U. S. Forest Service
Bankhead National Forest
Biological Evaluation of
Proposed Salvage of Forestland Damaged by Hurricane Rita – 2006
Winston County, Alabama

This proposed action is located in Winston County, Alabama.

Contact:
Glen D. Gaines
District Ranger
P. O. Box 278
Double Springs, Alabama 35553
Telephone 205-489-5111
FAX 205-489-3427
E-mail ggaines@fs.fed.us

Summary: Hurricane Rita came through Bankhead National Forest on September of 2005. Several areas within the Bankhead National Forest received damage from high winds associated with the storm. Stands of hardwood and pine trees were uprooted, broken, blown over and root sprung in the areas covered by this evaluation. The damaged, merchantable timber within these three areas is proposed for removal using a Salvage Timber sale. These areas vary in both cover type and age class but are primarily a mixture of mature pine and hardwoods. The salvage timber sale proposed for implementation under this proposal covers an estimated 97 acres over at least three sites. Sites have been proposed for salvage operations south of Fairview in Winston County (see attached map identified as Figure #1).

As with any Forest Service activity, considerations of the potential impacts to environmental resources of this project were evaluated. Some of the protected species of plants and wildlife that could potentially be impacted by these activities include those plant communities found in upland areas, riparian areas, streams and those found on rock outcrops. No incidental take of any federally listed species is expected or anticipated with this proposed action.

Proposed salvage sale areas were initially located, then reviewed by biological staff. The lay out of the proposed timber sale, including methods of tree removal and identification of riparian areas and other environmentally sensitive areas, have been planned with input from biological staff. Minimal impact operations are proposed for use on most of the sites. Existing roads, planned and identified access roads and skid trails will be used to remove salvageable, merchantable timber. Erosion control measures will be implemented to prevent, reduce or control soil erosion. Special erosion control measures and streamside management zones are recognized with regard to equipment limitations within close proximity to streams. Protected, endangered, threatened, sensitive and locally rare species will be protected by a combination of these practices, which include the use of erosion control measures and identification and avoidance of sensitive habitats. In addition several of the sites will be salvaged by logging from the road. In these instances, there will be no skidders or logging equipment off of the existing Forest Service road.

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Introduction

This Biological Evaluation (BE) addresses the effects of salvaging downed and damaged timber and associated activities on Proposed, Endangered, Threatened, Sensitive and locally rare species on the Bankhead National Forest and surrounding landscape. The project proposal is to salvage downed and damaged timber on approximately 88 acres in designated sites on the Bankhead National Forest. Hurricane Rita came through Bankhead National Forest on September of 2005. Several areas within the Bankhead National Forest received varying amounts of damage from high winds associated with the storm. All tracts proposed for salvage timber sale are listed within this document and a map depicting the location of these areas is referenced as Figure #1. This evaluation primarily covers the practices associated with the project. The salvage project consists of removing merchantable storm-damaged timber and any follow-up actions such as erosion control.

The objectives of this Biological Evaluation are:

- to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or animal species or contribute to trends toward Federal listing of any species.
- to comply with the requirements of the Endangered Species Act that actions of Federal agencies not jeopardize or adversely modify critical habitat of Federally listed species.
- to provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process.

Area description

Bankhead National Forest is located within the northwest corner of Alabama and lies within Lawrence, Winston and Franklin counties. It is comprised of approximately 181,470 acres of forestland. The forest cover varies in both cover type and age class but is mostly a mixture of hardwoods and pine. The areas proposed for salvage timber sale are composed of a mixture of hardwood and pine trees. General tree species observed on areas proposed for treatment include longleaf pine, loblolly pine, white oak, red maple, red oak, beech, dogwood, yellow poplar and sweetgum. Shrub and vine species commonly observed include greenbrier, oak-leaf hydrangea, blackberry, holly, mountain laurel and strawberry bush.

Areas to be salvaged are primarily located south of Fairview in Winston County and occur west of North Creek. One unit lies to the south of Rockhouse Creek while two other units are located to the north of Rockhouse Creek. The areas proposed for salvage are fairly dispersed and located on the topographic quadrangle sheets of Houston, AL and Black Pond, AL. These areas are located within the watershed of the impounded portion of Sipsey Fork of Lewis Smith Lake. On site evidence shows that these sites were utilized for agricultural production in the past which possibly accounts for the lack of rich soils within the project area.

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Consultation History

There has been consultation with the U.S. Fish and Wildlife Service (FWS) regarding timber sales and related operations in the Bankhead National Forest, for many years prior to the this proposal. A salvage operation was conducted during 2005 as a result of Hurricane Ivan damage. Under the Forest Health and Restoration Project stands of loblolly pines are being thinned at many locations across the District. During the period of 1999 through 2001 several sites in the vicinity of the areas proposed for salvage were treated to control the spread of the southern pine beetle. Immediately following the epidemic spread of pine beetles, many areas along these roadways were mechanically treated to reduce the threat of trees falling on passing vehicles and blocking the road.

Past correspondence from Fish and Wildlife Service gave concurrence to conduct salvage timber sale activities, thinning activities and treatment to control southern pine beetle, as long as protective measures were in place to protect water quality for aquatic species and that habitat for terrestrial species were adequately considered.

A review of Biological Evaluations, which were conducted for planned salvage timber sales since 1995, revealed that there has been increasing concern for protection of water quality and aquatic resources. These measures which are incorporated into the Revised Forest Land and Resource Management Plan will be applied to log loading areas, landing decks and skid areas to reduce potential for erosion in order to protect aquatic resources. Biological Evaluations for Storm Damaged Salvage, Wind Storm Salvage, and Ice Storm Salvage dated 3/97, 3/99, 7/95, 5/96, 10/96, 2/03 and 4/05 were reviewed as a part of this evaluation.

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Proposed Management Action

The current proposal is to remove all pine and hardwood trees from the identified areas that are down, leaning, broken, or root-sprung. The purpose of this management action is to salvage merchantable timber resources and reduce heavy fuel buildup within these areas. Tree removal by means of salvage will be over an estimated 88 total acres within these identified areas. The project will be accomplished by using ground based logging equipment. Ground disturbance resulting from the operations will be similar to that of a conventional logging operation conducted upon Forest Service lands with some exceptions, which are noted below. The sites and how they are to be treated are described in the following section.

Winston County Sites

Site Name / Location	Section/Township/Range	Watershed	Salvage Method
Unit #1 Kristy Road/FS 110	11 / 11 south/ 8 west	Tributary to Rockhouse Tributary to North Creek (Lewis Smith Lake)	Standard salvage operation with cut trees marked for harvest – 30 acres
Unit #2 FS 108-F	02 / 11 south/ 8 west	North Creek is a tributary to Rockhouse Creek (Lewis Smith Lake)	Area designation: every merchantable stem within designated area will be removed – 35 acres
Unit #3 Bailey Road/FS 108-I	35 / 10 south / 8 west 02/ 11 south / 8 west	North Creek is a tributary to Rockhouse Creek (Lewis Smith Lake)	Standard salvage operation with cut trees marked for harvest – 23 acres

- Unit #1
  Project: Remove all marked stems which primarily includes trees that are down, leaning, root sprung, broken, damaged tops and wind thrown.

  Mitigations: There is a designation of no equipment zones (green zone) along a small stream. Trees within this area that meet the definition of down, leaning, root sprung, broken, damaged tops and wind thrown can be salvaged only if they can be winched out. Trees in this area that can be reached with a winch cable from a skidder or loader will be salvaged. Equipment will not be allowed within the green zone.

  The distance of 100 feet was utilized as a buffer from a rock bluff of over 25 feet in height. With the observance of a protective setback for the bluff line, this site can be operated by standard methods. No plants of special concern (threatened, endangered, FS designated as sensitive species or locally rare) were found here.

- Unit #2
  Project: Remove all merchantable stems within the designated area, which is the entire unit #2 area. Essentially every tree within the entire site is down, leaning, root sprung, broken, damaged tops and wind thrown.

  Mitigations: There is a designation of one no equipment zone (green zone) along a small stream. Equipment will not be allowed within the green zone. Trees within this area that meet the definition of down, leaning, root sprung, broken, damaged tops and wind thrown can be salvaged only if they can be severed by chainsaw or

similar means and winched out. Trees that can be reached with a winch cable from a skidder or loader will be salvaged.

Unit # 3

Project: Remove all marked stems which primarily includes trees that are down, leaning, root sprung, broken, damaged tops and wind thrown. The salvage thinning that will remove the trees as described above but will retain most remaining trees that are not damaged. A few undamaged trees may have to be removed to allow removal of salvaged trees.

Mitigations: There is a designation of no equipment zones (green zone) along a small stream. Trees within this area that meet the definition of down, leaning, root sprung, broken, damaged tops and wind thrown. can be salvaged only if they can be winched out. Trees that can be reached with a winch cable from a skidder or loader will be salvaged. Equipment will not be allowed within the green zone.

Areas where storm damaged timber is to be removed were evaluated for potential impacts to protected, endangered, threatened, sensitive and locally rare species of animals, plants and their habitats. Timber sale design and layout were developed in a manner as to prevent impacts to these species and their habitats as per the Revised Forest Land and Resource Management Plan. Some of these practices are described as follows.

All streamside management zones within each sale area will be protected in accordance with the guidelines of the Revised Forest Land and Resource Management Plan of 2004. This document and the operational procedures contained therein were accepted by the Fish and Wildlife Service as to provide an adequate level of protection for aquatic species. Riparian guidelines for timber sales as outlined in the Forest Land and Resource Management Plan, will be adhered to. No harvest activity will take place within areas designated for protection such as rock outcrops and rock bluffs. The sales are designed in such a manner as to not require the use of stream crossings by equipment.

Temporary access roads, which may be constructed or utilized, will be equipped with water bars and turn outs or will be established to vegetative cover for protection against erosion, immediately following the timber removal. Log landings and loading decks will be disked, seeded, and mulched following the timber removal. FS personnel will evaluate the need for additional erosion control measures with considerations made for the soil type and the percent slope of the area. Erosion control measures may include road closure, construction of water bars and turnouts, seeding, mulching and nutrient application.

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SPECIES CONSIDERED AND SPECIES EVALUATED

District Wildlife Biologist Tom Counts has conducted field reviews of the project sites at various times during the month of March of 2006. The BNF district office keeps current records of locations of known listed species throughout the area, which were reviewed as part of this evaluation. Some of the species of concern that were identified in this review process are listed. There are known bald eagle nests within the vicinity; flattened musk turtles are known from the vicinity; several species of federally listed mussels are recorded as occurring within the lower Sipsey Fork drainage; occurrences of Menges fameflower have been reported on sandstone rock outcrops and glades near the salvage area and large whorled pogonia have also been recorded in the vicinity. All areas which may be disturbed or impacted, by this project were surveyed for presence of protected species or their habitat.

All currently listed threatened, endangered, protected and sensitive species (Regional Forester's Sensitive Species list) were considered during this evaluation as well as designated critical habitat. Some of the species are not known to occur on the BNF at the present time but potential habitat was assessed for effects. This evaluation considered species range, life history information, available habitat information, and known locations to determine which species to evaluate. See the following table for a listing of species considered.

Federally Listed Species of the Bankhead National Forest

Scientific Name	Common Name	Status	Habitat	Notes	Within Affected Area? May be affected by the project?
Myotis grisescens	Gray Bat	E	1	Known only from Lawrence County.	Not known in Winston County.
Myotis sodalis	Indiana bat	E	1	Known only from Lawrence County.	Not known in Winston County.
Haliaeetus leucocephalus	Bald Eagle	T	11	Known sites occur along Smith Lake.	**Yes – site is 2.0 miles from nest. This site will not be affected.**
Picoides borealis	Red-cockaded woodpecker	E	17	Does not occur on Bankhead	No.
Sternotherus depressus	Flattened musk turtle	T	A	Occurs on Bankhead.	**Yes. This aquatic species has potential habitat in watershed of project.**
Epioblasma brevidens	Cumberlandian combshell	E	A	Does not occur on Bankhead.	No.
Epioblasma metastriata	Upland combshell	E	A	Has not been recorded within the Black Warrior drainage since the 1900's.	No.
Epioblasma turgidula	Turgid blossom pearly mussel	E	A	Does not occur on Bankhead and may be extinct.	No.
Lampsilis altilis	Fine-lined pocketbook	E	A	Historically occurred on Bankhead.	**No. Historically found in upper Sipsey drainages. Aquatic habitats will be**

					protected by mitigation measures.
Scientific Name	**Common Name**	**Status**	**Habitat**	**Notes**	**Within Affected Area? May be affected by the project?**
Lampsilis perovalis	Orange-nacre mucket	T	A	Occurs on Bankhead. Critical habitat designated.	**Found w/in Winston County in Sipsey Watershed, not in vicinity of project. Aquatic species will be protected by mitigation measures.**
Medionidus acutissimus	Alabama moccasinshell	T	A	Occurs on Bankhead. Critical habitat designated.	**Found w/in Winston County in Sipsey Watershed, not in vicinity of project. Aquatic species will be protected by mitigation measures.**
Medionidus parvulus	Coosa moccasinshell	E	A	Has not been recorded on Bankhead in recent years.	**Not in recent years. Historically found in the upper drainage of Sipsey. Aquatic species will be protected by mitigation measures.**
Pleurobema furvum	Dark pigtoe	E	A	Occurs on Bankhead. Critical habitat designated.	**Found w/in Winston County in Sipsey Watershed, not in vicinity of project. Aquatic species will be protected by mitigation measures.**
Pleurobema perovatum	Ovate clubshell	E	A	Has not been recorded on Bankhead in recent years. Critical habitat designated.	**Historically found w/in Winston County in Sipsey Watershed, not in vicinity of project. Designated critical habitat is considered as unoccupied by this species. Aquatic species will be protected by mitigation measures.**
Pleurobema plenum	Rough pigtoe	E	A	Does not occur on Bankhead.	**No.**
Ptychobranchus greeni	Triangular kidneyshell	E	A	Occurs on Bankhead. Critical habitat designated.	**Found w/in Winston County in Sipsey Watershed, not in vicinity of project. Aquatic species will be protected by mitigation measures.**
Lampsilis orbiculata (L. abrupta)	Pink mucket pearlymussel	E	A	Does not occur on Bankhead	No.

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Scientific Name	Common Name	Status	Habitat	Notes	Within Affected Area? May be affected by the project?
Dalea foliosa	Leafy prairie clover	E	6	Species not documented on Bankhead.	No. Glades species will be avoided by this project.
Lesquerella lyrata	Lyrate bladder-pod	T	6	Species not documented on Bankhead.	No. Glade species will be avoided by this project.
Marshallia mohrii	Mohr's Barbara's Buttons	T	2	Not documented on Bankhead although found in close proximity.	No. Glade species will be avoided by the project.
Sagittaria secundifolia	Kral's water-plantain	T	A	Occurs on Bankhead.	No. This aquatic species will not be affected by the project.
Thelypteris pilosa var al.	Alabama streak-sorus fern	T	7	Occurs on Bankhead.	No. Potential habitat is not present and will not be affected.
Xyris tennesseensis	Tennessee yellow-eyed grass	E	11	Species not documented on Bankhead.	No. Potential habitat is not present within the project area.

[1]E = endangered; T = threatened

Habitat Code
1 = Cave Habitats
2 = Wetland (Bog) Habitats
6 = Glades, Prairies, and Woodlands Habitats
7 = Rock Outcrop and Cliff Habitats
8 = Grass/Forb Habitats
10 = Mid- to Late- Succesional Deciduous Forest Habitats
11 = Forest Riparian Habitats
12 = Habitat Generalist
13 = Area Sensitive Mid- to Late- Successional Deciduous Forest Habitats
17 = Southern Yellow Pine Forests and Woodland Habitats
18 = Mixed Mesic Forest Habitats
19 = Mixed Xeric Forest Habitats
0 = Shrub/Seedling/Sapling Habitats
21 = Seeps and Springs Habitats
A = Aquatic Species

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Forest Service Sensitive Species

Scientific Name	Common Name	Status[1]	Rank	Habitat	Within Affected Area? If yes, may be affected by the project?
Aesculus parviflora	Small flowered buckeye	S	S2S3G2G3	18	No.
Astragalus tennesseensis	Tennessee Milkvetch	S	S1G3	6	No
Aureolaria patula	Spreading yellow false foxglove	S	S1G2G3	7	No.
Carex brysonii	Bryson's sedge	S	S1G1	18	No.
Delphinium alabamicum	Alabama larkspur	S	S2G2	6	No.
Diervilla rivularis	Riverbank bush-honeysuckle	S	S2G3	11	No.
Hymenophyllum tayloriae	Gorge filmy fern	S	S1G1G2	7	No.
Jamesianthus alabamensis	Alabama jamesianthus	S	S3G3	11	No.
Juglans cinerea	Butternut	S	S1G3G4	18	No.
Leavenworthia alabamica var.alabamica	Alabama Gladecress	S	T2T3G2G3	6	No.
Leavenworthia crassa	Fleshyfruit Gladecress	C&S	S1G2	6	No.
Lesquerella densipila	Duck River Bladderpod	S	SHG3	6	No.
Monotropsis odorata	Sweet pinesap	S	G3	10	No.
Asplenium x ebenoides	Scott's Spleenwort	S	HYBS1	7	No.
Marshallia trinervia	Broadleaf Barbara's buttons	S	S3G3	11	No.
Minuartia alabamensis	Alabama Sandwort	S	S2G2Q	6	No.
Neviusia alabamensis	Alabama snow-wreath	S	S2G2	6	No.
Platanthera intergrilabia	White fringeless orchid	C&S	S2G2G3	2	Not found. Potential habitat
Polymnia laevigata	Tennessee Leafcup	S	S2S3G3	18	No.
Robinia viscosa	Clammy Locust	S	G3	17	No.
Rudbeckia triloba var pinnatiloba	Pinnate-lobed Black-eyed Susan	S	S2S3G4T2	7	No.
Scutellaria alabamensis	Alabama skullcap	S	S2G2	7	No.
Sedum nevii	Nevius' stonecrop	S	S3G3	7	No.
Silene ovata	Blue Ridge catchfly	S	S1G2G3	7	No.
Talinum calcaricum	Limestone Fameflower	S	S2G3	6	No.
Talinum mengesii	Menge's fameflower	S	S2S3G3	6	Potential No habitat.
Thalictrum mirabile	Little mountain meadow rue	S	QS1G2G3	7	No.
Trillium lancifolium	Lanceleaf Trillium	S	S2S3G2	11	No.
Trillium simile	Jeweled Trillium	S	G3	18	No.
Speyeria diana	Diana Fritillary	S	S3G3	11?	No.
Corynorhinus rafinesquii	Rafinesque's Big-eared bat	S		10	No.
Cheilolejeunea evansii	A liverwort	S	S1G1	11	No.
Aneura maxima	A liverwort	S	G1G2	11	No.

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Scientific Name	Common Name	Status[1]	Rank	Habitat	Within Affected Area? If yes, may be affected by the project?
Pellia X appalachiana	A liverwort	S	G1G2	11	No.
Nardia lescurii	A liverwort	S		11	No.
Plagiochila echinata	A liverwort	S	G2	11	No.
Radula sullivantii	A liverwort	S	G2	11	No.
Riccardia jugata	A liverwort	S	G1G2	11	No.
Hydroptila paralatosa	A caddisfly	S	S2G2	A	No.
Rhyacophila carolae	A caddisfly	S	S1G1	A	No.
Elliptio arca	Alabama spike	S	S2G3	A	No.
Obovaria jacksoniana	Southern Hickorynut	S	S2G1G2	A	No.
Obovaria unicolor	Alabama Hickorynut	S	S2G3	A	No.
Strophitus subvexus	Southern creekmussel	S	S2G3	A	No.
Villosa nebulosa	Alabama rainbow	S	S3G3	A	No.
Etheostoma bellator	Warrior darter	S	S2G2	A	No.
Etheostoma douglasi	Tuskaloosa darter	S	S2G2	A	No.
Etheostoma phytophyllum	Rush darter	S	S2G2	A	No.
Etheostoma tuscumbia	Tuscumbia darter	S	S1G1	A	No.
Percina sp.cf.macrocephala	Longhead darter (Warrior Brinled Darter)	S	G3	A	No.
Necturus alabamensis	Black Warrior waterdog	S	S2G2	A	No.

[1]S = sensitive; C = candidate for Federal listing

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All species listed for the Bankhead National Forest as threatened or endangered by the FWS and as sensitive by the Regional Forester were considered, but some were excluded from further evaluation. Potential habitat was assessed for effects.

A discussion of the excluded species and the reasons for exclusion follows.

Federally Listed Species (Threatened & Endangered Species), Considered and Excluded from Evaluation

Red-cockaded woodpecker. There has been no record of a red-cockaded woodpecker at the Bankhead National Forest since the early 1990's. Informal conversations with Ralph Costa of the Fish and Wildlife Service resulted in agreement that the red-cockaded woodpeckers are no longer present here. Habitat for the red-cockaded woodpecker was not maintained on the Bankhead. Potential habitat is not present within the project sites. For this reason, this species was excluded from further evaluation.

Mussels - turgid blossom, pink mucket pearly, rough pigtoe and cumberlandian combshell mussels. Three of these species of mussels (turgid blossom, pink mucket pearlymussel, and rough pigtoe) are listed as having historic range within Lawrence County, Alabama. Their habitat was associated with the Tennessee River and its large tributaries. The turgid blossom mussel is considered to be extinct by the Fish and Wildlife Service and has never been found within the streams of Bankhead National Forest. The rough pigtoe is currently known only to occur in a few sites in the Tennessee, Clinch, Cumberland, Barren and Green rivers. This species is not known to occur within Bankhead. The pink mucket is distributed in Colbert, Lauderdale, Limestone, Madison, Marshall, and Morgan counties in Alabama. The pink mucket is a large river species known from the Mississippi, Tennessee, Ohio and Cumberland river systems and their tributaries. This species has never been recorded within the streams of Bankhead National Forest and is not expected to occur here. The rough pigtoe is found within the Tennessee River proper and thus will not be found within Bankhead National Forest. The fourth, cumberlandian combshell, may have had historic range within north Alabama, as the habitat was associated with the Tennessee River. However, records do not indicate that it is currently found in or near the Bankhead National Forest.

None of these four species are listed by the US Fish and Wildlife Service within Winston County. There are no streams with mussel habitat within the project sites. Standards regarding riparian areas, riparian corridors and streamside management zones are outlined in the Revised Land and Resource Management Plan for the National Forests in Alabama. These standards are in place to protect water quality, aquatic species and the terrestrial and aquatic ecosystems associated with streams, seeps, ponds, bogs, and springs. Based on these standards, this project will not affect aquatic or riparian species.

For the reasons listed above, these mussel species were excluded from further evaluation.

Excluded species, continued.

Fine-lined Pocketbook Mussel

The fine-lined pocketbook was federally listed as threatened in 1993. The species historically occurred in the Alabama, Tombigbee, Black Warrior, Cahaba, Tallapoosa, Coosa River systems, and their tributaries. Currently, this species is limited to small streams above the fall line within the Cahaba, Coosa, and Tallapoosa River Basins (USFWS 2003). It is not currently known to exist within Bankhead National Forest although it historically had habitat in this area. This species is included in this analysis due to its having historical habitat within Bankhead National Forest. Critical habitat has been designated for selected watersheds including portions of the extant populations and historical habitats. The critical habitat designation was not given to this species in habitats found in Bankhead National Forest. For this reason, this species was excluded from further evaluation.

Coosa moccasinshell mussel

The Coosa moccasinshell was federally listed as endangered in 1993 (USFWS 1993). The species historically occurred in the Cahaba, Sipsey Fork of the Black Warrior, Coosa River systems, and their tributaries in Alabama, Georgia, and Tennessee. Currently, the species may be extirpated from the Cahaba and Black Warrior River basins. Since listing, the species has only been documented in the Conasauga River of the upper Coosa River Basin (USFWS 2003). Critical habitat has been designated on 9 watersheds of Alabama, Georgia, and Tennessee. This critical habitat does not include any portions of the streams within Bankhead National Forest (USFWS 2003).

The decline and extirpation of most populations of Coosa moccasinshells may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Passage of host fish may also be a factor. The five known or suspected extant populations of Coosa moccasinshell mussels probably inhabit only a small fraction of the suitable habitat remaining for this species within the Alabama National Forests and **none** is known from Bankhead National Forest. For this reason, additional evaluation was not conducted for this species.

Upland combshell mussel

The upland combshell was federally listed as endangered in 1993 (USFWS 1993). The species historically occurred in the Black Warrior, Cahaba, and Coosa Rivers, and some of their tributaries in Alabama, Georgia, and Tennessee. When listed, the mussel was believed to be restricted to only the Conasauga River in the upper Coosa River Basin in Georgia. Recent surveys of historic habitat have been unable to locate any extant populations. The species may be extinct, however, biologists continue to retain hope that additional surveys may locate these mussels (USFWS 2003). Critical habitat has been designated for 8 watersheds in Alabama, Georgia, and Tennessee (USFWS 2003) but none in Bankhead National Forest. This species is considered to be extirpated and for that reason was not evaluated.

Leafy Prairie Clover. This species has not been found on the Bankhead National Forest. Habitat of the leafy prairie clover in Alabama is described as thin-soiled limestone glades and limestone barrens. In Tennessee, this plant occurs on wet calcareous barrens and moist prairies or cedar glades, usually near a stream or where some seepage from limestone provides seasonal moisture. Leafy prairie clover requires full sun and low competition. Periodic fire is required to maintain these conditions.

Excluded species, continued.

This species has declined throughout its range due to habitat destruction and alteration due to development, overgrazing, and fire suppression. It is highly threatened by continued habitat loss due to land use change. Additionally, sites in Tennessee are threatened by exotic, invasive shrubs like privet and bush honeysuckle.

The proposed project does not include glades or barrens habitat. Because habitat is not available for this plant within the project sites and because it is not known to occur on Bankhead National Forest, this plant was excluded from further evaluation.

Lyrate bladderpod. This species has not been found on the Bankhead National Forest or in Winston County. The six known populations of this plant occur in Franklin, Lawrence and Colbert counties, Alabama.

This plant's habitat is described as red soils, limestone outcroppings, disturbed cedar glades and glade-like areas (open pastures, fields, and roadsides in calcareous areas). This species is restricted to shallow soils. This plant requires periodic disturbance to maintain the open cedar glade habitat where it occurs. It is threatened by woody plant succession and habitat loss or modification.

The proposed project does not include glades or outcrop habitats. Because habitat is not available for this plant within the project sites and because it is not known to occur on Bankhead National Forest, this plant was excluded from further evaluation.

Mohr's Barbara's buttons
Mohr's Barbara's buttons is a federally threatened species of moist prairie-like openings in woodlands and along shale-bedded streams in a grass-sedge community. Additionally, several populations are located within, or extend into, rights-of-ways. Soil associations are typically alkaline sandy clays that are seasonally wet and have a high organic matter content.

At listing, 22 locations were known to occur in Alabama and Georgia in the Cumberland Plateau and Ridge and Valley physiographic regions (Recovery Plan, 1991). One extant population was recently discovered within the southern administration boundary of the Bankhead National Forest (Whetstone, 2002, personal communication).

Primary threats to the species include loss of habitat resulting from fire suppression and conversion of suitable habitat to pine plantations and agricultural land (Protected Plants of Georgia). Herbicide use, mowing during the flowering period, and installation of underground cable or gas lines also has the potential to impact populations that occur within rights-of-ways (Recovery Plan, 1991).

This plant has not ever been found on Forest Service lands within Bankhead National Forest and suitable habitat does not occur within the project area. For these reasons, further evaluations were not conducted on this species.

Excluded species, continued.

Alabama Streak Sorus Fern. The known range of this plant includes a 3 mile stretch of the Sipsey River in Winston County. Where it is found, in rock shelters along the Sipsey Fork, it is locally abundant. Threats to this fern include impoundments, bridge construction, logging of upslope forests, vandalism, and incidental damage from recreational use of the habitat.

No plants occur within the proposed project sites, nor is their habitat present within the sale area. Standards regarding riparian areas, riparian corridors and streamside management zones are outlined in the Revised Land and Resource Management Plan for the National Forests in Alabama. These standards are in place to protect water quality, aquatic species and the terrestrial and aquatic ecosystems associated with streams, seeps, ponds, bogs, and springs. Based on these standards, this project will not affect this species. For this reason, this species was excluded from further evaluation.

Tennessee yellow-eyed grass. This species has not been found on the Bankhead National Forest. Twenty populations are known in Alabama, Georgia and Tennessee. In some locations this species is vulnerable to land-use conversion and habitat fragmentation resulting mainly from highway construction and alteration of wetlands. It is also threatened by right-of-way maintenance projects, however these situations are not immediate threats on Bankhead National Forest.

Tennessee yellow-eyed grass may be found in moist to wet places including, on seepage slopes, springy meadows, bogs, and banks of small streams, in open areas or thin woods where calcareous rock is at or near the surface or on thin calcareous soils.

The proposed project does not contain Tennessee yellow-eyed grass habitat nor was not found during field surveys. The plant is not known to occur on BNF although some areas of possible habitat are present. Therefore, it was excluded from further evaluation.

Kral's water plantain. This plant is not present within the project area and was therefore excluded from further evaluation. Kral's Water-plantain was listed as threatened by the USFWS in 1990. It is only known from three tributaries in northern Alabama and Georgia. Kral's water plantain (also known as Little River Arrowhead) occurs in undammed riverine reaches on exposed shoals or rooted among loose boulders in sands, gravels, and silts in pools up to 3 feet deep. Sphagnum seeps are frequently found with this species, and it prefers areas with stream bottoms that are narrow and bounded by steep slopes. Locally distributed, but where suitable habitat exists, the plants grow in nearly pure stands. On the Bankhead National Forest, plants have been found rooted tightly in cracks of sandstone bedrock along the Sipsey Fork, in the Wild and Scenic River corridor and, more recently, in the Caney Creek drainage. In the summer of 2000 one additional population was found in Brushy Creek (unpublished CCS reports, USFWS), also on the Bankhead National Forest, National Forests in Alabama. This plant was not observed during field surveys of the proposed project. Activities that increase water quality degradation, stream turbidity and siltation from erosion pose a significant threat to this species. However, it is not found in this area of the District.

Excluded species, continued.

Gray bat *(Myotis grisescens) and* **Indiana bat (**Myotis sodalis**)**
Small winter populations of gray and Indiana bats were found in two caves on the northern portion of Bankhead National Forest in February, 1999. Their presence has been verified by FS monitoring efforts in subsequent years. Monitoring efforts are ongoing to determine the extent of their range on the Bankhead. They have only been found in the portion of the forest within Lawrence County. These species are not known to occur within Winston County and thus are excluded from evaluation. There are no caves with primary or secondary protection zones within the vicinity of the salvage area.

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Threatened and Endangered Species, Evaluated

All currently listed threatened, endangered and sensitive species were considered during this portion of the evaluation. Some of the species are not known to occur on the Bankhead National Forest at the present time but potential and designated critical habitat was assessed for effects. It is likely that the habitat for these mussels is upstream from the salvage area.

Species considered and evaluated

Bald Eagle (Haliaeetus leucocephalus)
The bald eagle has been observed around portions of Bankhead National Forest that border the Lewis Smith Lake. Two inactive bald eagle nests were confirmed on National Forest system lands along Lewis Smith Lake during 2004. The nests were not active during 2004, while one of the nests was considered as "active" but an unsuccessful attempt during 2005. Observations in 2006 have failed to locate birds on the nests. However, the nest structures are maintained by the birds.

Direct, Indirect, and Cumulative Effects – Bald eagle

The bald eagle is threatened throughout its range by habitat loss, disturbance by humans, contaminants, decreasing food supply and illegal shooting. The project sites do not contain potential bald eagle nesting habitat and is not within an area of concern for their nest sites. Due to the fact that the eagle nest is 2.0 miles from Unit #1 of the salvage site; that Unit #1 is located in an upland position not on the water; that essentially all trees to be salvaged are already down or broken, the salvage area is not considered as current or potential habitat.

Mussels. The following species of mussels were considered and were evaluated because their habitat is located within a stream which is listed as occurring within the same county as the salvage sale. It is likely that the habitat for these mussels is upstream from the salvage area as Rockhouse Creek, North Creek and the Sipsey Fork are impounded from Lewis Smith Lake.

Orange-nacre mucket mussel (*Lampsilis perovalis)*
Alabama Moccasinshell (*Medionidus acutissimus)*
Dark Pigtoe (Pleuorbema furvum)
Ovate Clubshell (*Pleurobema perovatum*)
Triangular Kidneyshell (*Ptychobranchus greeni)*

In compliance with a court order the U.S. Fish and Wildlife Service has assessed the best data available to evaluate critical habitat for 11 species of mussels. The final rule to designate critical habitat was published in the Federal Register on July 1, 2004 (50 CFR Part 17) and was effective as of August 2, 2004. Those five species with designated critical habitat on Bankhead National Forest include the orange-nacre mucket (Lampsilis perovalis), Alabama moccasinshell (Medionidus acutissimus), ovate clubshell (Pleurobvema perovatum), dark pigtoe (Pleurobema furvum), triangular kidneyshell (Ptychobranchus greenii). Critical habitat is a term used in the Endangered Species Act to refer to a specific geographic area that is essential for the conservation of a threatened or endangered species and may require special management or protection. Federal agencies such as the Forest Service are required to consult with the Fish and Wildlife Service to

ensure that their actions do not jeopardize the continued existence of these species or destroy or adversely modify critical habitat. This designation also serves to enhance awareness of the importance of the habitat and the need for special management considerations.

Orange-nacre mucket (*Lampsilis perovalis)*

Environmental Baseline – Orange-nacre mucket

The orange-nacre mucket was federally listed as threatened in 1993 (USFWS 1993). The species historically occurred in the mainstem and tributaries of the Alabama, Tombigbee, Black Warrior, and Cahaba, River systems in Alabama, Mississippi, and Georgia. Currently, the mussel may be extirpated from the mainstem Tombigbee, Black Warrior, and Alabama Rivers; however it may still be found within several river basins including the Black Warrior and Cahaba Rivers (USFWS 2003). Critical habitat has been proposed for 15 watersheds in Alabama and Mississippi (USFWS 2003). Portions of the designated critical habitat are located in the Sipsey Fork largely on the Bankhead National Forest and upstream of the salvage site. Populations and potential habitats on or near Bankhead National Forest are displayed in the table below.

Overview of the orange-nacre mucket historical, potential, and designated critical habitat within five miles of the Bankhead National Forest.

River Basin	Watersheds	Forest	Counties	Status	Viability Risk[1]		
					L	M	H
Black Warrior	Clear	Bankhead	Winston	unlikely			N
	Lower Brushy			unknown		N	
	L. Sipsey Fork			24 mi occupied C Hab			N
	U. Sipsey Fork			27 mi occupied C.Hab		F	

[1]Viability risks: L = low, M = moderate, H = high, N = minimal FS influence, F = some FS influence

This species inhabits streams and small rivers among stable sand, gravel, or cobble substrates in moderate to swift currents. Larval glochidia are released as superconglutinates (Haag et al. 1995) within the months of March through June (Hartfield and Butler 1997). Redeye bass, spotted bass, and largemouth bass have been identified as suitable fish hosts for the glochidia (Haag and Warren 1997). Freshwater mussels are filter feeders taking organic detritus, diatoms, phytoplankton, and zooplankton from the water column. As with many other freshwater mussels, orange-nacre muckets require clean gravel riffles and are especially susceptible to the threat of stream degradation resulting from low dissolved oxygen levels or high chlorine concentrations in waterways. Additionally, this species does not survive in impoundments and reservoirs.

The decline and extirpation of most populations of orange-nacre mucket mussels may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Passage of host fish may also be a factor. The 7 known or suspected extant populations of orange-nacre muckets probably inhabit only a portion of the suitable habitat for this species within the Alabama National Forests. Severe drought conditions during 1999 and 2000 and existing barriers to fish passage may limit the extent of populations within the upper portions of most watersheds. Currently, only two known or suspected

populations associated with the Alabama National Forests are considered moderately secure based upon analysis of potential watershed conditions that could place the species at risk. The remaining 5 watershed scale populations rank as high risk but have limited opportunities for Forest Service involvement. One population (Upper Sipsey Fork) is potentially at risk of population decline due to reduced base flows and a downstream reservoir possibly reducing the ability of the species to re-colonize the upper watershed.

Direct, Indirect, and Cumulative Effects – Orange-nacre mucket

Orange-nacre muckets are fairly widely distributed across the Upper Sipsey, including Thompson, Flannagin, and Borden creeks in Lawrence county. Their populations in the upper Brushy creek watershed are not well known. They are also a species that can inhabit long reaches extending from the mainstem to tributary headwaters. The salvage project is located downstream from the known mussel habitat and does not directly intersect streams with populations of this mussel species.

The project is well downstream from their habitat so there is no potential for impact to their habitat. Project mitigations that prevent, limit and otherwise reduce to potential for soil erosion will provide varying levels of protection for all aquatic species and prevent or minimize indirect effects.

For populations of orange-nacre mucket mussels and their critical habitat on or near National Forests, potential management influences include any activity that could accelerate erosion or deposition, increase sedimentation or turbidity, alter water flow or chemistry, favor the spread of invasive species, or block host fish passage. Siltation and turbidity may affect orange-nacre muckets by altering the rocky insterstitial spaces where they live and also by reducing foraging and reproductive effectiveness.

This concern is addressed by employing mitigating measures to limit and minimize the transfer of sediment that potentially enters into aquatic sources. The fact that this species is not present in the streams directly adjacent to the salvage project prevents a direct impact. Adherence to the practices for conducting this salvage project as outlined within the Revised Land and Resource Management Plan for the National Forests in Alabama will reduce excessive soil erosion, thus minimize the chance for indirect impacts to aquatic habitat. The exercise of these project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest, including this species. The project is also downstream from their habitat so there is no potential for impact to their habitat. Thus, direct and indirect impacts are not anticipated.

A cumulative effects analysis should consider incremental impact of actions when added to past, present and reasonably foreseeable future actions. The analysis includes all actions regardless of who undertakes them. Cumulative effects can result from individually minor but collectively significant actions taking place over time. Cumulative watershed effects are of particular concern given the interspersion of private in-holdings on some areas of land above the proposed critical habitat. The management of private lands is not monitored, governed or regulated by the Forest Service, however it is being salvaged with limited concern for erosion. The areas impacted by the storm would not normally be harvested in the foreseeable future as part of the Forest Health and Restoration Project although some of the areas are adjacent to salvage sites. There is no overwhelming degree of resource management actions on Forest Service lands to provide concern for cumulative effects. Continued habitat and watershed protection, monitoring, and restoration will be the primary recovery objectives for this species and as such are considered for every practice with a potential for ground disturbance. Thus the cumulative effects for this project are negligible.

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Determination of Effect – Orange-nacre mucket

The determination is "no effect / no adverse modification of critical habitat" for orange-nacre mucket mussel. The rationale for this decision rests upon the fact there is no opportunity for the project to impact the habitat for this species as it occurs upstream from the project. Project resource protections as described will protect water quality within streams and tributaries, thus protecting histroic habitat for this species. It is therefore my determination that the practices and management actions necessary to carry out this project have "no effect" on the orange nacre mucket mussel and do not jeopardize the continued existence of the species or destroy or adversely modify critical habitat

Alabama moccasinshell (*Medionidus acutissimus)* Lea

Environmental Baseline – Alabama moccasinshell

The Alabama moccasinshell was federally listed as threatened in 1993 (USFWS 1993). The species historically occurred in the Alabama, Tombigbee, Black Warrior, Cahaba, Coosa River systems, and their tributaries in Alabama, Mississippi, and Georgia. The species appears to have declined or disappeared from the mainstem rivers of all basins but continues to survive in many tributary streams (USFWS 2003). Highest densities have been observed within the Sipsey Fork tributaries on the Bankhead National Forest (Warren and Haag 1994). Critical habitat has been designated for 16 watersheds including portions within the Sipsey Fork largely on the Bankhead National Forest (USFWS 2003). Current and historical habitats on or near Bankhead National Forest are displayed in the table below.

Overview of Alabama moccasinshell mussel occurrences and historical, potential, and designated critical habitat within five miles of the Bankhead National Forest.

River Basin	Watersh	Miles		Forest	Counties	Status	Viability Risk[1]		
							L	M	H
Black Warrior	Lower Brushy	13		Bankhead	Winston	Occupied		N	
	Upper Brushy	40			Winston	Occupied		F	
	L. Sipsey Fork	24			Winston	91mi occupied C.Hab			N
	U. Sipsey Fork	27			Winston	91mi occupied C.Hab		F	
total		104							

[1]Viability risks: L = low, M = moderate, H = high, N = minimal FS influence, F = some FS influence

This species is found in streams and small rivers along moderate to fast flowing shoals. It inhabits the interstices of gravel and cobble substrates, remaining completely embedded in the stream bottom most of the year. The blackspotted topminnow (*Fundulus olivaceus*), Tuskaloosa darter (*Etheostoma douglasi*), redfin darter (*E. whipplei*), blackbanded darter (*Percina nigrofaciata*), naked sand darter (*Ammocrypta beani*), southern sand darter (*A. Meridiana*), Johnny darter (*E. nigrum*), speckled darter (*E. stigmaeum*), saddleback darter (*Percina vigil*), and logperch (*P. caprodes*) have been identified as suitable fish hosts for the glochidia (Haag and Warren, 1997, 2001). Freshwater mussels are filter feeders taking organic detritus, diatoms, phytoplankton, and zooplankton from the water column. As with many other freshwater mussels, Alabama moccasinshells require clean gravel riffles and are especially susceptible to the threat of stream degradation resulting from low dissolved oxygen levels or high chlorine concentrations in waterways. Additionally, this species does not survive in impoundments and reservoirs. Other factors that can negatively impact freshwater mussels include contamination of waterways with pesticides, heavy metals, and other substances and the introduction of non-indigenous mollusks, such as the Asian clam and zebra mussel. The primary constituent

elements of critical habitat include: stable channels, appropriate flows, necessary water quality, clean substrates, available fish hosts, and lack of competitive nonnative species (USFWS 2003).
The decline and extirpation of most populations of Alabama moccasinshell may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Passage of host fish may also be a factor. Recent drought conditions and existing barriers to fish passage may limit populations within the upper portions of these watersheds where this species exists. One population (Lower Sipsey Fork) is potentially at high risk of population decline due to reduced base flows and a downstream reservoir possibly limiting the ability of the species to re-colonize the upper watershed.

Direct, Indirect, and Cumulative Effects – Alabama moccasinshell
Alabama moccasinshells are fairly widely distributed across the Sipsey and Brushy drainages within Bankhead National Forest. They are also a species that can inhabit long reaches extending from the mainstem to tributary headwaters. For populations of Alabama moccasinshell mussels and their critical habitat, potential management influences include any activity that could accelerate erosion or deposition, increase sedimentation or turbidity, alter water flow or water chemistry, or block host fish passage.

The salvage project does not directly intersect streams with populations of this mussel species, thus avoiding direct effects. The project is downstream from their habitat so there is no potential for indirect impact to their habitat. Project mitigations that prevent, limit and otherwise reduce to potential for soil erosion will provide varying levels of protection for this species and prevent or minimize indirect effects.
Siltation and turbidity may affect Alabama moccasinshell mussels by altering the rocky insterstitial spaces where they live and also by reducing foraging and reproductive effectiveness. This is addressed by employing mitigating measures to limit and minimize the transfer of sediment that potentially enters into aquatic sources. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. Thus, given the fact that the project is downstream of known habitat, protection afforded by the erosion control measures as described and by the overall water quality protection mechanisms of the Forest Land and Resource Management Plan, direct and indirect impacts are not anticipated.

A cumulative effects analysis should consider incremental impact of actions when added to past, present and reasonably foreseeable future actions. The analysis includes all actions regardless of who undertakes them. Cumulative effects can result from individually minor but collectively significant actions taking place over time. Cumulative watershed effects are of particular concern given the interspersion of private in-holdings on some sections of critical habitat. The management of private lands is not governed or regulated by the Forest Service. The salvage project will treat approximately 100 acres out of 182,000 acres of National Forest lands. While habitat and watershed protection, monitoring, and restoration will be the primary recovery objectives for the Forest Service, the exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. If the practices contained herein are implemented by utilizing standards of Forest Service procedures; the direct, indirect and cumulative effects will be negligible.

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Determination of Effect – Alabama moccasinshell

The determination is "no effect / no adverse modification of critical habitat" for Alabama moccasinshell mussels. The rationale for this decision rests upon the fact there is no opportunity for the project to impact the habitat for this species. The project is downstream from known populations of this species thus there would be no opportunity to impact the species. Project resource protections and project mitigations as described will be utilized to protect water quality within streams and tributaries, thus protecting the habitat for this species. It is therefore my determination that the practices and management actions necessary to carry out this project have "no effect" on Alabama moccasinshell mussels and do not jeopardize the continued existence of this species or destroy or adversely modify critical habitat.

Dark pigtoe (Pleuorbema furvum)

Environmental Baseline – Dark pigtoe

The dark pigtoe was federally listed as endangered in 1993 (USFWS 1993). The species historically was restricted to the Black Warrior River basin above the fall line (USFWS 2003). Since listing, it has been confirmed in the Sipsey Fork and its tributaries including Caney creek and tributaries of upper Brushy such as Brown, Capsey and Rush creeks (USFWS 2003). Highest population densities have also been recorded in these areas (Warren and Haag 1994). Critical habitat has been designated including areas within the Sipsey Fork, largely on the Bankhead National Forest (USFWS 2003).

Overview of known or suspected dark pigtoe mussel historical, potential, and designated critical habitat within five miles of the Bankhead National Forest.

River Basin	Watersheds	Forest	Counties	Population status	Viability Risk[1]		
					L	M	H
Black Warrior	Clear	Bankhead	Winston	unlikely			N
	Lower Brushy		Winston	present		N	
	L. Sipsey Fork		Winston	91mi occupied C.Hab			N
	Upper Brushy		Winston	present		F	
	U. Sipsey Fork		Winston	present		F	

[1]Viability risks: L = low, M = moderate, H = high, N = minimal FS influence, F = some FS influence

This species is found in sand, gravel, and cobble shoals and runs in small rivers and large streams. This species is gravid in June and releases glochidia in peach to pink colored conglutinates (Haag and Warren 1997). Fish hosts have been identified as the largescale stoneroller (*Campostoma oligolepis*), Alabama shiner, blacktail shiner, creek chub (*Semotilus atromaculatus*), and blackspotted topminnow (Haag and Warren 1997). Freshwater mussels are filter feeders taking organic detritus, diatoms, phytoplankton, and zooplankton from the water column. The decline and extirpation of most populations of dark pigtoe mussels may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Mussels such as the dark pigtoe require clean gravel riffles and are especially susceptible to stream degradation resulting from low dissolved oxygen levels or high chlorine concentrations in waterways. This species does not survive in impoundments and reservoirs. Other factors that can negatively impact freshwater mussels include contamination of waterways with pesticides, heavy metals, and other substances and the introduction of non-indigenous mollusks, such as the Asian clam and zebra mussel. The primary constituent elements of critical habitat include: stable channels, appropriate flows, necessary water quality, clean substrates, available fish hosts, and lack of competitive nonnative species (USFWS 2003).

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Direct, Indirect, and Cumulative Effects – Dark Pigtoe
For populations of dark pigtoe mussels and their critical habitat on or near National Forests, potential management influences include any activity that could accelerate erosion or deposition, increase sedimentation or turbidity, alter water flow or chemistry, favor the spread of invasive species, or block host fish passage. If conducted in an unrestrained fashion, a salvage project has the *potential* to impact water quality.

This salvage project does not directly intersect streams with populations of this mussel species, thus direct impacts to this species and its habitat are not anticipated. The project is well downstream from their habitat so there is no potential for impact to their habitat. Project mitigations that prevent, limit and otherwise reduce to potential for soil erosion will provide varying levels of protection for this species and prevent or minimize indirect effects.

Siltation may affect dark pigtoe mussels by altering the rocky insterstitial spaces where they live and also by reducing foraging and reproductive effectiveness. This is addressed by employing mitigating measures to limit and minimize the transfer of sediment that potentially enters into aquatic habitats where they live. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. Given the protection afforded by the erosion control measures as described and by the overall water quality protection mechanisms of the Forest Land and Resource Management Plan, direct and indirect impacts are not anticipated.

Cumulative watershed effects are of particular concern given the interspersion of private in-holdings on some sections of critical habitat. The management of private lands is not governed or regulated by the Forest Service. There is not an overwhelming degree of resource management actions on Forest Service lands in these areas to provide concern for cumulative effects. However, the continued efforts in habitat and watershed protection, monitoring, and restoration will be the primary recovery objectives for the Forest Service. Cumulative effects for the total of all of the ground disturbing practices such as salvage and harvest operations are minimized as the mitigation measures for soil erosion will be conducted on all sites.

The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. If the practices contained herein are implemented by utilizing standards of Forest Service procedures; the direct, indirect and cumulative effects will be non-existent.

Determination of Effect – Dark Pigtoe
The determination is "no effect / no adverse modification of critical habitat" for historical habitat and designated critical habitat for dark pigtoe mussel. The rationale for this decision rests upon the fact there is no opportunity for the project to impact the habitat for this species. Project resource protections as described will be utilized to protect water quality within streams and tributaries, thus protecting the potential habitat for this species. The project is downstream from historical habitat so there is no potential for impact. This species and their designated critical habitat will not be impacted It is therefore my determination that the practices and management actions necessary to carry out this project have "no effect" on dark pigtoe mussels and do not jeopardize the continued existence of this species or destroy or adversely modify critical habitat **.**

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Ovate clubshell (*Pleurobema perovatum*) Lea
Environmental Baseline – Ovate clubshell

The ovate clubshell was federally listed as endangered in 1993 (USFWS 1993). The species historically occurred in the Tombigbee, Black Warrior, Alabama, Cahaba, Tallapoosa and Coosa Rivers, and their tributaries in Mississippi, Alabama, and Georgia. Apparently, the species is extirpated from the Black Warrior(USFWS 2003). Critical habitat has been designated for 20 watersheds in Alabama, Mississippi, Georgia, and Tennessee (USFWS 2003). Portions of critical habitat are within Sipsey Fork largely on the Bankhead National Forest. The species is not currently known to exist within Bankhead National Forest although it historically had habitat in this area. It is evaluated due to the designation of its critical habitat within Bankhead National Forest.

Overview of known or suspected ovate clubshell mussel historical, potential and designated critical habitat within five miles of the Bankhead National Forest.

River Basin	Watersheds	Miles	Forest	Counties	Status	Viability Risk[2]		
						L	M	H
Black Warrior	Lower Brushy		Bankhead	Winston	extirpated?			
	Upper Brushy				extirpated?		F	
	U. Sipsey Fork				unoccupied C.Hab		F	
Total		80						

[1]Viability risks: L = low, M = moderate, H = high, N = minimal FS influence, F = some FS influence

This species utilizes habitat consisting of sand and gravel shoals and runs in large streams and small rivers. Gravid females are observed from June through July and glochidia are released as well formed white conglutinates (USFWS 2003). Host fish are unknown for this species. Freshwater mussels are filter feeders taking organic detritus, diatoms, phytoplankton, and zooplankton from the water column. The ovate clubshell utilizes stable sediments and requires clean gravel riffles and are especially susceptible to stream degradation resulting from low dissolved oxygen levels or high chlorine concentrations in waterways. Additionally, this species does not survive in impoundments and reservoirs. Other factors that can negatively impact freshwater mussels include contamination of waterways with pesticides, heavy metals, and other substances and the introduction of non-indigenous mollusks, such as the Asian clam and zebra mussel (*Dreissena polymorpha*). The primary constituent elements of critical habitat include: stable channels, appropriate flows, necessary water quality, clean substrates, available fish hosts, and lack of competitive nonnative species (USFWS 2003). The decline and extirpation of most populations of ovate clubshells may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Passage of host fish may also be a factor. The known or suspected extant populations of ovate clubshell mussels probably inhabit only a small fraction of the suitable habitat remaining for this species within the National Forests in Alabama and **none** is known from Bankhead National Forest. Recent drought conditions and existing barriers to fish passage, such as the presence of numerous reservoirs, may limit populations within the upper portions of these watersheds.

Direct, Indirect, and Cumulative Effects – Ovate Clubshell

For historical populations of the ovate clubshell mussel and their critical habitat on or near National Forests, potential management influences include any activity that could accelerate erosion or deposition, increase sedimentation or turbidity, alter water flow or chemistry, favor the spread of invasive species, or block host fish passage.

The salvage project does not directly intersect streams with populations of this mussel species thus direct effects are not anticipated. Project mitigations that prevent, limit and otherwise reduce to potential for soil erosion will provide varying levels of protection for this species and prevent or minimize indirect effects. Siltation and turbidity may affect ovate clubshell mussels by altering the rocky insterstitial spaces where they live and also by reducing foraging and reproductive effectiveness. This is addressed by employing mitigating measures to avoid, limit and minimize the transfer of sediment that potentially enters into aquatic sources. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. Given the protection afforded by the erosion control measures as described and by the overall water quality protection mechanisms of the Forest Land and Resource Management Plan, direct and indirect impacts are not anticipated.

A cumulative effects analysis should consider incremental impact of actions when added to past, present and reasonably foreseeable future actions. The analysis includes all actions regardless of who undertakes the actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time. Cumulative watershed effects are of particular concern given the interspersion of private in-holdings on some sections of critical habitat. Although the management of private lands is not governed or regulated by the Forest Service, projects on Forest Service lands utilize project mitigations and best management practices to provide protection of aquatic resources in the Bankhead National Forest. These practices have been considered as adequate to protect aquatic resources. Forestry management practices on private lands are addressed by the Alabama Forestry Commission in association with the Alabama Department of Environmental Management. Cumulative effects for the total of all of the salvage and harvest operations on Forest Service lands are minimized as the mitigation measures for soil erosion will be carried out on all sites.

If the practices contained herein are implemented by utilizing standards of Forest Service procedures; the direct, indirect and cumulative effects will be non-existent.

Determination of Effect – Ovate Clubshell

The determination is "no effect / no adverse modification of critical habitat" for the ovate clubshell mussel. The rationale for this decision rests upon the fact there is no opportunity for the project to impact the habitat for this species. Project resource protections as described will be utilized to protect water quality within streams and tributaries, thus protecting the habitat for this species. Project resource protections as described will be utilized to protect water quality within streams and tributaries, thus protecting the habitat for this species.

Ovate clubshell mussels and their critical habitat will not be impacted It is therefore my determination that the practices and management actions necessary to carry out this project have "no effect" on ovate clubshell mussels and do not jeopardize the continued existence of the species or destroy or adversely modify critical habitat.

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Triangular kidneyshell (*Ptychobranchus greeni)* Conrad
Environmental Baseline -- Triangular kidneyshell

The triangular kidneyshell was federally listed as endangered in 1993 (USFWS 1993). The species historically occurred in the Black Warrior, Cahaba, Alabama, and Coosa River systems, and their tributaries in Alabama, Georgia, and Tennessee. The species may be extirpated from the Alabama River and may no longer inhabit the mainstems of the Black Warrior and Coosa Rivers (USFWS 2003). Critical habitat has been designated for 13 watersheds in Alabama, Georgia, and Tennessee (USFWS 2003). Portions of critical habitat are within the Sipsey Fork largely on the Bankhead National Forest. For this reason, this species was considered and evaluated for this project. Historical, potential, and critical habitats on or near National Forests are displayed in the table below.

Overview of known or suspected triangular kidneyshell mussel historical, potential, and designated critical habitat within five miles of the Bankhead National Forest.

River Basin	Watersheds	Miles	Forest	Counties	Population Status	Viability Risk[1]		
						L	M	H
Black Warrior	L. Sipsey Fork		Bankhead	Winston	91mi occupied C.Hab			N
	U. Sipsey Fork			Lawrence	91mi occupied C.Hab		F	
	Upper Brushy			Winston	present		F	
Total		91						

[1]Viability risks: L = low, M = moderate, H = high, N = minimal FS influence, F = some FS influence

This species is found in areas with rapid currents over shoals and riffles in large streams and small rivers. Larval glochidia are released from March through April as conglutinates that mimic dipteran larvae (Hartfield and Hartfield 1996) or fish eggs (Haag and Warren 1997) and serve to attract potential host fish. The Warrior darter (Etheostoma bellator), Tuscaloosa darter, blackbanded darter, and logperch have been identified as suitable fish hosts for the glochidia (Haag and Warren 1997). Freshwater mussels are filter feeders taking

organic detritus, diatoms, phytoplankton, and zooplankton from the water column. This species requires clean gravel riffles and are especially susceptible to stream degradation resulting from low dissolved oxygen levels or high chlorine concentrations in waterways. As with many other freshwater mussels, the triangular kidneyshell does not survive impoundments and reservoirs. Other factors that can negatively impact freshwater mussels include contamination of waterways with pesticides, heavy metals, and other substances and the introduction of nonindigenous mollusks, such as the Asian clam and zebra mussel. The primary constituent elements of critical habitat include: stable channels, appropriate flows, necessary water quality, clean substrates, available fish hosts, and lack of competitive nonnative species (USFWS 2003).
The decline and extirpation of most populations of triangular kidneyshell may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Passage of host fish may also be a factor. The 7 known or suspected extant populations of triangular kidneyshell probably inhabit less than half of the suitable habitat for this species within the National Forests in Alabama. Recent drought conditions and existing barriers to fish passage may further limit populations within the upper

portions of these watersheds. Currently, 2 of the 7 known or suspected populations associated with the National Forests in Alabama are considered at high risk based upon analysis of potential watershed conditions.

Direct, Indirect, and Cumulative Effects – Triangular kidneyshell
Triangular kidneyshells were fairly widely distributed across Sipsey Fork and Brushy Creek of the Bankhead National Forest. They are also a species that can inhabit long reaches extending from the mainstem to tributary headwaters. For populations of triangular kidneyshell mussels and their critical habitat on or near National Forests, potential management influences include any activity that could accelerate erosion or deposition, increase sedimentation or turbidity, alter water flow or chemistry, favor the spread of invasive species, or block host fish passage.

The salvage project does not directly intersect streams with populations of this mussel species so direct effects to this species are not anticipated. The project is downstream from recognized habitat so there is no potential for impact to this species. Indirect effects such as water quality degradation should be considered. Excessive siltation and turbidity, which are caused by soil erosion may affect triangular kidneyshells by altering the rocky insterstitial spaces where they live and also by reducing foraging and reproductive effectiveness. The streams where this species currently lives have a naturally occurring level of siltation and turbidity following significant precipitation events. The practices that could potentially affect this species would be those which disturb the soil and potentially result in excessive levels of soil loss. Road construction and other projects associated with right of ways are widely recognized as major sources of sediment input to streams. This project employees mitigating measures to avoid, limit and minimize the transfer of sediment that potentially enters into aquatic sources. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. Given the protection afforded by the erosion control measures as described and by the overall water quality protection mechanisms of the Forest Land and Resource Management Plan, direct and indirect physical damage would be prevented to this species and its habitat if it occurred downstream from the project.

A cumulative effects analysis should consider incremental impact of actions when added to past, present and reasonably foreseeable future actions. The analysis includes all actions regardless of who undertakes the actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time. Cumulative watershed effects from off-forest sources are of concern given the interspersion of private in-holdings on some sections of critical habitat as the Forest Service has no authority on private land activities. Cumulative effects for the total of all of the salvage and timber harvest operations on Forest Service lands are minimized as the mitigation measures for soil erosion will be carried out as needed. Projects on private lands that disturb the soil and have a potential for aquatic impacts are regulated by the Alabama Department of Environmental Management.

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Determination of Effect – Triangular Kidneyshell
The determination is "no effect / no adverse modification of critical habitat" for triangular kidneyshell mussels. Habitat for this species is upstream from this project. Project resource protections as described will be utilized to protect water quality within streams and tributaries, thus protecting the habitat for this species. Thus, given the protection afforded project protection mechanisms, triangular kidneyshells and their critical habitat should be protected on the National Forest lands. It is therefore my determination that the practices and management actions necessary to carry out the project have "no effect" on the triangular kidneyshell mussel and do not jeopardize the continued existence of the species or destroy or adversely modify critical habitat.

Flattened Musk Turtle (*Sternotherus depressus*)
Environmental Baseline
The flattened musk turtle is an aquatic species that is found within the upper Black Warrior drainage. This species generally requires clear gravel bottomed streams with rocky outcroppings and pools 3 to 5 feet in depth. Clear streams are necessary for the production of filter feeders (mussels), which are the primary source of food for this species. The rocky crevices and outcroppings provide cover for the turtle. This species is found in the perennial streams of the Sipsey Fork, Brushy Creek, Clear and Caney Creeks and their primary tributaries. It is also found in backwater sloughs of Lewis Smith Lake.

Threats to the flattened musk turtle include over collection, disease, habitat degradation from sedimentation and water pollution, habitat fragmentation and human-caused catastrophes and accidents (for example accidental spills).

Streams of known habitat are not included within the proposed project area, however due to the concern for sedimentation entering aquatic habitats within the watershed of operation, this species was evaluated. Rogers and Marion (2004) found flattened musk turtles within some of the backwater areas of the Sipsey Fork of Lewis Smith Lake.

The proposed project has potential to result have indirect impacts to stream habitats for this species, however project mitigations have been planned that will reduce the potential. These mitigation actions include erosion control measures and practices to reduce impacts to riparian areas and aquatic ecosystems.

Direct, Indirect, and Cumulative Effects – Flattened Musk Turtle
Direct impacts are avoided by the fact that no project area is in direct contact with stream habitats where this species is found. The indirect impacts such as siltation and turbidity could affect flattened musk turtles and their prey by altering the rocky insterstitial spaces where they live and also by reducing foraging and reproductive effectiveness. This is addressed by employing mitigating measures to avoid, limit and minimize the transfer of sediment that potentially enters into aquatic sources. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion. This includes project operations in the "green zone" of providing equipment limitations in close proximity to streams. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. However due to the devastating effect of the storm on Unit #2 where essentially every tree within the project area was downed or broken, there is a very large area of operation. This area will be salvaged to the extent that every merchantable stem within the unit will be

harvested. Given this scenario, even with the consideration of project mitigations, there is a slight potential for an insignificant or very low level impact to the North Creek portion of Rockhouse Creek, which is an embayment of the impounded portion of the Sipsey Fork. Given the protection afforded by the erosion control measures as described and by the overall water quality protection mechanisms of the Forest Land and Resource Management Plan, any indirect impacts would be insignificant or discountable.

A cumulative effects analysis should consider incremental impact of actions when added to past, present and reasonably foreseeable future actions. The analysis includes all actions regardless of who undertakes the actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time. Cumulative watershed effects from off-forest sources are of concern given the interspersion of private in-holdings on some sections of critical habitat as the Forest Service has no authority on private land activities. The onset of increased residential development on Smith Lake presents a new set of concerns for this species within the lake. Erosion control measures are limited on many development sites however the Alabama Department of Environmental Management is becoming more active in the area. Private individuals and corporations have conducted timber harvest and salvage operations all over this vicinity. The utilization rate of Forestry Best Management Practices is not known. The cumulative effect of all of the ground disturbing activities within this immediate area is not known. Cumulative effects for the total of all of the timber salvage operations as part of this project are minimized as the mitigation measures for soil erosion will be carried out on this project.

Determination of Effect – Flattened Musk Turtle

Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest. Standards regarding riparian areas, riparian corridors and streamside management zones are outlined in the Revised Land and Resource Management Plan for the National Forests in Alabama. These standards are in place to protect water quality, aquatic species and the terrestrial and aquatic ecosystems associated with streams, seeps, ponds, bogs, and springs. For unit #1 and unit #3 these standards will provide adequate protection of aquatic resources. For unit #2 they will also provide protection, however due to the large area that is to be treated, there is a slight potential for the project to have minimal impacts to areas that are habitat for the flattened musk turtle. These impacts would be insignificant or discountable in the worse case, due to planned project mitigations. This potential would result in a finding of "not likely to adversely affect" the flattened musk turtle.

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Tabular Listing of Determination of Effect
For Federally Listed Species of the Bankhead National Forest

Scientific Name	Common Name	Status	Finding
Myotis grisescens	Gray Bat	E	No Effect
Myotis sodalis	Indiana bat	E	No Effect
Haliaeetus leucocephalus	Bald Eagle	T	No Effect
Picoides borealis	Red-cockaded woodpecker	E	No Effect
Sternotherus depressus	Flattened musk turtle	T	Not likely to adversely affect
Epioblasma brevidens	Cumberlandian combshell	E	No Effect
Epioblasma metastriata	Upland combshell	E	No Effect
Epioblasma turgidula	Turgid blossom pearly mussel	E	No Effect
Lampsilis altilis	Fine-lined pocketbook	E	No effect
Lampsilis perovalis	Orange-nacre mucket	T	No Effect/No Adverse Modification
Medionidus acutissimus	Alabama moccasinshell	T	No Effect/No Adverse Modification
Medionidus parvulus	Coosa moccasinshell	E	No Effect/No Adverse Modification
Pleurobema furvum	Dark pigtoe	E	No Effect/No Adverse Modification
Pleurobema perovatum	Ovate clubshell	E	No Effect/No adverse Modification
Pleurobema plenum	Rough pigtoe	E	No Effect/No Adverse Modification
Ptychobranchus greeni	Triangular kidneyshell	E	No Effect/No adverse Modification
Lampsilis orbiculata (L. abrupta)	Pink mucket pearlymussel	E	No Effect
Dalea foliosa	Leafy prairie clover	E	No effect
Lesquerella lyrata	Lyrate bladder-pod	T	No Effect
Marshallia mohrii	Mohr's Barbara's Buttons	T	No Effect
Sagittaria secundifolia	Kral's water-plantain	T	No Effect
Thelypteris pilosa var al.	Alabama streak-sorus fern	T	No Effect
Xyris tennesseensis	Tennessee yellow-eyed grass	E	No effect

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Determination of Effect on Federally Listed Species

The proposed activity will have "No effect" on the habitat of Indiana and gray bats, red-cockaded woodpecker, fine-lined pocketbook mussel, Coosa moccasinshell mussel, upland combshell mussel, turgid blossom mussel, pink mucket pearly mussel, rough pigtoe, cumberlandian combshell, Leafy prairie clover, Lyrate bladderpod, Mohr' Barbara's buttons, Alabama streak-sorus fern, Tennessee yellow-eyed grass and aquatic habitats for Kral's water plantain.. The rational for this decision is that the project will not intersect with potential habitat for these species, thus there is no opportunity for the proposed project to effect the species in either a direct, indirect or cumulative manner.

The determination is "No effect"on bald eagles or their nesting habitat. The rationale for this decision is that habitat for this species is known to exist within the vicinity of the salvage project but due to the distance and lack of habitat on the project site there will be no chance for an impact to the birds or their habitat. The determination is "No effect / No Adverse Modification" for aquatic habitats of the orange-nacre mucket mussel, the Alabama moccasinshell, the Coosa moccasinshell, the triangular kidneyshell mussel, the dark pigtoe mussel, and the ovate clubshell mussel. The rationale for this decision is that habitat for these species are known to exist within the same county and same broad watershed of the salvage project but separation of distance or mitigation measures are in place that will effectively prevent effects from occurring and the project does not directly or indirectly affect designated critical habitat.

The determination is "Not likely to adversely affect" the flattened musk turtle. Although project mitigations provide protection of aquatic resources, the large size and treatment method for Unit #2 could possibly result in insignificant or discountable impacts to downstream habitat. These possible impacts are not anticipated but are possible in a worse case scenario.

EXPLANATION OF DETERMINATIONS

Determinations and the Needed Follow-up Actions: The determination of effects for Federally Listed Species are: 1) No Effect; 2) Is not likely to adversely affect; 3) Is likely to adversely affect. All the possible effects can and should be included within one of the above determinations. The needed follow-up actions vary depending on the type of species and the determination.

A **"no effect/adverse modification"** determination should be used when the proposed actions have no effects on the federally listed species or their designated critical habitat. No follow-up action is required for this determination.

A determination of "**is not likely to adversely affect**" should be used for discountable, insignificant or beneficial effects. If the determination of "is not likely to adversely affect", written concurrence is required from the FWS for both proposed and listed species.
Discountable effects are those extremely unlikely to occur. Based upon best judgment, a person would not be able to meaningfully measure, detect or evaluate insignificant effects.
Insignificant effects relate in size of the impact and should never reach the scale where take occurs.
Beneficial effects are positive effects without any adverse effect to the species.

A determination of "**is likely to adversely affect** " should be used if any adverse effect to a listed species may occur as a direct or indirect result of the proposed action. If the determination is "likely to adversely affect" and the species is proposed for listing, conference with the FWS is required. If the determination of "is likely to adversely affect" and the species is listed as threatened or endangered, formal consultation with the FWS is required by ESA section 7.

Conference is a legally required "informal consultation" with the FWS. All requests for formal consultation must be sent through the Regional Forester. If applicable, Region or Forest-wide concurrence letters from the FWS can be referenced for site-specific projects.

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Forest Service Sensitive Species of the Bankhead National Forest

Scientific Name	Common Name	Status[1]	Finding
Aesculus parviflora	Small flowered buckeye	S	No impact
Astragalus tennesseensis	Tennessee Milkvetch	S	No impact
Aureolaria patula	Spreading yellow false foxglove	S	No impact
Carex brysonii	Bryson's sedge	S	No impact
Delphinium alabamicum	Alabama larkspur	S	No impact
Diervilla rivularis	Riverbank bush-honeysuckle	S	No impact
Hymenophyllum tayloriae	Gorge filmy fern	S	No impact
Jamesianthus alabamensis	Alabama jamesianthus	S	No impact
Juglans cinerea	Butternut	S	No impact
Leavenworthia alabamica var.alabamica	Alabama Gladecress	S	No impact
Leavenworthia crassa	Fleshyfruit Gladecress	C&S	No impact
Lesquerella densipila	Duck River Bladderpod	S	No impact
Monotropsis odorata	Sweet pinesap	S	No impact
Asplenium x ebenoides	Scott's Spleenwort	S	No impact
Marshallia trinervia	Broadleaf Barbara's buttons	S	No impact
Minuartia alabamensis	Alabama Sandwort	S	No impact
Neviusia alabamensis	Alabama snow-wreath	S	No impact
Platanthera intergrilabia	White fringeless orchid	C&S	No impact
Polymnia laevigata	Tennessee Leafcup	S	No impact
Robinia viscosa	Clammy Locust	S	No impact
Rudbeckia triloba var pinnatiloba	**Pinnate-lobed Black-eyed Susan**	S	No impact
Scutellaria alabamensis	Alabama skullcap	S	No impact
Sedum nevii	Nevius' stonecrop	S	No impact
Silene ovata	Blue Ridge catchfly	S	No impact
Talinum calcaricum	Limestone Fameflower	S	No impact
Talinum mengesii	Menge's fameflower	S	No impact
Thalictrum mirabile	**Little mountain meadow rue**	S	No impact
Trillium lancifolium	Lanceleaf Trillium	S	No impact
Trillium simile	Jeweled Trillium	S	No impact
Speyeria diana	Diana Fritillary	S	No impact
Corynorhinus rafinesquii	Rafinesque's Big-eared bat	S	No impact
Cheilolejeunea evansii	A liverwort	S	No impact
Aneura maxima	A liverwort	S	No impact
Pellia X appalachiana	A liverwort	S	No impact
Nardia lescurii	A liverwort	S	No impact
Plagiochila echinata	A liverwort	S	No impact
Radula sullivantii	A liverwort	S	No impact
Riccardia jugata	A liverwort	S	No impact

Hydroptila paralatosa		A caddisfly		S	No impact
Scientific Name		**Common Name**		**Status[1]**	**Finding**
Rhyacophila carolae		A caddisfly		S	No impact
Elliptio arca		Alabama spike		S	No impact
Obovaria jacksoniana		Southern Hickorynut		S	No impact
Obovaria unicolor		Alabama Hickorynut		S	No impact
Strophitus subvexus		Southern creekmussel		S	No impact
Villosa nebulosa		Alabama rainbow		S	No impact
Etheostoma bellator		Warrior darter		S	No impact
Etheostoma douglasi		Tuskaloosa darter		S	No impact
Etheostoma phytophyllum		Rush darter		S	No impact
Etheostoma tuscumbia		Tuscumbia darter		S	No impact
Percina sp.cf.macrocephala		Longhead darter (Warrior Brinled Darter)		S	No impact
Necturus alabamensis		Black Warrior waterdog		S	No impact

[1]S = sensitive; C = candidate for Federal listing

Some species are of concern although not listed as threatened or endangered by the FWS. They have been ranked Globally as G1, G2 or G3 by the Natural Heritage Network of The Nature Conservancy, which means viability concerns throughout their entire range. This may be due to habitat requirements, range limits or particular vulnerability to activities. These species have been listed by the Regional Forester as Sensitive and require special consideration in order to ensure that viability is not impaired and to preclude any trend toward the necessity of their being proposed for listing as threatened or endangered by the FWS. According to the Natural Heritage Network rankings, G1 species are critically imperiled globally because of extreme rarity (typically less than 6 occurrences, less than 1,000 individuals or very few remaining acres) or because of some factor(s) making them especially vulnerable to extinction. Species ranked G2 are imperiled globally because of extreme rarity (typically 6-20 occurrences, 1,000 to 3,000 individuals or few remaining acres) or because of some factor(s) making them very vulnerable to extinction. Species ranked as G3 are rare or uncommon (typically 21-100 occurrences or 3,000 to 10,000 individuals) throughout its range; or found locally, even abundantly, in a restricted range (e.g. in a single state or physiographic region); or vulnerable to extinction throughout its range because of specific factors. Rankings begin with a T instead of a G are used for subspecies and two rankings together, such as G2G3, indicates uncertainty in the ranking of that species. A question mark (?) indicates some doubt concerning the status of the species or subspecies. Rankings preceded by an S indicate the status inside the state of Alabama as determined by the Alabama Natural Heritage Program. The list of plant and animal species is based upon the Southern Region Sensitive Species, revision January, 2002.

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Potential Impacts to Sensitive Species

Based upon the information examined as part of this evaluation, each species on the list was evaluated for potential impact. The rationale for these decisions is noted below. Forest Service is not required to consult or otherwise review potential impacts to sensitive species with the US Fish and Wildlife Service.

BLACK WARRIOR WATERDOG
This salamander, found in the Black Warrior drainage basin, uses habitat almost identical to that of the
flattened musk turtle with the possible exception for lake habitat. (*No impact* is anticipated for this species,
see discussion of FMT for analysis of effects).
This relatively large salamander is found primarily in the Sipsey Fork of the Bankhead National Forest.
Its population is apparently restricted to 7 counties within north central Alabama. This species generally
requires clear streams with rocky outcroppings and pools 3 to 12 feet in depth. Surveys and monitoring for
this species were conducted during the 1990's by Bailey and Durflinger.

This project is not likely to have any impact upon this species. Records do not indicate their presence at this
position in the watershed and in this proximity to the lake, on the streams noted. Thus no impact is anticipated.

BRYSON'S SEDGE, JAMESIANTHUS AND MONKEY-FACE ORCHID (White-fringeless Orchid)
These species are associated with, but not limited to, low wet woods or areas that commonly fall into
streamside management zones. For survival, they need mesic conditions and at least partial shade. They
are not limited to a particular soil type. Bryson's sedge is found in rich deciduous woods, shaded slopes
above streams or on bluffs above streams. It is a relatively newly identified plant (1993) and little is known about its life science. It is known from only two locations on the Bankhead National Forest. It was not located during on-site field surveys. Jamesianthus is found in silty sand or gravelly margins of streams, especially where streams cut through limestone, in full or partial sun. Soil disturbance along stream margins may create openings for opportunistic weedy species, which will adversely impact Jamesianthus. This plant was not found during field surveys of the sites.

Monkey-face orchid (white-fringeless orchid) is found in bogs, seepage slopes, spring seeps or swamps. It grows in association with red maple, tulip tree, white oak, sweet bay, black gum, lady fern, royal fern, cinnamon fern, yellowroot and sphagnum moss. *This is a "Candidate" species for federal listing at this time.* There is potential for this plant to occur within the project site but no evidence of this plant was found during field surveys.

No impact on these species is expected even though some units will be salvaged by pulling them with a skidder winch. This activity will cause some level of disturbance. Efforts to minimize this disturbance will be made in the form of prohibiting equipment from operating in the riparian area, reducing the number of pulls across the stream. Evidence of these plants was not encountered during field surveys of sites.

Potential Impacts to Sensitive Species, continued

SWEET PINESAP

This small saprophytic plant is often found in dry sandy (acidic) woods, and is usually found in pine and mixed pine/hardwood stands. It is most often found under pines, giving rise to the common name. It has been reported as being saprophytic on pine roots and the bases of pine trees. It has been reported to occur in mixed deciduous hardwood pine stands also. In the south, it occurs in the mountain foothills and piedmont areas. Given the community association of occurrence, sweet pinesap should be a fire-tolerant, if not fire-dependent species. The community type, in addition to a frequent fire regime, historically tended to a more
open canopy, with occasional gap dynamics creating openings in the canopy cover.

No plants of this type were found during field surveys. *No impact* is anticipated on this species that would result in a trend towards federal listing or loss of viability based upon the limited information available on this species.

ALABAMA LARKSPUR

This species is associated with cedar glades, limestone or sandstone outcrops, sandstone cliffs or rocks. The larkspur is found in prairies, limestone cedar glades or open woods bordering these habitats. It is only found within Lawrence and Franklin counties of Alabama. Glades are not uncommon within the vicinity of the project but none were found within the project area. *No impact* on this species is anticipated as glade habitats are not present on the project area.

GORGE (Taylor's) FILMY FERN
This species is somewhat to very epipetric in that they are usually found on more or less vertical rock faces. Gorge filmy fern grows on moist bluff faces.

Potential habitat does exist within the area, but has been identified and avoided or protected by streamside management zones guidelines. The potential habitat near the project site was examined and this species was not found. *No impact* on this species is expected, as the salvage sale activities will not take place within this type of habitat.

GLADECRESS - Alabama and Fleshyfruit
Alabama gladecress is associated with limestone glades and fleshyfruit gladecress occurs on calcareous cedar glades. Potential habitat for these species does exist within BNF. Alabama gladecress has been encountered in Franklin and Lawrence counties. Fleshyfruit gladecress is known from Marshall County. Neither species was encountered during field surveys of the proposed sites.

No impact on this species is anticipated as glade habitats are not within the project operation boundary.

MENGE'S and LIMESTONE FAMEFLOWER and TENNESSEE MILKVETCH
Menge's fameflower is associated with cedar glades, limestone or sandstone outcrops, sandstone cliffs or rocks. The fameflower is found in soil pools within expanses of flat sandstone outcrops that are large enough to allow full sunlight or near full sunlight on the outcrop. The project area was examined and there were no glades present that might provide habitat for this plant. Although no plants were found during surveys of the proposed areas, these plants are present throughout the Bankhead National Forest in glade type habitats.

Limestone fameflower is also associated with glades and rock outcrops. It has not been encountered in the Bankhead National Forest. No limestone rock outcrops were found during field surveys.

Tennessee Milkvetch is found on limestone glades in Morgan County. Potential habitat exists within the BNF, although not within the project area.

No impact on these species is anticipated from salvage sale as glade habitats are not within the project boundary.

LITTLE MOUNTAIN MEADOW RUE, NEVIUS' STONECROP, LIVERWORTS AND SCOTT'S SPLEENWORT

These species are somewhat to very epipetric in that they are usually found on more or less vertical rock faces. Stonecrop is most likely on rock faces above creeks on limestone or shale, and on limestone outcrops in woodlands growing amongst various mosses under light to heavy shade.

Liverworts are moss-like, non-vascular plants that grow on damp ground, rocks and tree trunks. There are six species of liverworts, listed as sensitive, that may occur in the BNF. *Cheilolejeunea evansii* is known to occur on the bark of hardwood trees in humid gorges in North Carolina. In Alabama, this species is reported to be found associated with hemlocks and riparian areas. *Plagiochila echinata* is also found occurring on rocks and stream banks in humid gorges and in the spray zone of waterfalls in North Carolina.

Scott's Spleenwort is epipetric. It is found in cool rock crevices (limestone, sandstone, or conglomerate cliffs) with a northern exposure. It is also associated with moist, shady habitats. It is not known from BNF, but has been encountered in Jefferson County.

No impact on these species is expected, as the proposed activities will not occur within the appropriate type of habitat. The proposed activity may occur in close proximity to these species, but there is no opportunity for impact to the moist, rock habitats where they are found. The habitats for these species were examined although none of these species was observed.

CADDISFLIES

Two sensitive species of caddisflies may be found in the BNF. *Hydroptila paralatosa* is found in small streams of the fall line and has been collected in Winston County. *Rhyacophila carolae* has been collected in a small tributary of Bee Branch in the BNF. Caddisflies are confined to water during the majority of their life cycle. Adults of most species are inactive during the day and active during the evening (Harris et al., 1991).

No impact from the project is anticipated, as these are aquatic species. Streamside management zone guidelines will be followed for on every tract. Erosion control efforts will be utilized where indicated to prevent, reduce or control erosion.
There are no perennial streams within the project operation area.

DARTERS

Tuskaloosa darter is found in streams with moderate to swift flow. It will be found in cobble, gravel and slab riffles. It has been collected in Sipsey Fork, Borden Creek, Rush Creek and Capsey Creek in the Bankhead. This species was not collected during Biomonitoring in the Upper Mulberry Fork Watershed, 1999-2001 conducted by Geological Survey of Alabama.

The warrior darter is found in small to medium streams with moderate flow. This species will be found in rubble, bedrock, and gravel-filled pools. This species feeds on aquatic insect larvae. Warrior darter has been collected in the following creeks on Bankhead National Forest; Thompson, Borden and Sipsey Fork.

Preferred habitat for the goldstripe darter is described as small sluggish streams, spring seepage areas, and small woodland tributaries, which are adjacent to larger streams. Favored microhabitats include patches of woody debris, leaf material, mud, silt and sand. Records do not indicate that this species has been collected on BNF.

Rush darter has been collected in the Clear Creek system in Bankhead National Forest. Collection sites are characterized as relatively low gradient, small streams with sand substrate and burrweed beds. Streams present within the sites proposed for salvage do not contain potential habitat for rush darter.

Tuscumbia darter is found in limestone spring ponds and runs with aquatic vegetation present. This species is especially sensitive to changes in physical habitat, such as temperature or turbidity. Habitat for this species is not present within the proposed project area or downstream.

The longhead darter has been collected within the Bankhead National Forest in the Sipsey Fork.

No fish or streams of sufficient size to be fish habitat were encountered during field surveys of the proposed project site operational areas. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion from entering the aquatic habitats where they are found.

No impact is anticipated on these aquatic species. Streamside management zone guidelines will be followed on the seasonal drains within the project area. Thus, direct physical damage and downstream effects would be prevented. Erosion control efforts will be utilized where indicated by FS personnel to prevent, reduce or control erosion.

ALABAMA SPIKE, SOUTHERN CREEKMUSSEL, SOUTHERN HICKORYNUT, ALABAMA HICKORYNUT, ALABAMA RAINBOW

Potential habitat for these aquatic species exists on Bankhead National Forest. All of these mussel species require habitat stability, including substrate and water quality. These species are sensitive to water quality degradation; sedimentation being an important factor. Ground disturbing activities within a watershed are potential sediment sources. Reservoirs and other waterway projects, may have altered Alabama Spike habitat in some areas of this species range.

Several of these species have been collected in the northern portion of the BNF, including the Alabama Spike, Southern Creekmussel and the Alabama Rainbow (McGregor, 1992).

Alabama spike is known to occur in high gradient streams. Data are limited on population trends for the Alabama Spike throughout its range. Additionally, some taxonomic confusion and lack of status surveys contribute to the lack of abundance data/records. The Alabama Spike (*Elliptio arca)* may be the same species as the Delicate Spike (*Elliptio arctata)*. This species has been found in Brushy, Capsey and the Sipsey Fork.

The southern creekmussel is most common in mid-channel river habitats in most of its range. These habitats are threatened by excess sedimentation, channel modifications, impoundments, water withdrawals, urbanization and point and non-point pollution. This species has been collected in Capsey, Rush, Browns, Beech, East Fork of Beech, Brushy, Sipsey Fork, Caney, North Fork Caney, Borden, Flannagin, and Thompson creeks.

The Alabama hickorynut is restricted to large streams in the Mobile Basin. It has been extirpated from most of the historical range by stream impoundment and channelization and water quality degradation. This species is currently declining globally and is generally uncommon. It is relatively tolerant of nondestructive intrusion, but heavy recreational use of habitat could be disruptive.

The Southern hickorynut was historically distributed from Alabama to Eastern Texas, and in the Mississippi embayment as far north as southeastern Missouri. Alabama counties included in distribution records include Greene, Pickens, Sumter, and Tuscaloosa counties.

No impact is anticipated on these aquatic species as they do not have habitat in the project area. No perennial streams are found on the project operation area. Erosion control measures as described in the "Proposed Management Action" section will prevent excessive soil erosion from entering the aquatic habitats. The exercise of project mitigations and best management practices, which are part of this proposal, will provide protection of aquatic resources in the Bankhead National Forest.

Potential Impacts to Sensitive Species, continued

RAFINESQUE'S BIG-EARED BAT

This mammal uses abandoned buildings and large hollow trees as sites for nursery colonies. According to E. D. Pierson, this species may form roosts under loose sloughing bark of dead and dying trees, in addition to roosts formed in tree cavities (1998). It hibernates in old mines, caves, cisterns and wells in the northern part of its range. According to Best et al., this species usually is not found hibernating in caves in the southern part of its range (1999). The range of this species approximates the historical range of the great cypress swamps, indicating that it may have relied on these sites for roosting and foraging (Bat Conservation International 2001).

No impact is expected, as this species is not known to occur on BNF as field surveys and monitoring efforts on other areas of the forest have failed to locate this species.

SMALL-FLOWERED BUCKEYE and BUTTERNUT

Small-flowered Buckeye is found in rich mesic woods and along creek margins. It was not encountered during field surveys.

Butternut is found primarily on, but not limited to, limestone-derived soils, heavy clay-like soils associated with floodplain woods, or calcareous mesic woods. Butternut is found in rich hardwoods and streamside margins, especially in calcareous alluvial depositions along the streams.

These species were not encountered during field surveys and are not known to occur within the sites.
Rich soils are extremely limited or non-existant on the project area. *No impact* is expected.

SPREADING YELLOW FALSE FOXGLOVE

This species has been encountered in Cherokee County, which is approximately 100 miles from Bankhead. Other species of *Aureolaria* are found on a variety of sites from upland hardwoods to sandy sites of the coastal plain. This particular species is found on river bluffs in Tennessee.

No impact is expected, as this species is not known to occur in Bankhead.

RIVERBANK BUSH-HONEYSUCKLE
This species is found along streams in riparian areas. However, none were located during field surveys.

No impact is expected, as streamside management zone guidelines will be adhered to.

DUCKRIVER BLADDERPOD
This species is known to occur in Franklin and Marshall counties in calcareous fields and pastures. It has not been encountered within the BNF and is not expected to occur within the project area.

No impact is anticipated as the appropriate habitat does not exist within the project area.

Potential Impacts to Sensitive Species, continued

YELLOW FRINGELESS ORCHID
This species is known to occur in bogs in Winston County. It was not encountered during the field surveys.

No impact is anticipated as the proposed project does not contain any bogs. The site was closely examined for evidence of this plant or its habitat but none was found.

ALABAMA SNOW-WREATH
No impact is expected on this species, as it is known to occur in limestone woodlands and on bluffs. This species has not been recorded in BNF. It has been recorded from DeKalb, Jackson, Madison, and Tuscaloosa counties.

ALABAMA SKULLCAP
This species is known to occur in Calhoun, Cullman, Etowah, Jefferson and St. Clair counties. It is associated with moist clearings in oak-pine flats.

This project is not expected to impact this plant, as it was not encountered during field surveys and not known to occur in the Bankhead National Forest.

BLUE RIDGE CATCHFLY
This species is associated with cliffs, rock barrens, sandstone outcrops and rock houses. Although it has been recorded only from Dallas County, potential habitat does exist on the BNF and within the project area.

No impact is expected on this plant, as potential habitat will not be effected by the project. Rock houses and cliffs are outside of the area of operations for this project. This plant was not encountered during field surveys although it is apparently very rare and difficult to locate.

JEWELED TRILLIUM
This species is known from the Bee Branch area of the BNF. The habitat of this plant is described as rich coves under mature trees, in rhododendron thickets along streams, and at forest edges, frequently on outcrops partially exposed by road building. The plant is associated with moist, humus soil.

No impact is expected. Appropriate habitat is not available within the project area, and no individuals or trilliums of any kind were encountered during field surveys.

Potential Impacts to Sensitive Species, continued

LANCELEAF TRILLIUM
This trillium flourishes in alluvial soils and floodplains. It has been encountered growing in rocky upland woods and brushy thickets. It is commonly associated with moist to wet soils.

No impact is expected. Appropriate habitat was not found within the project area, and no individuals nor trilliums of any kind were encountered during field surveys.

CLAMMY LOCUST
This tree is reported to be growing in rocky woods in Winston County. Other habitat descriptions include thin woods and open places. It is also reported to have been established in a restoration project in a wildlife opening on Bankhead National Forest. Dr. Jimmy Huntley confirmed the presence of clammy locust in the wildlife opening.

No impact is expected. Appropriate habitat may be available within the project area, but no individuals were encountered during field surveys.

Explanation of Determinations for Sensitive Species

U. S. Forest Service
Bankhead National Forest
Biological Evaluation of
Proposed Salvage of Forestland Damaged by Hurricane Rita – 2006
Winston County, Alabama

Possible Determinations and the Needed Follow-up Actions – The four possible determinations of effects are:

1. "no impact",
2. "beneficial impact",
3. "may impact individuals, but not likely to cause a trend to federal listing or loss of viability",
4. "likely to result in a trend to federal listing or a loss of viability".

All the possible effects of a proposed action should be included under one of the above determinations. There is no need to consult with the FWS for sensitive species. No action, other than documenting the rationale, is required for determination of "no impact", "beneficial impact" or "may impact individuals, but not likely to cause a trend to federal listing or a loss of viability". If the determination is "likely to result in a trend to federal listing or a loss of viability", the proposed action should be modified to avoid, minimize or rectify the impact. Sensitive species must receive special management emphasis to ensure their viability and to preclude the need for federal listing.

Determination of Effects for Sensitive Species

The proposed activity will have no impact on Rafinesque's big-eared bat, 32 species of plants, the aquatic habitats of mussels, darters, caddisflies, and the Black Warrior waterdog, which are listed Sensitive Species as per the Regional Forester's List. Forest Service is not required to consult or otherwise review potential impacts to sensitive species with FWS.

U. S. Forest Service
Bankhead National Forest
Biological Evaluation of
Proposed Salvage of Forestland Damaged by Hurricane Rita – 2006
Winston County, Alabama

This Biological Evaluation was prepared for the Hurricane Rita Salvage Project by:

_/s/ Tom Counts_____

TOM COUNTS
District Wildlife Biologist
Bankhead National Forest

Date Signed_3/31/2006_____

REFERENCES AND DATA SOURCES

50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitats for Three Threatened Mussels and Eight Endangered Mussels in the Mobile River Basin; Proposed Rule. Wednesday March 26, 2003. Department of the Interior, Fish and Wildlife Service.

Alabama Inventory List – The Rare, Threatened and Endangered Plants and Animals of Alabama. The Nature Conservancy, Alabama Natural Heritage Program, June 2004.

Assessment of the Suitability of Selected Stream Sites in Bankhead National Forest for Occupation by Populations of Flattened Musk Turtles (Sternotherus depressus)and the Potential Effects of Silvicultural Improvements on Habitat Quality. 2004. Sherry R.H. Rogers & Ken R. Marion. University of Alabama at Birmingham.

Assessment of the Population Status of the Flattened Musk Turtle (Sternotherus depressus) in the Sipsey Fork and Brushy Creek Branches of Lewis Smith Lake, Alabama. 2004. Sherry R.H. Rogers & Ken R. Marion. University of Alabama at Birmingham.

Bailey, M.A. 1992. *Final Report of the Black Warrior Waterdog Status Survey*. Project E-1 Alabama Natural Heritage Program, Montgomery, Alabama.

Biomonitoring in the Mulberry Fork Watershed, 1999-2001. 2001. Thomas E. Shepard, Patrick E. O'Neil, Stuart W. McGregor, and Wiley P. Henderson. Geological Survey of Alabama, Environmental Geology Division. Tuscaloosa, Alabama. 60 pp.

Case, F.W. and R.B. Case. 1997. *Trilliums*. Timber Press. Portland, Oregon. 285 pps.

Dean, B.E., A. Mason, and J.L. Thomas. 1973. Wildflowers of Alabama and Adjoining States. The University of Alabama Press. Tuscaloosa, Alabama. 230 pp.

Dean, B.E., and A. Mason. 1968. Trees and Shrubs in the Heart of Dixie. Southern University Press. Birmingham, Alabama. 246 pps.

Demography and Habitat Requirements of the Black Warrior Waterdog, *Necturus alabamensis*. 2001. Michelle Durflinger, Auburn University. Master's Thesis, Auburn University. 55 pp.

Evaluation of Landscape level Habitat Attributes of Indiana Bat (Myotis sodalist)Autumn Home Ranges in the Bankhead National Forest, Alabama. Benjamin L. Battle, unpublished Masters thesis at Alabama A & M University, Normal, Alabama. May 2003.

REFERENCES AND DATA SOURCES, continued

Final Rule: Endangered and Threatened wildlife and Plants; Endangered Status for Eight Freshwater Mussels and Threatened Status for Three Freshwater Mussels in the Mobile River Drainage. March 17, 1993. Department of the Interior, United States Fish and Wildlife Service.

Final Rule: Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Three Threatened and Eight Endangered Mussels in the Mobile River Basin. July 1, 2004. Department of the Interior, United States Fish and Wildlife Service (50 CFR Part 17 40084 – 40171).

Florence, S. *Biological Evaluation: Suppression of the Southern Pine Beetle Infestation On the Nantahala and Pisgah National Forests*. Grandfather Ranger District, Nebo, North Carolina.

Harris, S.C., P.E. O'Neil, and P.K. Lago. 1991. *Caddisflies of Alabama*. Geological Survey of Alabama, Biological Resources Division. Tuscaloosa, Alabama. 442 pps.

Hartfield, P. D. 1990. *Status survey for Mussels in the Tributaries of the Black Warrior River, Alabama*. USDI, US Fish & Wildlife Service.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. *Bats of the United States*. Arkansas Game and Fish Commission. 63 pp.

Huntley, J. C. 1995. Biological Evaluation for Amendment Number 14, New SMZ Standards to National Forests in Alabama Land and Resource Management Plan. USDA Forest Service. 22 pp.

Indiana Bat, Myotis Sodalis, Maternity Roosts in the Southern United States. By Eric R. Britzke, Michael J. Harvey and Susan Loeb. Southeastern Naturalist, 2003, vol. 2(2):235-242.

Indiana Bat Recovery Plan – Technical Draft, October 22, 1996. U.S. Fish and Wildlife Service, Indiana Bat Recovery Team.

Lein, G. M. 1999. *An inventory of freshwater mussels and the flattened musk turtle (Sternotherus depressus) in selected streams of William B. Bankhead National Forest, Winston County, Alabama*. Challenge Cost Share Agreement #01-CCS-98-006 between USDA Forest Service, National Forests in Alabama and Alabama Department of Conservation and Natural Resources, State Lands Division, Natural Heritage Section.

Lellinger, D.B. 1985. A Field Manual of the Ferns and Fern-Allies of the United States and Canada. Smithsonian Institution Press. Washington, D.C. 389 pp.

McGregor, S.W. 1992. A Mussel Survey of the Streams Draining Bankhead National Forest and the Oakmulgee Division of the Talladega National Forest, Alabama. Geological Survey of Alabama. Tuscaloosa, Alabama. 29 pp.

REFERENCES AND DATA SOURCES, continued

Menzel, M.A., J.M. Menzel, T.C. Carter, W.M. Ford, J.W. Edwards. 2001. Review of the Forest Habitat Relationships of the Indiana Bat (*Myotis sodalis*). USDA Forest Service, Northeastern Research Station General Technical Report NE-284. Newtown Square, Pennsylvania. 21 pp.

Mettee, M.F., P.E. O'Neil, and J.M. Pierson. 1996. Fishes of Alabama and the Mobile Basin. Oxmoor House, Birmingham, Alabama.

Mount, R.H. 1975. The Reptiles and Amphibians of Alabama. University of Alabama Press, Tuscaloosa, Alabama. pp. 306-308.

Mussels That Matter. US Geological Survey leaflet. USGS, Biological Resources Division. May 1998.

NatureServe. 2003. NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer.

Personal conversations with:

- Dr. W.E. Stone. Alabama A & M University, 4900 Meridian Street, Normal, Alabama 35762.

- Paul Hartfield. USDI, US Fish & Wildlife Service, Threatened and Endangered Species Office, Jackson, Mississippi.

- Ralph Costa. Red-Cockaded Woodpecker Coordinator, USDI, US Fish & Wildlife Service, Clemson University, Clemson, South Carolina.

- Dan Spaulding. Curator of Collections, Anniston Museum of Natural History, 800 Museum Drive, Anniston, Alabama.

- Art Goddard. Forest Soils, Water & Air Unit Leader, UDSA Forest Service. Forest Supervisors Office, Montgomery, Alabama.

- Jay Edwards. Forest Hydrologist, USDA Forest Service. Forest Supervisors Office, Montgomery, Alabama.

Pierson, E.D. 1998. Tall Trees, Deep Holes, and Scarred Landscapes: Conservation Biology of North American Bats. *In* Bat Biology and Conservation, T.H. Kunz and P.A. Racey, eds., Smithsonian Institution, Washington. pp. 309-325.

Preliminary Work on Maternity Colonies of Indiana Bats in Illinois. Timothy C. Carter, Steven K. Carroll
and George A. Fieldhamer. A Symposium on The Indiana Bat: Biology and Management of an Endangered Species, Lexington, Kentucky, March 29, 2001.

REFERENCES AND DATA SOURCES, continued

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press. Chapel Hill, North Carolina. 1183 pps.

Revised Forest Land and Resource Management Plan. National Forests in Alabama, Management Bulletin R8-MB 112A, 2946 chestnut Street, Montgomery, Alabama. January 2004.

Rickett, H.M. 1967. Wildflowers of the United States, Volume Two. McGraw-Hill Book Company. New York. 688 pps.

Roost Tree Use By Indiana Bats and Northern Bats in the Wayne National Forest, Ohio. Department of Biological Sciences, Eastern Kentucky University, Katrina Schultes and Charles Elliott. A Symposium on
The Indiana Bat: Biology and Management of an Endangered Species, Lexington, Kentucky, March 29,
2001.

Roost Site Fidelity by Indiana Bats in Kentucky. Mark W. Gumbert, J.M. O'Keefe, and J. R. MacGregor. A Symposium on The Indiana Bat: Biology and Management of an Endangered Species, Lexington, Kentucky, March 29, 2001.

Schotz, A.R. 2001. Threatened and Endangered Species: Eggert's Sunflower. *Alabama's Treasured Forests*. Fall 2001. 25.

Simon. S.A. 2000. *Biological Evaluation for Regional Forester's Sensitive Species and Locally Rare Species: Nantahala and Pisgah Plan Amendment #10, National Forests in North Carolina*.

Status Survey of the Blueface Darter, Etheostoma sp. cf. E. zonistium, in upper Sipsey (Mobile Basin) and Bear Creek (Tennessee River Drainage) of Alabama. 2002. Bernard R. Kuhajda and Richard L. Mayden, University of Alabama. Submitted to US Fish and Wildlife Service, Jackson, Mississippi.

The Nature Conservancy, Alabama Natural Heritage Program. 2001. *Alabama Inventory List – The Rare, Threatened and Endangered Plants, Animals and Natural Communities of Alabama*. Montgomery, Alabama.

USDA Forest Service. 1994. Management Standards for Streamside Management Zones. National Forests in Alabama. 8 pp.

USDA Forest Service. 2004. Revised Land and Resource Management Plan, National Forests in Alabama.

USDI, US Fish & Wildlife Service. 1991. Kral's Water Plantain Recovery Plan. Jackson, Mississippi.

USDI, US Fish & Wildlife Service. 1993. Final Rule: Endangered and Threatened wildlife and Plants; Endangered Status for Eight Freshwater Mussels and Threatened Status for Three Freshwater Mussels in the Mobile River Drainage.

USDI, US Fish & Wildlife Service. 1996. Alabama Streak-Sorus Fern Recovery Plan. Atlanta, Georgia.

REFERENCES AND DATA SOURCES, continued

USDI, US Fish & Wildlife Service. 2002. Alabama's Federally Listed Species by County as Updated June 2003. Daphne Ecological Services Field Office web page. http://daphne.fws.gov/es/specieslst.htm

USDI, US Fish & Wildlife Service. Species Profile for federally listed clams. U.S. Fish and Wildlife Service Division of Endangered Species homepage. http://ecos.fws.gov/species_profile/species_profile.html

USDI, US Fish & Wildlife Service. Species Profile for federally listed plants. U.S. Fish and Wildlife Service Threatened and Endangered Species homepage. http://endangered.fws.gov/i/q.html

USDI, US Fish and Wildlife Service. 1994. Recovery Plan for Tennessee Yellow-eyed Grass (*Xyris tennesseensis* Kral). US Fish and Wildlife Service, Jackson, Mississippi. 24 pp.

USDI, US Fish and Wildlife Service. 1996. Leafy Prairie-clover Recovery Plan. US Fish and Wildlife Service, Atlanta, Georgia. 74 pp.

USDI, US Fish and Wildlife Service. 1996. Recovery Plan for the Lyrate Bladderpod (*Lesquerella lyrata* Rollins). US Fish and Wildlife Service, Atlanta, Georgia. 27 pp.

USDI, US Fish and Wildlife Service. 1998. Technical/Agency Draft Recovery Plan for *Heliantuhus eggertii* Small (Eggert's Sunflower). Atlanta, Georgia. 32 pp.

USDI, US Fish and Wildlife Service. 2000. Mobile River Basin Aquatic Ecosystem Recovery Plan. Atlanta, Georgia. 128 pp.

Wilson, L.A. 1995. The Land Manager's Guide to the Amphibians and Reptiles of the South. The Nature Conservancy, Southeastern Region. Chapel Hill, North Carolina. 360 pp.

Wilson, L.M. 1999. Biological Opinion on Impacts of Forest Management Activities to Indiana and Gray Bats on the National Forests in Alabama. USDI, US Fish & Wildlife Service. Ecological Services Field Office, Daphne, Alabama.