

**Environmental Assessment**  
for  
Partners for Fish and Wildlife Program  
Proposed Conservation Actions Restoring and Managing  
Longleaf Pine Ecosystems in Georgia and Alabama

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## 1.0 Purpose of and Need for Action

### 1.1 Introduction

The mission of the U.S. Fish and Wildlife Service (Service) Partners for Fish and Wildlife Program (Partners Program) is to efficiently achieve voluntary habitat improvement on private lands through financial and technical assistance to benefit federal trust species. The Service's Alabama and Georgia Ecological Services Field Offices recognize a significant opportunity to restore or improve habitat for the gopher tortoise (*Gopherus polyphemus*) and associated species (Table 1) on private lands in Alabama and Georgia through the Partners Program. This Environmental Assessment (EA) describes selection criteria and a suite of habitat restoration practices, with associated conservation measures, that we propose to implement on Partners projects in Alabama and Georgia to benefit the gopher tortoise and commensals. We are seeking landowners who are willing to implement these restoration practices, with Service financial and technical assistance, for a minimum of 20 years. We believe that our proposed program would result in population increases for gopher tortoises, tortoise-commensal species, and other species associated with longleaf pine forests.

Federal agencies proposing actions that may affect the quality of the environment, including Partners Program agreements, must comply with the National Environmental Policy Act (NEPA). The Service does so for most Partners agreements by documenting consistency with one or more approved "categorical exclusions" from the more rigorous NEPA-compliance pathways of an EA or Environmental Impact Statement (EIS), e.g., "The use of prescribed burning for habitat improvement purposes, when conducted in accordance with local and State ordinances and laws" (Department of the Interior Manual, 516 DM 8.5(B)(4)). However, the Service must prepare an EA or EIS when one or more specific "extraordinary circumstances" apply to a proposed action, e.g., when the action may "Have significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species" (516 DM 2, Appendix 2, 2.8). At minimum, the Service considers actions that may kill, harm, harass, or otherwise take listed species as "significant impacts" in this context. Such take is prohibited under the Endangered Species Act (ESA) and requires the Service first to determine whether an action will jeopardize continued species' existence, develop measures to reduce levels of potential take, and finally, exempt any remaining take that is incidental to an otherwise legal action. Improving gopher tortoise habitat using the practices described in this EA may result in take of one or more species listed under the ESA during land clearing, burning, and other habitat management activities, even though we expect a net benefit to these species over the duration of individual landowner agreements.

The Service's Alabama and Georgia Ecological Services Field Offices have prepared this EA to describe and examine the effects of gopher tortoise habitat improvement practices that we propose to incorporate in multiple landowner agreements in Alabama and Georgia as a program within the larger Partners Program. This document also serves as the Service's biological assessment of the effects of the Partners Program's gopher tortoise habitat improvement practices on ESA-protected species for intra-Service consultation under Section 7 of the ESA. We will revise the EA as necessary based on public comments received. If the

ESA consultation concludes with a non-jeopardy biological opinion, and our NEPA analysis determines that an EIS is not required, we will prepare a Finding of No Significant Impact (FONSI) as the decision document, giving notice to the public. Thereafter, Partners projects that satisfy the conditions for the gopher tortoise program would refer to the EA/FONSI and the biological opinion for project-specific compliance with NEPA, ESA, and other applicable laws without duplicating the analyses of the programmatic documents.

## **1.2 Project Background**

Intact longleaf forest ecosystems are among the most biologically diverse in North America. The extent of the North American longleaf pine forest has declined, with total acreage falling from an estimated 90 million acres at the time of European settlement to about 3.4 million acres today (America's Longleaf 2009). Of the remaining longleaf forest, 55 percent is in private ownership; 34 percent is in federal ownership; and 11 percent is in state or local ownership (Gaines 2010 personal communication cited in USFWS et al. 2013). The native groundcover community of grasses and forbs comprise the bulk of the diversity present in the forest system, which is adapted to and maintained by frequent, low-intensity fires. Prescribed fire can maintain this diversity in managed longleaf pine forests, because longleaf is fire-tolerant throughout its life history. Longleaf does not pioneer easily into areas dominated by other trees, and without frequent fire, competes poorly with other southern pines and hardwood species. However, once established and maintained through judicious use of fire and other management actions, it is a hardy forest. Conservation of this ecologically valuable forest type perpetuates regional biodiversity and also preserves a portion of the southern natural and cultural heritage.

Several species associated with longleaf pine forests have received protection under the ESA, and many others are in various states of decline, including the gopher tortoise. The current federal status of the gopher tortoise is "Threatened" for populations west of the Mobile and Tombigbee Rivers in Alabama, Mississippi, and Louisiana, and "Candidate" for populations east of these rivers in Alabama, Georgia, Florida, and South Carolina. Candidate species warrant listing under the ESA, but the Service is presently precluded from doing so due to lack of resources and higher listing priorities. The gopher tortoise is considered a "keystone" species of the longleaf pine ecosystem, because many other wildlife species benefit from its presence and abundance. More than 300 other species have been known to use gopher tortoise burrows, including snakes, foxes, skunks, and lizards. The Service has recently joined with state wildlife agencies in a range-wide conservation strategy for the gopher tortoise to: 1) collect and provide information needed to address the threats to the species; 2) outline and implement the highest-priority conservation actions for the gopher tortoise; and 3) identify those agencies and organizations best suited to effectively undertake those efforts (USFWS et al. 2013).

## **1.3 Purpose and Need**

The purpose and need for the proposed action are to increase populations and reduce threats to the gopher tortoise and its commensal species on private lands at a scale that will significantly contribute to the recovery of the already-listed western tortoise populations and

preclude the need for listing the eastern populations. Although some large tracts of public lands in Alabama and Georgia are managed for longleaf pine and support gopher tortoises (e.g., the Conecuh National Forest), this species does not disperse over great distances to colonize suitable habitats. Suitable habitats distributed widely and strategically on private lands in southern Alabama and southern Georgia would help conserve the gopher tortoise and other longleaf-associated species in this portion of the tortoise's range.

The Partners Program is the Service's primary vehicle for conservation delivery on private lands. Since 2008, we have entered into approximately 200 agreements with landowners in Alabama and Georgia for longleaf pine habitats on about 10,000 acres. We estimate that agreements are possible on at least another 6,500 acres in the next 5 years.

Although the Service enters Partners agreements with one landowner at a time and tailors each agreement to its specific circumstances, we intend to draw from a standard menu of practices when the goals of a proposed agreement are related to conserving gopher tortoises and other longleaf pine-associated species in Alabama and Georgia. We developed this menu of practices (described in section 2.1.1 and Appendix A) in cooperation with the Natural Resources Conservation Service (NRCS) and other partners. When applied in areas with suitable soils, these practices are effective at restoring longleaf pine habitats so they can support gopher tortoises; however, such restorations must be within the dispersal range of existing gopher tortoise populations to have maximum benefit to the species. This EA and the associated ESA consultation address the Service's NEPA and ESA responsibilities at the outset of a proposed program of multiple Partners agreements in Alabama and Georgia intended to benefit the gopher tortoise and its commensal species, which will streamline the Service's NEPA and ESA compliance processes for individual agreements thereafter.

The success of the proposed gopher tortoise program will depend both on appropriate selection of sites and methods for gopher tortoise habitat restoration, and the numbers and acreage of landowner enrollment. We are using this EA as a biological assessment of the effects of the proposed Partners gopher tortoise restoration program on both listed and candidate species that may occur on properties enrolled in the program. The intra-Service consultation based on this assessment will evaluate the effects on listed and candidate species, and provide a Biological/Conference Opinion (a conference opinion addresses proposed and candidate species for listing) and Incidental Take Statement.

The ESA prohibition against taking listed species affects how private property owners may use their lands, which leads some landowners to prevent or discourage colonization or use of their property by listed, candidate, and other at-risk species. Partners Program agreements specify management activities on private lands to benefit various species, often including endangered species. Partners agreements are federal actions that involve the Service providing funding and technical assistance directly to willing landowners; therefore, the Service is responsible for compliance with the ESA, and the landowner is responsible for faithfully implementing the terms of the agreement. The Service, not the landowner, will have the responsibility for implementing reasonable and prudent measures to minimize the impacts of take, including monitoring, and for reinitiating intra-Service consultation if the anticipated level of take is exceeded. If candidate species are listed during the course of

agreements funded under this program, the Service will at that time evaluate the projects and the affected species to determine whether modifications of the initial Opinion and Take Statement are warranted. A landowner who is following the terms of his/her agreement is at no time liable for take that may result from properly implementing the practices it prescribes. We hope that communicating a clear understanding of this division of responsibilities will encourage landowners to participate in the gopher tortoise program who might otherwise feel reluctant to promote endangered and other at-risk species on their lands.

## **2.0 Proposed Action and Alternatives**

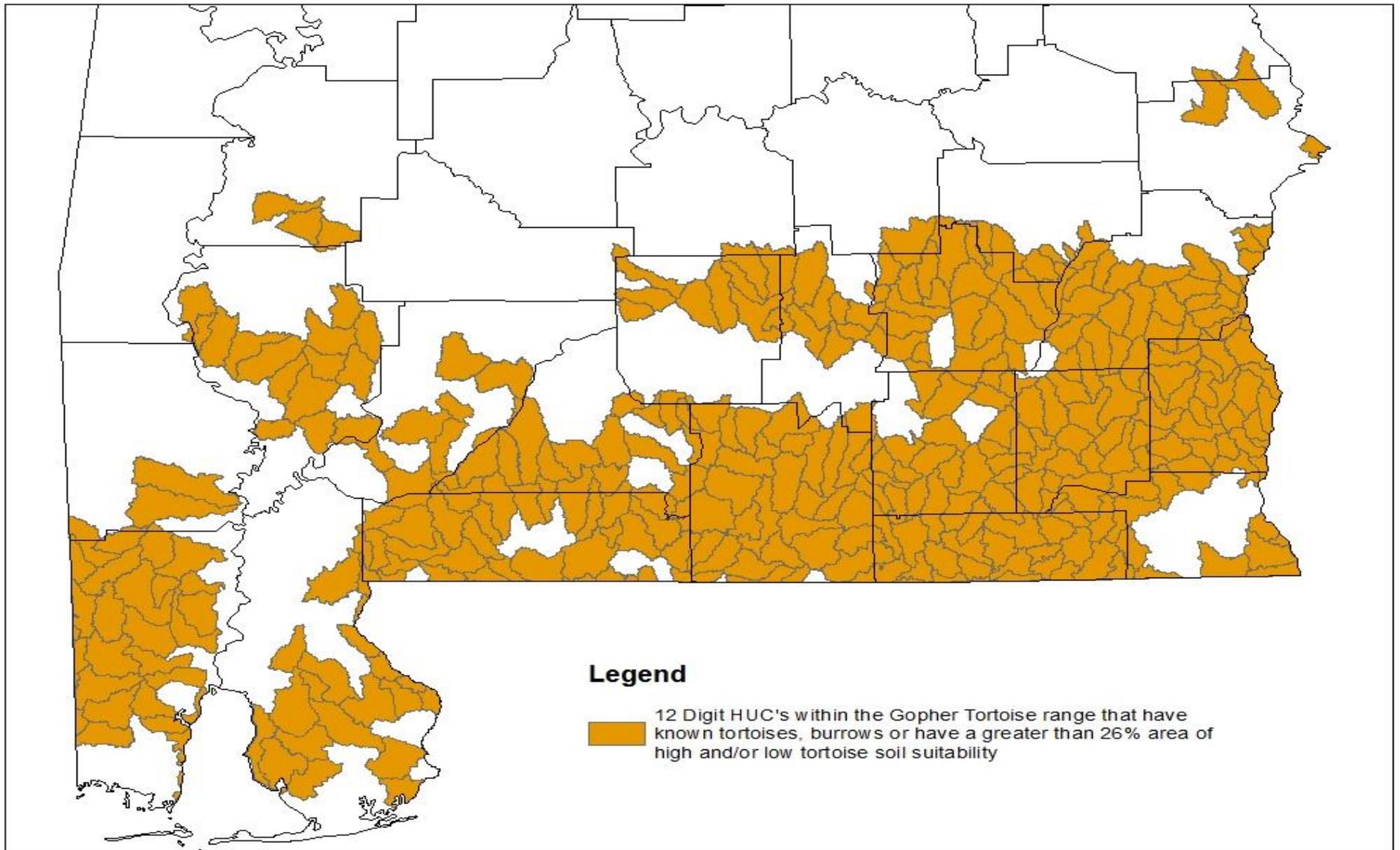
### **2.1 Proposed Action**

Partners Program agreements implement conservation practices on privately owned lands and are funded on an in-kind contribution and cost-share basis with State resource agencies, non-governmental organizations, and private landowners. Project sizes range from a few acres to several hundred acres, with most agreements enrolling 20-100 acres. Funding presently available for Partners projects targeting habitat improvements for the gopher tortoise and other longleaf pine-associated species in Alabama and Georgia is about \$200,000. The proposed action is to direct these funds towards delivery of the conservation practices listed in section 2.1.1, and more fully described in Appendix A, to projects within the areas shown in Figure 1 and Figure 2. These areas collectively represent the geographic scope of the proposed action, which we hereafter refer to as the Program Area.

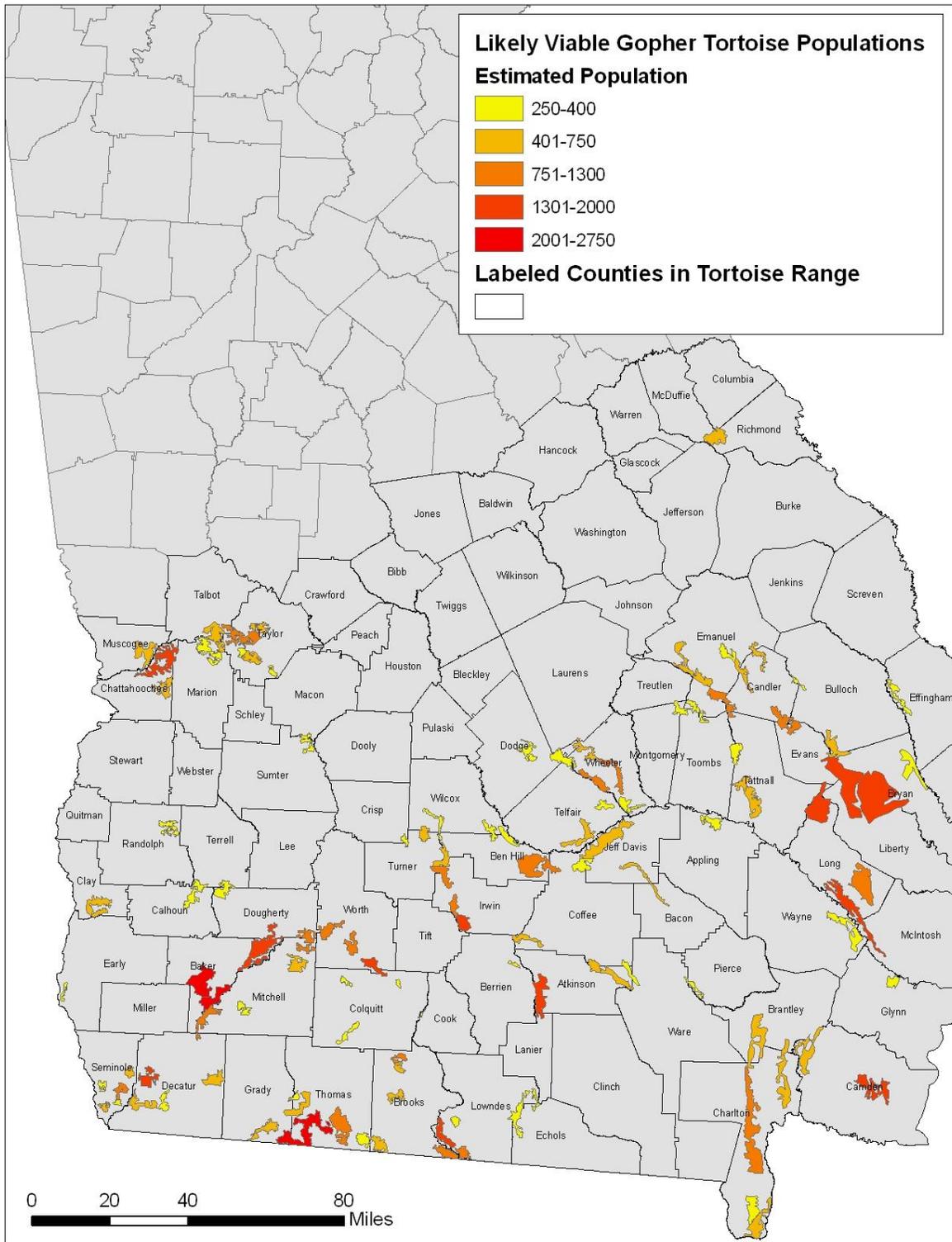
The Program Area in Georgia was based on maps created by the Georgia Department of Natural Resources, Wildlife Resources Division, Nongame Conservation Section (GDNR) in October 2013. The map depicts populations that GDNR believes meet the following minimum standards developed by the Gopher Tortoise Council Minimum Viable Population and Minimum Reserve Size Working Group at a March 2013 workshop: a long-term viable population should have

1. a minimum population of 250 adults
2. a minimum density of 0.4 tortoises/hectare (in habitat)
3. > 100 hectares (of habitat).

Map polygons were drawn using (1) existing tortoise population data derived from line transect distance sampling conducted by GDNR, the J. Jones Ecological Research Center, and others 2007-13 and (b) 2010 aerial photographs. Large streams, urban development, large agricultural fields, and major roads were interpreted as barriers for tortoises, and the boundaries of individual populations do not extend past them. Areas of suitable soils were not required to be adjacent to one another, but did need to be within a reasonable dispersal distance for tortoises (generally 1 km) (Diemer 1992). Suitable landcover types included all types of forest, exclusive of wetlands, mesic hardwoods, and very closed-canopy pine; clearcuts; and non-improved pasture. Suitable soil types included Kershaw, Lakeland, Bonifay, Fuquay, Blanton, Eustis, Cainhoy, Centenary, Foxworth, Galestown, Kureb, Lakewood, Lucknow, Palm Beach, Troup, Lucy, Americus, Benevolence, Bonneau, Chisholm, Echaw, Fripp, Goldsboro (thick surface), Hurricane, Irvington (thick surface), Lowndes, Valdosta, Mandarin, Meldim, Norfolk, Dothan, Orangeburg, Ridgeland, Ruston,



**Figure 1.** Geographic extent of the area in Alabama proposed for Partners Program agreements intended to benefit the gopher tortoise and other species associated with longleaf pine habitats (the Action Area).



**Figure 2.** Geographic extent of the area in Georgia proposed for Partners Program agreements intended to benefit the gopher tortoise and other species associated with longleaf pine habitats (the Action Area).

Tifton, Red Bay, Vacluse, Ailey, Stilson, Uchee, Wagram, Cahaba, Chipola, Cowarts, Chipley, Albany, Gilead, Maxton, and Suffolk. GDNR notes that some viable tortoise populations likely are not included on this map – these areas are not covered by this EA.

The Gopher tortoise range in Alabama covers the Southern portion of the state from Mississippi to Georgia. In an effort to identify areas of greater probability within this range two data sets were used. The first set was known tortoise burrows or live tortoise points from our existing data sets. Those points were limited to mostly Mobile and Washington County in the listed range within the state (Mobile, Washington and Choctaw counties). The first set of 12 digit HUC's selected were those that had these burrow/tortoise points in them.

The second dataset used was a soil layer provided by NRCS that depicted soil suitability for the gopher tortoise. This layer was an older layer and did not include Washington County because a digital copy of the Washington county soils was not available at the time. This Gopher Tortoise soil suitability layer has been updated. Using the soils dataset the soils that fell into the highly suitable and less suitable categories were selected and a Tabulate Area analysis was conducted (calculates cross-tabulated areas between two datasets and outputs a table) to determine the percent area of suitable soil within each 12 digit HUC in Alabama's Gopher tortoise range. A simple quantile classification was used with 5 classes. HUC's with 26% or greater area of suitable soil were selected and visually matches the soil layer. There are numerous HUC's that do contain suitable soil that had a lower percentage that very well may have Gopher tortoise.

Partners Program biologists will seek and encourage landowner participation in the gopher tortoise program within the Program Area and will assign the highest funding priority to projects on private lands using the following criteria (numbered criteria are not listed in order of importance, but bullets under the numbered criteria are listed in priority order). **All project sites, regardless of whether they meet one or more criteria below must be (1) located adjacent to or within 1 km of existing gopher tortoise populations and (2) on sites with soils suitable to support gopher tortoise populations.**

1. The proposed project site:
  - Already supports an existing gopher tortoise population.
  - Is immediately adjacent to properties that support existing gopher tortoise populations.
  - Is within 1 km of existing gopher tortoise populations.
  - Does not support gopher tortoise, but, once restored, will provide a gopher tortoise movement corridor.
2. The proposed conservation practices focus on:
  - Habitat management and/or enhancement of existing suitable habitat for the gopher tortoise and one or more commensals.
  - Habitat restoration or establishment of new suitable habitat for the gopher tortoise and one or more commensals.
3. The proposed project size is:
  - Greater than 250 acres.
  - From 100 to 250 acres

- Less than 100 acres
4. The proposed project includes one of the following habitat protection mechanisms:
    - Property already is protected.
    - Proposed permanent conservation easement.
    - Proposed conservation agreement greater than 30 years.
    - Proposed conservation agreement from 20 to 30 years.
  5. The proposed project includes a prescribed fire implementation plan for:
    - Prescribed fire every 2-3 years.
    - Prescribed fire at an interval greater than 2-3 years.

Given roughly equal rankings by these criteria, the Service will assign higher priority to funding projects that involve greater landowner support and cost-sharing, and/or demonstrate greater cost effectiveness.

### **2.1.1 Habitat Management Practices**

The Service has previously worked with NRCS to adapt the following practices specifically for the gopher tortoise through the Working Lands for Wildlife Partnership Initiative, which are described in greater detail in Appendix A.

1. Brush management: the management or removal of woody (non-herbaceous or succulent) plants including those that are invasive and noxious.
2. Herbaceous weed control: the removal or control of herbaceous weeds including invasive, noxious, and prohibited plants.
3. Prescribed burning: controlled fire applied to a predetermined area.
4. Fire break: a strip of cleared or plowed land used to stop the spread of a fire.
5. Tree/shrub site preparation: treatment of areas to improve site conditions for establishing tree and/or shrubs.
6. Tree/shrub establishment: establishment of woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.
7. Forest stand improvement/management: the manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation.

Under each Partners Program agreement executed under the gopher tortoise program, a landowner would agree to implement and maintain all prescribed conservation practices from the above list that are identified in his/her project plan to restore or enhance and maintain a functional open-pine ecosystem for the duration of the agreement (minimum of 20 years). We anticipate applying these practices through agreements covering up to 5,000 acres per year. Implementation and maintenance of the conditioned conservation practices should promote and encourage a stable or increasing population of gopher tortoises and other commensal species with similar habitat requirements by restoring or enhancing habitat conditions on lands that currently support gopher tortoise populations or that are within a reasonable dispersal distance for the species.

### **2.1.2 Conservation Measures**

To the maximum extent practicable, the Service shall design and implement projects under the gopher tortoise program to avoid and minimize adverse effects to listed species, species proposed for listing, candidate species, and other at-risk species. At this time, we anticipate direct adverse effects only to the gopher tortoise and other species that occur in longleaf habitat (Table 2). Most impacts would result from the use of heavy equipment for timber harvest and site preparation, prescribed fire, and application of herbicides to maintain herbaceous ground cover. The following conservation measures are intended to avoid and minimize adverse effects and will apply to all agreements under the Partners gopher tortoise program. Three groups of conservation measures are provided: general conservation measures and conservation measures designed specifically to protect Red-cockaded Woodpeckers and aquatic systems.

#### **General Conservation Measures for All Partners Gopher Tortoise Projects:**

1. The landowner and /or his agents will keep heavy equipment (including mowers) at least 25 feet from known gopher tortoise burrow aprons. The Service should be contacted if assistance is needed to identify these sites. Heavy equipment is defined as agricultural tractors, crawler loaders, crawler dozer, backhoe/loader, front end loader, scraper pan, motor grader, skid steer, forklift (P.I.T.), hydraulic excavator, and specialty tracked equipment.
2. The landowner and/or his agents will spray herbicides to control undesirable species on a “spot” basis to protect stream and wetland ecosystem, as well as grasses, forbs and legumes that benefit native pollinators and other wildlife and/or that are listed under the Endangered Species Act or considered rare. The Partners biologist should monitor the site after implementation and at regularly intervals thereafter, in accordance with the site’s monitoring plan, to ensure erosion and undesirable plant species issues are addressed quickly and Service goals are met.
3. The Partners biologist should design conservation practices to minimize or avoid unintentional damage to non-target plants and to aquatic systems.
4. The landowner and/or his agents will burn woody slash if significant buildup of fuels occurs. Slash piles will be burned when wildfire risk is low (usually when soils are frozen or saturated). The landowner should follow state forestry laws, when applicable, for treating slash to minimize wildfire risk. Slash should be piled, and burned when needed, in upland areas, avoiding placement over gopher tortoise burrows, in aquatic systems and their protected buffers (see conservation actions for aquatic species below), listed plant habitat, or other sensitive habitat, as identified by the Partners biologist during project planning.
5. The Partners biologist will use site specific reclamation strategies, based on ecological site descriptions or the recommendations of the NRCS state biologist, to design conservation practices for a site. Only species native to the Coastal Plain of Georgia and Alabama may be planted, with preference to forbs, grasses and grass-like plants. Seed mixes should be State-certified, meeting the appropriate State certification criteria as being free of state declared noxious and invasive material.

6. The landowner and/or his agents will conduct a cool-season burn on the site on a two-year rotation, although occasionally a longer burn interval may be necessary due to weather limitations. If three or more years have passed since the most recent burn, a growing season burn should be used to set back hardwoods and stimulate seeding of wiregrass.
7. The landowner and/or his agents will maintain a minimum of 2.5 acres of gopher tortoise foraging habitat around each gopher tortoise burrow at all times and not permanently convert, remove, or degrade this area by any means (e.g. clearing, trampling, flooding). The landowner should minimize clearing of gopher tortoise habitat, and restore any impacts as soon as possible when such clearing is temporary. Scrub-shrub habitat may be permanently or temporarily removed without adversely affecting gopher tortoise.
8. The landowner and/or his agents will not implement any conservation practices on the site using the “bedding” technique - a mechanical means of site preparation that mounds the soil in narrow strips for tree planting.
9. The landowner and/or his agents will not ditch or drain the site to improve soil conditions.
10. The landowner and/or his agents will limit roller chopping to single pass with single roller.
11. The landowner and/or his agents will restrict herbicide selection and use to those products that have the least effect on the seed bank but still provide the control of competition needed. Herbicides should be used at the lower rates/acre for the soil texture.
12. The Partners biologist will ensure that installation of the practice will not impede the movement of the gopher tortoise, Eastern indigo snake, or other listed, proposed listed, or candidate species; damage endangered or threatened plant habitat; or impact wetlands, ephemeral pools, or stream riparian buffers (50 feet from top of bank).
13. The landowner and/or his agent will plant only longleaf pine and native warm season grasses.
14. The landowner and/or his agent will ensure fields within the Partners project site are not overgrazed, and maintain a minimum of 6 in growth of native warm season grasses.
15. The Partners biologist will ensure that stocking densities and species of trees/shrubs shall be consistent with gopher tortoise habitat needs – this varies by state, and is detailed in reports by GA and AL’s state technical committee.
16. The landowner and/or his agent will apply all applicable State forestry best management practices during timber removal, particularly maintenance of streamside management zones and other protection measures for waters of the State.
17. The landowner and/or his agent will adhere to all applicable State and Federal laws regarding placement of fill in State or US waters and protection of riparian buffer zones.

### **Conservation Measures for Enrolled Sites with Active or Inactive Red-cockaded Woodpecker Colonies:**

1. The landowner will not remove or damage active Red-cockaded Woodpecker cavity trees. Selective cutting within cluster sites can be used to maintain the desired basal area. However, thinning within a cluster site should not be done if stocking is below 50 square feet of basal area per acre of stems 10 inches DBH or larger.
2. When regenerating stands, the Partners biologist will design the action so that pines are planted at 10x10 or 12x12 foot spacing to encourage rapid stand development.
3. The landowner will not remove or damage potential cavity trees (older, relict pines) within an active or inactive cluster.
4. The Partners restoration plan will provide adequate foraging habitat to support existing clusters and to facilitate establishment of new territories. A minimum of 3,000 square feet of pine basal area (10-inch DBH or larger) should be provided on at least 60 acres and up to 300 acres for each active cluster. Most of the foraging acreage should be adjacent to (within 300 ft.) or within 1/4 mile of the cluster site.
5. The Partners biologist, in developing prescribed burn routines, will evaluate baseline fuel loads. If fuel loads are sufficiently heavy that fire may burn hot enough to destroy cavity trees, the restoration plan should include removal of excess fuels by cutting or use of herbicide. Raking to remove mulch at the base of cavity trees is also helpful in preventing fire damage.
6. The landowner will maintain groups of larger pines (10 to 12 inches or larger DBH) within the surrounding forest for future cluster sites.
7. The landowner will leave some dead and abandoned cavity trees of both pine and hardwood for other cavity nesters, to reduce competition for Red-cockaded Woodpecker cavities.

### **Conservation Measures for Aquatic Areas on Enrolled Sites:**

1. The landowner and/or his agents will not ditch or drain the site to improve soil conditions.
2. The Partners biologist, before developing a conservation plan for an enrolled area, will use USGS topographic maps and on-site evaluations to locate wetlands, spring seeps, streams (including intermittent and ephemeral streams), and other aquatic systems that occur on site. These are best located in the spring as many wetlands and ephemeral/intermittent streams are difficult to identify during dry periods.
3. The Partners biologist will establish a 50-foot buffer around all wetland areas and on both banks of stream systems. This buffer will be clearly marked on site before heavy equipment begins to implement Partners program actions. These buffer areas can be burned and planted to meet gopher tortoise habitat requirements, but no heavy equipment, including tractors or backhoes, should operate within these delineated buffers, and herbicides should be applied only with a back-pack sprayer. If timber harvest is proposed within the buffer, at least 50% crown cover should be maintained to prevent an increase in water and ground surface temperature. Harvested logs should be winched from buffer zones rather than enter the buffer with equipment.

4. The landowner and/or his agent will locate any roads, landings, skid trails, maintenance areas, or other infrastructure needed to implement the Partners program actions in uplands, outside of the delineated wetland and stream buffers.
5. The Partners biologist will designate specific upland sites for accumulation of slash materials.

### **2.1.3 Monitoring**

Monitoring habitat conditions and selected species on enrolled lands is part of the proposed program, and is essential to meet the Service's mandate for adaptive management under our policy of Strategic Habitat Conservation; we anticipate revising the program over time, based on monitoring results, to improve its effectiveness.

For each Partners agreement executed under the gopher tortoise program, the Service will apply the monitoring protocol described in Appendix B, which involves monitoring both habitat conditions and focal species. Habitat monitoring assesses the quantity and quality of the restored or improved habitats, and focal species monitoring assesses the contribution of these habitats to the species' range and abundance. Monitoring results, for both habitats and species, will guide the Service in adapting this program over time to improve its effectiveness. Partners Program biologists will upload all monitoring plans and monitoring reports into the Service's Habitat Information Tracking System (HabITS).

Monitoring results will also inform the Service when the amount or extent of any take of listed species exempted in a biological opinion for this program is exceeded, which would then require a reinitiation of intra-Service ESA consultation. Although the ESA prohibitions against taking species do not apply until a species is listed, it is Service policy to conduct formal intra-Service consultation for actions that are likely to adversely affect species that are proposed or candidates for listing, and to implement the reasonable and prudent measures recommended in a conference opinion for minimizing the impacts of any unavoidable take. As described in section 4.5, the use of heavy machinery and prescribed fire may harm gopher tortoises (both listed and candidate populations), the endangered eastern indigo snake, and the candidate black pine snake. If and when the candidate species are listed, we would review monitoring results to determine whether any take has occurred, and request the consulting Service office (in this case, the Southeast Regional Office) to either reinitiate the ESA consultation or adopt the conference opinion written for this proposal as a biological opinion.

### **2.2 No Action Alternative**

Under the no action alternative, the Service would not implement the proposed action. We would not target the use of Partners Program funds on agreements to benefit the gopher tortoise in the Program Area.

### **2.3 Alternatives Considered but Eliminated from Detailed Analyses**

The Service considered alternatives to implementing the program that would eliminate the use of heavy equipment and prescribed burning, which are the habitat restoration and

improvement methods that are most likely to harm tortoises and commensal species. Although removing undesirable trees and debris, controlling invasive species, and constructing fire breaks, etc., without heavy equipment would reduce or eliminate the potential for take, it is likely more costly because manual labor must substitute for machinery and requires much more time. Conservatively, a skilled heavy equipment operator accomplishes as much in an hour at a cost of about \$100 as 10 or more workers with hand tools at a cost of over \$150. This additional cost, plus the difficulties of organizing large crews in rural areas, would thereby reduce the acreage the Service could enroll under the program, compromising its overall success. Further, the use of prescribed fire is essential to restoring and maintaining the vegetation community that supports healthy tortoise populations. Therefore, alternatives that do not rely upon heavy equipment and burning were dropped from detailed analysis because they would not satisfy the purpose of the program.

### **3.0 Affected Environment**

The scope of this proposed action in Alabama and Georgia was developed by constructing polygons around areas with known viable gopher tortoise populations and/or suitable soils for gopher tortoise habitat. Within this Program Area, we expect that many of the private landowners who would voluntarily enroll under this program have relatively small (less than 300 acres) tracts of former loblolly pine plantations that they have recently clear cut. If plant succession is not managed in these areas following clear-cut operations, they are typically invaded by species (e.g., cogon grass) that likewise provide poor habitat for gopher tortoises. Other sites that potentially could be enrolled may support mature longleaf or loblolly pine plantations. On mature longleaf and loblolly sites, Partner program actions will typically focus on enhancing gopher tortoise habitat by reducing canopy cover (if needed) and increasing groundcover that provides forage for gopher tortoise.

Gopher tortoises require relatively well-drained, sandy soils for burrowing and nest construction. Gopher tortoise burrows are typically located on well drained (rapid to moderate percolation rate), sandy soils where the groundwater table or impermeable clay or rock layer is at least 2 feet (0.5 m) below the soil surface.

The purpose of an EA is to determine whether the proposed action would have significant impacts on the environment. The restoration practices described in Section 2.1.1 and Appendix A all qualify for categorical exclusions under Service NEPA policy, which means that our agency has pre-determined that these actions do not have significant effects on the environment, unless extraordinary circumstances apply. As discussed in section 1.1, species protected under the ESA may occur on properties enrolled in the gopher tortoise program and the proposed restoration activities may incidentally injure, kill, harass, or otherwise take individuals of these species. Under these circumstances, an EA, as well as intra-Service consultation under the Endangered Species Act, is necessary. Our effects analysis is limited to the direct and indirect effects of the proposed habitat restoration practices on ESA-protected species; however, consistent with Service policy, we also consider effects to species that are candidates or are proposed for ESA protection.

### **3.1 Program Area ESA-Protected, Proposed, Candidate, and Petitioned Species**

As described in Section 2.1, we defined the Program Area based on known occurrences of gopher tortoises and soils that are suitable for gopher tortoises (Figure 1 and Figure 2). Table 1 lists species that are endangered, threatened, proposed as endangered or threatened, or candidates for protection under the ESA for which either (1) we have records of occurrence in the Program Area or (2) the known species' range extends into the Program Area. Table 1 also lists species in the Program Area that the Service has been petitioned to list, but for which no listing decision has yet been made. The sources of information for Table 1 are the element occurrence records from the Georgia Department of Natural Resources, Alabama Natural Heritage Program, NatureServe, and input from species experts in Georgia and Alabama. Because this EA addresses a program under which the Service intends to implement many site-specific landowner agreements, but the precise locations of these agreements are not yet known, we did not conduct new surveys for any of these species. In preparing a project plan for each agreement, Service biologists will inspect the potential enrollment lands and determine to the extent practicable the presence of protected and at-risk species, and customize the agreement accordingly.

The fish and mussels listed in Table 1 may occur in streams adjacent to upland sandhill or longleaf habitat, and wood storks may forage in adjacent wetlands; however, with implementation of the conservation measures described in Section 2.1.2 of this document, no direct or indirect impacts are expected to these species. Similarly, required conservation measures will minimize potential impacts of the Partners gopher tortoise program on red-cockaded woodpeckers, which often occur.

The proposed action may affect the two flatwoods salamanders, the green newt, black pine and Eastern indigo snakes, Eastern diamondback rattlesnakes, gopher tortoise, American chaffseed, and Cooley's meadowrue, all of which are longleaf or sandhill dependent. We are not able to develop conservation measures that will minimize the potential that these species may be killed, injured, harassed, or otherwise impacted during site preparation, prescribed burning, herbicide application, slash removal, construction of fire breaks, and other project actions. Although we anticipate some impact to these nine species during program implementation on enrolled sites, the long-term effect is likely to be beneficial, since program actions will both create new habitat and enhance existing habitat for these species. We provide more detailed information about the nine sandhill species in the following sections and address potential impacts to Table 1 species under Section 4, Environmental Consequences.

There are approximately 70 petitioned species that potentially occur with the Program Area. Of those, 32 are associated with longleaf pine ecosystems and could potentially occur on the areas restored through this Agreement. Table 1 lists the species that are petitioned for protection under the ESA for which we have records of occurrence or are longleaf pine dependent species in the Program Area. In preparing a project plan for each agreement, Service biologists will inspect the potential enrollment lands and determine to the extent practicable the presence of protected and at-risk species, and customize the agreement accordingly. Conservation measures described in Section 2.1.2 should reduce, but not

eliminate project impacts to most of these species; we anticipate the long-term effect is likely to be beneficial, since program actions will both create new habitat and enhance existing habitat for these species.

**Table 1.** Species known to occur in the Program Area (Figure 1 and 2) that are either endangered, threatened, proposed as endangered or threatened, or candidates for protection under the Endangered Species Act.

Common Name	Scientific Name	Status	State(s)	Habitat
Amphibian				
Chamberlain's Dwarf Salamander	<i>Eurycea chamberlaini</i>	P	GA	Mesic forests with relatively closed canopies, in particular bottomland forests
Frosted Flatwoods Salamander	<i>Ambystoma cingulatum</i>	T	GA	Mesic flatwoods habitats within longleaf pine-wiregrass community
Georgia Blind Salamander	<i>Haideotriton wallacei</i>	P	GA	Caves and aquifers; rarely seen above ground.
Gopher Frog	<i>Lithobates capito</i>	P	GA	Longleaf pine ecosystems. Lives in animal burrows, including those created by gopher tortoises and oldfield mouse ( <i>Peromyscus polionotus</i> ). In soggy soils of mesic flatwoods, where tortoise are absent, crayfish burrows may be used. Breeds in isolated, ephemeral, depressional wetlands.
One-Toed Amphiuma	<i>Amphiuma pholeter</i>	P	GA	Aquatic; live in permanent or semi-permanent bodies of water; burrows in the mud at the bottom of the waterway
Red Hills Salamander	<i>Phaeognathus hubrichti</i>	T	AL	Steep slopes of ravines and bluffs dominated by hardwood trees
Reticulated Flatwoods Salamander	<i>Ambystoma bishopi</i>	E	GA	Mesic flatwoods habitats within longleaf pine-wiregrass community
Striped Newt	<i>Notophthalmus perstriatus</i>	C	GA	Adults use sandhills and well-drained pine flatwoods. Breeding and larval development occur in isolated, usually ephemeral, wetlands.
Reptile				
Alligator Snapping	<i>Macrochelys</i>	P	GA	Large streams and rivers (and

Common Name	Scientific Name	Status	State(s)	Habitat
Turtle	<i>temminckii</i>			associated impoundments) in areas with undercut banks, log jams, and deep holes
Barbour's Map Turtle	<i>Graptemys barbouri</i>	P	GA	Relatively wide and swiftly flowing streams with abundant snags and fallen trees
Black Pine Snake	<i>Pituophis melanoleucus lodingi</i>	C	AL	Xeric, fire-maintained longleaf pine forest
Eastern Diamondback Rattlesnake	<i>Crotalus adamanteus</i>	P	GA	Dry sandy areas, palmetto or wiregrass flatwoods, pinewoods, coastal dune habitats, or hardwood hammocks; sometimes live along the edges of swamps. Winter in stump holes or tortoise burrows
Eastern Indigo Snake	<i>Drymarchon couperi</i>	T	AL,GA	Closely associated with longleaf pine habitats, such as sandhills and turkey oak
Florida Pine Snake	<i>Pituophis melanoleucus mugitus</i>	P	GA	Requires dry sandy soils for burrowing. It is found most often in open pine-turkey oak woodlands and abandoned fields, and also in scrub, sandhills, and longleaf pine forest
Gopher Tortoise	<i>Gopherus polyphemus</i>	C	AL,GA	Longleaf pine and wiregrass community
Southern Hog-Nosed Snake	<i>Heterodon simus</i>	P	GA	Well drained, xeric, sandy soils with longleaf pine and/or scrub oaks (especially turkey oak). Burrow both for cover and to unearth toads, their preferred prey. Surface activity is strictly diurnal and is apparently reduced during the middle of summer.
Spotted Turtle	<i>Clemmys guttata</i>	P	GA	Heavily vegetated, shallow wetlands with standing or slowly flowing water
Bird				
Red-Cockaded Woodpecker	<i>Picoides borealis</i>	E	AL,GA	Mature, open pine forest, particularly longleaf, slash, or loblolly pine
Wood Stork	<i>Mycteria americana</i>	E	AL	Freshwater and estuarine

Common Name	Scientific Name	Status	State(s)	Habitat
				wetlands
Mammal				
Florida Manatee	<i>Trichechus manatus</i>	E	GA	Coastal marine and riverine waters.
Gray Bat	<i>Myotis grisescens</i>	E	AL	Roosts and hibernates exclusively in caves. Forages over open water near a forested shoreline.
Fish				
Alabama Sturgeon	<i>Alosa alabamae</i>	E	AL	Mainstem reaches of rivers and large streams.
Bluestripe Shiner	<i>Cyprinella callitaenia</i>	P	AL,GA	Mainstem reaches of rivers and large streams in riffles and
Broadstripe Shiner	<i>Pteronotropis euryzonus</i>	P	GA	Mainstem and large streams in riffles and runs with rubble or sand substrate
Gulf Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	AL	Mainstem reaches of rivers and large streams.
Halloween Darter	<i>Percina crypta</i>	P	AL,GA	Mainstems and larger tributaries in shallow, swift-flowing riffles or shoals over cobble, gravel, and bedrock, and often in association with the aquatic plant, riverweed ( <i>Podostemum ceratophyllum</i> ).
Robust Redhorse	<i>Moxostoma robustum</i>	P	GA	Main-stem rivers in riffles, runs, and pools
Mussel				
Alabama Heelsplitter	<i>Potamilus inflatus</i>	T	AL	Aquatic
Alabama Hickorynut	<i>Obovaria unicolor</i>	P	AL	Aquatic
Alabama Pearlshell	<i>Margaritifera marrianae</i>	E	AL	Aquatic
Altamaha Arcmussel	<i>Alasmidonta arcula</i>	P	GA	Sloughs, oxbows, or depositional areas in large creeks to large rivers with silt, mud, and/or sand substrates, but most commonly over fine sand
Apalachicola Floater	<i>Anodonta heardi</i>	P	GA	Mud, sand, or detritus substrates in lakes, oxbows, sloughs, and backwaters
Brother Spike	<i>Elliptio fraternum</i>	P	AL	Aquatic
Chipola Slabshell	<i>Elliptio chipolaensis</i>	T	AL	Aquatic
Choctaw Bean	<i>Villosa choctawensis</i>	E	AL	Aquatic

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>	<b>State(s)</b>	<b>Habitat</b>
Delicate Spike	<i>Elliptio arctata</i>	P	AL,GA	Aquatic
Fuzzy Pigtoe	<i>Pleurobema strodeanum</i>	T	AL	Aquatic
Gulf Moccasinshell	<i>Medionidus penicillatus</i>	E	AL,GA	Aquatic
Inflated Floater	<i>Pyganodon gibbosa</i>	P	GA	Found in soft substrates such as mud, silts or fine sand
Inflated Spike	<i>Elliptio purpurella</i>	P	AL,GA	Sand and limestone shoals in medium sized creeks to large rivers
Narrow Pigtoe	<i>Fusconaia escambia</i>	T	AL	Aquatic
Oval Pigtoe	<i>Pleurobema pyriforme</i>	E	AL,GA	Aquatic
Purple Bankclimber	<i>Elliptoideus sloatianus</i>	T	GA	Aquatic
Rayed Creekshell	<i>Anodontoides radiatus</i>	P	AL,GA	Mud, sand, or gravel substrates in small creeks to large rivers
Round Ebonyshell	<i>Fusconaia rotulata</i>	E	AL	Aquatic
Savannah Lilliput	<i>Toxolasma pullus</i>	P	GA	Shallow water near the banks of streams, rivers, ponds, and lakes with little flow in soft substrates such as mud, silty sand, and sand.
Shinyrayed Pocketbook	<i>Hamiota subangulata</i>	E	AL,GA	Aquatic
Southern Clubshell	<i>Pleurobema decisum</i>	E	AL	Aquatic
Southern Elktoe	<i>Alasmidonta triangulata</i>	P	AL,GA	Large creeks to large rivers with soft substrates of silt, mud, sand, or gravel, often in backwaters and pools
Southern Kidneyshell	<i>Ptychobranthus jonesi</i>	E	AL	Aquatic
Southern Sandshell	<i>Hamiota australis</i>	E	AL	Aquatic
Tapered Pigtoe	<i>Fusconaia burkei</i>	T	AL	Aquatic
Crayfish				
Angular Dwarf Crayfish	<i>Cambarellus lesliei</i>	P	AL	Permanent pools and streams
Broad River Burrowing Crayfish	<i>Distocambarus devexus</i>	P	AL,GA	Burrows adjacent to streams or in low areas where the water table is near the surface of the ground. Individuals, particularly juveniles, are frequently collected in temporary pools and ephemeral streams.
Burrowing Bog Crayfish	<i>Fallicambarus burrisi</i>	P	AL	Burrower in pitcher plant bogs

Common Name	Scientific Name	Status	State(s)	Habitat
Dougherty Plain Cave Crayfish	<i>Cambarus cryptodytes</i>	P	GA	Underwater caves, wells, and other subterranean habitat.
Least Crayfish	<i>Cambarellus diminutus</i>	P	AL	Ditches and pools in sluggish streams
Speckled Burrowing Crayfish	<i>Fallicambarus danielae</i>	P	AL	Aquatic
Sucarnoochee River Crayfish	<i>Orconectes jonesi</i>	P	AL	Permanent streams
Snail				
Beaver-Pond Marstonia	<i>Marstonia/Pyrgulopsis castor</i>	P	GA	Freshwater aquatic
Cylinder Elimia	<i>Elimia cylindracea</i>	P	AL	Aquatic
Ocmulgee Marstonia	<i>Marstonia agarhecta</i>	P	GA	Freshwater aquatic
Reverse Pebblesnail	<i>Somatogyrus alcoviensis</i>	P	GA	Freshwater aquatic
Spotted Rocksnail	<i>Leptoxis picta</i>	P	AL	Aquatic
Caddisfly				
Little Oecetis Longhorn Caddisfly	<i>Oecetis parva</i>	P	AL	Aquatic
Setose Cream And Brown Mottled Microcaddisfly	<i>Oxyethira setosa</i>	P	AL,GA	Aquatic
Three-Toothed Triaenoides Caddisfly	<i>Triaenodes tridontus</i>	P	AL	Aquatic
Dragonfly				
Calvert's Emerald	<i>Somatochlora calverti</i>	P	AL	Boggy forest seepages
Say's Spiketail	<i>Cordulegaster sayi</i>	P	GA	Longleaf pine endemic. Nymphs are found in first and second order silt-bottom seepage streams adjacent ot longleaf pine uplands, or where absend, to weedy fields and open woodlands that provide foraging habitat.
Plant				
American Chaffseed	<i>Schwalbea americana</i>	E	AL,GA	Frequently burned longleaf pine sandhills, savannas, and flatwoods
Barren Strawberry	<i>Waldsteinia lobata</i>	P	GA	Stream terraces, floodplain forests, and rocky, lower slopes with oak-hickory-pine forest
Bearded Beaksedge	<i>Rhynchospora crinipes</i>	P	GA	Banks and sandbars of cool blackwater streams and spring runs

Common Name	Scientific Name	Status	State(s)	Habitat
Bigpod Wild Indigo	<i>Baptisia megacarpa</i>	P	GA	Well drained, sandy ridges in floodplains, stream terraces, and low, hardwood dominated slopes
Bog Spicebush	<i>Lindera subcoriacea</i>	P	AL, GA	Shrubby, seepage wetlands with peaty-mucky soils and continuous water source
Boykin Lobelia	<i>Lobelia boykinii</i>	P	AL, GA	Cypress - black gum depression ponds, limesink depression ponds, Carolina Bays, wet pine savannas and flatwoods, wet ditches.
Carolina Bogmint	<i>Macbridea caroliniana</i>	P	GA	Blackwater creek swamps
Cooley's Meadowrue	<i>Thalictrum cooleyi</i>	E	GA	Wet savannas and flatwoods over basic soils, also roadsides and powerlines through these habitats
Creeping Smallflower Seedbox	<i>Ludwigia spathulata</i>	P	GA	Exposed shores and bottoms of cypress - gum depression ponds and limesink depression ponds; granite outcrop pools
Curtiss' Loosestrife	<i>Lythrum curtissii</i>	P	GA	Swamps over limestone, clearings in wet pine flatwoods, sunny patches in stream thickets and floodplain forests
Dwarf Hatpins	<i>Eriocaulon koernickianum</i>	P	GA	Carolina bays
Elliott Croton	<i>Croton elliotii</i>	P	AL, GA	Exposed shores of limesink depression ponds, flatwoods ponds, and clay-based Carolina bays
Floodplain Tickseed	<i>Coreopsis integrifolia</i>	P	GA	Streambanks and floodplains of blackwater streams
Florida Willow	<i>Salix floridana</i>	P	GA	Edges of spring-fed streams and springheads, openings in wet woods
Gentian Pinkroot	<i>Spigelia gentianoides</i>	E	AL	Wooded areas dominated by trees such as loblolly pine, longleaf pine, various oaks, and black tupelo. Also occurs in dolomite glades in Alabama
Georgia Aster	<i>Symphotrichum georgianum</i>	P	GA	Edges and openings in rocky, upland oak-hickory-pine forests, and rights-of-way

Common Name	Scientific Name	Status	State(s)	Habitat
				through these habitats
Georgia Rockcress	<i>Arabis georgianum</i>	C	AL,GA	Shallow, basic or circumneutral, soils on rocky slopes above streams; thin woods on limestone or granite bluffs; hardwood forests on slopes above streams; sandy, recently eroded riverbanks
Godfrey's Wild Privet	<i>Forestiera godfreyi</i>	P	GA	Muddy shores and exposed bottoms of limesink, flatwoods, and farm ponds, silty sandbars in blackwater rivers, dried-up backwater sloughs
Gulf Sweet Pitcherplant	<i>Sarracenia rubra ssp. gulfensis</i>	P	GA	Bogs, seepy stream banks, wet savannas, Atlantic white cedar swamps, wet pine flatwoods; powerlines and ditches through these habitats
Hall Bulrush	<i>Schoenoplectus hallii</i>	P	GA	Peaty sand around the edges of natural ponds with fluctuating water levels
Harper's Fimbry	<i>Fimbristylis perpusilla</i>	P	GA	Seepage areas and wet depressions on Piedmont granite flatrocks
Hartwrightia	<i>Hartwrightia floridana</i>	P	GA	Wet flatwoods, hillside seeps, and savannas with wet, peaty soils
Little River Black-Eyed Susan	<i>Rudbeckia heliopsisidis</i>	P	GA	Limestone or sandstone outcrops and nearby streamsides, Coosa Valley prairies, and roadsides and rights-of-way through these habitats
Long Beach Seedbox	<i>Ludwigia brevipes</i>	P	GA	Shallow water, pond shores, blackwater rivers, interdunal swales, marshes, shores of impoundments, ditches
Mock Bishop-Weed	<i>Ptilimnium ahlesii</i>	P	GA	Moist or wet habitats
Monkeyface Orchid	<i>Platanthera integrilabia</i>	P	GA	Seepage sphagnum bogs, springheads, seepy stream banks, red maple-black gum swamps
Narrowleaf Naiad	<i>Najas filifolia</i>	P	GA	Sand-bottomed ponds and lakes
Ocmulgee Skullcap	<i>Scutellaria ocmulgee</i>	P	GA	Moist hardwood forests on

Common Name	Scientific Name	Status	State(s)	Habitat
				stream terraces, slopes, and bluffs
Panhandle Meadow-Beauty	<i>Rhexia salicifolia</i>	P	AL	Sunny margins of depression marshes, flatwoods ponds, and sinkhole ponds, in wet sands or peats
Pondberry	<i>Lindera melissifolia</i>	E	AL,GA	Edges of sandhill ponds and limesinks
Purple Honeycomb Head	<i>Balduina atropurpurea</i>	P	GA	Wet pine flatwoods and savannas, seepage slopes, pitcherplant bogs, and wet ditches
Quillwort	<i>Isoetes hyemalis</i>	P	GA	Densely shaded blackwater creeks
Relict Trillium	<i>Trillium reliquum</i>	E	AL	Mature hardwood forests in rich ravines and on stream terraces
Small-Flowered White Meadowbeauty	<i>Rhexia parviflora</i>	P	AL,GA	Edges of limesink ponds; wet, peaty sands around depression ponds
Swamp Black-Eyed Susan	<i>Rudbeckia auriculata</i>	P	GA	Sunny wet meadows, bogs, and seeps; edges of swamps and floodplains; stream banks and islands; wet rock outcrops; roadside ditches and rights-of-way through these habitats
Swamp Buckthorn	<i>Sideroxylon thornei</i>	P	GA	Forested limesink depressions and swamps over limestone
Thorne's Beakrush	<i>Rhynchospora thornei</i>	P	AL,GA	Edges of limesink ponds, wet seeps over calcium-rich rock, openings and stream edges in wet to moist prairies; ditches and rights-of-way through these habitats
Variable-Leaf Indian-Plantain	<i>Arnoglossum diversifolium</i>	P	AL, GA	Openings in floodplain forests
Wire-Leaved Dropseed	<i>Sporobolus teretifolius</i>	P	AL,GA	Wet savannas with longleaf pine and wiregrass, seepage slopes, pitcherplant bogs, wet edges of streamside thickets

<sup>1</sup>E=endangered; T=threatened; C=candidate;  
P=Proposed

### **3.2 Frosted and Reticulated Flatwoods Salamanders**

The frosted and reticulated flatwoods salamanders are endemic to mesic flatwoods habitats within the longleaf pine-wiregrass community. Nearly all flatwoods salamander sites currently dominated by slash pine have been converted from historic longleaf pine stands. As adults, flatwoods salamanders are primarily fossorial, living in burrows just below the soil surface. Triggered by rain-laden cold fronts during the fall and early winter breeding season, mature salamanders nocturnally migrate to isolated wetlands en masse. Movements of more than 1.6 km (1 mile) from a breeding site to a terrestrial retreat have been reported. Breeding sites are typically shallow, ephemeral cypress and/or swamp tupelo ponds or "domes," although flooded borrow pits, roadside ditches, and deep firebreaks are occasionally used. Breeding sites are also dependent on periodic dry season fires, which maintain an open canopy conducive to the luxuriant growth of emergent and submerged grasses, sedges, and forbs necessary for sheltering the aquatic larvae. A developmental period of 11 - 18 weeks follows hatching, and larvae typically metamorphose in March or April.

Adults are known to eat earthworms, but likely consume other invertebrates as well. Larvae eat a variety of aquatic invertebrates, especially crustaceans such as amphipods and isopods. Captive larvae readily eat small tadpoles and may also do so in the wild.

Flatwoods salamanders are restricted to the Coastal Plain of South Carolina, Georgia, Florida, and Alabama. Habitat loss has been the primary cause of these salamanders' demise throughout the range. Agriculture and silviculture have eliminated the vast majority of the once widespread longleaf pine flatwoods community in Georgia and elsewhere. Pine flatwoods are typically underlain by semi-hydric soils; forestry practices that involve altering the hydrology by ditching, draining, and/or bedding are detrimental to both the fossorial and aquatic forms and may interfere with successful migration. Ditching and draining isolated wetlands used by breeding flatwoods salamanders significantly shortens their hydroperiod, halting larval development prior to metamorphosis. Fire suppression throughout the Coastal Plain has also reduced the amount of suitable habitat.

Conservation and Management Recommendations: Avoidance of mechanical disturbance to the soil and discontinuing practices which may result in adverse hydrological impacts to breeding sites are critical, especially within at least a 1.6 km (1 mile) radius from the edge of all known breeding sites. Periodic lightning-season burns should be prescribed in pinelands inhabited by flatwoods salamanders, and these fires allowed to burn into isolated wetlands.

### **3.3 Striped Newt**

Striped newts are associated with longleaf pine-wiregrass communities. Sandhills and well-drained pine flatwoods are favored adult habitats. Breeding and larval development occurs in isolated, usually ephemeral, wetlands such as pond cypress domes, sinkhole ponds (lime sinks), and even borrow pits. Ponds are usually vegetated with an abundance of emergent grasses, sedges, and forbs. Maidencane (*Panicum hemitomon*) may be common at breeding ponds. Striped newts eat a variety of invertebrates, such as insects and crustaceans, as well as frog eggs.

Breeding occurs in late winter and early spring when fluctuating ponds are filled with rainwater. After hatching, larvae typically develop over a period of two or three months and, following transformation begin a 1- 3 year intermediate life stage, or "eft" stage, in which they are exclusively terrestrial. Following this stage, and upon reaching sexual maturity, efts usually return to isolated ponds during winter rains, where they remain as aquatic adults until drought forces them back to land. Occasionally, when ponds remain filled throughout the dry season, striped newts will omit the terrestrial eft stage and develop into larviform, or neotenic, adults that retain bushy gills. After breeding, these neotenic animals transform and become terrestrial.

Striped newts have a relatively small range that extends from the Georgia side of the Savannah River into northern and peninsular Florida. In Georgia, striped newts occur in the lower and middle Coastal Plain and at one site in the Upper Coastal Plain, but are apparently absent from the Red Hills of southwestern Georgia. The striped newt is threatened by the loss of both upland and wetland habitats. Extensive agricultural and silvicultural practices have replaced natural, open-canopied longleaf pine communities with frequently tilled fields and dense pine monocultures. In many areas, fire suppression has led to an unnatural succession of pine forests into densely forested, mixed hardwood communities. Drainage of isolated wetlands has significantly reduced the availability of suitable breeding sites for striped newts.

**Conservation and Management Recommendations:** Efforts should be made to create low impact buffer zones surrounding breeding sites that incorporate a substantial amount of upland habitat. In areas known to contain striped newts, forest managers should minimize heavy soil disturbance, incorporate longer rotations, and reduce the basal area of planted pines. Habitat management for the gopher tortoise is appropriate for the striped newt. Periodic fires are necessary to control woody midstory vegetation in upland habitats and should be allowed to burn into isolated wetlands. Drainage of isolated wetlands should be avoided.

### **3.4 Gopher Tortoise**

*Western Portion of Alabama.* On commercial forests in Alabama and Mississippi, tortoise surveys were conducted from July 1999 through May 2001 on about 11,838 ha (29,252 ac). Survey sites were selected opportunistically and not based on known tortoise populations or habitat suitability for tortoises. About 0.05 active burrows per ha (0.02 per ac) were found in these mostly closed-canopy slash and loblolly pine forests (Guyer et al. 2003). Burrow surveys conducted on corporate pine forests in southern Mississippi and southwestern Alabama on soils that were variably suitable for gopher tortoises did not detect active burrows on about 88 percent of surveyed sites (Jones and Dorr 2004). Where burrows were detected, densities of active burrows ranged from 0.10–0.60 burrows per ha (0.04–0.24 burrows per ac) (Jones and Dorr 2004).

*Eastern Portion of Alabama.* The official Web site of the Alabama Department of Conservation and Natural Resources, [http:// www.outdooralabama.com](http://www.outdooralabama.com) (accessed September 9, 2010), reports that gopher tortoises are found in Baldwin, Barbour, Bullock, Butler,

Clarke, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Monroe, Montgomery, Pike, and Wilcox Counties. Small introduced populations also occur in Autauga and Macon counties. Alabama is in the initial stages of planning surveys or censuses for the gopher tortoise in the eastern portion of the range. Therefore, no data currently exist to evaluate the status of tortoises on public lands in the eastern portion of the range in Alabama, beyond general counties of occurrence. In 2003, surveyors found 636 active gopher tortoise burrows at Fort Rucker, Alabama, which was reported to have about 19,830 ha (49,000 ac) of potential tortoise habitat (Southeast Regional Partnership for Planning and Sustainability 2010).

*Georgia.* In seven southwest Georgia counties, tortoise burrow surveys conducted at randomly selected forest units with suitable soils for gopher tortoises found that 64 percent of the parcels contained no gopher tortoise burrows (Hermann *et al.* 2002). On parcels that were occupied, burrow densities ranged from 0.04 per ha (0.02 per ac) to 2.2 per ha (0.9 per ac) with a mean of 1.1 per ha (0.4 per ac) (Hermann *et al.* 2002). Suitable soils that had non-timber agriculture, hardwoods, and planted pine plantations were about 6 times less likely to have burrows and contained 20 times fewer tortoise burrows than open pine sites (Hermann *et al.* 2002).

Recently, burrow surveys using line transect distance sampling and burrow scoping were conducted on 20 wildlife management areas, State parks, and other public lands in southern Georgia. No tortoises were observed at one parcel, and seven others had burrow densities that were insufficient to accurately estimate population levels (Smith *et al.* 2009). Thirteen sites contained populations ranging from 48– 321 individuals with densities of 0.21– 1.65 tortoises per ha (0.08–0.68 tortoises per ac). In general, burrow size class distribution were skewed toward adult tortoises suggesting low recruitment of juveniles.

One-time burrow surveys from Kings Bay Naval Submarine Base in southeastern Georgia indicated a total of 200 active burrows including juvenile and hatchling-sized burrows. The majority of burrows occurred in ruderal, edge, or transition habitat, sandhill, and young pine (Tuberville *et al.* 2009). Area of gopher tortoise habitat for Kings Bay Naval Submarine Base was not provided. Native pine forests were degraded and in need of management (Tuberville *et al.* 2009).

Surveys on 12 study sites at Fort Benning, Georgia, during 1995 found active and recently used burrow densities ranging from 0.05–1.2 per ha (0.02–0.49 per ac) (Styrsky 2010). About 2,700 active burrows were estimated to occur on Fort Benning during 1998 surveys, and with nearly 25,375 ha (62,700 ac) of potential habitat, this equates to about 0.11 active burrows per ha (0.04 burrows per ac) (Southeast Regional Partnership for Planning and Sustainability 2009).

Surveys on Fort Gordon, Georgia, located 147 active burrows on about 4,570 ha (11,300 acres) of tortoise habitat or about 0.03 active burrow per ha (0.01 per ac). During 2009 surveys on Fort Stewart, Georgia, 4,045 active burrows were located with a reported 5,790 ha (14,300 ac) of tortoise habitat or about 0.70 burrows per ha (0.28 per ac) (Southeast Regional Partnership for Planning and Sustainability 2009).

Okefenokee NWR surveyed two tracts in 2010 and found an 11 ha tract had 73 active, and 35 inactive, burrows and an 18 ha tract had 31 active and 16 inactive burrows. Surveys on a 102 ha (250 ac) tract on the Eufaula NWR in both Georgia and Alabama found 30 active tortoise burrows.

Conservation and Management Recommendations: Protection of remaining natural longleaf pine forests will benefit the gopher tortoise, as well as a large suite of rare animals and plants that use gopher tortoise burrows. The use of periodic controlled burns should be practiced to reduce hardwood vegetation and promote grasses and forbs.

### **3.5 Eastern Indigo Snake**

Indigo snakes utilize a variety of habitat types during the course of the year. During the warmer months, daylight hours are often spent foraging on the edge of wetlands, adjacent to or interspersed within sandy uplands, where frogs and other snakes are typically abundant. Indigos utilize a very large area, up to or exceeding 800 hectares (2000 acres), during this period. However, they become relatively concentrated on upland sand ridges once winter approaches. These snakes use gopher tortoise burrows and stump holes as shelter during the winter; gopher tortoise and armadillo burrows, root and stump channels, timber debris piles, and other areas are used as shelter in summer. Within the Altamaha Grit areas of Georgia, fissures within sandstone outcroppings often prove suitable for shelters. Eastern indigo snakes feed on a wide variety of vertebrate prey including birds, small mammals, fishes, frogs, small turtles, lizards and snakes (including venomous snakes).

Eggs are laid primarily in gopher tortoise burrows in Georgia, but occasionally in fallen logs and other habitats, from April through July. During the active season indigo snakes may move long distances and often forage along wetland margins. Historically, the eastern indigo snake ranged from southeastern Georgia south and west to southeastern Mississippi. The current stronghold for the eastern indigo snake is southeastern Georgia and peninsular Florida. The eastern indigo snake persists in the panhandle of Florida in lower numbers than these two areas. It is functionally extinct in Alabama and Mississippi; however, a project has been initiated in Alabama to establish an eastern indigo snake population on the Conecuh National Forest where longleaf pine restoration work has been successful.

Eastern indigo snakes are tied to the use of gopher tortoise burrows and their longleaf pine habitat in the northern parts of their range (southeastern Georgia and the panhandle of Florida). Due to loss of longleaf pine forests in these areas, and the subsequent decline in gopher tortoises, eastern indigo snakes have also declined. Appropriate management of occupied eastern indigo snake sites continues to be a challenge. Fire suppression, in particular, is affecting many of the remaining natural areas. Implementing long-term management on lands occupied by indigo snakes is necessary if recovery is to be achieved. Public agencies are attempting to conduct ecosystem management on their lands, but improvements in consistent implementation are needed. Indigo snakes also have become increasingly vulnerable to vehicles and to humans who indiscriminately kill any snake seen. Many populations were depleted by collection for the pet trade previous to their federal

listing and protection under the Endangered Species Act. Despite being illegal, the continued practice of introducing gasoline down gopher tortoise burrows ("gassing") to drive out eastern diamondback rattlesnakes results in the likely death of all burrow inhabitants, including the indigo snake.

Conservation and Management Recommendations: Significantly large areas inhabited by indigo snakes should be protected from further degradation. This includes avoidance of intensive soil disturbance and continuation or initiation of a periodic prescribed burning program. Any efforts to protect or enhance gopher tortoise populations should benefit the indigo snake, black pine snake and Eastern diamondback rattlesnake as well. Stronger enforcement of the laws prohibiting the gassing of tortoise burrows is encouraged. Education aimed at reducing or eliminating the unwarranted fears and misconceptions of nonvenomous snakes is perhaps the most critical long-term conservation measure that can be undertaken.

### **3.6 Black Pine Snake**

The black pine snake occurs in xeric, fire-maintained longleaf pine forest with sandy, well-drained soils, usually on hilltops, ridges, and toward the tops of slopes, with open canopy, reduced midstory, and dense herbaceous understory. Riparian areas, hardwood forests, or other closed-canopy conditions are not regularly used. Gopher tortoise burrows are rarely used, even where abundant. Instead, this snake spends much time underground in root channels of rotting pine stumps. Mean home range size is significantly less than the Eastern indigo snake (47.5 hectares; 117 acres). Principal prey is small mammals (cotton rats, mice, young rabbits), but some birds and bird eggs also are taken.

There are historical records for the black pine snake from three counties in Alabama west of the Mobile River Delta (Clarke, Mobile, and Washington counties). Duran (1998) recently completed a status survey that determined the black pine snake is still present in all three counties; however, the distribution of populations within these counties has become highly restricted due to the fragmentation of the remaining longleaf pine habitat. Most of the remaining populations in Alabama occupy private, non-industrial timberland where they have an uncertain future. All black pine snake populations outside of the DeSoto National Forest appear to be small and isolated on islands of suitable longleaf pine habitat (Duran 1998).

### **3.7 Eastern diamondback rattlesnake**

The historical native habitat for the eastern diamondback rattlesnake was longleaf pine savannahs (Martin and Means 2000, p. 20). Due to the decline of these habitats, the snake occupies remaining longleaf pine ecosystems of where open-canopy, ruderal forests and grasslands that mimic the native vegetation have developed. Remaining or restored longleaf pine savannahs are maintained by frequent fires. The Eastern diamondback rattlesnake depends on underground shelters from fire and cold. The utilize gopher tortoise burrows as well as fire-burned pine stumpholes as these shelters (Timmerman and Martin 2003, p 8; Means 2005, p. 74).

In Alabama, the eastern diamondback rattlesnake occurs in the Lower Coastal Plain where longleaf pine and wiregrass originally dominated the uplands (NatureServe 2010). It is found primarily in the southwestern part of the State, in southern Washington and northern Mobile Counties, Alabama (Martin and Means 2000, p. 13; Timmerman and Martin 2003, p. 9). The only Federal land in Alabama with a record of the eastern diamondback within the last 10 years is the Bon Secour National Wildlife Refuge (NatureServe 2010 as cited in the petition on p. 12).

In Georgia, the extent of the current range of the eastern diamondback rattlesnake is probably essentially unchanged from presettlement times and includes the Coastal Strand and Barrier Island region of the Atlantic coast (Martin and Means 2000, p. 14). However, much of the habitat within the range has been lost to development, hurricanes, or absence of shelter (hardwood stumps), and its distribution is highly fragmented (Martin and Means 2000, pp. 16–17).

### **3.8 American Chaffseed**

Chaffseed is a long-lived perennial herb that occurs in frequently burned longleaf pine sandhills, savannas, and flatwoods. Chaffseed is a hemiparasite – although it produces carbohydrates by photosynthesis, it extracts water and minerals, particularly nitrogen, from the roots of host plants by means of sucker-like connections called haustoria. Host plants are diverse and include shrubs such as gallberry (*Ilex glabra*) and huckleberry (*Gaylussacia dumosa*), grasses such as panicgrass (*Panicum tenui*), and composites such as grass-leaved goldenaster (*Pityopsis graminifolia*), deertongue (*Carphephorus odoratissimus*), and aster (*Symphotrichum adnatum*).

Historically, plants were found from Massachusetts south to Florida and west to Texas, but most of these populations have been destroyed. Currently, the plant occurs in Georgia, North Carolina, and South Carolina. Primary threats are conversion of habitat to pine plantations, pastures, and developments and fire suppression.

Chaffseed flowers in response to fire and also in response to management activities, such as mowing and raking that mimic fire by removing old chaffseed stems and competing vegetation. Chaffseed plants may remain dormant during years of low rainfall and resprout once conditions improve. Its flowers are pollinated by bumblebees but will also produce fruits and viable seeds following self-pollination.

Conservation and Management Recommendations: Chaffseed benefits from prescribed fire every 2 - 3 years. Mechanical clearing, soil disturbance, and cutting fire lanes through habitats should be avoided.

### **3.9 Cooley's Meadowrue**

Cooley's meadowrue is a perennial herb found in wet savannas and flatwoods over basic soils, and along roadsides and powerlines through these habitats. The plant reproduces sexually and, occasionally by the spread of rhizomes. Persistence is threatened by conversion

of habitat to pine plantations or agriculture, fire suppression and encroachment by woody species, invasion by exotic pest plants such as Japanese honeysuckle

Conservation and Management Recommendations: Habitat should be burned every 2 - 3 years, or mowed early in the growing season, before flowering, to control woody plants. Disturbances to soil and hydrology should be prevented, and sites protected from conversion to pine plantations and other development.

#### **4.0 Environmental Consequences**

This section examines the effects of the proposed action and no action on the resources identified in Section 3, and concludes with a comparison of the two alternatives.

##### **4.1 Effects of Proposed Action on Reptiles and Amphibians**

With sufficient enrollment, habitat restoration and enhancement through landowner participation in the Partners gopher tortoise program will expand and connect the existing patchwork of habitat that is suitable for the gopher tortoise and other sandhill and longleaf-dependent species listed in Table 1, providing opportunity for population expansion and reducing isolation between colonies. Reducing habitat fragmentation should facilitate movement of these species into previously abandoned areas, if other habitat requirements, such as isolated wetlands for breeding, are present.

However, if these species are already present on the enrolled land, the process of converting the property from its present condition (generally a recently clear-cut pine plantation or mature, but degraded pine habitat) to open longleaf pine habitat with a diverse native ground cover could kill, injure, harass, or otherwise take individuals. Site preparation, prescribed burning, herbicide application, slash removal, construction of fire breaks, and other project actions may crush adults and/or eggs, collapse burrow habitats, and force individuals temporarily from suitable habitat. The general conservation measures described in Section 2.1 should reduce, but not eliminate, potential adverse effects of the proposed restoration practices on these species. Risks to gopher tortoises and other other herptiles are primarily associated with the use of heavy machinery, particularly adjacent to or on top of the burrows or within wetland breeding areas and associated buffers, and should not restrict the use of hand tools within the buffer area.

All three of the amphibians that occur in Georgia sandhill habitat have life cycles that require aquatic systems for breeding. The conservation measures described in Section 2.1 for wetland systems minimize potential adverse effects of the proposed restoration practices on these breeding habitat, and no take of eggs and larvae produced by these amphibians in breeding habitat is anticipated.

The Red Hills Salamander inhabits burrows on slopes of moist, cool mesic ravines that are shaded by an overstory of predominantly hardwood trees. The Red Hills salamander is unlikely to occur on the specific properties enrolled in the gopher tortoise program. Therefore, the proposed action is likely to have no effect on this species.

## **4.2 Effects of Proposed Action on Threatened, Endangered, Candidate, and Petitioned Plant Species**

The proposed Partners program is likely to have short-term adverse impact on two listed plants that occur in longleaf pine ecosystems: Cooley's meadowrue and American chaffseed. Site preparation, prescribed burning, herbicide application, slash removal, construction of fire breaks, and other project actions may crush plants and reduce recruitment in the short term. We are unable to develop conservation recommendations to reduce this impact. Long-term, the project is anticipated to benefit these fire-dependent species.

The gentian pinkroot is a fire dependent species that thrives beneath the burned out ground underneath the longleaf pines. It does not do well in loblolly pine plantations that are not managed by fire. American chaffseed also requires fire to reduce completion from midstory invasive species to create openings in the canopy to enhance their growth. Most of the surviving populations of American chaffseed occur in areas that are subject to frequent fire. These two species will benefit from the restoration of longleaf pine forests.

The relict trillium is associated with moist undisturbed hardwood forests with an understory of thick shrubs and vines. Pondberry is found in wetland habitats including bottomlands and hardwoods in interior areas and margins of sinks, ponds and depressions. Georgia rockcress is found on high bluffs along major rivers on dry to moderately moist soils of open rocky woodland and forested slopes. These plants are unlikely to occur on the specific properties enrolled in the gopher tortoise program. Therefore, the proposed action is likely to have no effect on these three species.

The wire-leaved dropseed is a fire dependent species that grows in wet savannas and moist pinelands. It is threatened by the continuing loss of longleaf pine-dominated communities which are converted to development and pine plantation. Wire-leaved dropseed requires fire to reduce completion from midstory invasive species to create openings in the canopy to enhance their growth. Thorne's beakrush inhabits edges of limesink ponds, wet seeps over calcium-rich rock, openings and stream edges in wet to moist prairies. This species does best when prescribed fire is applied every 2 – 3 years in adjacent uplands, allowing fire to burn into ponds and stream edges. Panhandle meadow-beauty and small-flower meadow-beauty both inhabit seepage slopes, margins of dome swamps, depression marshes and evergreen shrub ponds. Both of these species are fire-dependent species that are in habitats adjacent to uplands and require prescribed fire every 2 - 3 years in these uplands, allowing fires to burn into their wetland habitats. These four species will benefit from the restoration of longleaf pine forests.

The general conservation measures described in Section 2.1 that specifies designing practices in individual management plans to reduce impacts to plants and use of herbicides in a manner

that does not affect the seedbank should significantly reduce the potential adverse effects of the restoration practices.

#### **4.3 Effects of Proposed Action on Threatened, Endangered, Candidate, and Petitioned Fish, Mussel, and Other Invertebrate Species**

The proposed action is limited to upland situations; therefore, any effects to 5 fishes, 22 mussels, and 9 other invertebrate species listed in Table 1 would occur indirectly through changes in soil stability, runoff patterns, and water quality to nearby streams. Enrollment in the Partners gopher tortoise program will change the existing land use from either agriculture or short-rotation timber production to open longleaf pine for conservation purposes and for long-rotation timber production. The greatest impacts of forestry on water quality are associated with access roads and harvest operations, and harvest operations would become less frequent under the proposed action. Because longleaf pine is managed with longer rotation times, more longleaf pine habitat on the landscape provides a more persistent forest cover that reduces overall surface run-off and establishes more stable riparian zones, which filter run-off and provide thermal protection for stream fishes and invertebrates. Therefore, the long-term net effect of the proposed action on aquatic species is likely beneficial

Depending on site-specific circumstances (e.g., slope, proximity to streams), burning and site preparation practices described in Section 2.1.1 and Appendix A may temporarily increase soil erosion and thereby affect water quality until new vegetative cover is well established. The general and aquatic measures described in Section 2.1 for stream systems minimize potential adverse effects of the proposed restoration practices on these species, and no take is anticipated. Long-term, the project is anticipated to benefit these aquatic species.

#### **4.4 Effects of Proposed Action on Threatened, Endangered, and Candidate Bird and Mammal Species**

The bird and mammal species listed in Table 1, although present in the Program Area, are unlikely to occur on the specific properties enrolled in the gopher tortoise program. The red-cockaded woodpecker is most often associated with mature stands of longleaf pine, and the program properties are unlikely to yet contain suitable nesting or foraging habitats. Where existing populations of gopher tortoises overlap with existing populations of red-cockaded woodpeckers, the program would eventually benefit the woodpecker by expanding and linking otherwise fragmented longleaf pine habitats. The conservation measures described in Section 2.1 for red-cockaded woodpeckers will minimize potential adverse effects of the proposed restoration practices on this bird, and no take is anticipated.

The wood stork forages and breeds in wetlands. The conservation measures described in Section 2.1 for wetland systems will minimize potential adverse effects of the proposed restoration practices on this bird, and no is anticipated.

The Florida manatee uses marine and riverine aquatic habitats, and is unlikely to occur in immediate proximity to a gopher tortoise restoration site. The gray bat may roost in caves

along rivers in the program area and forage in and near riparian zones. The conservation measures described in Section 2.1 for stream will minimize potential adverse effects of the proposed restoration practices on these species, and no take is anticipated.

#### 4.5 Summary of Effects of Proposed Action on Threatened, Endangered, Candidate, and Petitioned Species

Based on our analysis of effects in Sections 4.1 through 4.4, Table 2 contains our determinations of the effects of the proposed action for threatened, endangered and candidate species that may occur in the Program Area. No species that are presently proposed for listing under the ESA are known to occur in the Program Area. This EA is our biological assessment under Section 7 of the ESA for nine amphibian, reptiles, and plant species that the proposed action may adversely affect, although we anticipate long-term beneficial effects from the action for these species. The Service’s Alabama and Georgia Field Offices will initiate formal consultation with the Service’s Southeast Regional Office while this EA is under public review.

**Table 2.** Effect determinations for threatened, endangered and candidate species that may occur in the Program Area.

Common Name	Status	State(s)	Conservation Measures	Effect
Amphibian				
Chamberlain's Dwarf Salamander	P	GA	N/A	NE
Frosted Flatwoods Salamander	T	GA	General and wetland	MAA
Georgia Blind Salamander	P	GA	N/A	NE
Gopher Frog	P	GA	General and wetland	MAA
One-Toed Amphiuma	P	GA	N/A	NE
Red Hills Salamander	T	AL	N/A	NE
Reticulated Flatwoods Salamander	E	GA	General and wetland	MAA
Striped Newt	C	GA	General and wetland	MAA
Reptile				
Alligator Snapping Turtle	P	GA	N/A	NE
Barbour's Map Turtle	P	GA	N/A	NE
Black Pine Snake	C	AL	General	MAA
Eastern Diamondback Rattlesnake	P	GA	General	MAA
Eastern Indigo Snake	T	AL, GA	General	MAA
Florida Pine Snake	P	GA	General	MAA
Gopher Tortoise	C	AL, GA	General	MAA
Southern Hog-Nosed Snake	P	GA	General	MAA
Spotted Turtle	P	GA	Wetland	NLAA
Bird				
Red-Cockaded Woodpecker	E	AL, GA	General and RCW	NLAA-BE
Wood Stork	E	AL	N/A	NE

Common Name	Status	State(s)	Conservation Measures	Effect
Mammal				
Florida Manatee	E	GA	N/A	NE
Gray Bat	E	AL	N/A	NE
Fish				
Alabama Sturgeon	E	AL	Wetland	NLAA
Bluestripe Shiner	P	AL, GA	Wetland	NLAA-BE
Broadstripe Shiner	P	GA	Wetland	NLAA-BE
Gulf Sturgeon	T	AL	Wetland	NLAA
Halloween Darter	P	AL, GA	Wetland	NLAA-BE
Robust Redhorse	P	GA	Wetland	NLAA
Mussel				
Alabama Heelsplitter	T	AL	Wetland	NLAA-BE
Alabama Hickorynut	P	AL	Wetland	NLAA-BE
Alabama Pearlshell	E	AL	Wetland	NLAA-BE
Altamaha Arcmussel	P	GA	Wetland	NLAA-BE
Apalachicola Floater	P	GA	Wetland	NLAA-BE
Brother Spike	P	AL	Wetland	NLAA-BE
Chipola Slabshell	T	AL	Wetland	NLAA-BE
Choctaw Bean	E	AL	Wetland	NLAA-BE
Delicate Spike	P	AL, GA	Wetland	NLAA-BE
Fuzzy Pigtoe	T	AL	Wetland	NLAA-BE
Gulf Moccasinshell	E	AL, GA	Wetland	NLAA-BE
Inflated Floater	P	GA	Wetland	NLAA-BE
Inflated Spike	P	AL, GA	Wetland	NLAA-BE
Narrow Pigtoe	T	AL	Wetland	NLAA-BE
Oval Pigtoe	E	AL, GA	Wetland	NLAA-BE
Purple Bankclimber	T	GA	Wetland	NLAA-BE
Rayed Creekshell	P	AL, GA	Wetland	NLAA-BE
Round Ebonyshell	E	AL	Wetland	NLAA-BE
Savannah Lilliput	P	GA	Wetland	NLAA-BE
Shinyrayed Pocketbook	E	AL, GA	Wetland	NLAA-BE
Southern Clubshell	E	AL	Wetland	NLAA-BE
Southern Elktoe	P	AL, GA	Wetland	NLAA-BE
Southern Kidneyshell	E	AL	Wetland	NLAA-BE
Southern Sandshell	E	AL	Wetland	NLAA-BE
Tapered Pigtoe	T	AL	Wetland	NLAA-BE
Crayfish				
Angular Dwarf Crayfish	P	AL	N/A	NE
Broad River Burrowing Crayfish	P	AL, GA	Wetland	NLAA-BE
Burrowing Bog Crayfish	P	AL	Wetland	NLAA-BE

Common Name	Status	State(s)	Conservation Measures	Effect
Dougherty Plain Cave Crayfish	P	GA	N/A	NE
Least Crayfish	P	AL	Wetland	NLAA-BE
Speckled Burrowing Crayfish	P	AL	Wetland	NLAA-BE
Sucarnoochee River Crayfish	P	AL	Wetland	NLAA-BE
Snail				
Beaver-Pond Marstonia	P	GA	Wetland	NLAA-BE
Cylinder Elimia	P	AL	Wetland	NLAA-BE
Ocmulgee Marstonia	P	GA	Wetland	NLAA-BE
Reverse Pebblesnail	P	GA	Wetland	NLAA-BE
Spotted Rocksnail	P	AL	Wetland	NLAA-BE
Caddisfly				
Little Oecetis Longhorn Caddisfly	P	AL	Wetland	NLAA-BE
Setose Cream And Brown Mottled Microcaddisfly	P	AL,GA	Wetland	NLAA-BE
Three-Toothed Triaenoides Caddisfly	P	AL	Wetland	NLAA-BE
Dragonfly				
Calvert's Emerald	P	AL	Wetland	NLAA
Say's Spiketail	P	GA	Wetland	NLAA
Plant				
American Chaffseed	E	AL, GA	General	MAA
Barren Strawberry	P	GA	N/A	NE
Bearded Beaksedge	P	GA	N/A	NE
Bigpod Wild Indigo	P	GA	Wetland	NLAA
Bog Spicebush	P	AL, GA	N/A	NE
Boykin Lobelia	P	AL, GA	N/A	NE
Carolina Bogmint	P	GA	N/A	NE
Cooley's Meadowrue	E	GA	General	MAA
Creeping Smallflower Seedbox	P	GA	N/A	NE
Curtiss' Loosestrife	P	GA	N/A	NE
Dwarf Hatpins	P	GA	N/A	NE
Elliott Croton	P	AL, GA	N/A	NE
Floodplain Tickseed	P	GA	N/A	NE
Florida Willow	P	GA	N/A	NE
Gentian Pinkroot	E	AL	N/A	NLAA
Georgia Aster	P	GA	N/A	NE
Georgia Rockcress	C	AL, GA	N/A	NE
Godfrey's Wild Privet	P	GA	N/A	NE
Gulf Sweet Pitcherplant	P	GA	N/A	NE
Hall Bulrush	P	GA	N/A	NE
Harper's Fimbry	P	GA	N/A	NE

Common Name	Status	State(s)	Conservation Measures	Effect
Hartwrightia	P	GA	Wetland	NLAA-BE
Little River Black-Eyed Susan	P	GA	N/A	NE
Long Beach Seedbox	P	GA	N/A	NE
Mock Bishop-Weed	P	GA	N/A	NE
Monkeyface Orchid	P	GA	N/A	NE
Narrowleaf Naiad	P	GA	N/A	NE
Ocmulgee Skullcap	P	GA	N/A	NE
Panhandle Meadow-Beauty	P	AL	Wetland	NLAA
Pondberry	E	AL, GA	N/A	NE
Purple Honeycomb Head	P	GA	Wetland	NLAA
Quillwort	P	GA	N/A	NE
Relict Trillium	E	AL	N/A	NE
Small-Flowered White Meadowbeauty	P	AL, GA	N/A	NLAA-BE
Swamp Black-Eyed Susan	P	GA	N/A	NE
Swamp Buckthorn	P	GA	N/A	NE
Thorne's Beakrush	P	AL, GA	N/A	NLAA-BE
Variable-Leaf Indian-Plantain	P	AL, GA	N/A	NE
Wire-Leaved Dropseed	P	AL, GA	Wetland	NLAA-BE

<sup>1</sup> P=petitioned.

<sup>2</sup> BE=beneficial effect; MAA=may adversely affect; NE= no effect; NLAA=not likely to adversely affect.

#### 4.6 Effects of No Action

Under the No Action Alternative, the Partners Program would not target the use of funds on agreements to benefit the gopher tortoise in the Program Area. Absent the financial and technical assistance of Partners agreements, landowners would likely continue managing eligible properties as pine plantations; leave recent clear cuts fallow, or plant pastures or other crops. Without site preparation and planting, soils in fallow areas would be exposed until pioneering plants become established, allowing unstabilized sediment to flow into nearby streams reducing water quality. Under any of these scenarios, the unenrolled properties would provide poor habitat for gopher tortoises, commensals, and other longleaf pine-associated species, despite their proximity to existing gopher tortoise populations and suitable soils for gopher tortoises.

#### 4.7 Cumulative Effects

Cumulative effects are the environmental impacts resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of the agency or person undertaking such other actions. Silviculture, mining, agriculture, grazing, urban development, natural fire suppression, and other activities have contributed to a decline of gopher tortoises and other longleaf pine-associated species,

and are likely to continue to do so, unless actions such as the proposed action are successful in reversing the downward trend.

To address the prospect of continued declines in gopher tortoise populations, the Service’s Southeast Region has formulated and is implementing a comprehensive strategy for conservation of the gopher tortoise (USFWS *et al.* 2013). The strategy involves working with State partners, federal partners and private landowners to develop best management practices to minimize and avoid the adverse effects of many of these future actions and to ultimately conserve the species. Implementation of the strategy will vary by State and its success is unknown at this time. Cumulatively, we anticipate that these efforts will provide net conservation benefits to the gopher tortoise as well as other species that co-occur with the gopher tortoise; however, the proposed action is an important component of the strategy in Alabama and Georgia and would augment these benefits relative to the No Action Alternative.

#### 4.8 Comparison of Alternatives

Table 3 summarizes the two federal action alternatives and the primary environmental consequences of each as a basis for comparison.

**Table 3.** Summary of environmental consequences by alternative.

Resource or Issue	Alternative	
	<u>No Action</u>	<u>Proposed Federal Action</u>
Water Quality	Potentially significant impacts due to exposed soil reducing water quality.	Minor temporary impacts due to potential effects from prescribed fire and soil disturbance; long-term beneficial effects.
Listed and at-risk species	Potentially significant impacts from lack of restoration in areas that could provide habitat for species.	Minor temporary impacts due to potential effects from prescribed fire, site preparation, and other actions; long-term beneficial effects.

#### 5.0 List of Preparers

Shannon Holbrook, U.S. Fish and Wildlife Service  
 Robin Goodloe, U.S. Fish and Wildlife Service

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## **Appendix A Conservation Practices For Gopher Tortoise Habitat Improvement**

The following are the conservation practices that will be utilized by the Service in the implementation of the projects under this Agreement. These practices are adaptations of the NRCS practices which the Service worked on with NRCS to specifically condition for the gopher tortoise through the Working Lands for Wildlife Partnership Initiative.

The goal of this program is to restore and manage upland habitats and connectivity within the landscape for gopher tortoises and other covered species.

The purpose of this goal is to improve potential habitat to provide gopher tortoises and other covered species with shelter, cover, and/or food in proper amounts, locations and times to sustain stable populations. Sites should be selected based on FWS protocols detailed in this document that will maximize the potential for gopher tortoises and other covered species to colonize the restored site. Acceptable practices provide and manage upland habitats for these species include planting longleaf, planting native grasses and other suitable herbaceous vegetation, prescribed burns, and removal of midstory vegetation or excess canopy cover.

The conservation practices will be applied to benefit the gopher tortoise and other covered species. It involves the treatment of habitat components identified during the conservation planning process that will produce and manage vegetative conditions at early successional stages to support the gopher tortoise during all or part of its life cycle.

**Potential Adverse Effect(s) to Gopher Tortoise:** Temporary soil disturbance, vegetation removal, increased potential of introduction of invasive plants, and creased potential of accidental mortality or injury to individuals.

**Potential Beneficial Effect(s) to Gopher Tortoise:** Restoring and managing longleaf pine habitat on/adjacent/near occupied gopher tortoise populations will restore, enhance or create suitable habitat for the gopher tortoise and other covered species; improve habitat conditions for all life cycles, including breeding and nesting, and provide adequate food, cover and shelter, and address the effects of habitat fragmentation by creating, maintaining, or restoring landscape connectivity.

The conservation practices that will be utilized to implement this program include:

- Brush Management
- Herbaceous Weed Control
- Prescribed Burning
- Fire Break
- Tree / Shrub Site Preparation
- Tree / Shrub Establishment
- Forest Stand Improvement

### **Brush Management:**

**Definition:** The management or removal of woody (non-herbaceous or succulent) plants including those that are invasive and noxious. Removal may be by hand, using herbicides, or using heavy equipment.

**Purposes:** (1) Create the desired plant community consistent with the ecological site. (2) Restore or release desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality or enhance stream flow. (3) Maintain, modify, or enhance fish and wildlife habitat. (4) Manage fuel loads to achieve desired conditions.

**Application:** This practice will maintain, modify, or enhance wildlife habitat for gopher tortoise and create desired vegetation cover. Equipment commonly used in this practice includes tractor mounted mowers or mulchers, hand tools, and may be combined with other practices such as herbicide (see Herbaceous Weed Control and Forest Stand Improvement).

**Potential Beneficial Effect(s) to the gopher tortoise:** Removal of a limiting habitat factor (hardwood midstory) and creation of desired or targeted habitat conditions (diverse and abundant understory vegetation).

### **Herbaceous Weed Control :**

**Definition:** The removal or control of herbaceous weeds including invasive, noxious and prohibited plants. Removal may be by hand, using herbicides, or using heavy equipment.

**Purposes:** (1) Enhance accessibility, quantity, and quality of forage and/or browse. (2) Restore or release native or create desired plant communities and wildlife habitats consistent with the ecological site. (3) Protect soils and control erosion. (4) Reduce fine-fuels fire hazard and improve air quality.

**Application:** The practice may be used in conjunction with another conservation practice to address remaining and/or emergent herbaceous weeds considered noxious, invasive, or undesirable to support the desired habitat conditions. Practice implementation removes or reduces invasive or other weed species that directly or indirectly limit gopher tortoise habitat quality and productivity. Equipment commonly used in this practice includes tractor or ATV mounted herbicide applicators, aerial (helicopter or fixed wing aircraft) herbicide applicators, backpack sprayers. Practice may be combined with various tractor mounted mowers/mulchers, and/or hand tools.

**Potential Beneficial Effect(s) to the gopher tortoise:** Practice implementation removes or reduces invasive or other weed species that directly or indirectly limit gopher tortoise habitat quality and productivity. Practice can beneficially influence the vigor and establishment of native or desirable vegetation required to provide gopher tortoise habitat.

### **Prescribed Burning:**

**Definition:** Controlled fire applied to a predetermined area.

**Purposes:** (1) Control undesirable vegetation. (2) Prepare sites for harvesting, planting or seeding. (3) Control plant disease. (4) Reduce wildfire hazards. (5) Improve wildlife habitat. (6) Improve plant production quantity and/or quality. (7) Remove slash and debris. (8) Enhance seed and seedling production. (9) Facilitate distribution of grazing and browsing animals. (10) Restore and maintain ecological sites.

**Application:** This practice will create the desired plant community phase consistent with the ecological site description that is preferable gopher tortoise habitat. Actions may include: (a) Control undesirable vegetation or to manipulate desired vegetation; (b) prepare sites for planting or seeding; (c) manipulate vegetation to reduce wildfire hazards; (d) improve wildlife habitat specifically enhance and produce desirable or needed plant communities for all phases of gopher tortoise life cycle; (e) improve forage production quantity and/or quality; and/or (f) restore and/or maintain ecological sites.

**Potential Beneficial Effect(s) to the gopher tortoise:** Prescribed burning is one of the most important management tools for creating or maintaining gopher tortoise habitat. Prescribed burning shapes the forest structure and composition, providing desired gopher tortoise habitat conditions. Target areas and defined objective(s) will be clearly stated with intended goals to be addressed for each client defined management unit.

### **Fire Break:**

**Definition:** A permanent or temporary strip of bare or vegetated land planned to retard fire.

**Purposes:** (1) Reduce the spread of wildfire. (2) Contain prescribed burns.

**Application:** This practice will be a supporting practice to prescribed fire.

**Potential Beneficial Effect(s) to the gopher tortoise:** Practice can help reduce the spread of wildfires thus reducing the risk of large-scale, habitat loss. Firebreaks can provide foraging areas by stimulating forb growth.

### **Tree / Shrub Site Preparation**

**Definition:** Treatment of areas to improve site conditions for establishing trees and/or shrubs. Site preparation may include controlling undesirable vegetation; improving soil structure, drainage and fertility; and reducing logging slash. Site preparation methods include plowing, disking, deep ripping, mowing, burning, herbicide application, fertilization, control of undesirable competing trees and shrubs, and reducing logging slash

**Purposes:** (1) Encourage natural regeneration of desirable woody plants. (2) Permit artificial establishment of woody plants.

**Application:** Practice will be used to support additional conservation practices. Equipment commonly used in this practice includes tractor or skidder mounted herbicide applicators, ATV mounted herbicide applicators, aerial herbicide applicators, and skidder or tractor mounted mowers/mulchers.

**Potential Beneficial Effect(s) to the gopher tortoise:** Provide native herbaceous forage.

### **Tree / Shrub Establishment**

**Definition:** Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

**Purpose:** Establish woody plants for: (1) Forest products such as timber, pulpwood, etc.; (2) wildlife habitat; (3) long-term erosion control and improvement of water quality; (4) treating waste; (5) storing carbon in biomass; (6) reduce energy use; (7) develop renewable energy systems; (8) improving or restoring natural diversity; (9) enhancing aesthetics.

**Application:** This practice will be used in conjunction with additional conservation practices and will involve planting of longleaf pine. Equipment commonly used in this practice includes hand tools (e.g., dibble bar, hoe dad, etc.), and occasionally tractor mounted mechanical tree planters.

**Potential Beneficial Effect(s) to the gopher tortoise:** Establish longleaf pine and the potential to reintroduce prescribed fire to the ecosystem. Provide fuel for prescribed burning.

### **Forest Stand Improvement**

**Definition:** The manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation. Removal may be by hand, using herbicides, or using heavy equipment.

**Purposes:** (1) Increase the quantity and quality of forest products by manipulating stand density and structure. (2) timely harvest of forest products; (3) development of renewable energy systems; (4) initiate forest stand regeneration; (5) reduce wildfire hazard; (6) improve forest health reducing the potential of damage from pests and moisture stress; (7) restore natural plant communities; (8) achieve or maintain a desired native understory plant community for special forest products, grazing, and browsing; (9) improve aesthetic and recreation, values; (10) improve wildlife habitat; (11) alter water yield; and (12) increase carbon storage in selected trees.

**Application:** This practice will create desired tree and mid-story conditions consistent with the ecological site; maintain, modify, or enhance wildlife habitat for gopher tortoise. Equipment commonly used in this practice includes commercial timber harvest equipment

such as rubber or track tire skidders and cut down machines, loaders, and trucks. It may also include tractor mounted mowers/mulchers hand tools, and skidder/tractor/ATV/backpack mounted herbicide applicators.

**Potential Beneficial Effect(s) to the gopher tortoise:** Restoring and managing longleaf pine habitat on/adjacent/near occupied gopher tortoise populations will restore, enhance or create suitable habitat for the gopher tortoise and other covered species; improve habitat conditions for all life cycles, including breeding and nesting, and provide adequate food, cover and shelter, and address the effects of habitat fragmentation by creating, maintaining, or restoring landscape connectivity for movement.



## Partners for Fish and Wildlife Program Project Monitoring Guidelines, Southeast Region

This policy guidance establishes a requirement that all habitat improvement projects carried out through the Partners Program shall include a monitoring component to be included in our Habitat Information Tracking System (HabITS), and in compliance with the following guidelines and definitions.

### Overview

Monitoring of Partners Program habitat improvement projects in the Southeast Region will focus on achieving the following goals:

- . ■ Improve Program delivery, customer satisfaction and overall Program accountability;
- . ■ Improve project implementation and to assess whether projects were carried out according to the habitat improvement plan;
- . ■ Document and demonstrate success of PFW projects based on defined habitat factors that have been described as necessary for conservation of focal species;
- . ■ Evaluate the effectiveness of specific habitat improvement practices, and enable Program staff to learn from each project relative to implementing changes in future projects; and,
- . ■ Identify long-term information and research needs. This monitoring process is designed to meet these goals with minimal staff time and cost. As such, this process focuses on working with our partners to develop and pursue specific monitoring efforts, and using the information found in existing studies and published reports and other literature to help test and support our assumptions that specific habitat improvement efforts provide benefits to targeted fish and wildlife species.

To help us ensure that we are delivering the right conservation actions in the right places on the landscape, we are directed to work closely through our Landscape Conservation Cooperatives (LCCs) and Climate Service Centers (CSCs) as they become operational, as well as our many external partners as we apply the SHC process. We must continue to address and strive to improve our project accountability if we expect to continue to receive funding support for our conservation delivery efforts. We must continue to work with all of our partners to document and demonstrate that our conservation delivery efforts are successful in meeting stated species and

habitat goals and objectives. We must also strive to document and clarify our shortcomings and information needs through an adaptive management approach, and collaborate and work closely with our partners to help us address these needs.

Most of us that are actively involved with conservation delivery recognize that our current internal capacity to develop and carry out the level of monitoring and research that is needed is lacking. We currently lack the capacity to address and answer many of the specific questions that address future climate change impacts and species and habitat biological information needs and outcomes that are positively affected by our conservation delivery efforts. The future implementation of the LCCs and CSCs, and a comprehensive monitoring strategy for the National Wildlife Refuge System, are intended to help address this shortcoming, and it will be essential that everyone in the PFW Program become actively engaged in an effective and appropriate manner with the establishment and operation of the LCCs, CSCs, and Refuge monitoring protocols.

Developing and implementing a scientifically sound monitoring plan that addresses the biological outcome questions that need to be answered is a challenging and difficult task. You should consider the following information in developing a monitoring plan, realizing that our lack of capacity and other environmental factors that we cannot control must be considered. You should view the information below from the viewpoint of combining approaches to best meet your needs in the most cost-effective and efficient way possible.

- **Species-level monitoring**—seeks to detect changes in the status and/or trend in the presence, abundance, or occupancy of selected priority or focal species linked to our specific on-the-ground conservation actions. Although this type of monitoring may be the most desirable, it may not always be appropriate due to the many environmental factors that cause variability (potential interpretation errors) in species population data, the costs associated with this type of monitoring, and the long periods of study time that are typically needed to address the variation errors in the data.
  - Species monitoring may be more feasible and cost effective in the following situations:
    - Plant species or other species that are rare, but are known to be restricted to just a few sites within the geographic area of interest.
    - Conspicuous species that can be easily monitored.
    - Species that are not found in the study area, but are intentionally introduced.
    - Species that have been or have ongoing monitoring efforts being carried out by one or more of our partners.
    - An imperiled species that is determined to be of such a high priority due to pending extinction issues that it must be intensively monitored.
- **Habitat-based monitoring**---the focus is on monitoring environmental features that are thought to control the distribution and abundance of the target or focal species. This approach is based on assumptions that are supported by the use of habitat suitability or other habitat models and the existing scientific literature. Thus, habitat-based monitoring assumes that changes in the configuration or quality of habitat relative to the life needs of the designated target or focal species would be reflected in changes in the species. Although specific assumptions may not be validated for specific species, this

approach can provide information that helps us understand the link between our management actions and improvements to the habitat that should benefit certain species or groups of species.

- **Threats-based monitoring**---This approach also depends on assumptions that may use models and are supported by scientific information found in the literature or other sources. Attention is focused on the possible underlying causes of potential decline of species and/or habitat components. For example, the specific threats that are documented in a species recovery plan would be addressed and monitored, with an assumption that if the threat or threats are removed, the species would benefit. Climate change is a type of threat. Species vulnerability assessments that document and provide scientific information regarding the specific vulnerability of species and groups of species to climate change would provide us with useful examples of specific criteria that should be included in a monitoring plan.
- **Ecosystem-based monitoring**---This involves parameters related to the spatial configuration of major community types that are important indicators of changes to the distribution of species. Parameters include land cover and land use types and fragmentation information. Models and GIS data sets at the landscape-scale being developed to address climate change issues and impacts should be helpful in making decisions about what to include in your monitoring plan.

There are numerous factors that must be considered when developing and carrying out a monitoring plan. Further, there is no model or suite of criteria that will meet our needs in every situation. The overarching goal of our monitoring approach and partnerships is to design and carry out monitoring that will detect changes in the status and trend for selected focal species and habitats, and provide us with a documented measure of accountability and success of our habitat improvement conservation delivery practices and will also provide us with scientifically sound information for adaptive management. Development and implementation of monitoring plans will be a work in progress, and we should apply adaptive management in continuing to refine our approach as we move forward.

All Partners Program monitoring plans should include the following information:

- Address the four categories of monitoring (i.e., Baseline, Implementation, Effectiveness, and Validation monitoring).
- For each monitoring category, identify and define the specific tasks to be completed and the estimated time frames for completion of each task.
- Identify and discuss the role of the Service and our partners in developing and implementing the specific tasks identified in the Plan.
- Identify the target or focal species and related population, habitat, or other criteria that will be monitored. Baseline monitoring should include those monitoring criteria that you

expect to follow throughout the scope of the monitoring plan. Only monitoring criteria that are feasible to obtain and can be reasonably measured should be used.

- Provide rationale as to why the selected species and monitoring criteria were chosen.
- Identify any information gaps or anticipated obstacles that would preclude or limit our ability to carry out the Plan at the desired level.
- Provide ideas or recommendations as to how noted limitations can be effectively reduced or eliminated.

## Definitions

The following definitions are applicable to this process:

**Monitoring:** The collection and assessment of repeated observations and measurements over time to evaluate the effectiveness of specific habitat improvement actions.

## Types of Monitoring

- **Baseline:** Characterizes existing conditions before a project begins. Baseline monitoring establishes the benchmark against which the success of a project can be measured and evaluated. (Applicable to all Partners projects)
- **Implementation or Compliance:** Assesses whether project activities were carried out according to the habitat improvement plan. (Applicable to all Partners projects)
- **Effectiveness:** Evaluates whether the project had the desired effect on the selected resource indicators. For example, a post-survey review documents that changes from the baseline condition in the stream pool depth occurred after placement of large, woody debris in the stream.
- **Validation:** Attempts to establish a cause-and-effect relationship between the implementation of the project and specific habitat practices, and the selected biological responses and indicators. For example, did the planting of trees and shrubs lead to an increase in the population of black bears; or, did a specific mussel population increase following specific in-stream restoration actions?

Validation monitoring can be the most costly and involved, as it tends to move into the realm of “research,” and may require long periods of data collection and analysis to address cause-and-effect relationships. Also, such validation efforts often result in additional questions and the need for additional studies. For the Partners Program, validation monitoring that would involve extensive and long-term data collection and analysis will not be conducted in most situations.

To fully address our monitoring needs, we will need to work closely with our partners, but will also rely on site-visit observations and references to other published scientific studies and reports to support our assumptions regarding cause-and-effect relationships and biological responses related to the success and benefits of projects to specific species or groups of species.

In some situations, the Service and our partners may collectively agree to share funding and technical assistance resources to evaluate the benefits of specific habitat improvement practices or groups of similar projects and practices within a specific watershed (e.g., specific populations of protected mussels and fishes within a specific watershed). To monitor and scientifically evaluate/validate such information would require data collections, analyses and evaluations on both the study sites and designated reference areas, and would require data from multiple years to address any real changes in biological responses and population status.

The Partners Program may choose to be a partner in a limited number of such efforts, thereby providing technical assistance and/or financial assistance to the effort. However, it is important for us to weigh the costs and benefits to be obtained from such efforts with our goals of assisting private landowners in carrying out on-the-ground habitat improvement practices that are typically recognized as being beneficial to fish and wildlife resources.

The information that may be gained from these partnership approaches to validation monitoring, or from the published results of other studies not directly supported by the

Service, should be used in our adaptive management approach (i.e., revise our practices as new information becomes available to us), and to support or modify our assumptions regarding the fish and wildlife benefits of our projects and specific habitat improvement practices.

## **General Monitoring Schedule (record dates for all visits):**

Over the duration of a Partners project agreement, staff should visit each project site a minimum of five times according to the general monitoring schedule listed below, and prepare a narrative monitoring report for that project following each site visit.

- . ■ Pre-project visit
- . ■ Mid-project visit
- . ■ Post-project visit
- . ■ Mid-agreement visit
  - End of agreement visit

Effective monitoring requires thinking ahead with a clear identification of the goals and objectives of each project. Project goals should focus on the desired habitat and ecological changes, and benefits for Federal trust and other species of concern.

- . ■ **Pre-project:** This site visit and narrative report should scope out any specific baseline project information that has not already been included in the HabITS project narrative, and is identified as being needed to evaluate the project during later visits. It is during this visit that the Partners biologist should formulate the specific variables that will be monitored during future visits; for example, any success criteria, weather conditions such as drought that may affect the survival of planted vegetation, soil types, the number of gopher tortoise burrows on site prior to the projects, and/or the documentation of the presence or absence of target species, etc. Specific information to be documented is dependent upon the determination of those pertinent factors that can be reasonably measured and are needed to address the project goals and objectives found in the HabITS project narrative.

### **Photographic Documentation (to be completed for all monitoring visits):**

- ◆ Establish permanent photographic locations at the project site and take appropriate photographs during each site visit.
  - ◆ Take sufficient photographs to document and highlight the before and after habitat conditions, and any other unique or special features of the project.
  - ◆ Electronically scan the best photographs and transfer into the HabITS Monitoring Module.
- **Mid-project:** This visit and narrative report should address primarily project implementation issues.
- ◆ Check and document the status (e.g., active, on schedule, complete, of all project activities described in the scope of work in project agreement.

- ◆ Have the landowner and other partners carried out their responsibilities (technical or financial) as stated in the agreement? Describe.
- ◆ Do the landowner and/or contractor(s) have technical or other issues that need resolving? Document and track resolution of each.
- ◆ Continue photographic documentation.

■ **Post-project (immediately following scheduled completion of project activities or shortly thereafter):** Monitoring information collected during this visit and the narrative report should address the following issues:

- ◆ **Project Implementation:** A continuation of mid-project review issues; e.g., were all of the planned habitat improvement activities (e.g., a prescribed burn, three water-control structures installed, etc.) as noted in the project agreement completed as planned? Were all of the planned technical and financial assistance contributions met by all partners as identified in the plan?
- ◆ **Project Effectiveness and Validation:** Collect monitoring information for any specific factors previously selected to help determine the success of a project activity. Address whether or not the desired or expected ecological or biological conditions were achieved, based on the success criteria previously identified? For example, if the agreement plan called for the successful reestablishment of at least 200 trees per acres, and at least five species of trees, begin to collect the information needed to document this accomplishment. Summarize known or expected benefits to target species or other Federal trust resources. Is the project site being used by a target species? Use appropriate references from other published literature as needed. Summarize any research studies and partnerships associated with the project. Begin to document any recognized research needs and information gaps.

◆ **Photographic Documentation:** Continue at previously established photographic sites.

- ◆ **Landowner Satisfaction Survey:** Complete a landowner satisfaction survey and report to answer at least the following questions:

Are the landowner(s) and other partners satisfied with the project results to date?

Are the landowner(s) and other partners satisfied with the performance of the Service?

What does the landowner(s) and other partners like or dislike about this project?

Do the landowner(s) and other partners have recommendations for improvement? List and discuss.

■ **Mid-agreement:** For a project under the minimum 10-year agreement, the project should be visited approximately half way through the length of the agreement. If

the project is of longer duration (e.g., 25 years), we recommend visiting the site at approximately 5-year intervals.

Monitoring information collected and the narrative reports should continue to evaluate all of the issues identified in the Post-Project visit, above. Also, if the agreement included specific habitat maintenance responsibilities for the landowner and/or the Service, determine if these responsibilities are being carried out as specified in the agreement. Also, evaluate and document your thoughts as to whether the maintenance practices are achieving the desired results, and offer appropriate recommendations.

- **End-Of-Agreement:** Monitoring information collected and the narrative report should continue to evaluate all of the issues identified in the Post-Project and subsequent visits, above. Also, in this final narrative report, the Service biologist should develop project conclusions, based on all of the project information collected and evaluated throughout the life of the project. For example, what went well with this project, and what did not go well, and why? What are the documented benefits of this project to Federal trust resources? Additional data needs? What should be avoided in future projects, and recommendations?

**ANNUAL REPORTS:** For each monitoring plan that is developed, an annual monitoring report should be prepared and entered into the HabITS data base by no later than August 15<sup>th</sup> of each fiscal year. The monitoring report should summarize what was monitored, what was learned from the monitoring relative to the needs of the target or focal species and benefits linked to our conservation delivery actions, any modifications to the monitoring plan, any adaptive management changes, and the prospectus.