communities. Under these conditions, herbaceous plants like chaffseed were favored over trees and shrubs (Service Focus).

Most of the surviving populations, and all of the most vigorous populations, are in areas that are still subject to frequent fire. These fire-maintained habitats include properties where prescribed fire is part of a management regime for quail and other game species, army base impact zones that burn regularly because of artillery shelling and forest management areas that are burned to maintain habitat for wildlife like the endangered red-cockaded woodpecker. This species also find suitable habitats on various private lands that are burned to maintain open fields. Fire may be important to the species in ways that are not yet fully documented, such as for germination of seed or in the formation of the connection to the host plant (Service Focus).

American chaffseed has continued to decline since it was listed, often due to fire suppression that results in vegetative succession or woody encroachment (Service Focus). Habitat destruction is a significant concern for American chaffseed, as development for residential and commercial purposes encroaches on habitat. Agricultural and forestry practices, such as land conversion, timber harvesting, fire suppression, pesticide use, and soil compaction often result in unsuitable conditions for the species. Development for residential, commercial, or agricultural uses frequently leads to fire suppression, which threatens the species by leading to increased shade and competition, which can inhibit its growth and reproduction. Other potential threats include inadequate soil moisture and competing invasive species that may outcompete native flora.

Service's profile page for American chaffseed: https://ecos.fws.gov/ecp/species/1286.

Fleshy-fruit gladecress (Leavenworthia crassa)

Fleshy-fruit gladecress (Family: Brassicaceae [Mustard]) was listed as endangered in 2014 (79 FR 44712). Fleshy-fruit gladecress is a winter annual, spring-flowering herb. It is only found in Alabama. There are 10 occurrences of fleshy-fruit gladecress in eight populations in the Moulton and Tennessee valleys in Alabama, with one occurrence newly discovered since listing (Service Focus).

Fleshy-fruit gladecress grows from 1 to 4 decimeters tall, with leaves that grow as a basal rosette and are lyrately pinnatifid. The terminal leaf lobe is conspicuously larger than lateral lobes. Early season flowers are solitary, with racemes appearing later in the season. In general, flowers are on elongate stems and are approximately 9 to 14 millimeters long. The sepals and petals are widely spreading, the petals with a deeply emarginate apex, or having the margin notched. The petals are either yellow with orange or white with yellow, and usually with both color forms intermixed in a single population (Rollins 1963; Service Focus).

Fleshy-fruit gladecress exhibits a mixture of two mating systems, self-compatibility and self-incompatibility in fertilization. Populations tend to exhibit one mating system or the other and are easily identifiable by flower characteristics. Self-compatible flowers are small and white, while self-incompatible flowers are large and either yellow or white. Self-compatible plants do not require insect pollinators and can mature seeds earlier than self-incompatible plants, which must have favorable temperatures for insect flight and subsequent pollination. Populations with self-compatible fertilization tend to be greater in number than self-incompatible populations (Service Focus).

Fleshy-fruit gladecress is a winter annual that completes the main stages of the lifecycle - seed, seedling, juvenile, flowering and fruiting - in a single year (Baskin and Baskin 1972). The seeds germinate from September to October, with plants overwintering as rosettes. The flowers bloom in March and April (Rollins 1963). They are pollinated by generalist bee species (Lloyd 1969). Fruit maturation takes approximately two to three weeks (Solbrig and Rollins 1977). The first seeds mature in late April and during most years, the plants have died and dropped their seeds by the end of May (Caudle and Baskin 1968). Seed dispersal appears to be mostly by water, and partially by wind (Lloyd 1965), though the limited natural dispersal capacity of the species has likely been augmented by cattle, mowing equipment or other vehicle traffic on disturbed sites (Service Focus).

Fleshy-fruit gladecress is endemic to glade communities associated with limestone outcroppings with exposed rock and shallow soil in Lawrence and Morgan Counties, Alabama (Rollins 1963). Such glades occur in association with Bangor Limestone, typically as level areas with exposed sheets of limestone or limestone gravel interspersed with fingers of cedar-hardwood vegetation. It grows in open sections of the glades but not in adjacent shaded forests. It grows best in full sun, competing poorly with shade plants. As with most cedar glade endemics, fleshy-fruit gladecress exhibits weedy tendencies, with remnant populations located in glade-like habitats exhibiting various degrees of disturbance, including pastures, roadside rights-of-way, and cultivated or plowed fields. Well managed disturbance removes competing foliage from other plants (79 FR 50990, Service Focus).

The glade habitats that support *Leavenworthia* species are extreme environments. Cedar glades fluctuate between very wet (winter and early spring) and very dry (summer) conditions. The frequently hot, dry summers create xeric conditions that regulate competition and shading from encroaching vegetation. Fire likely serves to limit encroachment of competitors as well as invasive species where litter accumulation and soil development occur on the periphery of glades (Baskin and Baskin 2003; Service Focus).

Threats to fleshy-fruit gladecress from habitat destruction and modification occur throughout the entire range of the species. These threats include agricultural conversion or incompatible practices, maintenance of transportation rights-of-way, residential and industrial development, and shading and competition. We expect population-level effects from these activities to continue into the future. While efforts by the U.S. Forest Service have reduced threats associated with off-road vehicle use and encroachment of invasive species at one site, no regulations protect the species on privately owned land, which is where all but one of the remnant fleshy-fruit gladecress populations occur. The small number of populations, compounded by the small size of those populations within the limited range of this species are also substantial threats (risks due to small numbers and range area). Threats to the species' habitat are reasonably well understood and have potential to be managed (Service Profile).

Service's profile page for fleshy-fruit gladecress: https://ecos.fws.gov/ecp/species/1435.

Fleshy-fruit gladecress (Leavenworthia crassa) critical habitat

Fleshy-fruit gladecress critical habitat was designated in 2014 (79 FR 50990). Approximately 8.4 ha (20.6 ac) was delineated in seven units in Lawrence and Morgan Counties, Alabama: (1) Bluebird Glades; (2) Stover Branch Glades; (3) Indian Tomb Hollow Glade; (4) Cedar Plains South; (5) Cedar Plains North; (6) Massey Glade, and (7) Hillsboro Glade.

The primary constituent elements (PCEs) are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species for fleshy-fruit gladecress are as follows:

- PCE 1—Shallow-soiled, open areas with exposed limestone bedrock or gravel that are dominated by herbaceous vegetation characteristic of glade communities.
- PCE 2—Open or well-lighted areas of exposed limestone bedrock or gravel that ensure fleshy-fruit gladecress plants remain unshaded for a significant portion of the day.
- PCE 3—Glade habitat that is protected from both native and invasive, nonnative plants to minimize competition and shading of fleshy-fruit gladecress.

Fringed campion (Silene polypetala)

Fringed campion (Family: Caryophyllaceae [Pink]) was listed as endangered in 1991 (56 FR 1932). It is a patch-forming perennial herb. The species range includes Alabama, Florida and Georgia.

Fringed campion forms evergreen rosettes connected by runners. While fringed campion can successfully reproduce vegetatively via stolons (ground-hugging, horizontal stems rooting at nodes and tips of runners), there has been little documentation of sexual reproduction in the wild. Factors that potentially limit sexual reproduction may be reduced flowering due to low light conditions associated with high canopy cover (Birkhead and Ward 2015), competition from invasive plant species (Bowman Cutway 2019), herbivory of flowering stems by white-tailed deer (*Odocoileus virginianus*) (Bowman Cutway 2019), and pollen limitation (Birkhead and Ward 2015, Bowman Cutway 2019). Birkhead and Ward (2015) documented pollen limitation as a potential limiting factor for a fringed campion site that was established from cuttings. At this site, flowers that were hand pollinated produced more fruit and more seeds per capsule than open pollinated flowers. Pollen transfer may be limited because small, isolated populations of rare plant species often receive less pollinator visitation in comparison with larger populations or more widespread plant species (Ellstrand and Elam 1993). Pollinators for fringed campion are unknown. They may require specialized pollinators Birkhead and Ward (2015). A low germination rate and low seed counts have been reported (Bowman Cutway 2019). It flowers about March to May and fruits about April to June.

Fringed campion occurs in moist, cool hardwood forests with specific edaphic conditions. It occurs on steep slopes of deep ravines or north-facing hillsides, sometimes on nearly level ground in mature hardwood or hardwood-pine forests on river bluffs, small stream terraces, moist slopes, and well-shaded ridge crests (Service 1996).

Abundance of fringed campion continues to decline range wide. Impacts from invasive plants and browsing from overabundant white-tailed deer (which precludes flower and seed survival and thus precludes sexual reproduction) continue to reduce viability at many sites. In addition, impacts from timber harvests, feral hogs, and severe storms (e.g., hurricanes) appear to be negatively impacting fringed campion at multiple sites across its range. Many fringed campion sites have declined in quality since 2015 due to those factors (Service 2021c). Drought is likely detrimental as well. Due to continued and increasing threats, fringed campion appears to be stable and exhibit good to excellent viability at only five sites as of 2021 compared to 12 sites reported in 2015 (Service 2015, 2021c).

Service's profile page for fringed campion: https://ecos.fws.gov/ecp/species/3738.

Gentian pinkroot (Spigelia gentianoides)

Gentian pinkroot (Family: Loganiaceae [Logania]) was listed as endangered in 1990 (55 FR 49046). It is a perennial herbaceous plant of about 10-30 cm long. As of 2023, it is restricted to seven extant locations within four counties west of the Apalachicola River, including Geneva County in Alabama and the adjacent, Calhoun, Jackson, and Washington counties in Florida. As of 2018, these sites supported about 3,900 plants, with numbers ranging from three to about 2,000 individuals among the different sites. The species was historically recorded from nine locations, but two are considered extirpated. The extant locations occur on both public and private lands in fire-dependent longleaf pine-wiregrass and pine-oak-hickory ecosystems. Another pinkroot population in northern Alabama's Bibb County was considered to be a variant of *S. gentianoides*, but is now considered a full species, *S. alabamensis*. This species is found in 17 Ketona Glade locations in the county and numbers in the thousands (Service 2023b).

Gentian pinkroot can be found growing as a solitary individual or in small clumps. It inhabits predominately well drained upland pinelands where it is a component of a fire-maintained longleaf pine-wiregrass ecosystem, in areas where limestone outcrops and calcareous soils are widespread, and in soils somewhat dry but rich in humus. In Florida (Jackson County) it is also found in pine-oak-hickory woods (upland mixed woodland) (Service 2023b).

Gentian pinkroot remains endangered due to threats like habitat destruction or modification from development, the plant's narrow distribution, disturbances such as hurricanes, and its general low population numbers. Because some populations have less than 30 individuals, any impact to existing populations could cause extirpation of these populations (Service 2023b).

The main threat to gentian pinkroot is habitat loss and modification. Conversion of much of the historical forest land to commercial pine plantations has possibly extirpated many populations. Although some populations of S gentian pinkroot are protected by TNC ownership, properties under private ownership are still at risk of habitat loss and modification. Populations on private property are potentially threatened by future development for home-sites, agriculture, logging of associated hardwoods, recreational facilities, or other purposes. Additionally, lack of habitat management (e.g., fire, removal of shrubs) allows for habitat degradation and reduces species abundance (Service 2023b).

Service's profile page for gentian pinkroot: https://ecos.fws.gov/ecp/species/4583.

Georgia rockcress (Arabis georgiana)

Georgia rockcress (Family: Brassicaceae [Mustard]) was listed as threatened in 2014 (79 FR 54627). The Service recognizes 24 populations of Georgia rockcress that are distributed across 14 counties in Alabama and Georgia and within 3 ecoregions (Ridge and Valley, Piedmont, and Southeastern Coastal Plain). As of 2021, 17 populations were extant. Georgia rockcress populations are composed of 1 or more element occurrences. Georgia rockcress element occurrences range from more than 2,000 plants to as few as 1 at specific points in time. Overall, population resilience (an index factor relating to viability of populations) was considered good or excellent in nine of the 24 historically known populations (38 percent), while 8 exhibited poor to fair resilience as of 2021 (Service 2021c)

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). No studies of dispersal are known for Georgia rockcress, but dispersal is

believed to occur within drainages via sheet flow of water. Seeds fall from the fruit while the fruit remains attached to the parent plant. It is likely that gravity is a primary dispersal agent for this species, which limits most dispersal events to a meter (about 3 feet) or less; a few meters may be possible during high wind events. Surface water runoff likely plays a secondary role in dispersal. Water action could move seeds an additional few meters (about 10 feet) down slope (Schotz 2010).

Populations of Georgia rockcress are largely 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. 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. These habitat settings are conducive to micro-disturbances, such as sloughing soils, and canopy gap dynamics such as wind-thrown trees, which provide small patches of exposed mineral soil in a patchy distribution. It is occasionally found within limestone or dolomitic glades. 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 typified by eastern red cedar (*Juniperus virginiana*), American hophornbeam (*Ostrya virginiana*), chinquapin oak (*Quercus muehlenbergii*), white ash (*Fraxinus americana*), southern sugar maple (*Acer barbatum*), and eastern redbud (*Cercis canadensis*) with a rich diversity of grasses and forbs characterizing the herb layer (Service 2021c)

Georgia rockcress occurs on steeply sloped locations with thin soils that are circumneutral to slightly basic (pH between 6.5 and 7.5). Inhabited locations fall between 24 – 98 meters (78 – 322 feet) in elevation (Schotz 2010) and 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; Service 2021c)

Historically, suitable habitat for Georgia rockcress has been impacted by development, including quarrying, residential development, timber harvest, road building, recreation, and hydropower dam construction. One or more of these activities pose ongoing threats to all known Georgia rockcress occurrences as either direct effects, or as an indirect effect as a persistent pathway for invasive species spread. Given the typically low abundance of Georgia rockcress, activities that destroy even a small amount of habitat can have a serious impact on this species, including its genetic diversity. Forest succession may also result in extirpation of Georgia rockcress patches or populations (Service 2021d).

Currently, the primary threat to Georgia rockcress is the ongoing invasion of nonnative species into occupied habitat. More than 75 percent of the populations are threatened by habitat degradation from invasive plant species. Residential and industrial development through quarrying, construction of buildings and roads, timber harvest, recreation sites (such as campsites or mowing of fields) and other activities open the canopy, provide a source of invasive seed and plant material, destroy soil profiles and disrupt hydrology (Service 2021d).

Georgia rockcress populations are disjunct across its range and the lack of population connectivity limits potential gene flow between populations, making natural reestablishment of any population unlikely should the population become extirpated. Seven of the 17 extant populations have some level of protection; however, only three implement monitoring and management programs. Alabama populations are small and lack on-going population monitoring or management (Service 2021c).

Whether or how Georgia rockcress might respond to a changing climate is uncertain. Severe drought would be expected to have an effect on the plant community, including the mature canopy and canopy gap dynamic, and increased storm intensity could accelerate erosion-related disturbances (Service 2021d).

Service's profile page for Georgia rockcress: https://ecos.fws.gov/ecp/species/4535.

Georgia rockcress (Arabis georgiana) critical habitat

Georgia rockcress critical habitat was designated in 2014 (79 FR 54635). Overall, 17 critical habitat units (12 in Alabama and 5 in Georgia), encompassing approximately 297 hectares (732 acres), were designated. They are situated in riparian, river bluff habitat including parts of Bibb, Dallas, Elmore, Monroe, Sumter, and Wilcox counties in Alabama and several counties in Georgia.

The primary constituent elements specific to Georgia rockcress are:

1. Large river bluffs with steep and/ or shallow soils that are subject to localized disturbances that limit the accumulation of leaf litter and competition within the Lower Gulf Coastal Plain, Upper Gulf Coastal Plain, Red Hills, Black Belt, Piedmont, and Ridge and Valley Physiographic Provinces of Georgia and Alabama.
2. Well-drained soils that are buffered or circumneutral generally within regions underlain or otherwise influenced by granite, sandstone, or limestone.
3. A mature, mixed-level canopy with spatial heterogeneity, providing mottled shade and often including species such as eastern red cedar, America hophornbeam, chinquapin oak, white ash, southern sugar maple, and redbud with a rich diversity of grasses and forbs characterizing the herb layer.
4. Intact habitat that is fully functional (i.e., with mature canopy and discrete disturbances) and buffered by surrounding habitat to impede the invasion of competitors.

Kral's water-plantain (Sagittaria secundifolia)

Kral's water-plantain (Family: Alismataceae [Water-plantain]) was listed as threatened in 1990 (55 FR 13907). Kral's water-plantain occurs in a small number of locations in Alabama and Georgia, with relatively small numbers of plants in each population. Three of the four extant populations occur in streams within federally managed lands (Little River Canyon National Preserve and Bankhead National Forest) (Service Focus).

Kral's water plantain is a submersed to emersed aquatic, perennial herb. It can float above or below the water. Distinguishing characteristics include a stout, elongated rhizome, hairy filaments, linear leaves and spreading, or reflexed, sepals. The leaf shape depends on the velocity and depth of the water it inhabits. In swift shallows, the leaves are linear, rigid, and sickle shaped, 2 to 3 inches (5 to 8 centimeters) long and 0.08 to 0.20 inches (2 to 5 millimeters) wide. In quiet, deeper waters, the leaves are more quill-like, being longer (4 to 12 inches [10 to 30 centimeters]). The plant produces separate male and female flowers on the same plant, with stalks about 4 to 20 inches (10 to 50 centimeters) tall. Although infrequent, flowering occurs about May into July, and intermittently into fall (Service Focus).

Kral's water plantain is clonal, and reproduction is primarily asexual, which suggests there may be low genetic variability within the isolated populations. Although capable of sexual reproduction, Kral's water-plantain spreads primarily by growth of its underwater rhizomes. Approximately only 1 percent sets flowers. Bees are likely pollinators, but little is known about Kral's water-plantain reproduction. Many of the population sites are characterized by conditions other than those associated with flowering and sexual reproduction. Sexual

reproduction increases genetic variability, which enables species to adapt to changing conditions. Therefore, it is important to maintain and restore suitable flowering habitat to encourage reproduction by sexual means.

The plant occurs in shallow riffles, jointed, flat sandstone slabs, and substrates that include cobbles, small boulders, and sand. Kral's water-plantain typically occurs on frequently exposed shoals or rooted among loose boulders in quiet pools up to 3.2 feet (1 meter) in depth. Plants are locally distributed where suitable habitat exists and grow in pure stands or in association with various submergent (below-water), and emergent (above-water) plants. The immediate banks are often dominated by thickets of shrubs and adjacent sphagnous seeps which commonly contain sedges. Streams with Kral's water-plantain occurrences are typically narrow and bounded by steep slopes (Service Focus).

Maintaining natural hydrological cycles may be critical to the viability of the species. Although the Bankhead National Forest and the National Park Service provide for standards and protective measures for the Kral's water-plantain, siltation from silviculture, land use practices that lead to changes in hydrology and or degradation of water quality, and recreational use of the river corridor act as threats or stressors to the species. Overall, siltation, eutrophication due to sewage input, and impoundments currently threaten Kral's water-plantain continued viability. Activities that increase stream turbidity or siltation from erosion pose a threat to this species by reducing the amount of light reaching this submersed plant and burying it under silt. Eutrophication may lead to algal growth on the plant and result in degraded water quality. Unstable dams may break and release high volumes of water and sediment, uprooting plants and burying remaining plants. Kral's water-plantain could become vulnerable to extinction due to those factors along with its limited range (Service Focus).

Service's profile page for Kral's water-plantain: https://ecos.fws.gov/ecp/species/8235.

Leafy prairie-clover (Dalea foliosa)

Leafy prairie-clover (Family: Fabaceae [Legume] was listed as endangered in 1991 (56 FR 19953). It occurs in Alabama, Illinois, and Tennessee. Range-wide, leafy prairie-clover occurred within 63 populations as of 2022. Of those, 50 were located in central Tennessee, 11 in northeast Illinois and 2 in northwest Alabama (Service 2022). The distributional center for Leafy prairie-clover is the limestone cedar glades of central Tennessee and northern Alabama, where the species is considered nearly endemic. The disjunct Illinois sites occur on dolomite prairies on river terraces in the northeastern part of the State (Service 1996b).

Leafy prairie-clover is a glabrous, stout perennial herb, with one to several stems 2 to 8 decimeters (din) (8 to 31 inches [in.]) long arising from a hardened root crown. It is easily distinguished from most other species of the genus east of the Mississippi River on the basis of the leaflet number, which ranges from 9 to 31 but typically is between 20 and 27. The alternate, oddly pinnately compound leaflets are sparsely glandular-punctate beneath; flat, oblong, or oblanceolate to elliptic in shape; and S to 13 millimeters (mm) (0.2 to 0.5 in.) long. The axillary leaf clusters are reduced in the upper portions of the stem. The dense conic to cylindric flowering heads are between 0.4 and 8.9 centimeters (cm) (0.15 to 3.5 in.) long and 0.6 to 1.0 cm (0.24 to 0.4 in.) wide (Service 1996b).

Leafy prairie-clover requires full sun and low competition for optimum growth and reproduction. The species occurs in thin-soiled (less than 45 centimeters [cm] [18 inches] deep) mesic and wet-mesic dolomite prairie, limestone cedar glades, and limestone barrens. In northern Alabama, it occurs in limestone barrens positioned between adjacent drier (e.g., xeric glades) or wetter (e.g., washes) flat areas. It can persist in successional plant

communities following disturbance or woody succession, but will decline in advanced stages of woody succession. The natural communities supporting leafy prairie-clover must be maintained by periodic burning. Because the species is short-lived and does not spread vegetatively, population maintenance is dependent upon seed production and may be buffered from extinction-causing phenomena by a persistent seed bank (Service 1996b).

Threats of habitat destruction and degradation continue to affect populations throughout the species' range to varying degrees, as do threats from climate change, including risk from more severe drought conditions. Drought continues to threaten populations of the species, and projected climate change resulting in more severe (i.e., frequent, intense, or prolonged) drought conditions across the species range will continue to threaten the species in the foreseeable future. Available data indicate that herbivory by eastern cottontail rabbit (*Sylvilagus floridanus*) and white-tailed deer (*Odoicoileus virginianus*) herbivory also impacts leafy prairie-clover. Additional stressors include habitat degradation due to encroachment by invasive exotic or native species, illegal outdoor recreational vehicle use, and incompatible management of utility rights-of-way. The effects of these threats place smaller, isolated populations with low resiliency at greatest risk, though all populations are at risk due to low genetic variation, which could limit potential for adapting to changing conditions. The effects of these threats are likely to be exacerbated in sites where management to provide suitable habitat conditions is lacking or ineffective (Service 2022).

Additionally, leafy prairie-clover exhibits considerable interannual variability with respect to abundance in each of three stages: seedling/juvenile, non-flowering adult, and flowering adult, a trait that may confer an additional risk factor for the species viability, particularly if there are declines in viability and or germination failure of seeds in the seedbank. Fire may play a role in affecting germination. Lack of fire results in competition from other species and potentially, reduced germination (Service 2015, 2022).

Service's profile page for leafy prairie-clover: https://ecos.fws.gov/ecp/species/5498.

Little amphianthus (Amphianthus pusillus)

Little amphianthus (Family: Plantaginaceae [Plantain]) was listed as threatened in 1988 (53 FR 3560). Analysis of the genetics of little amphianthus resulted in a taxonomic change to the species' genus, and specific epithet, from *Amphianthus pusillus* to *Gratiola amphiantha*. It is a diminutive, aquatic, annual herb inhabiting ephemeral pools on granitic outcrops and flatrocks across the granitic belt of the Piedmont ecoregion, from eastern Alabama, across Georgia and South Carolina (Service 2024a).

As of 2024, little amphianthus was known from 78 extant and historical populations across 20 counties in Georgia, 3 counties in Alabama, and 3 counties in South Carolina. Nineteen populations across the range are considered extirpated (including complete extirpation in Tallapoosa County, Alabama). Of the remaining 59 populations, 25 are extant, 32 are unknown (that in most cases have not been observed since 2007), and 2 are introduced. Twenty-two of the 59 populations occur on protected or conservation lands, although only 15 of these are known to be natural and extant (i.e., observed since the 2019 5- year review in Service 2019b). Thirteen of the known extant protected populations occur in Georgia and two are from South Carolina; there are none known from Alabama (Service 2024a).

Despite the broad range of the species, suitable pool habitat is exceptionally rare. The species requires quality pools, capable of holding water during the winter and spring months while the species completes its life cycle. It

remains dormant as a seed in the extreme heat and drought experienced during the summer and early fall months (Se/rvice 2019b, 2024a).

Since listing in 1988, some threats have lessened or been ameliorated through awareness and proactive conservation. However, most threats remain unabated, especially those related to human population growth, such as land development for housing, infrastructure, commercial activities, and demand for quarried gravel aggregate. New threats have emerged that are associated with recreation and entertainment (Service 2024a).

Service's profile page for little amphianthus: https://ecos.fws.gov/ecp/species/6445.

Lyrate bladderpod (Lesquerella lyrata)

Lyrate bladderpod (Family: Brassicaceae [Mustard]) was listed as threatened in 1990 (55 FR 39864). The recent known distribution of lyrate bladderpod is confined to parts of Franklin, Colbert, and Lawrence counties in Alabama. At the time of listing, lyrate bladderpod was known from two sites in northern Alabama. Several additional sites have been located since listing, including a large population in Lawrence County. Two of the sites discovered after listing have not been seen in recent years, leaving three known populations in three different counties (Service Focus).

Lyrate bladderpod is an annual. Plants are comprised of one to several, usually simple and erect, stems of 4 to 12 inches (1 to 3 decimeters) in length. Leaves and stems are shortly pubescent. The outer stems are usually decumbent at the base. Basal leaves are stalked and lyrate-shaped, 0.8 to 2.8 inches (2 to 7 centimeters) long and 0.2 to 0.6 inches (6 to 15 millimeters) wide. The terminal lobes are large and orbicular to elliptic in shape. The stem leaves are ovate to broadly oblong and obtuse, 0.2 to 0.8 inches (5 to 20 millimeters) long and 0.2 to 0.4 inches (4 to 10 millimeters) wide and sessile with prominent ear-like projections, or auricles, at the bases. The margins of the stems are nearly smooth to coarsely toothed. Inflorescences are dense. The flowers are ascending on densely pubescent stalks 0.4 to 0.6 inches (1 to 1.5 centimeters) long. Sepals are pubescent, yellowish, oblong, 0.1 to 0.2 inches (3 to 4 millimeters) long and 0.1 inch (1.2 to 1.5 millimeters) wide. Petals are yellow, broadly ovate, 0.2 to 0.3 inches (5 to 7 millimeters) long and 0.1 to 0.2 inches (3.5 to 4 millimeters) wide and slightly rounded. The fruits are siliques, which are glabrous, globose in shape, 0.1 inch (2.5 to 3.5 millimeters) high and 0.1 to 0.2 inch (3 to 4 millimeters) broad. Seeds are flattened, brown, oval to nearly orbicular in outline, and margined, and range from 0.1 inch (1.5 to 2.5 millimeters) on the longest dimension (Service Focus).

Lyrate bladderpod is endemic to cedar glade areas associated with limestone outcrop areas in north Alabama. However, little is known regarding the original limestone outcrop system of which the lyrate bladderpod was a part. Historically, the northern Alabama glades occurred as glade complexes where open areas of limestone pavement or gravel were divided by fingers of woody vegetation to form an intricate mosaic of habitats (Service Focus).

Lyrate bladderpod likely evolved on these cedar glade systems. The glades, including those which naturally supported populations of the lyrate bladderpod, have generally been unable to escape human disturbances and most persist as highly disturbed remnants. Currently, none of the extant populations of the lyrate bladderpod occur on relatively pristine cedar glades, and occur on glades disturbed by cultivation, cattle pastures and roadsides. Plants extend onto roadsides at several sites, and mowing or herbicide application prior to seed set would negatively impact these populations. Housing development, trash dumping, adverse agricultural practices and road building have destroyed or negatively impacted a number of cedar glade systems, including those

associated with lyrate bladderpod. Populations in Franklin and Colbert counties are located near growing urban areas and potential for residential development poses a threat to both those sites (Service Focus).

The majority of the largest population is in Lawrence County and is permanently protected and managed on a preserve owned by The Nature Conservancy. This Lawrence County population is thriving and there are no apparent threats. The remaining two populations are small, isolated and declining due to lack of adequate management. There are no explicit protections for these sites and their future is uncertain. The small number of sites and lack of protection for all but one of these populations illustrates the extreme vulnerability of this species. However, since populations may exist for years as seed banks, it is possible that a number of the populations not seen in recent years will reappear, given the advent of some type of management (Service Focus).

Service's profile page for lyrate bladderpod: https://ecos.fws.gov/ecp/species/4654.

Mohr's Barbara's buttons (Marshallia mohrii)

Mohr's Barbara's buttons (Family: Asteraceae) was listed as endangered threatened in 1988 (53 FR 34698). The species is historically and currently known to occur in Alabama and Georgia (Service Focus). As of 2022, is was considered extant in 19 populations and extirpated from an additional 8 known populations.

Mohr's Barbara's buttons is an erect, perennial herb, 3-7 dm (1-2.3 ft.) tall. Leaves are alternate, 8-20 cm (3.2-7.8 in.) long, firm-textured, three-nerved, and lanceolate-ovate in shape. Leaves are often clustered near the base of the plant and gradually reduce in size upwards. Inflorescences typically consist of several flowering heads in a branched arrangement. Heads are approximately 2.5 cm (1 in.) wide and consist of disk flowers (tubular in shape) that are pale pink or white in color. The fruit is an achene. Plants flower between May and the end of June, setting fruit about July and August (Service Focus).

Mohr's Barbara's buttons appears to be adapted to disturbance and is often found growing in open to semi-shaded graminoid-dominated habitats. Habitats include moist areas in open woodlands, calcareous prairies and barrens, and along shale-bedded streams, as well as roadsides and utility right-of-way corridors. The soils are sandy clays, which are alkaline, high in organic matter, and seasonally wet.

Most of the remaining sites have poor to marginal habitat conditions. Of the species' 19 extant populations, only 8 are located on Federal, State, or non-governmental conservation lands and as such (e.g., protection from habitat loss, habitat management). Others potentially receive no conservation considerations. Ongoing threats include degradation and destruction of habitat (including habitat conversion, and encroachment of competing vegetation) and inadequate/ incompatible habitat management, which have resulted in the loss of suitable habitats and extirpation of populations. Road widening and indiscriminate herbicide spraying of road shoulders threatens habitats and populations. Additionally, rooting by feral hogs (*Sus scrofa*) is an emerging threat (Service 2022).

Service's profile page for Mohr's Barbara's buttons: https://ecos.fws.gov/ecp/species/7610.

Pondberry (Lindera melissifolia)

Pondberry (Family: Lauraceae [Laurel]) was listed as endangered in 1986 (51 FR 27495). The range of pondberry is limited to the Atlantic and Gulf Coastal Plains. It is known from Alabama, Arkansas, Georgia, Mississippi, Missouri, North Carolina, and South Carolina (Service Focus). Historically, the species also

occurred in Louisiana and Florida. Pondberry is a distinctive species, with diagnostic characters that clearly distinguish it from the two other species of spicebush in the southeastern United States, *L. benzoin* (spicebush) and *L. subcoriacea* (bog spicebush). Pondberry can grow to more to about 2 meters (6 feet) in height (Service Profile). Pondberry leaves have a distinct sassafras-like odor when crushed (Service Focus).

Pondberry is a flowering, deciduous woody shrub. It is also rhizomatous, frequently propagating by vegetative sprouts and forming clonal colonies. However, reproduction is primarily by means of stolons, a creeping stem or runner that takes root at points along its length to form new plants. The plants grow in clones of numerous stems which flower when little more than 2 to 3 years of age, but appear to live for only a few years. The dead stems are replaced by new ones that emerge from the rootstock. (Service Focus). Plants are dioecious (each plant is either a male or a female) and produce clusters of small, yellow flowers in early spring prior to leaf development. Fruits are drupes that are green when immature and ripen to red by fall. Flowering occurs from March to April, with male flowers emerging prior to female flowers (Service Profile). Mature fruits can be found on the plants in October. Seeds are only viable for a short period of time (Service Focus).

Pondberry for the most part is associated with wetland habitats such as bottomland hardwood swamps in more interior areas, and the margins of sandy or peaty sinks including Pocosin wetlands (shrub bogs; characterized by deep, acidic, organic peat soils) and Carolina bays, pond edges, and marshy depressions in the more coastal sites. These areas are often seasonal wetlands, covered with shallow water, often intermittently, or having saturated soil. The plants generally grow in shaded areas but may also be found in full sun (Service Focus). Pondberry is considered a facultative wetland species—plants that usually occur in wetlands but may also occur in non-wetlands. Hydrology at pondberry sites is maintained by overbank flooding, local rainfall, storage in depressions, or impeded drainage (independent of overbank flooding).

The most significant threats to pondberry are drainage ditching and subsequent conversion of habitat to other uses. Even ditching without later conversion of land use can alter the water regime in a manner that reduces the plant's vigor or eliminates it from the site. Swine, cattle grazing, and timber harvesting have also impacted the plants at some sites (Service Focus).

Service's profile page for pondberry: https://ecos.fws.gov/ecp/species/1279.

Price's potato-bean (Apios priceana)

Price's potato-bean (Family: Fabaceae or Leguminosae [Pea, Legume]) was listed as threatened in 1990 (55 FR 429). Price's potato-bean occurs in the Coastal Plain, Interior Low Plateaus, and Appalachian Plateaus physiographic provinces. As of 2022, there were an estimated 57 extant populations of Price's potato-bean distributed among 27 counties in 4 states, Alabama, Kentucky, Mississippi, and Tennessee. Historically it occurred in Illinois as well. Twenty-six of the 57 populations are on publicly owned lands or private conservation lands. Alabama counties with known, extant populations include Autauga, Butler, Dallas, Jackson, Lawrence, Madison, Marshall, Monroe and Wilcox.

Price's potato-bean is a twining, herbaceous, perennial vine that grows from a single, large tuber (often to 7.2 in. [18 cm] in diameter); its close relative, *Apios americana* grows from several small tubers. The vines may grow up to 15 feet long. When seeds are produced, they germinate readily with scarification. Temperature fluctuations probably break the impermeable seed coat in the wild. (Service Profile). The stem is round in cross section, somewhat twisted, and slightly ridged. The greenish-white to brownish-pink flowers are about 0.4 in. (1 cm) long and tinged with magenta at the apex. There are usually 4-10 seeds per pod (Service Focus). Flowering

occurs about mid-July through mid-August and produces fruit from August through September. Flowers are pollinated by bumble bees and honey bees among other arthropods (Service Profile).

Price's potato-bean thrives in mesic (moist), open, mixed-hardwood stands, often in forest gaps or along ravine slopes that grade into stream bottoms. The species often grows in well-drained loams or old alluvium over limestone (calcareous substrates) on rocky, sloping terrains (Service Profile). It is also found near the base of small limestone bluffs. It also can grow along highway right-of-way and powerline corridors bordered by open, mixed hardwood stands. Plant associates include cane, chinquapin oak, basswood, and slippery elm (Service 2022c).

Incompatible logging (i.e., clearcutting or heavy logging), excessive shading by canopy trees, right-of-way maintenance for roads and utilities (mowing, landslides, etc.), and competition with non-native, invasive plants remain as important, ongoing, threats. Feral hogs (*Sus scrofa*) are a potential new threat to the species. Among the most destructive exotic vertebrates established in the Southeast, feral hogs severely damage a variety of habitats and sensitive ecological communities. As feral hog numbers increase, direct impacts to the species are anticipated. Herbicide overspray from agricultural fields is another emerging threat. Price's potato-bean in proximity to agricultural fields have sustained substantial damage from herbicide spray drift. Herbivory by native and introduced insects (e.g., bean leaf beetle [*Certoma trifurcate*], a Japanese beetle [*Popillia japonica*]) and snails is a potential ongoing or emerging stressor on Price's potato-bean populations. The predicted increase in drought frequency, intensity, and duration could adversely affect the habitats inhabited by Price's potato-bean by reducing soil moisture and increasing plant mortality rates or reducing flowering and seed production rates. Climate change may disrupt plant-pollinator interactions via phenological shifts in flowering and/or pollinator activity. While climate has changed in recent decades and the rate of change is expected to continue increasing for the foreseeable future, uncertainty remains regarding the extent, severity, and precise impacts of how Price's potato-bean's habitats and its interspecific interactions will be affected by these changes and how the species will respond to these changes (Service 2022c).

Service's profile page for Price's potato-bean: https://ecos.fws.gov/ecp/species/7422.

Relict trillium (Trillium reliquum)

Relict trillium (Family: Liliaceae [Lily]) was listed as endangered in 1988 (53 FR 10879). It occurs along the fall line and portions of the Coastal Plain in Alabama, Georgia, and South Carolina. Relict trillium is a rhizotomous perennial herbs that sends up stems, leaves, and flowers in early spring, after temperatures have risen but before the forest canopy leafs out (Service Focus). After flowering and fruiting, the aboveground plant disappears, persisting through the late summer, fall, and winter as an underground rhizome. Seeds shed in the summer germinate the following spring and, within a year or two, send up a single, spatula-shaped seed leaf (cotyledon) for one year's growing season. The next year, a true leaf is produced, and, in subsequent years, three-leaved plants appear. After 5 - 7 years (possibly fewer in the Coastal Plain), the plant produces a flowering stalk.

Relict trillium occupies mature, **mixed deciduous forests** in rich ravines and on stream terraces and slopes, over calcium-rich bedrock such as amphibolite or limestone. Carrion insects, including fly and beetle families, attracted to the fetid smell of the green to maroon sepals are believed to be the dominant pollinators, while ants are noted as important dispersal mechanisms for seeds (Folkerts et al. 1987; Waddell 2006). Deer and woodchucks disperse seeds over longer distances. Mature trillium plants are very long-lived, perhaps living

hundreds of years, since the rhizome continues to lengthen and produce shoots on one end, while the other end decays.

Habitat loss and degradation remains the most significant limiting factor for the relict trillium. Relict trillium is found in habitat that is often well-suited for urbanization, infrastructure construction, and resource extraction activities such as timber harvest. In addition to direct habitat loss in areas that are not protected, urbanization can result in altered local hydrology from stormwater discharges to streams and reduce or remove floodplain habitat being used by downstream populations of relict trillium, reduced pollinator movements, and increased invasive species occurrences. Further indirect impacts from urbanization include fragmentation and loss of connectivity between populations and increased ancillary activities related to residential and commercial development such as construction and maintenance of linear infrastructure (e.g., roads and utility lines). Runoff from road rights-of-way often result in soil erosion and changes in water runoff patterns that can alter soil and moisture conditions, making habitat unsuitable. Detrimental land uses occurring adjacent to relict trillium populations may alter the natural hydrology of the site and/or influence the vegetation structure and composition. For those populations in non-urbanized areas, agriculture and silviculture pressures are most prevalent. Timber operations, including clear-cutting, have been extensive on and near relict trillium sites in Henry and Bullock counties, AL, since the 1990's. Wild and prescribed fire also pose a threat to relict trillium plants and its habitat depending on severity, seasonality, and return interval (Service 2023c).

Non-native invasive plants pose threats to trillium populations through competition for space and nutrients. Invasive plant species can outcompete native vegetation, sometimes forming monotypic stands, and limit the available resources (nutrients, water, and sunlight) necessary for relict trillium to become established, develop, and reproduce. Non-native invasive plants have been documented in 42 of 44 (95 percent) of relict trillium populations and have a substantial or extensive presence at 23 of 44 (53 percent) of the sites. Of particular concern are thorny olive (*Elaeagnus pungens*), Japanese stiltgrass (*Microstegium vimineum*), Chinese privet (*Ligustrum sinense*), Carolina cherry laurel (*Prunus caroliniana*), and kudzu (*Pueraria lobata*). Feral hogs (*Sus scrofa*) occur throughout the Southeast and on most public conservation lands, where they are considered a non-native invasive species. Hogs can negatively affect almost all aspects of ecosystem structure and function and are known to have significant impacts to native plant communities both directly (through consumption) and indirectly through rooting and soil disturbance. Impacts to relict trillium from feral hogs have been documented from 17 of 44 (39 percent) of populations, although substantial and extensive damage was observed at 8 of 44 (18 percent) of relict trillium sites (Service 2023c).

Service's profile page for relict trillium: https://ecos.fws.gov/ecp/species/8489.

Tennessee yellow-eyed grass (Xyris tennesseensis)

Tennessee yellow-eyed grass (Family: Xyridaceae [Yellow-eyed grass]) was listed as endangered in 1991 (56 FR 34151). At the time of listing in 1991, Tennessee yellow-eyed grass was known from only seven sites, with five in Tennessee, one in Georgia and one in Alabama. Surveys since its listing have resulted in the location of 17 additional sites for a total of 24 sites. Recently, a total of 21 populations are known to be extant including four in Bibb County, four in Calhoun County and one each in Shelby and Franklin counties in Alabama, five in Georgia and six in Tennessee (Service Focus). A newly described *Xyris* species grows alongside *X. tennesseensis* at a single area in Bibb County. Moffett Jr. (2008) described it as *X. spathifolia* Kral & Moffett, from a single calcareous dolomitic (Ketona Limestone) fen in a fen-seep complex within the Ketona Glades area.

Tennessee yellow-eyed grass is a perennial, monocotyledonous herb. The plant ranges from 2.3 to 3.3 feet (7 to 10 decimeter) in height. Plants typically occur in clumps where they arise from fleshy bulbous bases. The flowers, which are pale yellow in color and 0.2 inches (4.5 millimeters) long, unfold in the late morning and wither by mid-afternoon. Fruits are thin-walled capsules containing numerous seeds 0.5 to 0.02 inches (0.6 millimeters) in length. Flowering occurs from August through September (Service Focus).

Tennessee yellow-eyed grass is an obligate wetland plant that prefers relatively high pH seeps and streambanks in an open, sunny setting. It grows in open areas or thin canopied woods of various wet habitat types such as seeps, fens, wet meadows, gravelly seep-slopes, and gravelly bars and banks of small streams and ditches. Although *Xyris* species are usually found on acidic soils, Tennessee yellow-eyed grass is restricted to relatively specialized habitats that are almost exclusively found in slightly alkaline or circumneutral, gravelly-sandy substrata in rocky calcareous (shale, limestone, dolomite) regions of the Ridge and Valley or Interior Low Plateaus physiographic provinces. The thin soils overlying the calcareous substrates have year-round or nearly permanent moisture regimes (seepage or mineral-rich water flow) (Moffett Jr. 2008, Service Focus).

The modification and alteration of habitat within the species range remains the primary and major threat for this species. Threats to the species include shading from woody trees and shrubs, competition from invasive species, road construction and quarrying. Logging and clearcutting, soil disturbances, cattle trampling and grazing, draining and filling wetlands, stream impoundment, off-road vehicle use and lowering of water table by groundwater pumping all provide additional treats to this species (Service Focus).

The existence of Tennessee yellow-eyed grass continues to be threatened because of its specialized habitat needs, small population size and continued impacts to its habitat. The potential development of private land, changes in moisture, severe drought, and shade and overcrowding from woody plant encroachment in the absence of facilitative natural disturbance all present continuing threats to the species. Habitat destruction or modification is presently the largest threat to this species. Because the species relies on active management to keep sites open and well-lit, partnerships with private landowners and government agencies to implement active management and easements on their properties are vital to its continued existence. Protection of this species through habitat management remains difficult and sporadic, because the majority of sites where this species occurs is solely or partially in private ownership (Service Focus).

Service's profile page for Tennessee yellow-eyed grass: https://ecos.fws.gov/ecp/species/6010.

White fringeless orchid (Platanthera integrilabia)

The white fringeless orchid (Family: Orchidaceae [Orchid]) was listed as threatened in 2016 (81 FR 62826). The white fringeless orchid is a perennial herbaceous plant with a light green stem arising to nearly 2 feet tall, from a tuber. Flowering typically occurs from late July through September but can occur as early as June in the southern portion of its range (Alabama). Fruiting capsules mature in October.

White fringeless orchid habitat is described as partially shaded sites with sandy and acidic soils in wet areas where groundwater seeps to the surface, including seeps, seepage slopes, bogs, swamps, or the heads of streams. It occurs in both forested areas as well as restored grassland or woodland habitats and managed utility line corridors. The species is associated with a wide range of light availability, indicating that individuals can acclimate to, or populations have adapted to, locally prevalent environmental conditions. It is often associated with sphagnum moss in partially shaded areas. It occurs at elevations of 100 to 700 meters (325 to 2,300 feet) above sea level.

Available data indicate that the species requires the presence of a single fungal species, *Epulorhiza inquilina*, to form mycorrhiza in root cells which provide a source of carbon for seed germination and growth of seedlings and mature plants. White fringeless orchid also appears dependent on a limited number of diurnal Lepidoptera (butterfly and moth) species, with only three known external pollinators, silver spotted skipper (*Epargyreus clarus*), spicebush swallowtail (*Papilio troilus*), and eastern tiger swallowtail (*Papilio glaucus*). However, they may also be adapted for pollination by nocturnal hawkmoths.

The remaining populations of white fringeless orchid are in many cases small, isolated, and have limited potential for recolonization should they be extirpated. The greatest threats to this species are loss or degradation of habitat, which are exacerbated by dynamics of small populations. The main causes of habitat degradation or loss include human development and silvicultural practices, which can result in conversion of habitat to non-native forest types or other land uses, altered hydrology, soil disturbance, and increased abundance of competing plants, both native and introduced. Additional threats include loss of individual plants from unauthorized collecting, herbivory, and pathogens (81 FR 62826).

Service's profile page for white fringeless orchid: https://ecos.fws.gov/ecp/species/1889.

Whorled sunflower (Helianthus verticillatus)

The whorled sunflower (Family: Asteraceae [Aster, Composite]) was listed as endangered in 2014 (79 FR 44712). It is a perennial herb arising from horizontal, tuberous-thickened roots with slender rhizomes, producing stems that can reach 4 meters (13 feet) or more in height (Mathews et al. 2002). Whorled sunflower is a self-incompatible, clonal perennial and flowers from about August into October (Mathews et al. 2002; Ellis and McCauley 2009).

It propagates by sexual reproduction (i.e., flowering and seed production) as well as clonally (vegetatively, via rhizomes [horizontal underground stems that produce roots and shoots]). Its clonal nature results in a clumped distribution and, as a result, many stalks that appear to be individual plants are genetically identical to neighboring stems (Ellis et al. 2006). Self-incompatibility of flowers prevents inbreeding, but requires genetically different individuals for outcrossing, and pollinators capable of providing for fertilization between such different individuals (studies to determine effective pollinators of this species have not been conducted). Ellis and McCauley (2009) reported lower germination rates in seeds produced from crosses between plants from a Tennessee population compared to plants from a larger, Alabama population. Lower rates of seed viability were also observed in second generation crosses of the Tennessee versus Alabama plants. These results suggest a possible influence of population size on individual fitness in whorled sunflower populations. Poor seed germination rates may be reflected in the low number of populations in the wild (Mathews et al. 2002).

Whorled sunflower is found in moist-soiled sites where little to no overstory canopy is present. Habitat quality ranges from remnant prairie or woodland sites to degraded sites along roadsides, railroad tracks, and agricultural fields. Despite their commonly degraded condition, plant associations in these habitats indicate a community with strong prairie affinities (Service Species). Because it requires open conditions, habitat management activities may need to include controlling invasive plants and woody vegetation with herbicide, fire, or mechanical thinning.

Regarding threats, TNC (2025) compiled the following: habitat (including wet prairie habitat) fragmentation, loss or degradation due to agricultural, silvicultural, and residential development and from mechanical or chemical vegetation management for industrial forestry, right-of-way maintenance, and agriculture; and

vegetative succession due to fire suppression. Most remaining wet prairie occurrences are in fragmented remnants found along rights-of-way where succession is artificially impeded.

Service's profile page for whorled sunflower: https://ecos.fws.gov/ecp/species/3375.

Whorled sunflower (Helianthus verticillatus) critical habitat

Critical habitat was designated in 2014 (79 FR 50989). Critical habitat units were designated in Alabama (four units in Cherokee County), Georgia and Tennessee, including approximately 624.2 ha (1,542.3 ac) overall.

The physical or biological features of the whorled sunflower critical habitat include:

5. Silt loam, silty clay loam, or fine sandy loam soils on landforms including broad uplands, depressions, stream terraces, and floodplains within the headwaters of the Coosa River in Georgia and Alabama and the East Fork Forked Deer and Tuscumbia rivers in Tennessee.
6. Sites in which forest canopy is absent, or where woody vegetation is present at sufficiently low densities to provide full or partial sunlight to whorled sunflower plants for most of the day, and which support vegetation characteristic of moist prairie communities. Invasive, nonnative plants must be absent or present in sufficiently low numbers not to inhibit growth or reproduction of whorled sunflower.
7. Occupied sites in which enough compatible mates are present for outcrossing and production of viable achenes to occur.

Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on September 25, 2014.

The features essential to the conservation of whorled sunflower may require special management considerations or protection to reduce the following threats:

1. Soil disturbance due to silvicultural site preparation, timber harvest, or cultivation of row crops;
2. indiscriminate herbicide use or mowing;
3. conversion of remnant prairie habitat to agricultural or industrial forestry uses; and
4. excessive shading or competition from native woody species or invasive, nonnative plants.

5 EFFECTS OF COVERED ACTIVITIES AND CONSERVATION MEASURES

5.1 EFFECTS OF COVERED ACTIVITIES

This section addresses the effects of the anticipated activities on covered species and critical habitat in this standing analysis.

Where appropriate in this analysis, activities that are expected to have no effect (i.e., an NE determination) on a species and critical habitat are specified. This information is provided as helpful technical assistance to those agencies and project proponents who may be unfamiliar with the species and activities. The action agencies may incorporate this information by reference when making an NE determination.

The "effects" of the action means:

> *all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but that are not part of the action. A*

consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02).

If the activities satisfy the two-part test for causation ("but for" and "reasonably certain to occur"), they should be considered as part of the action. A project's action area must include all areas affected (i.e., modifications to land, air, or water) by the proposed action, and not merely the immediate area involved in the action. To qualify for use of this standing analysis, a project's action area must be wholly encompassed by the coverage area for this standing analysis as described above and all activities within the proposed action must fit within the scope of the standing analysis.

Here, we describe project conditions and conservation measures that are consistent with May Affect, Not Likely to Adversely Affect, and No Effect, determinations for the listed species covered by this DKey.

5.2 CONSERVATION MEASURES

This standing analysis applies conservation measures as design features to avoid adverse effects on an individual, population, or species. The Service has previously found that incorporation of certain conservation measures, while voluntarily adopted by action agencies, has reduced effects to the extent that the Service and the action agency found that the actions are not likely to adversely affect species and critical habitat and do not require formal consultation. Where pertinent, the general, species-specific and species group-specific exclusions and/or conservation measures in the following sections must be met in order to apply this standing analysis and receive a determination of NE or NLAA from IPaC through the DKey. Projects using this standing analysis to support a determination of NE or NLAA must meet all the requirements of the standing analysis. If project proponents commit to conservation measures as part of their project description, regardless of whether they are needed to conclude NLAA, such conservation measures are required as part of the action.

The inability to adopt certain conservation measures may result in a project not qualifying to use this standing analysis. Such projects would not necessarily result in significant adverse effects to federally listed species or their habitats. However, to ensure compliance with the ESA, individual project consultation (or other programmatic consultation, if applicable) with the Service may be necessary for projects that cannot apply pertinent conservation measures or are otherwise not consistent with a NE or NLAA determination for any listed species that may occur in the project area.

To obtain an NLAA determination, the anticipated effects of a proposed action must be "insignificant", "discountable", or "wholly beneficial". These effects are defined as:

- "Insignificant" effects have impacts that are so small that "take" of a listed species (even to the level of disturbance of a species) would never occur.
- "Discountable" effects are those that are extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur.
- "Wholly beneficial" effects are those effects of an action that are wholly positive, without any adverse effects, on a listed species or designated critical habitat.

These discountable and insignificant thresholds are usually reached through avoidance and minimization measures implemented as part of the project. A completely beneficial effect might be, for example, that the nature of the project means that additional suitable habitat for listed species is created.

Additional conservation measures may be implemented as part of a federal action agency's program as part of section 7(a)(1). Please coordinate with the Alabama ESFO to determine if appropriate.

The Alabama Ecological Services Field Office (Alabama ESFO) notes that successful completion of this DKey requires a thorough review and familiarity with laws, regulations and associated programs relevant to the project prior to proceeding with this DKey. These may include but are not limited to the following:

- U.S. Clean Water Act
- Alabama Erosion and Sediment Control Act
    - Alabama's Erosion and Sediment Control Program develops the *The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas*, referred to as "The Blue Book" (2022), see Volume 1 for Planners and Designers and Volume 2 for Contractors and Inspectors.
- National Pollutant Discharge Elimination System (NPDES) administration by the Alabama Department of Environmental Management, including Construction General Permits
- Species-specific best management practices and survey protocols

5.2.1 General conservation measures to avoid and minimize effects to listed species and critical habitat

Habitat protection

- Maximize use of disturbed land for all project activities (i.e., siting, lay-down areas, and construction).
- Avoid impacts to suitable habitat for listed species or their critical habitats.
- Minimize project creep by clearly delineating and maintaining project boundaries (including staging areas).
- Restrict unauthorized access to natural areas adjacent to the project site by erecting a barrier and/or avoidance buffers (e.g., gate, fence, wall) to minimize foot traffic and off-road vehicle uses.
- Projects should avoid land disturbance activities that may result in discharge of sediment into streams. If such effects may occur as part of the activity conducted, implement and strictly adhere to erosion and sedimentation control best management practices in compliance with the Alabama Erosion and Sedimentation Control Act.
- Projects resulting in an increase in impervious surface should implement stormwater management Best Management Practices necessary to comply with water quality performance criteria in the Alabama Stormwater Management Manual[5] and implement measures to reduce stormwater runoff volume and velocity, promote infiltration, reduce input of surface contaminants.

[5] Alabama Stormwater Management Manual: https://alabamasoilandwater.gov/wp-content/uploads/2022/08/20220801_HandBook_Vol_1.pdf.

- Avoid directly or indirectly impacting lands identified as permanently protected in the State's Conservation Lands database[6] or lands located in priority corridors as identified in the State Wildlife Action Plan (SWAP)[7]. Development in or along the boundaries of these properties can cause habitat fragmentation that restricts animal movement and reduces population connectivity of at-risk or listed species and can interfere with conservation practices used to manage these species (e.g., prescribed fire).

To the greatest extent practicable, projects will avoid and minimize modification to aquatic/wetland habitats, such as activities that:

- adversely impact wetlands and streams;
- divert surface water and groundwater;
- change hydrology; and
- cross wetlands and streams and impact aquatic habitats.

If possible, projects should take advantage of already disturbed areas such as roads, roadway shoulders, bridges, well pads, old railroad beds, or existing infrastructure. To the greatest extent practicable, projects should avoid clearing mature trees and should create and maintain buffer zones around wetlands, riparian areas, springs, seeps, ponds, and streams.

Habitat assessments and presence surveys: An important early step in designing a project is to evaluate the action area for the existence of listed species and their habitats. The IPaC online tool will provide information on whether the project intersects the geographic area of listed species and if the project has the potential to impact the listed species expected to occur within the same geographic scope of the project. Site-specific surveys may be needed to determine whether the proposed action presents actual risks to species. If suitable habitat for listed species cannot be avoided, presence/absence surveys for suitable habitat and or listed species will inform and support accurate determinations. All survey plans and results must be submitted to the Alabama Ecological Services Field Office for review and approval prior to implementation. While this conservation recommendation is not required, surveys documenting absence of listed species support conclusions that the species are unlikely to occur in the action area, which may result in a NLAA determination for the given species. Some general guidelines for gathering existing survey data and initiating new surveys include:

- Surveys must be conducted by qualified biologists, possessing the appropriate state and federal permits, who can clearly demonstrate the ability to identify species in the wild and recognize their suitable habitat.
- Surveys must follow applicable guidelines, including a thorough search of suitable habitats within the action area, and occur during the appropriate seasonal window (e.g. during the breeding season, flowering period). Surveys outside appropriate survey times may not be accepted as valid without prior approval from the appropriate Service biologist.
- Targeted botanical surveys must comply with seasonal timelines determined by the Service.
- Survey plans must be submitted to the Alabama Ecological Services Field Office for review and approval.

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[6] Alabama Department of Conservation and Natural Resources spatial data sources include: https://lands.dcnr.alabama.gov/, https://alabama-department-of-conservation-natural-resources-algeohub.hub.arcgis.com/, https://conservationgis.alabama.gov/dcnr/ and https://conservationgis.alabama.gov/fwlt/.

[7] Alabama's draft 2025-2035 Wildlife Action Plan can be found at https://www.outdooralabama.com/2025-swap-update/alabama-state-wildlife-action-plan-2025-2035-draft.

- Survey plans must demonstrate appropriate methods and effort for the species being surveyed.
- Those surveying for listed animals must have a section 10(a)(1)(A) permit from the Service or be conducting surveys with a permitted individual or agency if there is a chance that animals will be captured and handled.
- Those surveying for listed animals must have appropriate State issued scientific collecting permits.
- Survey results must be provided to the Alabama Ecological Services Field Office for review and approval via direct submission at alabama@fws.gov or through the determination key prompts.

5.2.2 Conservation Measures for Individual Species and Species Groups

The following sections identify conservation measures specific to individual species and species groups that must be met in order to receive a determination of NLAA or NE through the DKey in IPaC. The species-specific conservation measures were generated in development of the Alabama Statewide DKey, to help users of the DKey decide which conservation measures to implement in order to avoid or minimize potential impacts to listed species and critical habitat. Where conservation measures have been developed for individual species or species groups, these are included in the approval conditions in the exit letter generated by IPaC. It should be noted that conservation measures have not been developed for all species and species groups included in this SA.

5.3 MAMMALS

5.3.1 West Indian manatee (*Trichechus manatus*)

Avoiding direct or indirect impacts to West Indian manatees, including disturbance, changes to water quality or impacts to food sources, will ensure that adverse effects are insignificant and/or discountable. This is expected for projects that do not intersect the species list area of the West Indian manatee or do not occur within waters that potentially support manatees (e.g., slow-moving freshwater coastal rivers, streams, canals; estuaries; saltwater bays; other marine environments).

Projects that intersect the species list area of the West Indian manatee and occur within waters that potentially support manatees would not be eligible for an NE or NLAA determination if proposed activities were to include underwater explosives (i.e. blasting).

Projects that intersect the species list area of the West Indian manatee and occur within waters that potentially support manatees, including operation of vessels or heavy equipment (e.g. dredging, construction barge, excavator, etc.) in areas with water depths less than 4 feet at mean high tide are not expected to affect the West Indian manatee.

For projects that intersect the species list area of the West Indian manatee and occur within waters that potentially support manatees, including operation of vessels or heavy equipment (e.g. dredging, construction barge, excavator, etc.) in water depths greater than 4 feet at mean high tide, conservation measures would be advised in order for a potential determination of NLAA for the project.

West Indian manatee conservation measures

Pertinent conservation measures may include, and are not limited to, the following:

- Avoid project activities between June 1 and December 31.
- Incorporate the following conditions into the action:

Standard manatee conditions for in-water activities

During in-water work in areas that potentially support manatees all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable.

All on-site personnel are responsible for observing water-related activities for the presence of manatee(s).

The following conservation measures are expected to minimize potential impacts to manatees where they potentially occur:

- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot (15 m) radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).
- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at "no wake/idle" speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.
- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8½ " X 11" reading language similar to the following: "CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSTRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT". A second temporary sign measuring 8½ " X 11" should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: "CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION".
- Collisions with, injury to, or sightings of manatees should be immediately reported to the Service's Alabama Ecological Services Office. Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

Complementary and additional conservation measures for projects that intersect the manatee's species list area:

- Crushing (in flood-control structures, in canal locks, or between large ships and wharfs) is a cause of mortality for manatees. Care must be taken that the presence of manatees is monitored, and they are not present in the activity area, when such structures or large vessels are components of a project.
- Collisions with boats are a major source of mortality for manatees. The project applicant shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s).
- Breakwaters, pilings, and similar structures must be designed with an exit path to avoid potential wedging and entrapment, including at low tide. Structures that are enclosed at one end must have at least a 5-foot-wide opening to allow manatees enough room to freely navigate and exit the area. Oyster reefs and similar structures should allow 5-foot openings every 75 feet to allow manatees to escape
- Lines in the water can entangle and injure or kill manatees. The project applicant must ensure that all in-water lines (rope, chain, and cable, including the lines to secure turbidity curtains) must be stiff, taut, and non-looping. Examples of appropriate lines include heavy metal chains or heavy cables that do not readily loop and tangle. Flexible in-water lines, such as nylon rope or any lines that could loop or tangle, must be enclosed in a plastic or rubber sleeve/tube to add rigidity and prevent the line from looping and tangling. In all instances, no excess line should be allowed in the water. Where appropriate, in-water wires and cables should be fitted with PVC sleeves from the surface to the bottom to prevent any passing manatees from scraping, and being injured by, cables when they swim past.
- Adherence to the *Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas* (2022).

West Indian manatee NE determinations

For projects[8] with action areas that overlap with the West Indian manatee species list area, the following project activity scenarios will result in a NE determination.

Activity Description	**Rationale for NE Determination**
Project activities will not occur within waters that potentially support manatees (e.g., slow-moving freshwater coastal rivers, streams, canals; estuaries; saltwater bays; Gulf of America; any tidal waters accessible to manatees).	Project activities will not directly or indirectly impact suitable habitat. Therefore, we can be reasonably certain that the action will have no effect on the species.
Project may occur within waters that potentially support manatees but do not involve operation of vessels or heavy equipment (e.g. dredging, construction barge, excavator, etc.) in water depths greater than 4 feet at mean high tide.	Action and activities will not directly or indirectly impact suitable habitat. Therefore, we can be reasonably certain that the action will have no effect on the species.

Table 4. Description of project activities covered by this DKey that would be consistent with "NE" determination for West Indian manatee.

West Indian manatee NLAA determinations

For projects[9] with action areas that overlap with the West Indian manatee species list area, the following project activity scenarios will result in a NLAA determination.

Activity Description	**Potential Stressor-Exposure-Response Pathway**	**Rationale for NLAA Determination**
Project: • **occurs within** waters that potentially support manatees AND • **involves operation** of vessels or heavy equipment (e.g. dredging, construction barge, excavator, etc.) in	Stressors: Slow moving mechanical equipment, construction materials, turbidity, water quality impacts, habitat alteration, noise, reduced food availability, increased boat traffic, increased human activity, and strikes with slow moving motorized vessels.	Project activities will occur outside (June 1 and December 31) of the active period for manatees in Alabama, thus avoiding or minimizing stressors to the species such that any effects should be

[8] Projects include: marina or dock activities within tidal waters; construction, modification, or maintenance of a water access facility other than a dock or marina facility (e.g. public boat ramp, fishing pier, etc.); and in-water construction or other project activities (e.g., bulkhead construction or repair, rip-rap, bridge, dredging, mooring buoys).
[9] Projects include: marina or dock activities within tidal waters; construction, modification, or maintenance of a water access facility other than a dock or marina facility (e.g. public boat ramp, fishing pier, etc.); and in-water construction or other project activities (e.g., bulkhead construction or repair, rip-rap, bridge, dredging, mooring buoys).

Activity Description	Potential Stressor-Exposure-Response Pathway	Rationale for NLAA Determination
water depths greater than 4 feet at mean high tide, AND • **does NOT include** underwater explosives (i.e., blasting), AND • **will NOT occur** between June 1 and December 31.	Exposure Path: Likelihood of exposure reduced to discountable levels while project work is being completed, as work **will not occur** between June 1 and December 31 as manatee are unlikely to occur in Alabama between January 1 and May 31. Potential for increased exposure to human activities post-project. Responses: For projects that fit this scenario, likelihood of exposure is greatly diminished while project work is being completed, due to the season of work. If a manatee enters a project area and exposure to project activities occurs, there is the potential for manatee to alter behavior to avoid or inspect activities, or it may sustain injury.	reduced to discountable or insignificant levels.
Project: • **occurs within** waters that potentially support manatees AND • **involves operation** of vessels or heavy equipment (e.g. dredging, construction barge, excavator, etc.) in water depths greater than 4 feet at mean high tide, AND • **does NOT include** underwater explosives (i.e., blasting) and project activities, AND • **will occur** between June 1 and December 31, AND • Standard Manatee Conditions for In-Water Activities **will be included** as permit conditions for the project.	Stressors: Slow moving mechanical equipment, construction materials, turbidity, water quality degradation, habitat alteration, noise, reduced food availability, increased boat traffic, increased human activity, and strikes with slow moving motorized vessels. Exposure Path: Operation of large equipment within habitats that can support manatee during a time when the species is expected to be in Alabama waters increases the potential for the activity to interact with the species. Incorporation of the Standard Manatee Conditions reduces the likelihood of interactions with manatees. Responses: Expected responses would include direct injury, stress and avoidance behavior, and reduction of food sources.	The proposed action incorporates conservation measures (Standard Manatee Conditions for In-Water Activities) that avoid or minimize stressors to the species, such that any effects should be reduced to discountable or insignificant levels.
Projects include marina or dock activities within tidal waters	Stressors: Slow moving mechanical equipment, construction materials, turbidity, water quality impacts, habitat alteration, noise, reduced food availability, increased boat traffic, increased human activity, and strikes with slow moving motorized vessels. Exposure Path: Incorporation of the Standard Manatee Conditions reduces the likelihood of interactions with manatees. Potential for increased exposure to human activities post-project.	The proposed action incorporates conservation measures (Standard Manatee Conditions for In-Water Activities) that avoid or minimize stressors to the species, such that any effects should be reduced to discountable and insignificant levels.

Activity Description	Potential Stressor-Exposure-Response Pathway	Rationale for NLAA Determination
	Responses: If a manatee enters a project area and exposure to project activities occurs, there is the potential for manatee to alter behavior to avoid or inspect activities, or it may sustain injury.	
Construction, modification, or maintenance of a water access facility other than a dock or marina facility (e.g. public boat ramp, fishing pier, etc.)	Stressors: Slow moving mechanical equipment, construction materials, turbidity, water quality impacts, habitat alteration, noise, reduced food availability, increased boat traffic, increased human activity, and strikes with slow moving motorized vessels. Exposure Path: Incorporation of the Standard Manatee Conditions reduces the likelihood of interactions with manatees. Potential for increased exposure to human activities post-project. Responses: If exposure occurs and a manatee enters project area there is a small likelihood manatee will alter behavior to avoid or inspect activities, or it may sustain injury.	The proposed action incorporates conservation measures (Standard Manatee Conditions for In-Water Activities) that avoid or minimize stressors to the species, such that any effects should be reduced to discountable and insignificant levels.
In-water construction or other project activities (e.g., bulkhead construction or repair, rip-rap, bridge, dredging, mooring buoys)	Stressors: Slow moving mechanical equipment, construction materials, turbidity, water quality impacts, habitat alteration, noise, reduced food availability, increased boat traffic, increased human activity, and strikes with slow moving motorized vessels. Exposure Path: Incorporation of the Standard Manatee Conditions reduces the likelihood of interactions with manatees. Potential for increased exposure to human activities post-project. Responses: If exposure occurs and a manatee enters project area there is a small likelihood manatee will alter behavior to avoid or inspect activities, or it may sustain injury.	The proposed action incorporates conservation measures (Standard Manatee Conditions for In-Water Activities) that avoid or minimize stressors to the species, such that any effects should be reduced to discountable and insignificant levels.

Table 5. Description of project activities covered by this DKey that would be consistent with May Affect, Not Likely to Adversely Affect determination for West Indian manatee.

5.3.2 Alabama beach mouse (*Peromyscus polionotus ammobates*)

Alabama beach mouse conservation measures

Avoiding direct or indirect impacts to Alabama beach mouse will ensure that adverse effects are insignificant and/or discountable. This would be the case for projects that do not intersect the species list area of the Alabama beach mouse or occur within its critical habitat.

If the project area intersects the species list area of the Alabama beach mouse, the following conservation measure is pertinent:

- Conduct an Alabama beach mouse habitat assessment in the action area.

For a potential NLAA determination for projects that intersect the species list area of the Alabama beach mouse, activities must:

- Not occur within Alabama beach mouse critical habitat,
- Not occur within Alabama beach mouse suitable habitat, and
- Be limited to pier construction or maintenance of an existing structure. Site plans uploaded by the user into the Dkey will provide supporting documentation.

Suitable habitat is generally described as beach dunes and inland scrub dunes where herbs grow in loose, well-drained sand with sparse cover, or sloping sides of beach dunes where the species may easily burrow in clean, loose sand.

Users will be prompted to upload the habitat assessment report, including descriptions and photographs that thoroughly document habitat at the site, to the DKey.

Alabama beach mouse NE determination

For projects with action areas that overlap with the Alabama beach mouse species list area, the following activity scenarios will result in a NE determination.

Activity Description	**Rationale for NE Determination**
• Activities **occur within** the Alabama beach mouse species list area, and • a survey **determined** that the affected environment does not provide necessary components to support the species.	The affected environment does provide the components used by the Alabama beach mouse; therefore, the species will not be encountered in the area nor will effects on the environment translate to effects on the species.

Table 6. Description of project activities covered by this DKey that would be consistent with "NE" determination for West Indian manatee.

Alabama beach mouse NLAA determination

For projects with action areas that overlap with the Alabama beach mouse species list area, the following activity scenarios will result in a NLAA determination.

Activity Description	Potential Stressor-Exposure-Response Pathway	Rationale for NLAA Determination
• Activities **occur within** the Alabama beach mouse species list area, AND • a survey **determined** that the affected environment does provide necessary components to support the species, AND • activities and effects to the environment **will be limited to installation** of piers for pier supported structures.	Stressors: Ground disturbance can directly affect mice in burrows; cause burrow collapse; remove food sources; creation of structures can provide shelter for predators and non-native competitors. Exposure Path: Activities occur within areas that support the Alabama beach mouse and have the potential to directly interact with the species and resources that provide it food and shelter. Responses: Individuals may be crushed; evacuate and avoid previously occupied areas	Pier construction is expected to allow for natural sand deposition and sand dune structure. The small footprint of individual piers are unlikely to directly contact with individuals of the Alabama beach mouse or their burrows. The species' food sources are expected to persist adjacent to the structure. Movement and dispersal is not expected to be reduced as a result of the pier supported structure.
• Activities **occur within** the Alabama beach mouse species list area, AND • a survey **determined** that the affected environment does provide necessary components to support the species, AND • all activities **will be constrained** to the maintenance of existing structures.	Stressors: Increased activity can cause individuals to flee an area Exposure Path: Activities occur within areas that support the Alabama beach mouse and have the potential to directly interact with the species and resources that provide it food and shelter. Responses: Individuals may avoid a previously occupied area.	Effects on the Alabama beach mouse resulting from the maintenance of existing structures is expected to be discountable or insignificant.

Table 7. Description of project activities covered by this DKey that would be consistent with May Affect, Not Likely to Adversely Affect determination for Alabama beach mouse.

5.3.3 Gray bat (*Myotis grisescens*)

Gray bat conservation measures

A No Effect determination is appropriate for the gray bat only when all characteristics related to potential roosting or staging habitat are absent within or near the project area. Gray bats rely on specific karst features such as caves, sinkholes, disappearing streams, springs, exposed bedrock, bluffs, cliffs, rock outcrops, and overhanging rock formations. If none of these features occur within or adjacent to the project area, then suitable roosting habitat is not present. Additionally, the project must not involve removal of trees within 150 feet of caves or mines, as such trees may provide cover or staging habitat. The project also must not include the repair or replacement of bridges or culverts that could serve as gray bat roosting sites. When all of these conditions are met, meaning no karst features are present, no tree removal occurs near caves or mines, and no structures that may function as roosts are modified, there is no exposure pathway and the proposed action results in a No Effect determination for the gray bat.

5.4 BIRDS

5.4.1 Eastern black rail (*Laterallus jamaicensis* ssp. *jamaicensis*)

Eastern black rail conservation measures

Avoiding direct or indirect impacts to eastern black rail suitable habitat[10], including changes to hydrologic regimes or impacts to food sources, and avoiding human or animal disturbance will ensure that adverse effects are avoided. Projects that intersect the species list area and contain marsh habitat are expected to affect the eastern black rail, and therefore a MA will result.

Eastern black rail NE determinations

For projects with action areas that overlap with the Eastern black rail species list area, the following activity scenarios will result in a NE determination.

Activity Description	**Rationale for NE Determination**
• Action Area **does not include** suitable habitat for the eastern black rail.	Suitable habitat for the species is not present in the action area; therefore, the species is not expected to occur within the Action Area.

Table 8. Description of project activities covered by this DKey that would be consistent with "NE" determinations for the Eastern black rail.

Avoidance of Eastern black rail habitat will provide for:

1. Precluding changes to Eastern black rail habitat quality, quantity, or availability (e.g., land management activities including mowing, haying, grazing, prescribed fire, and fire suppression; development; conversion of habitat to agriculture or other land type; herbicide application; changes in hydrology; etc.),
2. Precluding direct or indirect affects to the Eastern black rail (e.g., changes in hydrology; application of pesticides, including insecticide, fungicide, etc.; increased potential for oil and chemical spills; etc.), or
3. Avoiding increased predation or human disturbance (e.g., posts or other avian predator perches, structures or habitat features likely to encourage predator nesting/denning, trash cans or other predator attractants, feral cat colonies, commercial/residential development, beach access structures, boardwalks, pavilions, bridges/roads/ferries/trails, marinas, etc.).

As noted above, projects that intersect the species list area and contain marsh habitat (e.g., wetland dominated by herbaceous plants such as grasses, rushes, or sedges) are expected to affect the eastern black rail, and therefore a MA will result. In these scenarios consultation with the Alabama ESFO will be required.

[10] Eastern black rails nest in marshes, wet meadows, along creeks and rivers, and coastal prairies, as well as around farm ponds, hayfields with standing water, and impounded wetlands. All Eastern black rails habitats have stable shallow water, usually just 1.2 inches deep at most.

5.4.2 Red-cockaded woodpecker (*Picoides borealis*)

Red-cockaded woodpecker conservation measures

Projects that do not intersect the species list area are not expected to interact with the species and therefore, are not likely have an effect on the red-cockaded woodpecker. Activities that do occur within the species list area but do not, intersect suitable foraging habitat for the red-cockaded woodpecker are similarly unlikely to interact with the red-cockaded woodpecker.

Suitable foraging habitat is pine or pine/hardwood stands in which 50% or more of the dominant trees are pines and the dominant pine trees are 30 years of age or older or >9-inches diameter breast height (dbh), and the midstory height does not exceed 12 feet (Service 2003).

Suitable red-cockaded woodpecker nesting habitat is pine or pine/hardwood stands that contain pines 60 years in age or older or >10-inches dbh (Service 2003).

If the project area intersects suitable foraging habitat but suitable nesting habitat is not present within 0.5 miles of the suitable foraging habitat that would be impacted by the project, as supported by a thorough survey, any effects to the species are expected to be discountable or insignificant.

For projects that intersect the species list area and intersect suitable foraging habitat and suitable nesting habitat is present within 0.5 miles of the affected foraging habitat, to ensure that effects remain discountable or insignificant, the project must:

- Provide for a survey[11], according to the Service's protocol for the presence of red-cockaded woodpecker cavity trees, of all suitable red-cockaded woodpecker nesting habitat within 0.5 miles of the project.
- Not involve removal or damage to red-cockaded woodpecker cavity tree(s) (e.g., via root compaction, soil compaction, removal of branches, trunk wounds, injury to bark, etc.).
- Not involve a disturbance (e.g., seismic activity, all-terrain vehicle or other off-road vehicle use, motorized equipment, forest management) within 200 feet of any cavity tree(s).
- Conduct a foraging habitat analysis to determine whether sufficient foraging habitat remains for each red-cockaded woodpecker group under post-project conditions.
- Not result in inadequate amounts of foraging habitat post project (as per the foraging habitat analysis).

If those conditions are not met, effects on the red-cockaded woodpecker would be expected at detectable and measurable levels.

Complementary and additional conservation measures for projects that intersect the red-cockaded woodpecker's species list area:

- Avoid removal of suitable red-cockaded woodpecker foraging habitat.
- Avoid impacts to areas with suitable red-cockaded woodpecker nesting habitat.

[11] Red-cockaded woodpecker cavity tree surveys are conducted by running line transects through stands and visually inspecting all medium-sized and large pines for evidence of cavity excavation by red-cockaded woodpeckers. Transects must be spaced so that all trees are inspected and are run north-south. The cavity tree survey report must include descriptions and photographs that thoroughly document habitat at the site.

- Avoid disturbance within a cluster boundary during the nesting season. A cluster boundary is an aggregate of cavity trees and may include one to 20, or more, cavity trees on 3 to 60 acres. The average cluster is about 10 acres.
- Outside of the breeding season, avoid disturbance within a cluster boundary prior to one hour after sunrise and/or after one hour before sunset (i.e., seismic activity, all-terrain vehicle and other off-road vehicle use, motorized equipment).

Red-cockaded woodpecker NE determinations

For projects with action areas that overlap with the Red-cockaded woodpecker species list area, the following activity scenarios will result in a NE determination.

Activity Description	**Rationale for NE Determination**
Project does not occur within suitable red-cockaded woodpecker foraging habitat. Note: Suitable foraging habitat consists of a pine or pine/hardwood stand of forest, woodland, or savannah in which 50 percent or more of the dominant trees are pines and the dominant pine trees are generally 30 years of age or older (2003 RCW Recovery Plan Appendix 4. Survey Protocol). Trees 60 years of age or older are suitable nesting habitat.	Suitable habitat for the species will not be affected by project activities.
Project will occur within suitable red-cockaded woodpecker foraging habitat. However, no suitable nesting habitat for red-cockaded woodpecker (pine or pine/hardwood stands that contain pines 60 years of age or older) is found within 0.5 mile of the action area.	Suitable habitat is present in the action area but is not likely to be used by the species.

Table 9. Description of project activities covered by this DKey that would be consistent with a "NE" determination for red-cockaded woodpecker.

Red-cockaded woodpecker NLAA determinations

For projects with action areas that overlap with the Red-cockaded woodpecker species list area, the following activity scenarios will result in a NLAA determination.

Activity Description	Potential Stressor-Exposure-Response Pathway	Rationale for NLAA Determination
Project activities will occur within suitable foraging habitat and the foraging habitat is within 0.5 mile of suitable nesting habitat: All suitable RCW nesting habitats within 0.5 mile of the Action Area were surveyed for the presence of RCW cavity trees following the 2003 RCW Recovery Plan Appendix 4 Survey Protocol; and red-cockaded woodpecker cavity trees were not observed.	Stressors: Habitat loss and fragmentation, reduced prey availability, increased human activity, noise Exposure Path: Since there is suitable nesting habitat within 0.5 mile of the Action Area, RCWs in nearby nesting locations would depend on the adjacent foraging habitat. Response: RCWs must have sufficient foraging resources to persist. Loss of foraging habitat leads to smaller group sizes especially in already fragmented, isolated, or small populations. This may reduce the long-term viability of the population.	Activities will remove or disturb suitable foraging habitat for the red-cockaded woodpecker. Surveys suggest a low likelihood that the affected area is being used by the red-cockaded woodpecker. Therefore, we expect that the project activities will have an insignificant or discountable effect on the species.
Project activities will occur within suitable foraging and nesting habitat. All suitable RCW nesting habitats within 0.5 mile of the Action Area were surveyed following the 2003 RCW Recovery Plan Appendix 4 Survey Protocol; and red-cockaded woodpecker cavity trees were observed. The project will not involve: Removal or damage to (i.e., via root compaction, soil compaction, etc.) red-cockaded woodpecker cavity tree(s). Disturbance within a cluster boundary during the nesting season or prior to one hour after sunrise and/or after one hour before sunset outside the breeding season (i.e., seismic activity, all-terrain vehicle and other off-road vehicle use, motorized equipment, etc.); A foraging habitat analysis confirms that an adequate amount of foraging habitat will	Stressors: Habitat loss and fragmentation, reduced prey availability, increased human activity, noise Exposure Path: Since there is suitable and occupied nesting habitat within 0.5 mile of the Action Area, RCWs are likely to travel from surrounding habitat to forage in the area that will experience impacts. Responses: RCW will abandon clusters if sufficient suitable cavities are not available. Cluster abandonment can lead directly to population extirpation (Costa and Escano 1989), because populations of RCW are regulated by the number of potential breeding groups rather than by annual variation in reproduction and survival (Walters 1991), and because natural formation of new clusters is very slow at least under conditions of relatively young forests and small populations. RCWs must have sufficient foraging resources to persist. Loss of foraging habitat leads to smaller group sizes especially in already fragmented, isolated, or small populations. Access to prey resources is essential to supporting reproduction and survival. RCWs would need to travel further and likely across	Activities will remove or disturb suitable foraging and nesting habitat for the red-cockaded woodpecker. However, the project will not involve removal or damage to cavity trees, disturbance that could impact nesting success, and will ensure that the population is left with enough foraging habitat to persist. Therefore, we expect that the project activities will likely have an insignificant or discountable effect on the species.

Activity Description	Potential Stressor-Exposure-Response Pathway	Rationale for NLAA Determination
remain for each RCW group under post-project conditions.	large open areas to access enough food, which increases energetic cost and vulnerability to predators.	

Table 10. Description of project activities covered by this DKey that would be consistent with May Affect, Not Likely to Adversely Affect determination for red-cockaded woodpecker.

the 2003 RCW Recovery Plan Appendix 4 Survey Protocol;

5.5 SHOREBIRD GROUP

Shorebird Group conservation measures

The Shorebirds group includes the piping plover (*Charadrius melodus*) and rufa red knot (*Calidris canutus rufa*). This section analyzes the likely effects of projects expected to occur within the range of these shorebirds. It also specifies conservation measures for projects that intersect the species list area of the piping plover or the rufa red knot and that contain suitable piping plover or rufa red knot habitat, or projects that intersect piping plover critical habitat or rufa red knot proposed critical habitat. For effects to listed shorebirds to remain discountable or insignificant, projects that intersect the species list area for piping plover or rufa red knot or intersect designated critical for piping plover or proposed critical habitat for rufa red knot must not:

1. Affect piping plover or rufa red knot foraging, loafing, or roosting habitat[13] during the birds' wintering period (July 1-May 18);
2. Increase human disturbance (including lighting and noise), dog or cat activity, or presence of potential predators[12] such as raptors or raccoons (*Procyon lotor*), above baseline conditions within suitable piping plover or red knot habitat or piping plover CH.
3. Result in any permanent (lasting more than six months) changes to the quality, quantity, or availability[13] of piping plover or red knot foraging, loafing, or roosting habitat[14],
4. Permanently modify beaches, dunes, mudflats, peat banks, sandbars, shoals, or other red knot habitats[15],
5. Result in any changes to the quality, quantity, or availability of piping plover or rufa red knot CH at any time of year.

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[12]For example, the action is likely to indirectly increase access or use of piping plovers or red knot habitats by humans and/or predators at times of year that the birds are typically present (e.g., commercial/ residential development, beach access structures, boardwalks, pavilions, bridges/roads/ferries/trails, marinas, posts or other avian predator perches, structures or habitat features likely to encourage predator nesting/denning, trash cans or other predator attractants, feral cat colonies, policy changes likely to increase human use).

[13]For example, beach grooming, boardwalk actions, breakwaters, development, dredge deposition, etc.

[14]Along Alabama's Gulf Coast, red knots and piping plovers rely on a mosaic of open, sparsely vegetated, sandy coastal habitats to meet their wintering needs. Both species forage along intertidal sand and mudflats, where they probe for invertebrates like mollusks and marine worms exposed during low tide. When not feeding, the birds shift to loafing areas—open beaches, sandbars, and washover flats—where they rest, preen, and socialize during the day. These sites are typically close to foraging zones and offer visibility to detect predators. For roosting, especially during high tides or at night, both species seek quiet, elevated beach zones above the high tide line. These include sparsely vegetated dunes, shell rakes, and undisturbed upper beaches, which provide safety from flooding and disturbance. Together, these habitats form a critical network that supports the survival of these shorebirds throughout the winter months in coastal Alabama.

[15]For example, the following actions may modify red knot habitat: groins, jetties, sea walls, revetments, bulkheads, riprap, beach nourishment, nearshore dredging, dredge spoil disposal, sand mining/borrowing, beach bulldozing, sandbagging, sand fencing, vegetation planting/alteration/removal, deliberate or possible introduction of non-native vegetation, beach raking/mechanized grooming, boardwalks, aquaculture development. Some of those (e.g., beach renourishment, beach restoration, or inlet sand transfer) are potentially considered as temporary.

If the action area does not intersect the red knot or piping plover species list area or critical habitat, project activities are expected to have no effect on the species and/or critical habitat, respectively. If project activities resulting in effects to suitable habitat are temporary, and the proposed action only involves piling installation, and/or the action will not result in potential human disturbance above baseline conditions, project activities are expected to have no effect on the species.

If the project does not occur in suitable habitat, or if the project is located within the general location of critical habitat but doesn't contain the physical and biological features essential to the conservation of piping plover or rufa red knot, these shorebirds are not likely to be present in the action area. As such, the effects are unlikely. Further, actions that occur outside of the time-period when the species are expected to be in the State are unlikely to have immediate and direct effects on the piping plover and rufa red knot. If these actions do not result in permanent conversion of habitat to unsuitable conditions, adverse effects to the species may be discountable or insignificant.

Projects that increase disturbance by humans, dogs or cats, or potential for predation need further evaluation and will result in an MA. Actions conducted during the wintering period, that may cause habitat loss, disturbance and increased predation could result in adverse effects and warrant additional evaluation separate from the DKey.

If the project's action area intersects suitable foraging, loafing, or roosting habitat, pertinent conservation measures may include, and are not limited to, the following:

- Limit project activity to periods outside of the piping plover (July 1st to May 15th) and red knot (October 10th to May 18th) wintering seasons (cumulatively, July 1st to May 18th).
- Avoid permanent impacts (i.e., effects lasting 6 months or more) to suitable piping plover or red knot habitat.
- Avoid permanent impacts (i.e., effects lasting 6 months or more) to suitable piping plover critical habitat or red knot proposed critical habitat.

If project activity is limited only to piling installation that will not result in potential human disturbance (including noise and lights) above baseline conditions or if project activities occur outside of the cumulative piping plover and red knot wintering season (July 1st to May 18th), effects to the species are likely to be discountable or insignificant.

Complementary and additional conservation measures for projects that intersect the piping plover's or red knot's species list area:

- Facilitate surveys of the project area (i.e., operational site, access points, travel corridors, staging areas, etc.) by a qualified biologist, to assess presence of piping plover or red knot, or optimal habitat features (e.g., inlets, bayside sand and mud flats, tidal pools, and tidal wrack lines).
- Avoid impacts to dune systems (both vegetated and non-vegetated), such as crushing, excavating, or trampling dune vegetation; impacts to bayside sand and mud flats; and blockage of major egress points to channels, rivers, passes, and bays to avoid disturbance to natural coastal processes.
- Adhere to the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas (2022), as appropriate.
- Staging and waste collection areas should be located to avoid beaches, dunes, inlets, mudflats and ephemeral pools.
- Trash and work-related debris should be removed daily to maintain a clean worksite.

- Do not disturb foraging or roosting piping plovers or red knots. A wildlife monitor (qualified biologist trained in shorebird identification) will ensure piping plovers and red knots are not affected by activities.
- Facilitate a shorebird monitor that can highlight for project personnel areas being utilized by the birds, instruct them to avoid these areas, and ensure their compliance.
- When piping plover or red knot are identified, vehicle and foot traffic should not occur within 80 feet (25 meters) of the birds.
- Avoid vehicle and foot traffic within 40 feet (12.5 meters) of optimal habitat features (even when birds are not present). These recommended buffer areas should be maintained for the duration of the work activities, even if the birds depart or relocate.
- Maintain a no-work buffer zone of at least 500 feet (152.4 meters) from high tide shorebird roosting areas - including roosting areas for large flocks of shorebirds that might contain piping plover or red knot.
- Personnel, equipment and vehicles should ideally follow existing/established travel and access corridors.
- Access points, staging areas, waste collection areas, and travel corridors should be established away from known rufa red knot and piping plover foraging and roosting areas. All personnel, vehicles, and equipment should be kept within those designated corridors.
- Project activities should be designed and planned to avoid driving up and down the shoreline to minimize disturbance to birds and beach topographic alterations.
- Vehicles should maintain slow speeds to avoid disturbing any of the birds.
- Use low-pressure tires (10 psi), or tracked vehicles, to avoid and minimize beach topography alterations when driving off paved roads.
- The wrack (seaweed) line should not be disturbed during project work or while traveling to and from the project site.
- If vehicles must cross the wrack line, gently rake seaweed out of the way to establish a single travel corridor. This gap should be limited to the smallest width feasible to accommodate vehicles. Replace the seaweed to its original location once access is no longer needed.
- To the fullest extent practicable, restore beach topography and the wrack line to their natural pre-project conditions.
- If the project will place sand on the beach, only place sand that matches the existing grain size, color, composition, and minerology. After project completion, restore beach topography to their natural pre-project conditions. Smooth out impressions or ruts.
- All work should be conducted during daylight hours.
- Avoid installing permanent lighting. If permanent lighting is unavoidable, all such lighting will be permanently down-shielded.
- If construction lighting at night is unavoidable, it should be minimized, directed toward the construction activity area, and shielded from view outside of the project area to the maximum extent practicable.
- The project should not include flying aircraft or drones below 500-feet elevation, hovering, or landing near bird concentration areas.
- Avoid hovering, or landing, unmanned aircraft near dunes, roosting or foraging areas, and areas of high shorebird concentrations.

5.6 ALABAMA RED-BELLIED TURTLE

Alabama red-bellied turtle conservation measures

Projects that do not take place within 600 feet of a waterbody or projects that consist solely of pile supported structures located in areas that do not contain foraging, basking, or nesting habitat for the Alabama red-bellied turtle are not expected to impact the Alabama red-bellied turtle.

Projects that intersect the species list area for the red-bellied turtle must not remove or degrade aquatic plants used for forage, remove basking habitat, alter salinity or otherwise degrade habitat quality or quantity, or introduce significant barriers that would exclude females from accessing nesting sites.

Avoiding direct or indirect impacts to wetlands and waterbodies, including affecting hydrology, and limiting construction outside of the nesting period of May 1-October 31 will better ensure adverse effects are insignificant and/or discountable.

If the project falls within 600 feet of any waterbody or wetland (stream, lake, pond, wet weather conveyance, wetland, spring, beaver pond, marsh, bay, bayou, etc.) and includes Alabama red-bellied turtle nesting habitat and work cannot be initiated and completed during the non-nesting time period (November 1 – April 30), pertinent conservation measures may include, and are not limited to, the following:

- Conduct a survey during the nesting season (May 1 to October 31), by a qualified biologist, of all suitable Alabama red-bellied turtle habitat in the action area
- Install temporary exclusions structures, such as silt fencing, prior to the nesting period to prevent the Alabama red-bellied turtle from accessing the project area and remove the temporary barriers after project completion.
- Develop an erosion control plan tailored to the site, to include BMP's that prevents erosion and excessive sedimentation into the waterway, negative effects to aquatic plants, and disturbance or removal of basking habitat such as large woody features, and where pertinent, provide for installation of exclusion fencing to prevent turtles from accessing the work:
- Adhere to the best management practices in the “The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas”.
    - All erosion controls should be inspected routinely, especially during and immediately following significant rain events, to ensure no impacts to nearby surface waters and aquatic habitat.
    - Immediate corrective action should be taken if erosion or sedimentation is observed.
    - Immediately revegetate any disturbed areas with a native species or an annual grass.
    - To the extent feasible, complete any work that results in exposed earth during periods when significant rainfall is not predicted.
- Prevent removal or shading of greater than 0.5 acres of submerged/emergent vegetation and/or Alabama red-bellied turtle basking habitat
- Prevent increasing the salinity of Alabama red-bellied turtle habitat
- Limit project activities to existing pile-supported piers/structures and or repair/replacement of existing boat ramps or bank stabilization structures
- Conduct work within the non-nesting season (November 1 to April 30)

If areas adjacent to the project contain potentially suitable nesting habitat (e.g., open, patchy forest of maritime live oak or longleaf pine receiving less than 50% sunlight on the forest floor):

- Avoid new permanent barriers for nesting Alabama red-bellied turtles (e.g., bulkheads, shoreline riprap, boat ramps), or permanent barrier installation resulting in greater than 100 feet of shoreline disturbance

Complementary and additional conservation measures for projects that intersect the Alabama red-bellied turtle species list area:

Additional or complimentary conservation measures are optional - to be used at the discretion of the project proponent - and if implemented may support recovery efforts.

- Avoid removing in-stream woody structure (basking material) and submerged and emergent vegetation to the maximum extent practicable.
- Refer to the document, Stream Obstruction Removal Guidelines, developed by the Stream Renovation Guidelines Committee, The Wildlife Society, and American Fisheries Society, and prepared in cooperation with the International Association of Fish and Wildlife Agencies (1983) (https://www.fws.gov/sites/default/files/documents/Stream%20Obstruction%20Removal%20Guidelines_0.pdf).
- Consider natural/nature-based features that do not prevent turtle migration to nesting sites (e.g., living shorelines) where appropriate.

5.7 Gopher Tortoise (Gopherus polyphemuss)-Western Distinct Population Segment

5.7.1 Gopher tortoise conservation measures

Avoiding direct or indirect impacts to gopher tortoises will ensure that adverse effects are insignificant and/or discountable. This would be the case for projects that do not intersect the following: a) the species list area; b) any marginal or suitable gopher tortoise soils, and c) suitable gopher tortoise habitat.

Suitable gopher tortoise habitat includes “open” longleaf pine-scrub oak communities that are thinned and burned every few years, pipeline and powerline or road rights-of-ways, fence rows, orchard edges, park and golf course roughs and edges, or fields and pasturelands lacking dense understories. For projects that intersect suitable habitat for the gopher tortoise, the project must:

- Not contain gopher tortoises or active burrows in the action area as supported by a survey for the presence of gopher tortoises and burrows throughout the action area.

The habitat assessment, gopher tortoise survey, and/or gopher tortoise burrow survey report will need to be uploaded to the DKey. The report(s) must include descriptions and photographs that thoroughly document habitat at the site.

If gopher tortoises or their burrows occur within the action area, a MA determination will follow.

For projects that intersect suitable habitat but, as per the survey, do not contain gopher tortoises and/or active burrows in the action area, the project must implement these conservation measures:

- Visually inspect equipment staging area regularly to ensure there is no gopher tortoise activity.

- Provide information to site personnel (such as signs) about the gopher tortoise.
- Require driving speeds to and from the worksite be reduced such that reaction times will allow for the avoidance of gopher tortoises that may be present in the roadway (consider speeds less than 25mph).
- Check for tortoises underneath equipment prior to moving vehicles.

Note that the Alabama Department of Conservation and Natural Resources administrative code, rule 220-2- .92, prohibits taking, capturing, killing, or possessing certain nongame wildlife species, including gopher tortoises, without a permit from the Commissioner of the Department.

Proper state permits must be obtained before scoping any gopher tortoise burrows. *11*

5.8 Sea turtles: Green sea turtle (Chelonia mydas), hawksbill sea turtle (Eretmochelys imbricata), Kemp's Ridley sea turtle (Lepidochelys kempii), leatherback sea turtle (Dermochelys coriacea), and loggerhead sea turtle (Caretta caretta)

Sea turtles – conservation measures

In Alabama, the North Atlantic population of green turtles and northwest Atlantic population of loggerhead turtles are listed as threatened. The hawksbill, Kemp's ridley and leatherback sea turtles are listed as endangered throughout their range. If the proposed project involves in-water activities, consultation with NOAA Fisheries may be required and coordination with that agency is recommended.

Projects that do not intersect the species list area for any of the five sea turtle species or critical habitat for the loggerhead sea turtle, and do not include open sandy beaches above the high-tide line on an Alabama mainland beach or barrier island (nesting beaches include Gulf-fronting beaches and beaches immediately adjacent to gulf-fronting areas) are unlikely to affect sea turtles.

If a project is to take place during the nesting season in an area where there is a turtle nesting beach, or one is adjacent, Section 7 consultation with the Alabama Ecological Services Field Office may be pertinent, as there will likely be impacts on turtles and their habitat and a MA determination will result. Projects that include beach nourishment activities or any activities that result in new, permanent (lasting six months or more) impacts to open sandy beaches above the high-tide line, including new lightning will also return a MA determination and require further coordination with the Alabama Ecological Services Field Office.

For projects that intersect critical habitat for the loggerhead sea turtle, a MA determination will result and coordination with the Alabama Ecological Services Field Office will be necessary.

For projects that intersect the species list area for any of the five sea turtle species, or include open sandy beaches above the high-tide line on an Alabama mainland beach or barrier island (nesting beaches include Gulf-fronting beaches and beaches immediately adjacent to gulf-fronting areas), the following conditions and conservation measures are pertinent. For a potential NLAA determination, the actions must:

- Occur between November 1 and April 30 (non-nesting and hatching season);
- Not result in new permanent impacts (i.e., effects lasting 6 months or more), including new lighting impacts, to open sandy beaches above high-tide line; and
- Not intersect critical habitat for the loggerhead sea turtle, and
- there must be no changes to the quality, quantity, or availability of suitable sea turtle nesting habitat during the nesting & hatching season (May 1 through October 31st).

Accordingly, projects must not cause increased human disturbance or predation or result in nighttime lighting (including lights in buildings, vehicle headlights and flashlights) during the May 1 through October 31 sea turtle nesting season. Lights can disturb and disorient nesting females and disorient turtle hatchlings.

Complementary and additional conservation measures for projects that intersect any sea turtle species list area[16]:

[16] Additional sea turtle conservation measures can be found in turtle recovery plans (Service, NOAA Fisheries).

- Adhere to the best management practices in the "The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas".
- After completion of the project, sandy beaches should be completely restored to pre-project conditions, including removal of any tire ruts.
- For activities within the nesting season, a designated qualified biological monitor, acceptable to the Alabama Ecological Services Field Office, should be present each day to monitor construction activity and the presence of sea turtles. Permittee shall provide the name of the monitor and their qualifications prior to commencing work.
- For work within the nesting season, the permittee or their contractor should coordinate with Alabama Department of Natural Resources - Wildlife Resources Division's Sea Turtle Specialist and the Service before work commences, in order to be aware of and provide protection for sea turtle nests that may be present in the project area and potential hatchlings that may still be using beach habitat later in the nesting season. The permittee or contractor should be expected to avoid impacts to sea turtle nests and hatchlings using protective barriers such as hay bales or similar materials, through the end of nesting season (October 31st).
- The permittee will notify the Service's Alabama Ecological Services Field Office and Alabama Department of Natural Resources - Wildlife Resources Division's Sea Turtle Specialist if any sea turtle adult, hatchling, or egg is harmed or destroyed as a direct or indirect result of the project.
- The permittee should measure sand compaction in the work area immediately after project completion and consult with Alabama Ecological Services Field Office to determine if the sand needs to be tilled to improve sea turtle nesting habitat.
- For beach renourishment project activities, visual surveys for escarpments should be made immediately after completion and in late March-early April (prior to the nesting season) for three years post-construction. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for 100-feet should be leveled and the beach profile reconfigured to minimize scarp formation before May 1 annually.
- All personnel associated with the project should be notified, in writing, that there are civil and criminal penalties for harming, harassing, or killing sea turtles.
- All vessels associated with the project should always operate at "no wake/idle" speeds while in the construction area and follow routes of deep water whenever possible.
- All temporary construction materials should be removed upon completion of the work. No construction debris or trash should be discarded in the water.

5.9 Coastal Snakes

Coastal Snakes – conservation measures

The Coastal Snakes group consists of the Eastern indigo snake (*Drymarchon couperi*) and black pine snake (*Pituophis melanoleucus lodingi*). Avoiding direct or indirect impacts to Eastern indigo snake and black pinesnake will ensure that adverse effects are insignificant and/or discountable. This would be the case for projects that do not intersect the species list area or intersect suitable habitat for either species.

Eastern indigo habitat includes mesic pine flatwoods, scrubby flatwoods, longleaf pine sandhills, oak scrub, sand pine scrub, dry prairie, freshwater and saltwater marshes and swamps, and coastal dunes. Black pine snake primary habitat includes longleaf pine forest on well-drained sandy soils, with pine stumps, herbaceous ground cover, and an open mid-story; secondary habitat includes riparian areas, hardwood forests, and pine plantations within 300 feet of primary habitat. Both species are commonly associated with the gopher tortoise.

In Alabama, encounters with the eastern indigo snake are expected to occur in the vicinity of Conecuh National Forest. Projects that intersect this geographic area or the species list are for the black pine snake must provide an assessment of habitat for the relevant coastal snake species to demonstrate the likelihood of conditions in the proposed action area to support either the black pine snake or the Eastern indigo snake. In the absence of surveys, a "may affect" for the applicable species will be returned and further coordination with the field office will be necessary to gather sufficient information to make the most appropriate determination on the relevant snake species.

Habitat assessment reports need to be uploaded to the DKey. The reports shall include descriptions and photographs that thoroughly document habitat at the site.

For projects that intersect Eastern indigo snake and or black pine snake habitat, certain conditions or conservation measures need to be met in order for a NLAA determination to result. Specifically, the project must:

- Not remove, fill, or otherwise permanently alter primary or secondary black pine snake habitat;
- Not remove, fill, or otherwise permanently alter Eastern indigo snake habitat;
- Result in only temporary disturbances to black pine snake habitat[17];
- Result in only temporary disturbances to Eastern indigo snake habitat[18];
- Maintain low speeds while driving to and from the worksite to avoid snakes that may be present in roadways;
- Observe a no-kill snake policy on site;
- Adhere to the Service's 2024 Standard Protection Measures for Eastern indigo snake (https://www.fws.gov/story/eastern-indigo-snake-conservation) for those projects that intersect Eastern indigo snake habitat.

[17] Examples could maintenance, repair, or replacement of existing structures; or activities that allow for native plant communities to reestablish the impacted area.

[18] Examples could maintenance, repair, or replacement of existing structures; or activities that allow for native plant communities to reestablish the impacted area.

If the project overlaps with designated critical habitat for the black pine snake, a MA will be returned to allow for additional coordination with the field office.

Complementary and additional conservation measures for projects that intersect the Eastern indigo snake and or black pine snake species list area:

- Entirely avoid impacts to gopher tortoises and their burrows because Eastern indigo snakes use these burrows and their sandy aprons as wintering and breeding habitat, respectively. Maintain a minimum 15-foot buffer radius around gopher tortoise burrow entrances. However, a 50-foot buffer is preferred to ensure complete avoidance.
- Avoid activities that disturb the soil, such as heavy machinery use, especially in sandy, well-drained soils preferred by the snakes.
- Use snake-friendly erosion control measures (such as loose, natural fibers) and avoid plastic netting that can entangle snakes.
- Avoid removing pine stumps.
- Create wildlife underpasses for new roads bisecting longleaf forest habitats.
- Adhere to the best management practices in the "*The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas*".

5.10 DUSKY GOPHER FROG

Dusky gopher frog – conservation measures

Avoiding impacts to suitable dusky gopher frog (Rana sevosa) pond habitat (i.e., open-canopied, ephemeral, seasonally flooded pool or depression) will ensure that adverse effects are insignificant and/or discountable. A dusky gopher frog habitat assessment reports need to be conducted and uploaded to the DKey. The report shall include descriptions and photographs that thoroughly document habitat at the site. If the project activity area intersects dusky gopher frog habitat, a MA determination will result; if there is no habitat, a NE will result.

5.11 STURGEONS

Sturgeons – conservation measures

For projects in freshwater habitats and riverine critical habitat units of the Gulf sturgeon (*Acipenser oxyrinchus (=oxyrhynchus) desotoi*), the Service will be responsible for all consultations regarding Gulf sturgeon and critical habitat. In estuarine units, consultation responsibilities will be divided based on the action agency involved. The Service will consult with the Department of Transportation, EPA, the U.S. Coast Guard, and the Federal Emergency Management Agency, while NOAA Fisheries will consult with the DOD, USACE, MMS, and any other Federal agencies not mentioned here explicitly. In marine units, NOAA Fisheries will be responsible for all consultations regarding Gulf sturgeon and critical habitat. For any Federal projects that extend into the jurisdiction of both agencies, as defined above, the Service will be the lead consulting agency, and coordinate internally with NOAA Fisheries.

Avoiding impacts to Gulf sturgeon, Alabama sturgeon (*Scaphirhynchus suttkusi*) and their suitable or critical habitats will result in a NE determination. This would be the case for projects that will not intersect the species list area or critical habitat for either species, and will not occur within 200 feet of a large river or tidally influenced, brackish water system. If the project will intersect the species list area or critical habitat for either species, or will occur within 200 feet of a large river or tidally influenced, brackish water system, a NE determination also may result if the project:

- will only involve the repair or replacement of an existing residential structure (e.g. pier, bulkhead), without in-water operations of vessels or heavy equipment (e.g. construction barges, excavators, etc.) and

A may affect determination will result for projects that intersect the species list area or critical habitat for either species or will occur within 200 feet of a large river or tidally influenced, brackish water system, and:

- Will involve riverine (or similar habitat) flow obstructions (i.e., construction of dams, hydropower plants), new bridge construction, modification of existing diversion/training structures (e.g., low-head dams, weirs), mining activities, or include underwater explosives (i.e. blasting) or
- will not meet Sturgeon Project Design Criteria (Appendix D) and or will not implement best management practices (BMP's) in order to minimize turbidity and or sedimentation in adjacent waters and will not result in minor individual and cumulative impacts to the environment.

For the Gulf sturgeon, a may affect determination will also result for projects that intersect the species' critical habitat, and:

- Will not be completed entirely within non-migratory windows – in the summer when water temperatures are >23.0 C [73.4 F], approximately between June 1 to August 31, or when temperatures drop below 16 C [60.8 F], approximately between December 1 to February 29.

For projects that intersect the species list area or critical habitat or will occur within 200 feet of a large river or tidally influenced, brackish water system, a NLAA determination may result where adverse effects are insignificant and or discountable. This may be the case for projects that:

- Will involve some in-water construction and operations of vessels or heavy equipment (e.g. construction barges, excavators, etc.), but not involve major infrastructure activities, mining, or underwater explosives and
- will meet Sturgeon Project Design Criteria and implement best management practices (BMP's) in order to minimize turbidity and or sedimentation in adjacent waters.

5.12 FRESHWATER AQUATICS GROUP: FLATTENED MUSK TURTLE, BLACK WARRIOR (=SIPSEY FORK) WATERDOG, FRESHWATER STREAM FISHES, MUSSELS AND SNAILS

This section pertains to the following species (Table 1):

- Flattened musk turtle;
- Black warrior (=Sipsey Fork) waterdog;
- Freshwater stream fishes (blue shiner, Cahaba shiner, palezone shiner, boulder darter, rush darter, slackwater darter, trispot darter, vermilion darter, watercress darter, goldline darter, pygmy sculpin, and spring pygmy sunfish);
- Mussels (Alabama lampmussel, Alabama moccasinshell, Alabama pearlshell, Canoe Creek clubshell, Chipola slabshell, Choctaw bean, Coosa moccasinshell, cracking pearlymussel, Cumberlandian combshell, dark pigtoe, fanshell, finelined pocketbook, finerayed pigtoe, fluted kidneyshell, fuzzy pigtoe, Georgia pigtoe, Gulf moccasinshell, heavy pigtoe, inflated heelsplitter, longsolid, narrow pigtoe, orangenacre mucket, oval pigtoe, ovate clubshell, oyster mussel, pale lilliput [pearlymussel], pink mucket [pearlymussel], purple bankclimber, purple bean, rabbitsfoot, round ebonyshell, round hickorynut, sheepnose mussel, shiny pigtoe, shinyrayed pocketbook, slabside pearlymussel, snuffbox mussel, Southern clubshell, Southern combshell, Southern kidneyshell, Southern pigtoe, Southern sandshell, spectaclecase, tapered pigtoe, triangular kidneyshell, and white wartyback [pearlymussel]); and
- Snails (Anthony's riversnail, armored snail, cylindrical lioplax, flat pebblesnail, interrupted rocksnail, lacy elimia, painted rocksnail, plicate rocksnail, rough hornsnail, round rocksnail, slender campeloma, Tulotoma snail).

Aquatics Group – NE determinations

Avoiding impacts to listed freshwater species and their suitable or critical habitats meet the definition of an NE determination. Projects that successfully avoid impacts to listed freshwater species and their suitable or critical habitats generally meet the following conditions:

1. The action will not temporarily or permanently affect local hydrologic processes.
2. The action will not have any direct impacts to a stream or river.
3. The action will not impact the riparian zone (defined as buffer of 200 feet in this standing analysis).
4. The action will not have indirect impacts to a stream or river.

These conditions are expected to be met for actions that do not occur within 200 feet of a waterbody (stream, lake, pond, wet weather conveyance, wetland, spring, beaver pond, etc.) or habitat that could be described as a wetland, bog, fen, stream, seep, or wet meadow, etc., or designated critical habitat. Activities covered by the statewide DKey and this SA can also reach an NE determination when the action area is in a watershed where, although listed aquatic species are known to occur, it has been determined they are not likely to occur within or near the action area. This can be demonstrated by conducting a thorough site investigation that carefully documents and reports how the environments encountered do not provide habitat for listed species likely to occur in the watershed.

Aquatics Group – NLAA determinations

Minimizing direct or indirect impacts to the stream and riparian zone, including changes to hydrologic processes, will improve the likelihood that any adverse effects are insignificant and/or discountable. An NLAA determination is most appropriate for projects that have no permanent effects upon local hydrologic processes, nor will they alter natural aquatic environments. Implementation of all conditions associated with applicable state and federal permits required during construction activities are generally expected to reduce impacts to aquatic species and their habitat, which could potentially contribute to an NLAA determination.

Common stressors to aquatic environments that should be avoided include changes in water quality, water quantity, or timing of flows, sedimentation, erosion. Disturbances that introduce these stressors may include introduction of chemicals or contaminants due to Horizontal Directional Drilling (HDD), hydrostatic testing, stream crossings, new outfall discharge, cut and fill, dams, or other in-stream or potentially, stream-adjacent work.

For projects that will intersect the species list area of one or more federally listed aquatic species, occur in a perennial stream containing suitable habitat for a species of aquatic organism on the official species list for the project, or occur within 200 feet of a waterbody (stream, lake, pond, wet weather conveyance, wetland, spring, beaver pond, etc.) or habitat that could be described as a wetland, bog, fen, stream, seep, or wet meadow, a NLAA determination may result if all aquatic environments are surveyed for suitable habitat of all aquatic species on the official species list, and all of the following apply:

- The project will not involve instream channel alteration (e.g., construction of dams, weirs, low water crossing); channel realignment (e.g., river training structures), or dredging,
- The project will not involve removal of large woody material (excluding maintenance of existing structures [e.g., culverts and bridges]) in coastal plain streams or greater than 100 linear feet in all other streams and rivers
- The project will not involve mining within 200 feet landward of a top bank,
- The project will not involve a new roadway/railway, low-water crossing, bank stabilization, pile-supported structure, and/or bridge construction with regulated structures/fill that will occur below or extend to below the ordinary high water (OHW) mark,
- If the project involves addition of, or modifications to, water intake structures, the following measures will be adhered to:
    1. Water intakes will be screened with a ¼-inch (6.35 mm) or smaller mesh, and
    2. water intakes will have an intake velocity of less than 1/2 ft/sec (15.24 cm/sec).
- The project will be limited to an existing, previously authorized structure that requires maintenance, repair, replacement, or removal, AND all project activities will take place within the existing project's footprint without disturbance or alteration of suitable habitat,
- The project will be limited to non-dredging activities and meet all the following criteria:
    1. Would not result in more than 50 linear feet of stream bank clearing or disturbance, and
    2. would not result in placement of fill/riprap below the OHW mark
- The project will implement all the following BMP's[19]:

[19] This will likely require incorporation of and adherence to or exceedance of standards and practices in the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas (2022)

1. Develop an erosion control plan tailored to the site. All erosion controls should be inspected routinely, especially during and immediately following significant rain events, to ensure no impacts to nearby surface waters and aquatic habitat. Immediate corrective action should be taken if erosion or sedimentation is observed.
2. Immediately revegetate any disturbed areas with a native species or an annual grass.
3. To the extent feasible, complete any work that results in exposed earth during periods when significant rainfall is not predicted.

In addition to the conditions above that apply to all aquatic species, for projects that will intersect the species list area of the flattened musk turtle and occur within 200 feet of habitat for the flattened musk turtle, a NLAA determination for the species may result if all of the following apply:

- The project will occur during the time-period when the flattened musk turtle is less active (November 1-March 31), and
- If the project will result in any new permanent barrier for nesting turtles (e.g., bulkheads, shoreline riprap, boat ramps) methods that mimic natural shoreline features (boulders and logs in addition to rip-rap) that will facilitate movement of the flattened musk turtle and maintain or promote habitat conditions will be employed.
- Or, the project will occur during the nesting period, between May 1st to September 15th, and
- All suitable flattened musk turtle habitat in the action area will be fully surveyed by a qualified biologist during the nesting season (May 1 to September 15), with no turtles or nests observed and observed habitat evaluated a moderate or poor quality, and
- If the project will or may result in any new permanent barrier for nesting turtles (e.g., bulkheads, shoreline riprap, boat ramps) methods that mimic natural shoreline features (boulders and logs in addition to rip-rap) that will facilitate movement of the flattened musk turtle and maintain or promote habitat conditions will be employed.

In addition to the conditions above that apply to all aquatic species, for projects that will intersect the species list area of the trispot darter or the slackwater dater, a NLAA determination may result if:

- The project will not permanently alter seepage areas such that they no longer hold water, lose connection to permanent bodies of water, or are dug or deepened to more pond-like conditions; and
- The project will be outside of the spawning period for slackwater darter (November 10-May 31) or trispot darter (January 1-April 30), whichever is relevant to the project; and
- The following BMP's be implimented:1.) Develop an erosion control plan tailored to the site. All erosion controls should be inspected routinely, especially during and immediately following significant rain events, to ensure no impacts to nearby surface waters and aquatic habitat. Immediate corrective action should be taken if erosion or sedimentation is observed. 2.) Immediately revegetate any disturbed areas with a native species or an annual grass. 3.) To the extent feasible, complete any work that results in exposed earth during periods when significant rainfall is not predicted. For specific techniques, see “The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas” (2018), available from the Alabama Soil and Water Conservation Committee or on-line at: https://alabamasoilandwater.gov/wp-content/uploads/2021/03/2018-Handbook-Vol-1.pdf

5.13 PLANTS

5.12.1 Overview

This section evaluates whether the proposed action may affect the federally listed plant species that may occur within the action area. Effects determinations are based on whether the project generates stressors, whether suitable habitat is present, and whether surveys confirm the presence or absence of listed plants when required.

5.12.2 Upland and Wetland Plant Species

This subsection applies to the following federally listed plant species: whorled sunflower, Mohr's Barbara's buttons, fleshy fruit gladecress, lyrate bladderpod, leafy prairie clover, Morefield's leather-flower, relict trillium, Alabama canebrake pitcher-plant, fringed campion, green pitcher plant, Harperella, Kral's water-plantain, pondberry, Tennessee yellow-eyed grass, and white fringeless orchid.

If the proposed action includes no ground disturbance and no herbicide application, then the project does not generate any stressors that could affect these species. Under these conditions, effects could occur only if suitable habitat and individuals are present within the action area. If neither habitat or listed plants are present, no exposure pathways exist. When these conditions are met, where there is no ground disturbance and no herbicide use, or no species or habitat present, the proposed action will result in a No Effect determination for these plant species.

5.12.3 Louisiana Quillwort

If the proposed action includes no ground disturbance and no herbicide use, the project creates no stressors that could affect Louisiana quillwort and the determination is No Effect. If the project occurs within small or medium-sized streams, or within 165 feet of these streams where suitable habitat may be present, effects are evaluated based on whether the project would increase sedimentation, reduce stream flow, reduce canopy cover, apply herbicides, or otherwise negatively affect the species. This logic is appropriate because Louisiana quillwort is restricted to specialized hydrologic and microhabitat conditions and is highly sensitive to changes in sediment input, canopy shading, and water movement. Activities within or adjacent to these stream systems have the potential to modify these conditions; therefore, only actions that avoid these impacts or occur in highly degraded or altered stream reaches, where suitable habitat has already been lost, can be considered Not Likely to Adversely Affect. When suitable habitat is present, surveys conducted by a qualified biologist between November 1 and May 30 under appropriate conditions confirm whether Louisiana quillwort occurs in the action area. If surveys detect no individuals, no exposure pathway exists and the project is Not Likely to Adversely Affect.

5.12.4 American Chaffseed and Gentian Pinkroot

A No Effect determination is appropriate for American chaffseed and gentian pinkroot when the proposed action does not occur within habitat conditions associated with their ecological requirements. These species occur within savanna ecosystems characterized by an open understory maintained through fire disturbance or fire-based management. If the project is not located within such a savanna system, suitable habitat is absent, no exposure pathway exists, and the proposed action will result in a No Effect determination.

5.12.5 Karst-Associated Plant Species

This subsection applies to little amphianthus, American Hart's-tongue fern, Alabama streak-sorus fern, and Georgia rockcress.

A No Effect determination is appropriate when the proposed action does not occur within karst features or landscapes that provide habitat for these species. Relevant habitat features include caves, sinkholes, disappearing streams, exposed bedrock, rock outcrops, bluffs, cliffs, ledges, overhangs, or other prominent geological formations. If none of these features occur within the action area, suitable habitat is absent and no exposure pathway exists. Without suitable habitat, the proposed action cannot affect these species and therefore results in a No Effect determination.

6 SUMMARY AND CONCLUSION

After considering the relevant information pertaining to the species and critical habitat, reviewing the covered activities and associated required conservation measures, and evaluating their anticipated effects, we conclude that the actions subject to this standing analysis will support a federal action agency determination of "No Effect" or support a section 7(a)(2) determination pursuant to the Act of "may affect, not likely to adversely affect," as appropriate, for the subject species and critical habitat as described above. This standing analysis is based on the consultation provisions of section 7(a)(2) of the Act and the information cited and will undergo review and revision, as needed, if any of the following conditions have been met: 1) If new information reveals the effects of the covered action(s) to the covered species or critical habitat are occurring in a manner or to an extent not considered in this standing analysis based on applied use; or 2) If the species or critical habitat covered by the standing analysis has a change in status.

A link to this standing analysis is provided in the DKey output letter.

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8 APPENDIX A: INITIAL QUALIFYING DKEY QUESTIONS

9 APPENDIX B: MANATEE SPECIAL PERMIT CONDITIONS FOR U.S. ARMY CORPS OF ENGINEERS PROJECTS

The Special Permit Conditions for the West Indian Manatee apply to to the construction, modification, maintenance and use of single and multi-family private recreational docks (conditions A through J) and private community docks and commercial marinas (conditions A through P). Although the Special Permit Conditions were written primarily with dock and marina projects in mind, they can be appropriate for other types of projects that are permitted by the U.S. Army Corps of Engineers Savannah District.

A. The permittee shall ensure that all personnel associated with construction of the authorized dock facility are informed of the civil and criminal penalties for harming, harassing or killing manatees, which are protected under the Endangered Species Act of 1973 (ESA) and the Marine Mammal Protection Act of 1972. The permittee and the permittee's contractor(s) will be held responsible for any manatee harmed, harassed or killed because of construction activities.

B. The use of siltation barriers in waters of the United States, below the high tide line, is not allowed in association with the construction of the authorized dock facility.

C. All vessels associated with project construction shall operate at "no wake/ idle" speeds at all times while in the project area. All vessels will follow routes of deep water when entering or exiting the project area, and while operating in the project area, whenever possible. For the purposes of compliance with manatee conditions, the project area is defined as all areas of shoreline, marsh and open waters within 100 feet of the outermost perimeter of the authorized dock facility.

D. All contractors and other on-site personnel are responsible for observing for the presence of manatees in or near the project area. All in-water construction activities shall cease upon sighting of a manatee within 50 feet of any ongoing work in the marsh or open waters. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

E. Extreme care shall be taken when lowering equipment and materials below the water surface and/ or to the water bottom. Equipment and materials include but are not limited to: piles; sheet piles; casings for drilled shaft construction; spuds; pile templates; and anchors. All such equipment/ material shall be lowered as slow as possible, to avoid injury to any manatee that may have entered the project area undetected.

F. In the event of injury to or mortality of a manatee in the project area, the permittee or contractor shall immediately notify the Alabama Department of Natural Resources (Alabama DNR) at 912-264 -7218, or 1-800-272-8363 (weekdays between 8:00 a.m. to 4:30 p.m.), or 1-800-241-4113 (nights and weekends). Within one hour of a manatee injury or mortality the permittee or contractor shall notify the U.S. Army Corps of Engineers (Corps) at 1-800-448-2402 and the U.S. Fish and Wildlife Service (FWS) Alabama Ecological Services Field Office

at *GAES_Assistance@FWS.gov*. Any dead manatee found in the project area shall be secured to a stable object to prevent the carcass from moving with the current. In the event of a manatee injury or mortality, all open water construction activity shall cease pending completion of consultation between the Corps and FWS, pursuant to Section 7 of the ESA.

G. The permittee shall ensure that the contractor keeps a log of sightings, collisions or injury to manatees that occur during construction of the dock facility.

H. Within 30 days of project completion, the permittee shall submit a report summarizing manatee sightings or incidents that occurred during project construction, to the U.S. Fish and Wildlife Service at *GAES_Assistance@FWS.gov* or 4980 Wildlife Drive NE, Townsend, Alabama 31331. Submission of a negative report is not required.

I. All temporary or unused construction materials shall be removed from the project area upon completion of the work, and any impacted area of salt marsh shall be restored. No construction debris or trash is to be discarded in project area.

J. The permittee shall regularly inspect and maintain all hoses, faucets, and other potential sources of freshwater, to ensure that any freshwater leak is stopped and immediately repaired. Manatees are attracted to freshwater leaking from dock facilities, where boats are concentrated and there is an increased risk for manatee collisions.

K. Prior to initiating authorized construction activities, the permittee shall contact Alabama DNR at 912-264-7218 for assistance with development of temporary manatee awareness sign plan for the project area. The plan will include the types and number of signs; and locations where signs will be installed to be prominently visible to contractors entering the project area from uplands and from the water. The permittee shall install temporary manatee awareness signs in accordance with the Alabama DNR approved plan. See attached Appendix A for information about the size and appearance of temporary manatee awareness signs. Within 30 days of project completion, the permittee shall remove all temporary manatee signs.

L. Once construction activities are completed, and prior to use of the facility, the permittee shall contact Alabama DNR at 912-264-7218 for assistance with development of permanent manatee awareness sign plan. The plan will include the types and number of signs; and locations where signs will be installed to be prominently visible to all facility users entering the project area from uplands and from the water. The permittee shall install permanent manatee awareness signs in accordance with the Alabama DNR approved plan. See attached Appendix A for information about the size and appearance of permanent manatee awareness signs.

M. Within 30 days of installation, the permittee shall submit a notarized letter to the Corps confirming that required permanent manatee signs have been installed in compliance with the Alabama DNR approved plan. The permittee shall maintain all permanent manatee signs in a clearly visible condition for the life of the facility.

N. The permittee shall utilize the Alabama DNR video "Alabama Wildlife - Sharing the Coast - Manatee" as a manatee education awareness program. This video program focuses on educating boaters on manatee biology, how watercraft can adversely affect the manatee, and detail actions

that boaters can take to avoid impacts to the manatee. The permittee shall insure that all boat operators view this video before using the permitted facility. The permittee shall continue a manatee education awareness program for the life of the facility. The permittee may develop and use a comparable manatee education awareness program upon approval by the Corps, FWS, and Alabama DNR.

O. After project completion, the permittee shall identify the individual, facility operator or homeowner's association representative to be responsible for reporting manatee sightings, boat strikes or other manatee concerns to the FWS and Alabama DNR.

P. For facilities with oil/ gas pumps and/ or sewage pump-out equipment, the permittee shall develop and maintain spill contingency plans in accordance with the requirements of the Alabama DNR, Coastal Resources Division.

APPENDIX B-1. RATIONALE FOR MANATEE SPECIAL PERMIT CONDITIONS

A. Informing personnel associated with construction of civil and criminal penalties for taking manatees will enhance vigilance for manatees while operating vessels and construction equipment with the potential to strike manatees and reduce risk of take to insignificant levels and making it discountable.
B. Prohibiting construction associated siltation barriers below the high tide line will eliminate the risk of manatees present near the siltation barrier becoming entangled, thereby reducing the risk of injury/ take to insignificant levels and making it discountable.
C. Reducing the speed of vessels to ""no wake/ idle"" speeds will lengthen the time manatees have to avoid vessels and will provide vessel operators with more time to observe manatees and stop the vessel and/ or adjust course, thereby reducing the risk of injury/ take to insignificant levels and making it discountable.
D. Clarifying all on-site personnels' personal responsibility toward manatees and establishing the stop work procedures should a manatee enter the project area will reduce the risk of take to insignificant levels and make it discountable.
E. Lowering equipment and materials below the water surface and/ or to the water bottom as slowly as possible will lengthen the time potential manatees in the project area have to notice the activity and safely move away before becoming injured, thereby reducing the risk of take to insignificant levels and making it discountable.
F. In the unlikely event of manatee injury or death while following these conditions, stopping work to prevent further injuries and reporting the incident to FWS and Alabama DNR will allow wildlife biologists and veterinarians to respond, at which time they may take measures to facilitate healing injuries, collect data about the injury to study the efficacy of conservation measures, or facilitate other scientific endeavors. This condition is wholly beneficial to manatees as it allows for immediate professional care of injured manatees and will reduce the rate of incidents in the future with improved study of construction conservation measures for manatees and manatee behavior.
G. A log of manatee sightings, collisions, or injury to manatees that occur during construction activities will be wholly beneficial for manatees as it will reduce the rate of incidents in the future with improved study of manatee behavior and conservation measures for manatees.

H. Submitting a report summarizing manatee sightings and incidents that occurred during project construction within 30 days of project completion will be wholly beneficial for manatees as it will reduce the rate of incidents in the future with improved study of construction conservation measures for manatees and manatee behavior.
I. Removal of all temporary or unused construction materials/ debris/ trash from the project area upon completion of the work, and any impacted area of salt marsh shall be restored will prevent habitat degradation. In conjunction with the other special permit conditions, the short-term risk of manatee take while implementing these activities is reduced to insignificant levels and the long-term effect is wholly beneficial.
J. Leaky sources of freshwater inputs attract manatees where boats are concentrated, thereby increasing the risk for manatee collisions. Eliminating freshwater inputs eliminates a trigger for manatee congregations near marina and dock facilities where manatees are at greater risk of injury/ take from collision with vessels. Implementing this condition removes manatee injury/ death risk factor and has wholly beneficial effects.
K. The permittee working in conjunction with Alabama Department of Natural Resources to develop a temporary manatee awareness sign plan for the project area will create reminders to this specific project phase thereby reducing a manatee injury/ death risk factor by changing human behavior while operating vessels to avoid vessel strikes and associated injury/ take to manatees and has wholly beneficial effects.
L. The permittee working in conjunction with Alabama Department of Natural Resources to develop a permanent manatee awareness sign plan for the project area will provide detailed information about manatees, how to avoid negative impacts to manatees, and to raise awareness of their presence in Alabama to any person using the facility. This condition reduces the risk of manatee-vessel collisions. Implementing this condition reduces a manatee injury/ death risk factor by changing human behavior while operating vessels to avoid vessel strikes and associated injury/ take to manatees and has wholly beneficial effects.
M. The permittee confirming compliance with the permanent manatee awareness sign plan and maintaining all permanent manatee signs in a clearly visible condition for the life of the facility reduces a manatee injury/ death risk factor by changing human behavior while operating vessels to avoid vessel strikes and associated injury/ take to manatees and has wholly beneficial effects.
N. Showing the Alabama DNR video ""Alabama Wildlife - Sharing the Coast - Manatee"" (or a comparable manatee education awareness program approved by the Corps, FWS, and Alabama DNR) to all boat operators as a manatee education awareness program and requirement prior to using the facility reduces a manatee injury/ death risk factor by changing human behavior while operating vessels to avoid vessel strikes and associated injury/ take to manatees and has wholly beneficial effects.
O. Identification of the individual, facility operator or homeowner's association representative to be responsible for reporting manatee sightings, boat strikes or other manatee concerns to the FWS and Alabama DNR will be wholly beneficial for manatees as it will reduce the rate of incidents in the future with improved study of manatee behavior and conservation measures for manatees.

P. Development and maintenance of spill contingency plans in accordance with the requirements of the Alabama DNR, Coastal Resources Division for facilities with oil/ gas pumps and/ or sewage pump-out equipment reduces exposure to contaminants harmful to manatees and their habitats thereby decreasing the risk factor associated with these facilities to a discountable level.

10 APPENDIX D: STURGEON PROJECT DESIGN CRITERIA

Projects meeting the following criteria are expected to reduce the likelihood and magnitude and severity of effects to the environment such that the effects of the project would be consistent with a "not likely to adversely affect" Gulf sturgeon or Alabama sturgeon determination. For any activities not listed below, further coordination with the Ecological Services Office for further guidance on potential project effects is recommended.

1. Removal, Repair, and Replacement:
    a. Must occur within the same footprint of the existing fill or structure, with only minor deviations. For repair of uplands damaged by discrete events, restoration of the damaged area (including bank stabilization) must not exceed the contours, or Ordinary High Water (OHW) or Mean High Water (MHW) line, that existed before the damage occurred.
2. Bank Stabilization/Fill:
    a. Limited to no more than 500 linear feet of structure, fill and/or bank disturbance.
    b. Bank stabilization does not extend more than 10 feet waterward of the OHW/MHW line, including the toe of any rip-rap.
    c. For living shorelines projects, fill does not extend more than 30 feet waterward of the OHW/MHW line.
3. Pile-supported Structures:
    a. Limited to minor structures that do not support large commercial vessels (e.g. ferries, tankers, cargo ships).
    b. Piers/docks for single-family lots are limited to no more than 4 slips for motorized vessels.
    c. Piers/docks for marinas or multi-family facilities are limited to no more than 50 total slips for motorized vessels.
4. Dredging:
    a. Maintenance dredging of existing areas (e.g. canals, channels, basins, berths, marinas, slips, intake/discharge structures) does not exceed previously authorized limits (i.e. area/depth).
    b. New dredging does not exceed 5,000 square feet and is limited to depth of -8 feet OHW/MHW.
    c. Dredged material disposal is limited upland disposal sites only, unless the in-water/beneficial use site has previously undergone ESA Section 7 Consultation.
5. Boat Ramps and Indented Slips:
    a. Boat ramps are limited to 40 feet in width.

b. Indented slips are limited to the berthing, dredging, and bank stabilization criteria listed in Section 2-4 above.

6. Utility and Areial Transmission Lines:
   a. In-water structures (e.g. foundations, piles, footings) for aerial transmission lines are limited to 0.5 acres total.
   b. For horizontal directional drilling, applicants must provide a frac-out contingency plan.
   c. Repair activities (including placement of rip-rap and articulated mats) are limited to minimum amount necessary to stabilize and protect existing infrastructure.
7. Intake/Outfall Structures:
   a. Structures must be designed and implemented to prevent erosion and scour.
   b. Intake velocities at the screen should not exceed ½ ft/sec (USFWS 1993).
   c. Mesh size at intake screens should have a maximum mesh opening of ¼ inch to reduce the size of aquatic organisms that can be entrained (USEPA 1976, USFWS 1993)
   d. A Johnson (or Johnson-type) screen/intake with 1/8-inch mesh or less, should be used if feasible.

USEPA. 1976. Development document for best technology available for the location, design, construction and capacity of cooling water intake structures for minimizing adverse environmental impact. EPA 440/1-76/015-a. 263 pp.

USFWS. 1993. Pallid sturgeon recovery plan. U.S. Fish and Wildlife Service, Bismark, North Dakota. 55 pp.