

Appendix H

Biological Evaluation

BIOLOGICAL EVALUATION
OF
FOREST MANAGEMENT ACTIVITIES PROPOSED
FOR

Analysis Unit 5

Includes all or portions of
Compartments 17, 18, 19, 28, & 29

Caseyville and McCall Creek
Quadrangles

USDA Forest Service
Southern Region (8)
National Forests in Mississippi
Homochitto National Forest Mississippi

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Introduction

This Biological Evaluation (BE) documents the likely impacts on proposed, endangered, threatened, and sensitive (PETS) species from forest management activities proposed for Analysis Unit 5.

This BE is in accordance with direction given in Forest Service Manual (FSM) 2672.41 and 2673.42. As part of the NEPA decision making process, the BE provides a review of Forest Service (FS) activities in sufficient detail to determine how an action or proposed action will affect any PETS species. PETS species, taken from both state and federal lists, are species whose viability is most likely to be put at risk from management actions.

The BE has three primary objectives: 1) Ensure FS actions do not contribute to loss of viability of any native or desired non-native plant or animal species. 2) Incorporate concerns for sensitive species throughout the planning process, reducing negative impacts to species and enhancing opportunities for mitigation. 3) Ensure that activities will not cause a species to move toward federal listing. Consideration by decision makers of the information contained in this BE will ensure that no species is placed in jeopardy by management actions.

The Regional Forester's list of "sensitive" species for the National Forests in Mississippi (USDA 2001) and National Forests in Mississippi Threatened and Endangered Species List (USDA 2002) were reviewed to devise a target list of PETS species for the Homochitto Ranger District, Homochitto National Forest. Three federally listed and 16 sensitive species are confirmed, likely to occur, or have the potential to occur on the Homochitto National Forest.

Table 1. PETS taxa recorded from or likely to occur on the Homochitto Ranger District,

Common Name	Scientific Name	Status*			Occurrence
		USFWS	FS	State	
Louisiana black bear	<i>Ursus americanus luteolus</i>	T		S3	Potential
Bald eagle	<i>Haliaeetus leucocephalus</i>	T		S1	Potential
Red-cockaded woodpecker	<i>Picoides borealis</i>	E		S1	Confirmed
Webster's salamander	<i>Plethodon websteri</i>		S	S3	Possible
Bachman's sparrow	<i>Aimophila aestivalis</i>		S	S3	Confirmed
Pearl blackwater crayfish	<i>Procambarus penni</i>		S	S3	Confirmed
Alabama shad	<i>Alosa alabamae</i>		S		Unlikely
Crystal darter	<i>Ammocrypta asprella</i>		S		Unlikely
Broadstripe topminnow	<i>Fundulus euryzonus</i>		S		Unlikely
Rayed creekshell	<i>Anodontooides radiatus</i>				Unlikely
Natchez stonefly	<i>Alloperla natchez</i>		S	S2	Confirmed
Chukcho stonefly	<i>Haploperla chukcho</i>		S	S2	Confirmed

Common Name	Scientific Name	Status*			Occurrence
		USFWS	FS	State	
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>		S	S3?	Confirmed
Arogos skipper	<i>Atrytone arogos arogos</i>		S	S2S3	Possible?
A moss	<i>Trachyxiphium heteroica</i>		S	S1?	Confirmed
Cypress-knee sedge	<i>Carex decomposita</i>		S	S3?	Confirmed
Small's woodfern	<i>Dryopteris X australis</i>		S	S1	Confirmed
Bay starvine	<i>Schisandra glabra</i>		S	S3?	Confirmed
Fetid trillium	<i>Trillium foetidissimum</i>		S	S3	Confirmed

* See Appendix 3 for explanation of codes.

This list is based on documented occurrences, habitat presence/suitability within or near the National Forest boundaries, and the geographic range of PETS species gathered from the records of the Mississippi Natural Heritage Program and other credible sources (i.e., literature reviews, conversations with knowledgeable biologists, etc.). See Appendices 1 and 2. Table 1 depicts the 19 PETS taxa considered in this Biological Evaluation.

Potential risks resulting from management actions were assessed by referring to available occurrence records and to information on the general biology of these species obtained from survey reports, the Mississippi Natural Heritage Program and the scientific literature.

Affected Area and Proposed Actions

Analysis Unit 5 is located in Franklin and Lincoln counties, Mississippi. In total, 6 compartments were examined within the analysis unit. A more specific set of compartment locations is in Table 1.1

Table 1.1 Compartment Locations

Compartment	Township	Range	Sections
17	7N	6E	6
17	8N	5E	35, 36
17	8N	6E	31
18	7N	5E	1, 2, 3
18	8N	5E	33, 34, 35, 36
19	8N	5E	33, 34
28	7N	5E	3, 4, 9, 15
29	7N	5E	10, 11, 14, 15, 22

Analysis Unit 5 consists of approximately 10,668 total acres; approximately 3,800 acres of National Forest land are within Compartments 17, 18, 19, 28, and 29 of the project area. This

proposal was developed for these five compartments and includes a total of 1,474 proposed treatment acres. Approximately 6,868 acres of private land within Analysis Unit 5 are not included within this analysis, but were considered in the analysis of the direct, indirect, and cumulative effects of these actions within and adjacent to the Analysis Unit. A vicinity map and other maps associated with this project, including Alternative maps, are enclosed.

The historic forest for the area represented in Analysis Unit 5 was described as “longleaf hills”. “It is for the most part a rolling, hilly country, with deep ravines and steep slopes. The ravine and lower slopes for the most part are covered with hardwood forests. Oaks predominate, associated with hickory, sweet gum, ash, and others. Loblolly pine is scattered over these lower slopes, and the upper slopes and summits of the ridges are covered by shortleaf and longleaf pine with some loblolly and hardwoods. ... Longleaf is the predominate species, and forms from 50 to 70 per cent of the stand over large areas. ... Shortleaf and loblolly pine in varying proportions make up about 30 per cent of the forest. On the average about 10 per cent of the stand is hardwood...” (Holmes, J.S. and J.H. Foster, 1908). The present forest cover is predominantly loblolly pine mixed with shortleaf pine with a scattering of longleaf pine, all mixed with a hardwood midstory due to the lack of prescribed burning. Mid and understory trees and shrubs are present throughout the compartment. Overstory hardwoods are found primarily along streamsides and minor drains as well as scattered throughout richer upland sites.

The Homochitto Ranger District proposes to convert approximately 121 acres of mixed pine to a longleaf pine dominated mixed pine forest using a clearcut with reserves treatment on mixed pine, and to replant longleaf in order to restore a historic species component to a portion of the project area. This determination is based on the anticipated future ability to maintain regular prescribed burning as a future management tool. Without fire, there is no need to attempt to restore longleaf into its historic place in the ecosystem. Those areas that cannot be managed with fire will remain in a pine hardwood type of forest not very different from the present condition. Approximately 133 acres would be regenerated using a clearcut with reserves treatment to develop a mixed pine/hardwood stand, replanting widely spaced loblolly pine in order to maintain a pine component, while increasing the likelihood for a long term presence of hardwood species on the sites. Approximately 40 acres of mixed pine would be regenerated by using the irregular seed tree method in upland sites where regularly scheduled prescribed burns are not anticipated but are primarily suited to suitable for shortleaf and loblolly pine.

Other harvests associated with this proposal include thinning about 1538 acres. Areas proposed for thinning include the following: approximately 566 acres of sawtimber thinning in the mixed pine and mixed pine/hardwood forest type, and first thinnings in poletimber stands in about 972 acres of the mixed pine forest type. Other actions proposed include site preparation, temporary road construction, spot road reconstruction, road maintenance, and prescribed burning.

On regenerated sites, herbicides would be used in a manner consistent with the direction identified in the VMCP/P. Herbicide treatments would include the hand tool application of

Oust[®], Garlon 3A[®] and 4[®], Velpar[®], and/or Arsenal[®] for the purposes of release and site preparation.

Approximately 16 miles of road reconstruction is required to implement this decision. In response to public access issues approximately 0.76 miles of new road will be constructed. Within the immediate vicinity of the sale, temporary roads may be constructed as necessary to remove timber.

Approximately 432 acres of prescribed burning would be implemented on a three-year interval starting one year after completion of harvesting. Within the burning area, the objective is to maintain a mixed pine forest type. Outside of the prescribed burning area, the emphasis would be for management of a pine-hardwood, or hardwood forest type, depending on the soil and site conditions.

Inventories.

The Mississippi Natural Heritage Program database was consulted for Threatened, Endangered and Sensitive species' locations within the project area. The Mississippi Natural Heritage Program reported that there were no known occurrences of state or federally listed or proposed endangered, threatened, rare or otherwise significant plants or animals (elements of natural diversity) at analysis unit 5. (Mississippi Natural Heritage Program, 2001). The Mississippi Natural Heritage Program maintains the single most comprehensive database on the location, numbers, and status of rare and endangered plants, animals, and communities of Mississippi. The District PETS database and distribution maps were reviewed to disclose areas of known populations of PETS species within the proposed project area. The federally listed red-cockaded woodpecker is surveyed over the ranger district in 10 year sequential surveys of suitable pine and pine-hardwood habitats for new occurrences. In addition, active clusters of red-cockaded woodpeckers are surveyed annually and nest checks done during the nesting season (late April to early June). Breeding bird surveys have been conducted at over 200 permanently established points in 1994, 1995, 1999, 2000, 2001 and 2002. A comparison across years of Management Indicator Species (MIS) breeding bird abundance on the Homochitto National Forest is in Mabey (2000). The final analysis shows there is no statistically significant change in abundance noted for any bird Management Indicator Species. The fish fauna has been sampled in many streams on the Forest (Ebert, D.J., R.M. Weill, and P.D. Hartfield, 1985; Ebert, D.J. and P.D. Hartfield, 1981; Johnston, C.E. and J.G. McWhirter, 1996; Douglas, N.H., 1975.). Monitoring of the fish population is being conducted at the present time and the results should allow, for the first time, inferences regarding changes in the fish population structure over time.

The Mississippi Natural Heritage Program conducted a rare plant inventory of the Homochitto National Forest (Gordon, K.L. and J.A. Smith, 1992) as well as an overall rare/sensitive plant and animal survey of four proposed lake sites on the Homochitto NF (Gordon, K.L., *et. al.*, 1992). A study of the vascular flora of Amite County was completed by Mac Alford (1999) and reported on sensitive and rare plants collected on and near the Homochitto NF. Two additional studies have been completed that are particularly applicable: a study of the effects of red-cockaded woodpecker management on breeding native songbirds (Burger, L.W., Jr., C. Hardy,

and J. Bein., 1998). A preliminary survey to document the floral changes due to prescribed burning and hardwood midstory removal was begun in 2000 (Doffitt, C.H., 2000). Surveys of two stoneflies, once federal candidates for listing, have been conducted on the Homochitto NF (Hardy, C.L., *et. al.*, 1994, Meriwether and Hargis 2002 unpublished data).

Wildlife Biologist Ken Gordon surveyed selected habitats in the analysis unit in 1999. In 2001, additional surveys were conducted and in August 2002 Wildlife Biologist April Hargis conducted surveys. These surveys examined suitable habitats for rare plants and animals, which were considered to be possible inhabitants of the project area. Potential risks resulting from management actions were assessed by referring to available occurrence records and to information on the general biology of these species obtained from survey reports, the Mississippi Natural Heritage Program, and the scientific literature.

DETERMINATION OF EFFECTS

Cumulative Impacts

In the Analysis Unit 5 planning area, thinning and regeneration activities during the last ten years (1989-1999) have been limited in size and distribution. These were not planned actions but were southern pine beetle infestations, which are a natural occurrence in low-health forests and tend to verify Project Purpose and Needs associated with the need to manage vegetation. Although Forest Service ownership within the planning area is only about 40% of the total area, these holdings are well blocked up with a minimum of in-holdings. Acres regenerated during previous entries, broken down into 10-year increments, ranged from 561 acres to 1217 acres. The 458 acres of regeneration proposed under the proposed action would be regenerated in the year 2002. Thinning has been an ongoing management activity since the 1960's and tends to be lower in impact than regeneration.

Changes in land use on surrounding private land cannot be predicted with any certainty but could include re-forestation of abandoned farmland, clearing of forest for pasture or cropland, building of homes and other structures, construction and improvement to county and private roads and others. Future activities on private lands are estimated based upon current use or condition of the existing timber. Much of the private land in the watershed is managed for commercial forestry. These lands have been heavily cut and will not support harvests within the planning period. Since the vegetation management project described in the EA implements events that are temporary (regenerated lands will be growing trees within 5 years) and mitigated for, these actions will not add to the cumulative effects of private land action. Indeed, since the Forest Service cannot predict or control actions on private lands, the only actions for which we can plan are those that occur on Forest Service land.

Effects on water quality are another potential cumulative effect, which could potentially impact aquatic PETS species. Water quality modeling developed specifically for the National Forests in Mississippi was applied to this analysis area. The methodology and results of that model are presented in Appendix H, Environmental Assessment: Analysis Unit 5. The estimated

disturbance is more than 1000% under the threshold that would be expected to adversely impact or have a cumulative effect on water quality and aquatic habitats.

Threatened and Endangered Species

Louisiana black bear

In 1992, it was estimated that only 25 to 50 black bears still remained in the state. Black bears eat a wide variety of foods, including vegetable matter such as grasses, fruits, seeds, nuts and roots. Insects, fish, carrion, and small rodents are also eaten. Blackberry thickets, hardwood forests producing acorns and other mast and containing shrubs, fallen logs, and brush-piles are typical habitat for black bears. (Mississippi Department of Wildlife, Fisheries and Parks, 1995a).

A pattern of repeated sightings over time suggests a single black bear may occur on and in the vicinity of the Sandy Creek Wildlife Management Area (Adams county) of the Homochitto National Forest, approx. 30 to 40 miles from the Analysis Unit. Louisiana black bears are not confirmed elsewhere on the National Forest. There is a confirmed population of at least 3 bears in the general area of southern Wilkinson County. Two of these bears are radio-collared and no sightings of these tagged bears have yet been observed on the Homochitto NF. A confirmed sighting of a black bear has also been documented in Amite county (2001) approximately 5 miles south of the southern portion of the Homochitto National Forest.

Black bears exist primarily in bottomland hardwood and floodplain forest, although use of upland hardwood, mixed pine/hardwood and coastal flatwoods and marshes has been documented. Black bears are adaptable and opportunistic, and can survive in the proximity of humans if afforded areas of retreat that ensure little chance of close contact with humans. Forest management practices, in general, have much less impact on black bear than the density of roads with unrestricted traffic. Black bears could appear in any large block of forest on the Homochitto NF with limited road access.

Direct Effects – Due to the apparent absence of the black bear within the project vicinity, there should be no direct effects on the Louisiana black bear. However if a bear was located within the project vicinity it could be temporarily disturbed.

Indirect Effects -- The proposed vegetation management practices (in all alternatives except the no action alternative) are consistent with the Black Bear Management Handbook (Black Bear Conservation Committee, 1992) recommendations for managing Upland Pine stands. This handbook is referenced in the Louisiana Black Bear Recovery Plan (U.S. Fish and Wildlife Service, 1995) as containing recommendations on management of forests for the Louisiana black bear. Specifically, the handbook called for stand thinning as soon as economically feasible, tree harvest in "patches" large enough to allow sunlight to penetrate to the forest floor and encourage soft mast production and vigorous growth of herbaceous vegetation, and the maintenance of Streamside Management Zones (SMZ) and denning trees. After a few years, the "patches" will become impenetrable thickets with many hardwood sprouts and pine seedlings growing

vigorously. Bears may still use these sites as denning areas since thick cover will be provided. Also, rotting logs, stumps, and logging slash from the harvest operation will provide a good source of grubs, insects, and beetles. Both thinning and harvest are called for in the proposed action and both are believed to be consistent with the management recommendations of the handbook. Therefore there should be no negative indirect effects on the black bear.

Cumulative Effects -- The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

There is no documented observation of black bears in the analysis area, however black bears are known to move large distances and there is a possibility of a bear using the analysis area. Because the proposed actions are the recommended actions to benefit black bear, it is my determination that the proposed action and all alternatives are “not likely to adversely affect” the Louisiana black bear. The no action alternative will have “no effect” on this species.

Bald eagle

Bald eagles are generally limited to winter occupancy in Mississippi. The bald eagle is a large bird that generally occurs in the vicinity of lakes, rivers, and marshes and along seacoasts. Nesting usually occurs in areas with mature trees near large bodies of water. The diet of southeastern bald eagles is primarily fish, supplemented with reptiles, waterfowl, small mammals, and carrion. (Mississippi Department of Wildlife, Fisheries and Parks, 1995c). Although bald eagles winter and breed on St. Catherine’s Creek National Wildlife Refuge (approximately 32 miles to the West of this Analysis Unit), no suitable habitat is known to occur in the project area, and this area is considered generally unsuitable habitat for the bald eagle.

Direct Effects – Since no bald eagles or their nests have been observed in the project area, no direct effects on this species are expected.

Indirect Effects – Suitable nesting and feeding activity has not been documented in the project vicinity. Consequently, the proposed activity should have no indirect effects on bald eagles.

Cumulative Effects – The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

Based on the lack of suitable habitat in the project area, it is my determination that the proposed action and all alternatives will have “no effect” on the bald eagle.

Red-cockaded woodpeckers

Red-cockaded woodpeckers (RCW) are native to the open, fire-maintained, pine forests of the southeastern U.S. This species requires large areas of mature, open, pine forests to meet both foraging and nesting requirements. Hardwood midstory negatively impacts the suitability of pine stands for nesting red-cockaded woodpeckers. Management practices that promote the

establishment of healthy pine stands are necessary to meet the requirements of Red-cockaded Woodpecker habitat. In general, pine trees 30 years or older are needed for foraging habitat and pine trees 70 years or older are needed for nesting habitat. Trees with red heart fungus that weakens the heartwood are preferred for cavity excavation (Mississippi Department of Wildlife, Fisheries and Parks, 1995b).

Sawtimber stands previously thinned, treated for midstory reductions, and within the prescribed burning area are potential nesting habitat. In general, the areas proposed for the first thinnings contain tree diameters, which are too small for RCW cavity construction. However, the areas proposed for first thinning may contain suitable habitat for foraging. Sawtimber stands that contain a broad range of midstory and understory conditions could potentially serve as foraging habitat.

Thinning and midstory treatments have not been widespread in this area. Consequently, much of the area is dominated by stands with dense pine canopies and dense hardwood midstories. These forest conditions may have limited the expansion of RCWs in the analysis area.

According to records for the Homochitto National Forest, there were 31 active RCW clusters in 1980. In 1991, the number of active RCW clusters had dropped to 25. In 1990, the Homochitto National Forest began to actively thin pine, implement hardwood midstory reduction, prescribe burn, and install artificial nesting inserts for RCW habitat enhancement. These efforts were largely focused in and adjacent to active RCW clusters. Through these combined efforts, the current RCW population for the Homochitto National Forest has now exceeded 50 active clusters.

The analysis area was surveyed October 2002 and no RCWs or RCW activities were documented. The Project Area is not within the boundaries of the proposed Habitat Management Area (HMA) for the Homochitto National Forest. Long term there will be suitable RCW habitat with the prescribed burning and longleaf restoration. Therefore, these areas could attract red-cockaded woodpeckers, however, this area is not being managed to expand the current red-cockaded woodpecker population.

Direct Effects – Since there are no red-cockaded woodpeckers or their nest cavities in the project vicinity, there should be no direct effect on this species, its habitat or its recovery.

Indirect Effects -- Indirect potential impacts to the RCW in this type of habitat may include: Foraging and roosting habitat can be impacted by harvest of mature pines; Timber harvest can also reduce the number of potential future cavity trees, limiting cluster expansion and formation of new clusters (Conner and Rudolph 1991).

On the other hand, the proposed project will enhance potential RCW habitat within that portion of the analysis unit that is prescribed burned by reducing hardwood midstory and by reduction of the pine basal area to encourage the grass-forb understory typical of good red-cockaded woodpecker habitat.

Cumulative Effects -- The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

There is no active colony within the analysis area and no active cluster within approximately 10 miles of the project boundary. Any effects on the red-cockaded woodpecker would be long term by the establishment of the longleaf pine dominated mixed pine forest of the future which could provide habitat as the red-cockaded woodpecker population continues to expand with the action alternatives. The action alternatives meet the long-term needs of the red-cockaded woodpecker by removing hardwood midstory, lessening the possibility for southern pine-beetle infestation, and by providing for future habitat needs by removing loblolly pine and replacing it with longer-lived longleaf pine. The no herbicides alternative will provide for the same benefits but will require higher costs in labor to meet the objectives. The thin only alternative provides for hardwood midstory removal on a larger scale than either of the other two action alternatives but it does not provide long-term for the provision of future habitat. The No Action Alternative does not provide for any of these long-term needs. Based on this and the lack of potential negative impact to potential red-cockaded woodpecker habitat within the project area, it is my determination that all action alternatives will have a “not likely to adversely affect” the red-cockaded woodpecker. The no action alternative, although does not create habitat in the long term for the RCW will, in the short term have a “no effect” determination.

FS Sensitive Species

Webster's salamander

Webster's salamanders are strongly associated with moist, north-facing, mixed-hardwood slopes with rock outcrops on or near the surface (Wilson 1995). Distribution across their range is very disjunct and they have not been documented on the Homochitto National Forest. A herptile survey of four potential lake impoundment sites on the Homochitto Ranger District was conducted for 29 field days. Utilizing past field experience with this species the surveyer searched under logs and leaf litter above streams in hilly terrain and found no specimens. The surveyer concluded that while Webster's salamander occurs in southwest Mississippi in a disjunct range pattern, its occurrence on the Homochitto Ranger District might be expected (Vandeventer, T.L., 1992). In February 1998, two potentially suitable sites in Compartment 43 (north of the analysis area but containing rock outcrops and therefore presumably more suitable habitat) were surveyed for Webster's salamanders, but none were located. There are no rock outcrops documented in the analysis area. The analysis area does not likely contain suitable habitat for the Webster's salamander.

Direct Effects – There are no known occurrences of Webster's salamander on the Homochitto Ranger District. Due to the apparent absence of the salamander in the project vicinity, there should be no direct effects on the Webster's salamander. However, if the salamander were found to be present there could be potential impacts to the salamander during harvesting activities.

Indirect Effects – Since the Webster’s salamander is not known to occur in the project vicinity, it is unlikely to be affected by indirect impacts to habitat from the actions proposed.

Cumulative Effects -- The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

If the Webster’s salamander were to be found present, the no action alternative would have “no impact” on this species. The action alternatives, including the proposed action, “may impact individuals but is not likely to cause a trend to federal listing or loss of viability”. These impacts would occur in habitats not suitable for the Webster’s salamander (ridge tops and gently sloped upper side slopes).

Bachman’s sparrow

Bachman's sparrow is a habitat specialist. Historically, it was found in mature to old growth southern pine woodland subject to frequent growing-season fires. It is a fugitive species, breeding wherever fire creates suitable conditions. It requires a well-developed grass and herb layer with limited shrub and hardwood midstory. Ideal habitat was originally the extensive longleaf pine woodlands of the South. In the southeastern U.S. on the Coastal Plain breeding habitat usually is open pinewoods with thick cover of grasses or saw palmetto. Bachman’s sparrow is able to colonize recent clearcuts and early seral stages of old field succession, but such habitat remains suitable only for a short time. These habitat conditions are nearly synonymous to the habitat associated with red-cockaded woodpecker restoration. On the Homochitto National Forest, Bachman's sparrow populations have been observed in active red-cockaded woodpecker clusters and adjacent suitable red-cockaded woodpecker habitat where thinning of the hardwood component and regular prescribed fire has taken place. Within the analysis area, there are approximately 432 acres of the open, regularly burned mixed pine of the type preferred by Bachman's sparrows. The remaining pine and pine/hardwood forest that is not subject to regular prescribed fire is not suitable for the Bachman's sparrow. Continued management in open pine stands for red-cockaded woodpeckers and improvement of more dense stands by midstory removal techniques and aggressive prescribed fire regimes will provide beneficial habitat for the Bachman’s sparrow.

Direct Effects – There is a chance that a Bachman’s sparrow nest could be damaged or destroyed during harvest activities, however the effect would be short term (the loss of a single years reproduction at worst).

Indirect Effects – Within the approximately 432 acres of fire-maintained habitat within the analysis unit, the proposed thinning and restoration of longleaf pine through regeneration will enhance or create habitat for the Bachman’s sparrow. Potential impacts to Bachman's sparrow include the following: Under the no action alternative, deferment of thinning, midstory removal and prescribed burning will result in lost opportunities for development of habitat for the Bachman's sparrow. Because they include thinning, midstory removal, and prescribed burning to open the forest stand and promote a grassy/brushy understory, the Proposed Action and all action

alternatives will result in additional suitable habitat for the Bachman's sparrow. Alternatives including regeneration will result in short term losses of potentially suitable habitat.

Cumulative Effects -- The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and the action alternatives could cause minimal impacts on the Bachman's sparrow. However, the proposed action and all action alternatives will create and maintain additional acres of suitable habitat for the future by creating new acres of fire-maintained longleaf dominated forest. The no action alternative does not cause any direct adverse impacts on the Bachman's sparrow population but it does not create and maintain new habitat acres therefore, in the short term, it would have "no impact" on this species. The proposed action and all action alternatives "may impact individuals but will not likely result in a trend towards federal listing or a loss of viability" for the discussed species.

Pearl blackwater crayfish

The Pearl blackwater crayfish inhabits permanent –or nearly so—streams with clear sandy bottoms. The species occupies a limited range which is confined to drainages associated with the west bank of the Pearl River and streams associated with the north shore of Lake Ponchatrain. Recent records from the Homochitto National Forest in Amite and Franklin Counties are the first records from the Homochitto River drainage (J.F. Fitzpatrick, in press). The Homochitto National Forest collections were made from water under exposed tree roots in streambanks in Tanyard Creek, Richardson Creek, Porter Creek, and Dry Creek (in the McGehee Creek drainage). (Tom Mann, Pers. Comm., 2000). An additional collection from Brushy Creek was made in 1980 (Collections Records, Mississippi Museum of Natural Science). Collection records confirm the presence of the Pearl blackwater crayfish within the Homochitto NF and it is likely that other undocumented occurrences occur within the project area. Because the crayfish live in flowing streams, their presence within the planning area would be restricted to flowing streams. Logging equipment is allowed only to cross streams at 90 degree angles and only at designated crossings. Heavy equipment is also restricted within the streamside management zones (only 10% soil disturbance allowed within these areas). Therefore, impacts to the crayfish should be minimized.

Direct Effects – A crayfish could be killed if heavy equipment should cross a stream in which crayfish are located.

Indirect Effects -- Alternative 1 (No Action) is anticipated to result in no change of habitat suitability for the pearl blackwater crayfish. Suitable habitat for pearl blackwater crayfish may be deteriorated or lost if timber harvesting results in the removal of overstory streamside canopy, additional stream siltation, and destabilization of stream banks (T. Mann, Pers. Comm. 1993). Potential impacts to the pearl blackwater crayfish will be minimized through implementation of streamside management zones, which provide for protection of the overstory streamside canopy and reduction of potential siltation and destabilization of stream banks.

Cumulative Effects -- The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and all action alternatives “may impact individuals but will not likely result in a trend towards federal listing or a loss of viability” for the discussed species. The no action alternative will have “no impact” on this species.

Alabama shad

The Alabama shad is an anadromous species that spawns in large flowing rivers from the Mississippi River to the Suwannee River of Florida (Office of Protected Resources, 2001). The largest existing population occurs in the Apalachicola River of Florida (Office of Protected Resources, 2001). Other notable populations persist in the Pascagoula River drainage of Mississippi and the Mobile River drainage of Alabama. The fish enter freshwater during the spawning season (January to April) when water temperature reaches 19 to 22 degrees Celsius. Spawning is known to occur over sand, gravel, and rock substrates in a moderate current (Office of Protected Resources, 2001).

The decline of the Alabama shad in Alabama has been blamed on the construction of a series of high lift navigating dams in the Alabama and Tombigbee Rivers, which block spawning migration (Office of Protected Resources, 2001). Other threats to the shad include poor water quality and commercial and navigational dredging of sand and gravel from river bars used for spawning (Office of Protected Resources, 2001).

Currently the closest known population of Alabama shad was collected from the Amite River in Amite County, Mississippi (Mississippi Museum of Natural Science, Pers. Comm. 8/13/01). It is possible, but highly unlikely, for the Alabama shad to be in the Homochitto River drainage (Mississippi Museum of Natural Science, and Southern Research Station, Pers. Comm. 8/13/01). If the shad were utilizing the Homochitto River, it would be restricted to the main stem.

Direct Effects – Because the proposed actions are not within the Amite River drainage, no direct effect on the Alabama shad will be possible.

Indirect Effects - Because the proposed actions are not within the Amite River drainage, no indirect effect on the habitat of the Alabama shad will be possible.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

Because the proposed actions are well away from both the Amite and Homochitto Rivers (main stems), there will be “no impact” on the Alabama shad. The no action alternative would have “no impact” on this species.

Crystal darter

The crystal darter is known from the Pascagoula, Pearl, and Tombigbee drainages in the Gulf of Mexico basin and from the Bayou Pierre and Homochitto River systems in the Lower Mississippi drainage. It is represented in the Homochitto River drainage by a single collection in 1973 at the Highway 98 Bridge south of Bude (Ross, Stephen T. Pers. Comm.). Since that time, no other collections of this species have been made from the Homochitto drainage. Crystal darters inhabit clean sand and gravel beds with swiftly flowing water in large rivers. The streams in this project area are too small to be inhabited by this species and therefore are not classified as suitable habitat for this species.

Direct Effects – None

Indirect Effects - None

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

Therefore the proposed action and all alternatives will have “no impact” on populations of this species.

Broadstripe topminnow

The broadstripe topminnow is found only in the Lake Pontchartrain Drainage and in the Amite and Tangipahoa River systems. Dr. Stephen Ross, fisheries biologist at the University of Southern Mississippi, confirmed that broadstripe topminnows are not considered potential residents of the Homochitto River drainage. Based on this, the analysis area does not contain suitable habitat for this species.

Direct Effects – None

Indirect Effects - None

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

Therefore the proposed action and all alternatives will have “no impact” on populations of this species.

Rayed Creekshell

Although the range of the rayed creekshell covers portions of five southeastern states (Alabama, Florida, Georgia, Louisiana, and Mississippi) its occurrence is sporadic. Museum records suggest that historically it was seldom collected in large numbers, and today it is unusual to find more than a few individuals at a site. Now this mussel is considered to be of special concern due to reductions in both the number of sites where it historically occurred as

well as a decline in the number of individuals found per occurrence (NatureServe Explorer, 2002). Threats to this species include sedimentation as a result of bank destabilization, runoff from agriculture and roads and overall stream modifications. This species is known from large rivers, however, most collections are from small to medium-sized creeks where it occurs in mud, sand, or gravel substrates in slow to medium currents (NatureServe Explorer, 2002). The immature form is parasitic, however species of host fishes are not known.

This species of mussel has not been found on the Homochitto National Forest and it is not known from the Homochitto River, into which most drainages on the Homochitto National Forest flow. However, this species is known to occur in the Amite River watershed, which does include a very small portion of the Homochitto National Forest. This creek, that is part of the Amite Watershed, is not within the project area, therefore, there should be no impacts to the rayed creekshell.

Direct Effects – No direct effects are expected due to the location of this drainage, which is not within the Homochitto Watershed and well away from any proposed activities.

Indirect Effects – No indirect effects are expected. Again, this is due to the location of the proposed project being outside of the Amite River watershed.

Cumulative Effects – Cumulative effects derived from our proposed action will not affect this species habitat. Therefore, our effects will not be adding to the cumulative effects occurring in the Amite River watershed.

Natchez and chukcho stoneflies

Nymphs and adults of both the Natchez and chukcho stoneflies are associated with small, clear, cold, and unpolluted streams. These streams are usually 1-4 meters in width, with full overstory canopy and sandy gravel substrate (Hartfield 1993). They are weak fliers and will usually remain near the water from which they emerge as nymphs. Present surveys seem supportive of Brown and Stark's (1995) suggestion that both species are endemic to southwest Mississippi. Surveys for Natchez and chukcho stoneflies have been conducted in streams of the Homochitto Ranger District. Sixty-six streams sites in the Homochitto National Forest were sampled for adult stoneflies. Natchez stoneflies were found at 23 sites and the chukcho found at 9 sites. During the spring of 2002, selected streams in Analysis Unit 17 and 3 in Analysis Unit 16. Analysis Unit 17 had recent (FY 2000) timber sale activity and Analysis Unit 16 had no recent timber sale activity. One station (157) in Analysis Unit 17 had neither Natchez nor chukcho stoneflies collected. One station in Analysis Unit 16 (153B) and two in Analysis Unit 17 (107L & 155A) had only Natchez stoneflies collected. These four stations were in the upper ends of their respective watersheds and were not considered representative stonefly habitat. Seven stations (2 in Analysis Unit 16 and 5 in Analysis Unit 17) had both species collected.

Four sites were sampled in Analysis Unit 5. Of these sites only two sites had Natchez stoneflies. No chukcho stoneflies were found. The analysis unit may contain other, unsampled drainages with potentially suitable habitat for these stoneflies.

Direct Effects – There could be negative direct effects to the stoneflies. Equipment is to cross at designated stream crossings, therefore, nymphal stoneflies living within the substate could be impacted.

Indirect Effects – There could be negative indirect effects to the stoneflies with this project, however, impacts should be minimal. Soil disturbance is limited to 10% within the streamside management zone, therefore, there could be additional siltation entering the water. This, However, should be temporary and therefore indirect effects would be short term.

Cumulative Effects -- The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

Possible short term impacts form all action alternatives, “may impact individuals but will not likely result in a trend towards federal listing or a loss of viability” for the stoneflies. The no action alternative will have “no impact” on populations of these species.

Rafinesque's big-eared bats

While Rafinesque's big-eared bats may use a variety of habitats for foraging, their distribution is most likely tied to suitable roosting habitat such as abandoned buildings, abandoned mines and wells, beneath concrete road bridges, trees with loose bark, and trees with cavities extending upward from the opening. The high densities of insects found around bodies of water such as streams and ponds makes these very important foraging habitats for this bat species.

In 1991, a colony of Rafinesque's big-eared bats was observed roosting in an abandoned house on a small private inholding of land within the Homochitto National Forest (J.A. Smith, Pers. Comm., 1992b). Because current inventory methods for the Rafinesque's big-eared bat are neither feasible nor effective for determining definitive information on the number and location of individuals, and because the project and all alternatives are expected to have either insignificant effects, site-specific inventory was deemed to not be necessary. It was assumed that Rafinesque's big-eared bats were or could be present in the study area and the effects of management on the species were analyzed.

Direct Effects – Bats could be living in trees of the type proposed for harvest, therefore, there could be potential minimal negative direct effects to the bat. However, this bat is more likely to be trees that form cavities which would unlikely be harvested in this project.

Indirect Effects - Standard mitigations require the leaving of snags and cavity trees for wildlife purposes. The presence of these snags is further enhanced by the leaving of additional living hardwoods and pines in groups of 2-5 trees or in clumps of trees from 0.5 to 2 acres in size within the regeneration cuts. In addition, the largest trees with loose shaggy bark and or cavities

are in the creek bottoms and will be protected inside the expanded streamside management zones. Therefore, the project should have only minimal indirect effects on the Rafinesque's big-eared bat.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The No Action Alternative will have "no impact" on populations of the species. Because the streamside management zones will continue to provide large trees capable of producing cavities of the sort needed as potential roost sites, and because of the relatively small percentage of the forest area being harvested, it is determined that the proposed action and all action alternatives "may impact individuals but will not likely result in a trend towards federal listing or a loss of viability" for the discussed species.

Arogos skipper

The Arogos skipper is a small butterfly with a wingspan about 1 to 1 ¼ inches. This species is found only in native grasslands, including prairies, savannahs, and bogs. The butterfly is rare and local in distribution. The larval foodplant is Bluestem grasses in the mid west and northern New Jersey, lopsided indiangrass in Florida, toothache grass along the Gulf Coast, and pine barrens reedgrass in the Carolinas and southern New Jersey. The adults feed on nectar from flowers such as blazing star, purple vetch, dogbane, stiff Coreopsis, purple coneflower, green milkweed, and ox-eye daisy among others.

There has been a recent concern about the survival of this species and a status survey has been commissioned by the U.S. Fish and Wildlife Survey to determine if listing as an endangered species is appropriate. In the vicinity of the Homochitto, historical collections exist for both Hinds and Copiah counties. Forest Service personnel spent over seven person-days collecting all species of skippers in seemingly suitable habitat on the Homochitto Ranger District in grassy portions of nineteen sections scattered throughout the forest. None of the specimens collected were the Arogos skipper (Marc Minno, Pers. Comm., 2001).

Direct Effects – The greatest threat to the survival of the Arogos skipper, if indeed it is part of the District's fauna, is the burning of large contiguous blocks of grassland for which no refugia are retained, not timber harvest (Minno, M., Pers. Comm, 2001). However, during logging activities, there is a potential for the larva, which feeds on the bluestem grasses to become impacted. Therefore, there could be minimal direct effects on the Arogos skipper as a result of this proposed project.

Indirect Effects – Because the creation of open, fire maintained grass-forb habitat of the type being created on that portion of the project area within the burn block is considered suitable for the Arogos skipper, suitable habitat may be created.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

Because the Arogos skipper is not confirmed to occur on the Homochitto Ranger District, and because the management proposed is anticipated to create habitat beneficial to the skipper, however, the proposed action and all action alternatives “may impact individuals but will not likely result in a trend towards federal listing or a loss of viability” on the Arogos skipper population. The no action alternative would have “no impact” on this species.

Trachyxiphium moss

Trachyxiphium heteroica (a moss) is a slender, green, flaccid, rather shiny moss growing in mats with an interesting, if confusing, distribution. This small moss was for many years considered to be endemic to wet forests on soil and logs at moderate elevations (up to 5500 feet) in the Puebla and Veracruz states of Mexico. It was not known to occur outside of Mexico until August, 1969 when it was collected growing on a wet, rotted log in a spring seep at Clear Springs Recreation Area, Homochitto National Forest. Between 1969 and 2000, it had been collected only two other times in the United States: both from Washington Parish, Louisiana. All currently known collections from the southern United States come from man-made habitats: an artificial lake in Mississippi; and concrete culverts around springs in Louisiana (Crum and Anderson, 1981). In September 2000, a concentrated effort was undertaken to confirm this species continued occurrence on the Homochitto. The original collector was contacted in order to develop a refined search image. Dr. Reese provided valuable information on the specific microhabitat required by this species and a better verbal description of the site of the first collection. It was re-collected from the original location in September 2000. Its current status on the Homochitto is being investigated. Although at least six other spring seeps seemingly suitable have been investigated, the moss has been collected only one other time on the Homochitto. Based on research to date, it seems that this moss is associated with decaying wood in springs and spring seeps. The specific type of seep seems to be of a type that has water flowing year-round. Current flow is obvious and mosses dominate the lowest level of the ground cover, although there are patches of bare sand and gravel present. There have been no spring seeps of this type located during field surveys between 1998 and 2001. Collections of mosses were made in 2001 but this moss was not collected.

Direct Effects – There are no known occurrences of *Trachyxiphium heteroica* in the vicinity of the project. All potential habitats will be protected within expanded streamside management zones and standard wetland mitigation measures.

Indirect Effects – Because spring seeps and other wetland types are specifically avoided, there should be no indirect effects on *Trachyxiphium heteroica*.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and all action alternatives focus management activities on ridges and specifically avoid streamside management zones and all wetlands. Therefore, the proposed action and all alternatives would have “no impact” on the discussed species.

Cypress-knee sedge

The cypress-knee sedge is an aquatic sedge that is usually associated with cypress trees, logs, or knees. It occurs in areas of permanently flooded cypress timber. Frequently the cypress-knee sedge may occur on floating or partially submerged rotting logs or stumps and may form dense tussocks. It has been found in all light conditions from full sun to dense canopy. Associated species may include: baldcypress (*Taxodium distichum*), swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), possum haw (*Viburnum nudum*), buttonbush (*Cephalanthus occidentalis*), bogmoss (*Mayaca fluviatilis*), marsh St.-John’s-wort (*Triadenum walteri*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis* ssp, *spectabilis*), and netted chain-fern (*Woodwardia areolata*). The present distribution of cypress-knee sedge is poorly understood partially because of the inaccessible nature of the habitat and the generally inhospitable nature of southern swamps in mid-summer (snakes and mosquitoes) (Bryson, Charles. 2001. pers comm.). The cypress-knee sedge has been collected from at least four sites on the Homochitto RD and with additional survey new sites will undoubtedly be added.

Direct Effects – Because neither the species nor suitable habitat has been found in the vicinity of the project, no direct impacts to the cypress-knee sedge is likely.

Indirect Effects - Direct Effects – Because neither the species nor suitable habitat has been found in the vicinity of the project, no indirect impacts to the cypress-knee sedge is likely.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and all alternatives focus management activities on ridges and specifically avoid streamside management zones and all wetlands. There are no known cypress sloughs or swamps in the analysis unit so it is very unlikely for the species to occur here. Therefore, the proposed action and all alternatives (including the no action) will have “no impact” on the discussed species.

Small’s wood fern

The Small’s wood fern occurs in moist to wet woodlands (shaded seeps and bald cypress swamps) comprised of several species of deciduous hardwoods and sweetbay, sometimes with baldcypress and dwarf palm. Associates include: sweetgum, swamp black gum, tulip poplar, loblolly pine, cinnamon fern, royal fern, lizard's tail, poison sumac, American holly, red maple, switchcane, and netted chain fern. This species is known to occur on the Homochitto Ranger District but not in the planning unit and an extensive survey to locate additional populations in seemingly suitable habitat on the forest has been conducted without additional populations being

located (J.A. Smith, 1995). No populations of this species were located during site surveys in 1998 and 2001. No management activities are planned for areas of seemingly suitable habitat.

Direct Effects – Because no management activities will take place within seemingly suitable habitat and because no individual plants were found during field surveys, no direct effects are expected.

Indirect Effects – Because suitable potential habitat is being protected within streamside management zones, no indirect impact on the species is expected.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and all alternatives should have no impact for the discussed species.

Bay starvine

The bay starvine may be locally abundant on steep slopes beneath deciduous hardwoods (beech-magnolia) and occasional pines, usually midslope or lower, and less commonly found on floodplains along the bases of mixed hardwood slopes. Associates: American beech, spruce pine, shortleaf pine, white oak, Darlington oak, hophornbeam, southern magnolia, bigleaf magnolia, pyramid magnolia, cucumber tree, sourwood, tulip poplar, sweetgum, horse-sugar, American holly, florida anise, sebastian-bush, Elliotts blueberry, sliky camelia, witch hazel, wild ginger, partridge-berry, melic grass, variable panic grass, narrow-leaf sedge, hirsute sedge, striate sedge, and christmas fern. Although scarlet woodbine may be most abundant in small areas of the forest where more light than normal is hitting the forest floor due to windthrow or other mortality of single trees, the recommended management is to maintain a forest cover with as little disturbance as possible, avoid clear-cuts and thinnings, protect from fire, and minimize or restrict vehicular traffic. Due to the steep nature of the microhabitat, erosion is a constant threat, especially if thinning or harvest activities on the ridgetops are conducted in a careless manner.

Direct Effects – Most habitat for this species will receive only minimal impacts by logging operations therefore, direct effects should be negligible with only individual plants being impacted.

Indirect Effects – Logging of adjacent ridges could allow additional sunlight to reach into the bottoms and slopes in which this species grows, possibly encouraging growth of the vines and flowering and fruiting.

Cumulative Effects - The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and all action alternatives may impact individuals but will not likely result in a trend towards federal listing or a loss of viability for the discussed species. The no action alternative will have “no impact” on the bay starvine.

Fetid trillium

The fetid trillium has a wide range of reported habitat preferences: ravines, floodplains, low ground, in rich woods, even on roadsides and shoulders, in silts, sandy-alluvium, and loess soils. It is often locally abundant in rich soils on steep slopes in the shade of mixed pine-hardwoods and less commonly on low ridges, in well drained soils. The fetid trillium also occurs in floodplains in mixed hardwood forests. Associates may include: shortleaf pine, loblolly pine, longleaf pine, spruce pine, American beech, white oak, tulip poplar, bigleaf magnolia, pyramid magnolia, sourwood, flowering dogwood, witch hazel, American holly, red maple, Florida anise, Elliotts blueberry, wild azalea, partridge-berry, long-leaf spikegrass, and yellow jessamine, green-dragon, jack-in-the-pulpit, wild sweet William.

The species seems tolerant of a wide range of soil moisture and soil types from low swampy woods to high, dry bluffs and ravine slopes. Fetid trillium was found by J. A. Smith “on all sites that I have covered during my endangered plant survey” (J.A. Smith, Pers. Comm., 1992a). They are considered widespread on the Forest and have been confirmed in the analysis area. A 1998 rare plant survey confirmed the presence of fetid trillium in the analysis area at several locations.

Direct Effects – Logging activity may result in the loss of individual plants. However, implementation of streamside management zones will minimize potential impacts to the fetid trillium.

Indirect Effects - Potential impacts to the fetid trillium include the following: The no action alternative is anticipated to result in no change of habitat suitability for the fetid trillium. In general, excessive removal of the overstory or conversion of sites from mesic to xeric conditions may damage or destroy populations. However, implementation of streamside management zones will minimize potential impacts to the fetid trillium. Because streamside zones are applied similarly for all action alternatives, there is no anticipated difference in the potential impacts to habitat for the fetid trillium.

Cumulative Effects -The proposed project does not contribute to other unconnected actions within the project area to create unacceptable levels of negative cumulative impacts.

The proposed action and all action alternatives may impact individuals but will not likely result in a trend towards federal listing or a loss of viability for the discussed species. The no action alternative will have “no impact” on this species.

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APPENDIX 1.

Threatened and Endangered Species
National Forests in Mississippi
4 April 2002

Group	Scientific Name	Common Name	Federal Status	TNC Global	TNC State	Possibility of Occurrence on Homochitto NF	
Amphibian	<i>Rana capito sevosa</i>	Mississippi Gopher Frog	E	G1	S1	Outside known range/no suitable habitat	
Bird	<i>Grus canadensis pulla</i>	Mississippi Sandhill Crane	E	G5T1	S1	Outside known range/no suitable habitat	
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	G4	S1B/S1N	Potential	
Bird	<i>Picoides borealis</i>	Red-Cockaded Woodpecker	E	G3	S1	Confirmed	
Fish	<i>Acipenser oxyrinchus desotoi</i>	Gulf Sturgeon	T	G3T1T2	S1B/S1N	Outside known range/no suitable habitat	
Fish	<i>Percina aurora</i>	Pearl Darter	C	G1	S1	Outside known range/no suitable habitat	
Fish	<i>Scaphirhynchus albus</i>	Pallid Sturgeon	E	G1G2	S1	Outside known range	
Invertebrate	<i>Fallicambarus gordonii</i>	Camp Shelby Burrowing Crawfish	C	G1	S1	Outside known range/no suitable habitat	
Invertebrate	<i>Pleurobema decisum</i>	Southern Clubshell	E	G1G2	S1/S2	Outside known range	
Mammal	<i>Ursus americanus luteolus</i>	Louisiana Black Bear	T	G5T2	S1	Potential	
Plant	<i>Apios priceana</i>	Price's Potato Bean	T	G2	S1	Outside known range/no suitable habitat	
Plant	<i>Isoetes louisianensis</i>	Louisiana Quillwort	E	G1	S1	Outside known range	
Plant	<i>Lindera melissifolia</i>	Pondberry	E	G2	S2	Outside known range	
Reptile	<i>Drymarchon corais couperi</i>	Eastern Indigo Snake	T	G4T3	S1	Outside known range/no suitable habitat	
Reptile	<i>Gopherus polyphemus</i>	Gopher Tortoise	T	G3	S2	Outside known range/no suitable habitat	
Reptile	<i>Pituophis melanoleucus lodingi</i>	Black Pine Snake	C	G4T3	S2	Outside known range/no suitable habitat	

APPENDIX 2.

**Forest Service Sensitive Species
 National Forest in Mississippi
 7 August 2001**

Group	Scientific Name	Common Name	<u>TN</u> <u>C</u> Global	TNC State	Possibility of occurrence on Homochitto
Amphibian	<i>Plethodon websteri</i>	Webster's salamander	G3	S3	Outside of known range / Suitable Habitat Present
Bird	<i>Aimophila aestivalis</i>	Bachman's sparrow	G3	S3?	Confirmed Present
Crustacean	<i>Fallicambarus danielae</i>	Speckled burrowing crayfish	G2	S2	Outside of known range / No Suitable Habitat
Crustacean	<i>Fallicambarus gordonii</i>	Camp Shelby burrowing crayfish	G1	S1	Outside of known range / No Suitable Habitat
Crustacean	<i>Hobbseus attenuatus</i>	Pearl rivulet crayfish	G2	S2	Outside of known range / No Suitable Habitat
Crustacean	<i>Procambarus barbiger</i>	Jackson Prairie crayfish	G2	S2	Outside of known range / No suitable Habitat
Crustacean	<i>Procambarus fitzpatricki</i>	Spiny-tailed crayfish	G2	S2	Outside of known range / No Suitable Habitat
Crustacean	<i>Procambarus penni</i>	Pearl blackwater crayfish	G3	S3	Confirmed Present
Fish	<i>Alosa alabamiae</i>	Alabama shad	G3	S1	Potential / At extreme periphery of range / No Suitable Habitat
Fish	<i>Crystallaria asprella</i>	Crystal Darter	G3	S2	Potential
Fish	<i>Etheostoma raneyi</i>	Yazoo darter	G2	S2?	Outside of known range / No Suitable Habitat
Fish	<i>Fundulus euryzonus</i>	Broadstripe topminnow	G2	S2	Not Present
Fish	<i>Notropis melanostomus</i>	Blackmouth shiner	G2	S2	Outside of known range / No Suitable Habitat
Fish	<i>Noturus munitus</i>	Frecklebelly madtom	G3	S2	Outside of known range
Fish	<i>Noturus stigmosus</i>	Northern madtom	G3	S1	Outside of known range
Fish	<i>Percina lenticula</i>	Freckled darter	G2	S2	Outside of known range / No Suitable Habitat
Insect	<i>Alloperla natchez</i>	Natchez stonefly	G2	S2	Confirmed Present
Insect	<i>Atrytone arogos arogos</i>	Arogos skipper	G3G4T1T2	S2S3	Possible / Habitat possibly suitable
Insect	<i>Haploperla chukcho</i>	Chukcho stonefly	G2	S2	Confirmed Present
Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	G3G4	S3?	Confirmed Present
Mollusk	<i>Anodontoides radiatus</i>	Rayed creekshell	G3	S2	Potential / At extreme periphery of range / Habitat possibly suitable
Mollusk	<i>Eliptio arca</i>	Alabama spike	G3Q	S3	Outside of known range
Mol	<i>Obovaria unicolluskor</i>	Alabama hickorynut	G3	S3	Outside of known range

Group	Scientific Name	Common Name	$\frac{TN}{C}$ Global	TNC State	Possibility of occurrence on Homochitto
Mollusk	<i>Plethobasus cyphus</i>	Sheepnose	G3	S1	Outside of known range
Mollusk	<i>Pleurobema beadleianum</i>	Mississippi pigtoe	G2G3	S3?	Outside of known range
Mollusk	<i>Pleurobema rubrum</i>	Pyramid pigtoe	G2	S1	Outside of known range
Mollusk	<i>Quadrula cylindrica</i>	Rabbitsfoot	G3T3	S1	Outside of known range
Mollusk	<i>Strophitus subvexus</i>	Southern Creek Mussel	G3	S2	Outside of known range
Nonvasc. Plant	<i>Trachyxiophium heteroicum</i>	Trachyxiophium moss	G2G3	S1	Confirmed Present
Reptile	<i>Pituophis melanoleucus lodingi</i>	Black pine snake	G4T3	S2S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Agalinis pseudaphylla</i>	Shinner's false foxglove	G2?Q	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Agrimonia incisa</i>	Incised agrimony	G3	S2/S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Amsonia ludoviciana</i>	Louisiana bluestar	G3	SH	Outside of known range
Vascular Plant	<i>Arabis patens</i>	Spreading rockcress	G3	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Aristida simpliciflora</i>	Southern three-awn grass	G2	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Botrychium jenmanii</i>	Dixie grapefern	G3G4	S1?	Outside of known range / Suitable Habitat Present
Vascular Plant	<i>Calopogon multiflorus</i>	Many-flower grass pink	G2G3	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Carex baltzelli</i>	Baltzell's sedge	G3	S1	Outside of known rang / No Suitable Habitat
Vascular Plant	<i>Carex decomposita</i>	Cypress-knee sedge	G3	S3?	Confirmed Present
Vascular Plant	<i>Carex impressinervia</i>	Ravine sedge	G1G2	S1	Outside of known range / Suitable Habitat
Vascular Plant	<i>Cleistes bifaria</i>	Small spreading pogonia	G3G4	S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Coreopsis nudata</i>	Georgia tickseed	G3?	S1S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Crataegus ashei</i>	Ashe hawthorne	G1	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Crataegus triflora</i>	Three-flower hawthorne	G2	S1	Outside of known range / No suitable Habitat
Vascular Plant	<i>Desmodium ochroleucum</i>	Cream tick-trefoil	G2G3	S1S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Dryopteris X australis</i>	Small's woodfern	HYB	S1	Confirmed Present
Vascular Plant	<i>Juglans cinerea</i>	Butternut	G3G4	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Lachnocaulon digynum</i>	Pineland bogbutton	G3	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Lindera subcoriacea</i>	Bog spicebush	G2	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Linum macrocarpum</i>	Spring Hill flax	G2?	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Macranthera flammea</i>	Flame flower	G3	S3?	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Marshallia trinervia</i>	Broadleaf Barbara's buttons	G3	S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Myriophyllum laxum</i>	Loose watermilfoil	G3	S1	Outside of known range / Possible habitat

Group	Scientific Name	Common Name	$\frac{TN}{C}$ Global	TNC State	Possibility of occurrence on Homochitto
Vascular Plant	<i>Penstemon tenuiflorus</i>	White-flowered beardtongue	G3?	S2S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Pieris phyllireifolia</i>	Climbing fetterbush	G3	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Pinguicula primuliflora</i>	Southern butterwort	G3G4	S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Platanthera integra</i>	Yellow fringeless orchid	G3G4	S3S4	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Polygala hookeri</i>	Hooker's milkwort	G3	S2S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Polygala leptostachys</i>	Slender spike milkwort	G3G4	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Pteroglossaspis ecristata</i> (= <i>Eulophia ecristata</i>)	Giant Orchid	G3G4	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Quercus oglethorpensis</i>	Oglethorpe oak	G3	S2?	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Rhododendron austrinum</i>	Orange azalea	G3	S2S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Rhynchospora crinipes</i>	Hairy peduncled beakrush	G1	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Rhynchospora macra</i>	Large beakrush	G3	S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Ruellia noctiflora</i>	Night flowering ruellia	G2	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Sarracenia leucophylla</i>	Crimson pitcherplant	G3	S2S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Schisandra glabra</i>	Bay starvine	G3	S3?	Confirmed Present
Vascular Plant	<i>Silene ovata</i>	Blue Ridge catchfly	G2G3	S1S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Spiranthes longilabris</i>	Giant spiral ladies'-tresses	G3	S2S3	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Tridens carolinianus</i>	Carolina fluffgrass	G3		Outside of known range / No Suitable Habitat
Vascular Plant	<i>Trillium foetidissimum</i>	Fetid trillium	G3	S3	Confirmed Present
Vascular Plant	<i>Trillium pusillum</i>	Least trillium	G3	S1	Outside of known range / Suitable Habitat
Vascular Plant	<i>Uvularia floridana</i>	Florida bellwort	G3	S1	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Xyris chapmanii</i>	Chapman's yellow-eyed grass	G3	S2?	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Xyris drummondii</i>	Drummond's yelloweyed grass	G3	S2	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Xyris louisianica</i>	Louisiana yelloweyed grass	G3	S3?	Outside of known range / No Suitable Habitat
Vascular Plant	<i>Xyris scabrifolia</i>	Harper's yelloweyed grass	G3	S1S2	Outside of known range / No Suitable Habitat

Appendix 3

STATUS CODES

Federal Status

- E - Endangered
- T - Threatened
- S - Forest Service Sensitive

State Ranks

- S1 - Critically imperiled in state because of extreme rarity (very few individuals or acres) or because of some factors making it especially vulnerable to extinction.
- S2 - Imperiled in state because of rarity or because of some factor(s) making it especially vulnerable to extinction.
- S3 - Rare or uncommon within state.