DRAFT

ENVIRONMENTAL ASSESSMENT

Bain's Gap Road

Road Improvement and Public Access

Mountain Longleaf National Wildlife Refuge
Fort McClellan, Calhoun County, Alabama
U.S. Fish and Wildlife Service
August 2005

Facility: **Mountain Longleaf National Wildlife Refuge**
Title: **Habitat Management Plan – Mountain Longleaf NWR**

FINDING OF NO SIGNIFICANT IMPACT

For the reasons briefly presented below and based on an evaluation of the information contained in the supporting references enumerated below, I have determined that management activities described as the Preferred Alternative (Alternative 3) in the attached Environmental Assessment (sub-section II.C) at Mountain Longleaf National Wildlife Refuge is not a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. An Environmental Impact Statement will, accordingly, not be prepared.

Reasons:

1. **The refuge was established through congressional legislation to enhance and manage the unique longleaf pine resource on the former military installation.**

2. **There are no anticipated impacts to threatened and endangered species or other wildlife populations on the Refuge.**

3. **The preferred alternative represents the best compromise for providing vehicle access across the refuge, while minimizing adverse effects to the biological integrity, diversity and environmental health of refuge natural communities.**

Supporting References:

1. Environmental Assessment
2. Section 7 Consultation

_____
Regional Director, FWS, Region 4

Date: _____

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I. PURPOSE AND NEED FOR ACTION

A. Introduction

The mission of the National Wildlife Refuge System is " to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Improvement Act of 1997). National Wildlife Refuges provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in preserving endangered and threatened species. Refuges offer a wide variety of wildlife-dependent recreational opportunities and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 30 million visitors annually hunt, fish, observe and photograph wildlife, or participate in educational and interpretive activities on refuges.

The Bob Stump National Defense Authorization Act for Fiscal Year 2003, P.L. No. 107-314, authorized the transfer, to the administrative jurisdiction of the Secretary of the Interior, 7,759 acres in order to establish Mountain Longleaf National Wildlife Refuge (NWR). On October 23, 2003, the Calhoun County Joint Powers Authority (JPA) transferred an additional 1,257 acres to the Department of the Interior to increase refuge acreage to 9,016 acres (Figure 1). Approximately 2.4 miles of Bain's Gap Road were part of the original transfer authorized under the Bob Stump National Defense Act (Figure 2).

B. Background

Choccolocco Mountain forms a 2000 foot high barrier that stretches over 30 miles north-south across Calhoun County. This mountain ridge historically restricted movement between the Choccoloccoo Valley and community of White Plains (east of the mountain), and the Towns of Anniston and Jacksonville (west of the mountain). Access across the mountain occurred at lower gaps along the ridge. Prior to the U.S. Army's closure of Fort McClellan, two improved roads were available to the public for access across the 30 mile long mountain ridge. The Whites Gap-Cottaquilla Roads provided Jacksonville residents access, while residents north of Anniston used Bain's Gap Road. Bain's Gap Road was owned by the U.S. Army and open to the public during daylight hours.

With selection of Fort McClellan for closure by the 1993 Defense Base Closure and Realignment Commission, and effective closure of the installation in 1998, training lands, to include Bain's Gap Road, were closed to the public. As part of the closure process, the U.S. Army initiated studies to characterize potential environmental contamination and the presence of unexploded ordnance (UXO) on former training lands. These studies, along with the safety hazards from UXO, further impeded the opening Bain's Gap Road to the public.

FIG. 1

FIG. 2

Transfer of the eastern portion of Fort McClellan to the U.S. Fish and Wildlife Service (USFWS) in 2003 included interim land use controls that continued to impose land use restrictions on most of the national wildlife refuge. Sections of the Refuge and Bain's Gap Road east of the mountain gap were identified by the U.S. Army as free of potential contamination and opened to the public in December, 2003 (Figure 2). Portions of the road west of the gap however have remained closed in accordance with U.S. Army interim land use controls (USFWS 2004).

C. Bain's Gap Road

Bain's Gap Road was first designated as such on maps in 1900. On October 1, 1917, Bain's Gap Road was withdrawn from public use and declared to no longer be a public road by the Court of Commissioners, Calhoun County (USGPO 1937). Since the early 1900's, Bain's Gap Road has been open to the public at the discretion of the base commander. Immediately prior to the closure of the road in 1999, Bain's Gap Road was open during daylight hours for use by the public.

When the Refuge was established in May 2003, Bain's Gap Road had been closed by the U.S. Army since 1999. The Refuge intended for Bain's Gap Road to remain closed, through areas the U.S. Army determined as potentially contaminated with UXO, until completion of remediation. The Refuge anticipated opening Bain's Gap Road only to those areas that were determined by the U.S. Army to be safe for public access. This decision was based on closed status of the road when the refuge was established and U.S. Army studies completed since closure having further defined the area as likely contaminated with UXO.

In late-2003, the Refuge approached the U.S. Army to ask about the possibility of opening Bain's Gap Road. The U.S. Army verbally indicated the possibility of opening the road with existing Land Use Controls, provided the road could be closed as needed for safety exclusion zones during unexploded ordnance remediation. Due to the ongoing remediation and the frequent closures of Bain's Gap Road, to include refuge staff, the opening was not pursued.

In 2004, following further inquiry on the status of opening Bain's Gap Road from local and federal officials, the Refuge requested the Federal Highway Administration (FHWA) to evaluate road safety for both refuge visitors and through traffic by local residents. Based on anticipated traffic volumes provided by Calhoun County officials (2,000 vehicles per day), the FHWA evaluated the 2.3 miles of road segment within the Refuge as a public thoroughfare under American Association of State Highway and Transportation Officials (AASHTO) standards. Significant safety improvements were outlined in the study that needed to be completed or mitigated prior to opening Bain's Gap Road as a public thoroughfare. Due to budget considerations and other factors, opening the road was not considered at that time.

A recent commitment from the JPA to open their portion of the closed road, the availability of funding to do the necessary improvements from Calhoun County and a commitment from the U.S. Army to do necessary UXO remediation in support of opening the road has allowed the USFWS to pursue opening the road at this time.

The environmental assessment evaluates the environmental and ecological consequences of opening Bain's Gap Road to vehicle traffic use in accordance with U.S. Army safety land use controls and AASHTO standards.

II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

An assessment for improving and opening Bain's Gap Road to vehicle through traffic was evaluated through four design alternatives. The primary difference between alternatives involves road design according to through traffic speed and volume (Table 1). Gates at the eastern and western refuge entrances will limit use of Bain's Gap Road to daylight hours only under all four alternatives.

Segment C (Figure 3) of the road alignment is similar under the three improvement alternatives. Ecological sensitivity of the wetland environment and steep terrain limits the ability to construct and widen the road on this segment. The present EA assumes resurfacing existing pavement and grading up to 2 foot shoulders and ditches. Should existing box culverts under Bain's Gap Road require replacement, a supplemental environmental assessment will be prepared at the time of road design to evaluate potential effects on Bain's Gap Creek.

The following design alternatives were evaluated in the EA:

Alternative 1 (No Action – No Improvement)
Alternative 2 (Improvement to Support 2000 Vehicles/Day)
Alternative 3 (Improvement to Support 400 Vehicles/Day)
Alternative 4 (Preferred Alternative – Improvement to Support 400-2000 Vehicles/Day)

A. Alternative 1: No Action – No Improvement

Bain's Gap Road will be opened to through traffic and refuge visitation with no improvements other than general maintenance. Road signage will be established with maintenance to include roadside tree trimming and grass mowing.

The existing road corridor is from 18 to 38 feet wide; 18-20 feet of pavement surface and 0-20 feet of road shoulder and ditch. It should be recognized this width is variable with some areas east of Bain's Gap having no shoulder or ditches. Future refuge management actions involve establishing native herbaceous cover along existing shoulders and ditches, effectively reducing corridor width to approximately a 24-foot wide corridor

B. Alternative 2: Improvement to Support 2000 Vehicle/Day

Bain's Gap Road would be improved to support through traffic averaging 2000 vehicles per day (FHWA 2004). This alternative represents improvements recommended for 30 mph vehicle

speed of a rural collector road whose primary function is both mobility and access. Improvements include: selective clearing at horizontal curve areas to improve sight distance, widening pavement surface to 22 feet, grading 6 foot shoulders and ditches along the road, opening a 12-14 foot clear zone along each side of the road, and construction of up to an additional 500 linear feet of guardrail in areas where widening the road is not practical due to steep terrain.

The road corridor would be 70 feet wide: 22 feet of pavement surface, 12 feet of graded shoulders, 8 feet of grassed ditch, and 28 feet of clear zone. This alternative assumes the additional requirements of 500 feet of new guardrail and selective clearing at horizontal curves.

C. Alternative 3: Improvement to Support 400 Vehicles/Day

The 400 vehicle/day improvement alternative represents an ecological low impact alternative of improving Bain's Gap Road for through vehicle traffic. This alternative closely follows FHWA guidelines for rural local roads that provide access for fewer than 400 vehicles per day with a 25 mph speed limit (FHWA 2004). Improvements include repaving existing road surface and reconditioning 2 foot wide shoulders and ditchlines. Forests along most of the road length are planned or currently being restored to an open longleaf pine savannah forest, which will provide improved viewing over existing conditions. Ecotonal edge will be minimized for this alternative by creating an abrupt break between road shoulder edges and natural forest. Soil disturbance will be limited to road edges immediately adjacent to pavement and ditching.

The road corridor would be 32 feet wide: 20 feet of pavement surface, 4 feet of graded shoulders, and 8 feet of grassed ditch. This alternative assumes existing guardrails are adequate and selective clearing on horizontal curves is not required.

D. Alternative 4: Preferred Alternative – Improvement to Support 400-2000 Vehicles/Day

The preferred alternative involves a compromise between the 400/day and 2000/day vehicles thoroughfare design. Improvements include; selective clearing at horizontal curve areas to improve sight distance, resurfacing the existing pavement, grading 2 foot shoulders with intermittent 6 foot graded pull-outs, constructing 4 foot wide ditches on the roadside, and constructing up to 500 feet of new guardrail in areas where widening the road is not practical due to steep terrain..

The road corridor width would vary from 32-42 feet: 20-22 feet of pavement surface, 4-12 feet of graded shoulders, and 8 feet of grassed ditch. This alternative assumes the additional requirements of 500 feet of new guardrail and selective clearing at horizontal curves.

TABLE 1

III. AFFECTED ENVIRONMENT

A. General.

The Refuge is located north of the City of Anniston in Calhoun County, Alabama (Figure 1). Birmingham, Alabama is 65 miles to the west; Atlanta, Georgia is 85 miles to the east; and Chattanooga, Tennessee is 125 miles to the northeast. Bain's Gap Road bisects the refuge west-east with 2.4 miles of paved road surface within refuge boundaries (Figure 2).

B. Endangered Species.

With the decision to close Fort McClellan in 1993, the U.S. Army prepared and submitted a Biological Assessment (BA) to the USFWS on endangered and threatened species listed under the Endangered Species Act of 1973 (USCOE 1998). The BA identified area streams as foraging habitat for the endangered gray bat (*Myotis grisecens*) and the historical presence of the endangered red-cockaded woodpecker (*Picoides borealis*) in pine forests within the mountains. Streams within the refuge portion of Fort McClellan however were classified as low quality foraging habitat and provide little or no value to foraging gray bats. The red-cockaded woodpecker historically was found within refuge forests, but has not been recorded on refuge lands since 1968. With restoration efforts and improving habitat, woodpeckers could be reintroduced or pioneer to the refuge from existing clusters in the adjacent Talladega National Forest at some future time.

A single candidate species, white-fringeless orchid (*Platanthera integrilabia*), has been recorded on the refuge. This orchid is found in spring seepages within the Marcheta Mountain Seepage and along the upper reaches Cave Creek. The Marcheta Mountain Seepage contains one of the largest remaining populations of white-fringeless orchid in the Southeast. Intact portions of the seepage are located behind former Range 21 small arms firing range south of Bain's Gap Road (Figure 3). Construction of the Range 21 complex during the World War II era no doubt filled or altered portions of the headwater seepage nearest Bain's Gap Road. There currently is no suitable habitat for white-fringeless orchid along or immediately adjacent to Bain's Gap Road. Long-term refuge management plans however are to replant forest cover in upland areas along Bain's Gap Road and, where possible, restore wetland functions (USFWS 2005).

C. Cultural Resources.

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archeological Resources Protection Act require the USFWS to evaluate the effects of any of its actions on cultural resources (historic, architectural and archeological) that are listed or eligible for listing in the National Register of Historic Places (NRHP). The U.S. Army contracted to

have the entire military installation, to include refuge lands, surveyed for cultural resources. The results of these surveys were submitted to the State of Alabama's Historic Preservation Office and are available through that agency.

Seventeen cultural resource sites were identified on the refuge as possessing the necessary attributes to make them eligible for inclusion on the NRHP (U.S. Army 2003). The only site located in the vicinity of Bain's Gap Road was a single lithic scatter (CA-0121). This site is located 20 meters south of Bain's Gap Road along Segment 3 (Figure 3) and can be avoided under all three road improvement alternatives.

D. Wetlands.

Steep mountain ridges and slopes limit the types and extent of wetlands on the refuge. Springs and associated seepages comprise most wetlands. Most, but not all, are located along the base of Choccolocco Mountain. While some are seasonal, the larger more significant wetlands are perennial and up to seven acres in size. Two wetland seepage complexes are located in the vicinity of Bain's Gap Road (Figure 3). Bain's Gap Creek headwater wetland complex is situated directly adjacent to the road and extends from Bain's Gap to the eastern refuge boundary and downstream through Alabama Forestry Commission property (Section IIIF). Marcheta Mountain Seepage is located behind former U.S. Army Range 21 on the western side of Choccolocco Mountain (see Section IIIB).

Hardwood seepages are arguably the most significant and sensitive community type on the refuge. Walker (1993) considers seepage bogs as one of the rarest habitats within the longleaf pine forest as well as particularly sensitive to soil and hydrologic disturbances. Over half of all rare plant species identified by the Alabama Natural Heritage Program (1994) on former Fort McClellan occurred in or were associated with seepages. High quality seepages on the refuge meet the criteria of sphagnum and shrub bogs, which have been defined as "rare community" types within the multi-agency Southern Appalachian Assessment (SAMAB 1996). The assessment concludes that few existing examples of this community remain, and those that do are in a degraded condition.

E. Biodiversity.

The Cumberlands and Southern Ridge and Valley Biodiversity Plan (TNC 2003) provides a landscape scale planning document for selecting and protecting areas of high biodiversity in the Southeastern United States. The plan selected 160 terrestrial conservation target areas, with 29 selected as high priority action sites. The Talladega Mountains Conservation Area, which includes the refuge, comprises a high priority biodiversity action site. The Talladega Mountain Conservation Area was also selected as a Neotropical migratory bird "Hotspot" within the Biodiversity Plan.

FIG. 3

While Choccolocco Mountain is connected in forest cover to the core Talladega Mountain region and is an integral part of the high priority biodiversity conservation area (TNC 2003), the mountain actually exists as an isolated outlier of the Talladega Mountains with tenuous forested connections to core forests. The existence of less forested acreage along the mountain ridge and limited biological connections to core forests has historically resulted in community types particularly sensitive to environmental change. An example of this sensitivity can be viewed through historic red-cockaded woodpecker distribution in the region. The woodpecker was considered "not uncommon" in the adjacent Talladega Mountains into the early 1960s with approximately 10 clusters currently managed as an endangered species. On Choccolocco Mountain only "fair populations" were suspected to have existed on the refuge into the 1950s with the last active cluster recorded in the late 1960s (Summerour 1992).

The ecological integrity of the Choccolocco Mountain landscape embodies the species-area relationship, which states that, in stable, old, ecological communities, the number of species and hence biodiversity can be expected to increase with increases of contiguous acreage. While Choccolocco Mountain is connected to the main stem of the Blue Ridge, it is and has experienced adverse effects associated with habitat fragmentation for many years.

F. Bain's Gap Road Ecology.

This section describes the local environment that would be affected by proposed alternatives. A detailed description of the natural, social and cultural environment on the refuge can be found in the refuge habitat management plan (USFWS 2005). Bain's Gap Road crosses three separate ecological communities on the refuge (Figure 3); Disturbed Range Area (0.8 miles), Mature Longleaf Pine Forest (0.7 miles) and Headwater Wetlands (0.9 miles). The environmental setting and environmental constraints along the road are provided according to each community type.

Segment A – Disturbed Range Area (0.8 miles). Segment A (Figure 3) includes formerly developed U.S. Army range and training areas from the western refuge boundary to the base of Choccolocco Mountain. This relatively level segment was heavily used during operation of former Fort McClellan. Most forest cover south of the road was cleared for small arms firing ranges. Lands north of the road were heavily disturbed, but contain a forest cover in most areas. Invasive plants and soil disturbance have severely altered roadside communities and species composition along this segment. Invasive plants that pose an immediate threat to adjacent natural communities include weeping lovegrass (*Eragrostis curvula*) and Chinese lespedeza (*Lespedeza cuneata*).

Forest restoration programs along this segment have been delayed until U.S. Army remedial contaminant and UXO programs have been completed. The entire segment is believed to have historically been bordered by longleaf pine forest. Restoration objectives are to eliminate exotic plants, replant longleaf pine and establish a long-term management program to maintain the restored longleaf pine forest. Management objectives of reestablishing a forest cover along the

road should reduce existing adverse effects of habitat fragmentation and improve refuge biodiversity.

The Marcheta Mountain Seepage, the largest wetland complex on the refuge, is located behind former U.S. Army Range 21. The ecological significance of this seepage complex was discussed under Section IIIB–Endangered Species and Section IIID-Wetlands. One of the larger populations of the candidate white fringeless orchid can be found in the Marcheta Mountain Seepage. Range construction along Bain's Gap Road has severely altered or eliminated wetlands near the road. Long-term refuge management plans are to restore wetland functions (USFWS 2005).

Segment B – Mature Longleaf Pine Forest (0.7 miles). Segment B (Figure 3) crosses the western slopes of Choccolocco Mountain. These slopes contain a relatively intact and continuous cover of mature longleaf pine with an encroaching understory of hardwoods. Restoration programs have been initiated within forests bordering this segment with the objective of returning forest structure to a more open longleaf pine forest or savannah. Invasive plants are restricted to a narrow border along both sides of the road. Invasive plants of particular concern include Chinese lespedeza and Nepalese browntop (*Microstegium vimineum*).

Forests along this segment contain restorable high quality longleaf pine forests (Varner et al 2000). An overstory of mature longleaf pine, with trees more than 100 years old, forms the forest cover both north and south of the road. This forest appears to have been a relatively open high quality longleaf pine stand through the midpoint of the 20th century. A decreasing fire regime in recent decades has allowed hardwoods to become established and eventually form a closed canopy forest. The native herbaceous ground cover has been lost or relegated to isolated patches, and the shade intolerant longleaf pine seedlings have failed to regenerate in the closed canopy forest. Longleaf pine seedlings and younger age classes are absent and the forest is slowly evolving into a hardwood dominated forest community. Without active restoration, to include structural modifications and prescribed burning, this longleaf forest will disappear in the future.

Segment C - Headwater Wetlands (0.9 miles). Segment C (Figure 3) extends from the gap east to the refuge boundary. The entire road segment is within the core area of Bain's Gap Creek headwater wetland complex. The stream parallels the road to the south with the pavement edge in some areas forming the bank above the stream. A tributary of the stream crosses under the road at midpoint along the segment. The Bain's Gap Waterfall east of the western refuge boundary forms the highest waterfall in Calhoun County.

The Bain's Gap Seepage Area is recognized as biologically unique and designated as a "Significant Biological Area" within the refuge habitat management plan (USFWS 2005). Rare biota documented in the headwater wetland include Fraser's Loosestrife (*Lysimachia fraseri*) and a number of caddisflies. The loosestrife was originally documented only 15 feet from the paved road surface.

Appalachian headwater drainages in northeast Alabama contain isolated habitat where speciation has been responsible for a number of rare and endemic biotic populations. Caddisflies have been studied on the refuge (Harris et al. 1991) and are particularly good indicators of high quality pristine aquatic environments. As such, they are also particularly sensitive to degradation and changes in water quality. *Hydroptila setegera* exemplifies this rarity and is known only from the type locality along South Branch Cane Creek, approximately 2 miles south of Bain's Gap. Rare caddifflies documented from Bain's Gap Creek on the refuge include *H. talladega, Polycentropus carlsoni, Pycnopsyche luculenta, Rhyacophila glaberrima, R. nigrita* and *R. torva* (ANHP 1994). *Polycentropus carlsoni* is an endemic and former Candidate 2 species that is known only from two refuge streams and an additional collection site in South Carolina.

Invasive plants are particularly common along the narrow road edge of Segment C. The closed canopy forest adjacent to the road has limited the spread of exotic plants requiring sunlight. Common invasive plants include Chinese lespedeza, Chinese wisteria (*Wisteria sinense*), Chinese privet (*Ligustrum sinense*), Nepalese browntop, mimosa (*Albizia julibrissim*), Johnson grass (*Sorghum halapense*) and exotic roses (*Rosa* spp.). Shade tolerant species such as Chinese privet and Nepalese browntop represent the greatest threat to shaded deciduous forests along Segment 3.

IV. ENVIRONMENTAL CONSEQUENCES

The National Wildlife Refuge System Improvement Act of 1997 firmly established that wildlife conservation takes priority on national wildlife refuges. It established a framework for ensuring refuge uses are compatible with the mission of "conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats". The Ecological Integrity Provision of the Act further requires refuges to "ensure that the biological integrity, diversity and environmental health of the System are maintained". Subsequent Integrity Policy established that, in accordance with Refuge Purpose, the highest measure of biological integrity, diversity, and environmental health can be achieved through restoration and management of historic landscape cover. The legislated purpose of establishing Mountain Longleaf NWR is "to enhance, manage, and protect the unique mountain longleaf pine ecosystem on the property" and clearly meets mandates to manage and restore the historic forest cover on the refuge.

This section analyzes and discusses the potential impacts of the four alternatives described in Section II. Impacts can be expected to differ according to biological integrity, restoration potential and past disturbances along individual segments. Several environmental issues should be considered in assessing road improvements and road widening: biodiversity and habitat fragmentation, invasive plants, wetlands and environmental effects outside refuge boundaries. Ecotonal edge along the road is evaluated within habitat fragmentation. The potential environmental consequences of alternatives are provided on Table 2. Impact levels provided on the table are relative to alternatives and do not represent a degree of adverse impact.

TABLE 2

A. Biodiversity and Habitat Fragmentation.

As discussed in IB, Choccolocco Mountain forms a 30 mile north-south tract of relatively contiguous forest cover along the mountain ridge and slopes. The bisection of this relatively narrow 3-5 mile wide ridge can effectively fragment the mountain range into smaller intact forest communities. While Bain's Gap Road already bisects and fragments the mountain to some degree, additional widening and increased traffic can be expected to incrementally increase habitat fragmentation. Habitat management objectives (USFWS 2005) to restore historic landscape vegetation cover on the refuge can be expected to remediate existing levels of habitat fragmentation and increase biodiversity in the future.

Ecotonal forest edge exists as a successional border between road margins and adjacent forest communities. Forest edge selectively provides habitat for large to moderate sized predators that can adversely affect forest interior Neotropical migratory birds (Keyser et al. 1998), as well as, game birds, such as bobwhite and turkey (Simberloff 1993). Many of these species evolved within contiguous forest habitat and are particularly susceptible to nest predation by moderate to large-sized predators that are absent or less common within intact forests. Forested edge is often referred to as biological barriers along which animals will forage. Preferential use of edge habitat by nest predators leads to increased nest loss in what can be considered "ecological traps"

Keyser et al. (1998) evaluated the effects of habitat fragmentation and nest predation along refuge roads. The results of this study are particularly relevant and reflect conditions and processes in place on refuge lands. Their study supports findings from other regions, and provides a specific suite of predators of concern on the refuge. The researchers concluded that reduced forest size (road fragmentation) increases predation on ground nests and that nest clustering (forested edge habitat) increases predation of ground nests by larger predators. The result of increased fragmentation is the abandonment of smaller forest fragments and bordering forest edge by many Neotropical migratory songbirds.

Habitat fragmentation effects can be reduced by minimizing road width and eliminating ecotonal edge habitat along the road. Alternative 1 (No Action) results in the least amount of fragmentation with planned refuge and existing restoration programs eventually reducing the road to a 24 foot wide corridor opening. Under the No Action Alternative, much of the existing shoulder and ditched roadside would be restored to native species reducing ecological effects of habitat fragmentation. This alternative however fails to meet AASHTO safety standards or repair infrastructure deterioration resulting since road closure in 1999.

Alternative 3 (400 Vehicles/Day), Alternative 4 (400-2000 Vehicles/Day) and Alternative 2 (2000 Vehicles/Day) incrementally increase corridor width by 32 feet, 32-40 feet, and 62 feet, respectively. Alternative 2 (2000 Vehicles/Day) includes a 28 foot clear zone and selective clearing, while Alternative 4 (400-2000 Vehicles/Day) includes only selective clearing. Alternative 3 (400 Vehicles/Day) includes neither a clear zone nor selective clearing. Early successional plant cover and/or disturbed vegetation associated with clear zones and selective

clearing create ecotonal edge, which can form ecological traps for many species, particularly low nesting Neotropical migratory birds. This impact can be minimized or reduced by eliminating clear zones and selective clearing, and by constructing an abrupt boundary between roadside shoulder/ditch areas and bordering forest. With existing and future refuge longleaf pine restoration along Segments A and B, much of the roadway will eventually be more open without actually requiring clear zones.

Proposed road improvements on Segment C are constrained by terrain and environmental sensitivity, and have consistent design requirements, 2 foot road shoulders and minimal ditching, for all three improvement alternatives. Hardwood forest canopy closure should effectively remain unchanged through these design constraints.

B. Invasive Plants.

Bain's Gap Road provided a road connection across Choccolocco Mountain prior to creation of Fort McClellan in 1917. Subsequent activities by the U.S. Army continued to utilize the area for military training creating further disturbances along the roadway. An environmental consequence of these activities has been soil disturbance and introduction of exotic and invasive plants along the entire route. Where training and firing ranges were constructed (Segment A), disturbances were expanded onto adjacent lands. A disturbed soil border exists along the both sides of the entire road. The width of this disturbance varies as to location and past use.

While planted turf grasses and a number of non-native and early successional species exist in the road margin, ecological concern primarily involves those invasive plants in which road widening presents a potential threat (Miller 2003) to existing natural communities, as well as, those communities that may become susceptible to invasive plants after restoration. Important invasive plants along the route include weeping lovegrass, Chinese lespedeza, Nepalese browntop, Chinese wisteria, Chinese privet, mimosa, Johnson Grass and exotic roses. Kudzu (*Pueraria montana*), while not currently on refuge road edge, can be found short distances west and east of the refuge boundary, and constitutes a potential threat of spreading onto the refuge through roadside mowing.

Environmental consequences of invasive plants are related to the width of road margin clearing, amount of soil disturbance, bordering community type and future changes to bordering communities from refuge restoration programs. Many of these exotic plants have been effectively controlled or contained within road margins by the dense forest cover adjacent to the road. The exception to this condition exists along Segment A, which represents an example of an expanding invasive plant problem from removing forest cover and disturbing soils.

While all exotics represent a potential threat to adjacent natural communities, several invasive plants constitute a particular concern along the roadway. A closed hardwood forest canopy and mesic environment along Segment C have restricted the spread of exotics requiring sunlight. Soil disturbance and road widening however represent a particular concern from aggressive shade tolerant species such as Nepalese browntop and Chinese privet. Both species are common

along the segment and have made intrusions into bordering forest communities. Nepalese browntop in particular has invaded and formed monocultures along all abandoned roads and firebreaks within the shaded forest community. Disturbance from construction activities can be expected to further spread this aggressive invasive plant.

Longleaf pine restoration has been initiated along Segment B and is planned along Segment A. The existing closed canopy forest adjacent to Segment B will be opened to form a forest more closely resembling a savannah. Open sunlight into bordering natural communities poses a threat from shade intolerant invasive plants spreading into restored forest systems. Weeping lovegrass and Chinese lespedeza are particularly adapted to a more open community type. The addition of soil disturbances within or along forest edge could exacerbate the spread of additional exotics.

Invasive plants can be reduced by minimizing shoulder width and soil disturbances along Bain's Gap Road. Alternative 1 (No Action) minimizes road shoulder width, but fails to meet AASHTO safety standards or repair infrastructure deterioration resulting since road closure in 1999. This alternative however includes refuge restoration programs to eliminate existing invasive plants, and replant or encourage native species along the roadside.

Potential impacts from remaining alternatives incrementally increase according to roadside clearing requirements along Segments B and C. Actual turf and ditch creation is relatively similar between alternatives. All three improvement alternatives include 8 feet (4 feet on each side of road) turf/ditch road shoulder border. Differences between alternatives, however, involve clear zones, selective clearing and guardrail construction. These activities open up the roadside environment to sunlight and introduce soil disturbances, which are conducive to the spread of exotic plants. Alternative 2 (2000 Vehicles/Day) would produce the highest potential for invasive plants by opening a 28 foot clear zone, selective roadside clearing and construction of 500 linear feet of new guardrail. Alternative 4 (400-2000 Vehicles/Day) requires selective roadside clearing and construction of 500 linear feet of new guardrail, while Alternative 3 (400 Vehicles/Day) requires no selective roadside clearing or new guardrails.

Improvements involving 2 foot road shoulders and minimal ditching are similar for all alternatives on Segment C. As described for Segments A and B, selective roadside clearing and new guardrail construction, however, would incrementally increase impacts for Alternative 2 (2000 Vehicles/Day) and Alternative 4 (400-2000 Vehicles/Day), respectively.

C. Wetlands

Bain's Gap Creek headwater wetland complex is situated directly adjacent to the road and extends from Bain's Gap to the eastern refuge boundary and downstream through Alabama Forestry Commission property. Marcheta Mountain Seepage is located behind former U.S. Army Range 21 on the western side of Choccolocco Mountain. Both wetlands have been recognized as important and sensitive natural communities on the refuge and designated as "Significant Biological Areas" in the refuge habitat management plan (USFWS 2005). The location and significance of these wetlands were discussed in Section III.

While surface water runoff from the road could impact the Marcheta Mountain wetland complex, this wetland is not located directly adjacent to Bain's Gap Road (Figure 3). With the completion of U.S. Army remediation and restoration of forests, some areas and drainages near and along the road may eventually be restored as functional wetlands and ecologically connected to the wetland complex at some future time. Alternative selection however is not expected to adversely impact wetlands associated with this wetland complex.

Bain's Gap wetland complex is located directly in and adjacent to Segment C of Bain's Gap Road (Figure 3). The stream and wetland complex actually parallel the road increasing the potential for adverse effects from road improvements and increased traffic. While impacts to wetland biological integrity are clearly related to previously described effects of habitat fragmentation and invasive plants, construction activity and higher traffic levels are expected to also introduce increased sediments and contaminant runoff into the stream. Higher use of the road will likely also increase human activity along the roadway. The sensitivity of biotic populations in this headwater wetland complex (Section IIIF) makes them particularly susceptible to slight changes in the environment.

Three box culverts are located under Bain's Gap Road adjacent to Bain's Gap Creek (Figure 3). All three are early masonry culverts, with the two eastern culverts carrying main-stem flows of Bain's Gap Creek beneath the road. Because of the environmental significance of Bain's Gap Creek (Section III D and F), this EA assumes that all existing culverts are adequate and stream-bed and aquatic disturbances will not be required for road improvement. Should future engineering assessments require culvert replacement, a supplemental EA will be prepared on site specific design.

Potential environmental consequences of road improvements and increased traffic are only anticipated on Segment C, which parallels and crosses the Bain Gap headwater wetland complex. Alternative 1 (No Action) maintains existing levels of environmental effects, but fails to meet AASHTO safety standards or repair infrastructure deterioration resulting since road closure in 1999. Contaminated runoff, increased visitor access and sunlighting of shaded wetland and streamside environments are concerns for improvement alternatives. Alternative 2 (2000 Vehicles/Day) would create the highest level of impact by opening a 28 foot clear zone, selective roadside clearing and construction of 500 linear feet of new guardrail. Alternative 4 (400-2000 Vehicles/Day) requires selective roadside clearing and construction of 500 linear feet of new guardrail, while Alternative 3 (400 Vehicles/Day) requires no selective roadside clearing or new guardrails.

D. Effects Outside Refuge Boundaries. Improvements to refuge roads for vehicle through access are only a part of the Bain's Gap Road traffic connection project. Approximately 0.6 miles of public roadway to the west and 1.7 miles of road on the east would be improved by the county to support the project. Because improvement and increased traffic use on these sections is dependent on refuge approval and improvement, there are environmental consequences outside refuge boundaries attributable to the refuge action.

The 0.6 mile western segment crosses sections of former Fort McClellan that is planned for future privatized development by the Calhoun County Joint Powers Authority. Significant environmental consequences are not anticipated along this section of Bain's Gap Road.

The 1.7 mile eastern segment extends from the eastern refuge boundary gate to Choccolocco Road. Most land along the road is owned by the Alabama Forestry Commission with a few private parcels to the north of the road. The primary environmental concern along this section involves the 0.3 mile sub-segment extending east from the refuge boundary. Bain's Gap Creek is parallel and directly adjacent to the road along this section. As previously discussed in Section IIIF, this stream and headwater wetland complex contain sensitive and rare biotic communities that could be adversely affected through road improvements and increased traffic levels. Bain's Gap Waterfall, the highest in Calhoun County, is also located along this sub-segment.

Road improvement outside the refuge will not necessarily follow refuge design alternatives, with road design and construction the responsibility of the Calhoun County Commission. All four alternatives are expected to result in similar environmental consequences outside refuge boundaries.

V. INFORMATION ON PREPARERS

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VI. SUMMARY OF PROPOSED ACTION

As previously described, the USFWS proposes to improve Bain's Gap Road and subsequently open the renovated road to through vehicle traffic. Alternative 4 constitutes the preferred alternative and was designed to meet public demand for opening the road, while minimizing adverse ecological impacts and meeting legislated mandates for refuge management (Table 2). An analysis of three alternatives included:

Alternative 1: No Action – No Improvement

Alternative 2: Improvement to Support 2000 Vehicles/Day

Alternative 3: Improvement to Support 400 Vehicles/Day

Alternative 4: Preferred Alternative – Improvement to Support 400-2000 Vehicles/Day

<u>Alternatives 1 (No Action)</u> would result in the lowest level of adverse environmental consequences, but fails to meet AASHTO safety standards or repair infrastructure deterioration

resulting since road closure in 1999. Alternative 2 (Preferred Alternative) requires the greatest extent of improvements, road widening, roadside disturbance and would result in the highest level of environmental impact on the local environment (Table 2).

An analysis of potential environmental and cultural resource impacts concludes that with the described mitigative measures significant adverse impacts are not anticipated through implementation of the Preferred Alternative- Alternative 4. Should future engineering assessments require culvert replacement along Segment C or additional traffic safety features along Bain's Gap Road, a supplemental EA will be prepared on the specific design. The following mitigative measures are included as part of the preferred alternative:

a. Clear zones have been eliminated from road design;

b. Selective roadside clearing will be minimized and consider long-term benefits from longleaf pine restoration that visually opens bordering forests along Segments A and B;

c. Ditch and road shoulder (4 feet on each side of road) vegetation will make an attempt to plant or establish grasses native to the adjacent longleaf pine forest along Segment A and B;

d. Construction soil disturbances will not occur beyond the roadside shoulder and/or ditches (4 feet on each side of road);

e. The boundary between the roadside shoulder/ditch and natural forest will be abrupt and minimize any ecotonal edge;

f. Construction will maximize erosion control measures, particularly along Segment C;

g. Construction activity will avoid periods of heavy precipitation or heavy surface water runoff that contribute sediment and contaminants to Bain's Gap Creek;

h. Road widening of Segment C will remain within the existing pavement/disturbed shoulder footprint, and will avoid encroachment onto undisturbed bordering forest.

VII. Literature Cited

Alabama Natural Heritage Program (ANHP). 1994. Natural Heritage Inventory of Fort McClellan, Main Post: Federal Endangered, Threatened, Candidate Species and State-Listed Species. Submitted to the U.S. Army Corps of Engineers, Mobile District and Fort McClellan by Alabama Natural Heritage Program, Department of Conservation and Natural Resources, Montgomery, AL. 76 pp.

Federal Highway Administration (FHWA). 2004. Bain's Gap Road Safety Study – Mountain Longleaf National Wildlife Refuge, Calhoun County, Alabama. Safety Study Report Number 2-

04. Federal Highway Administration, Eastern Federal Lands Highway Division, Sterling, Virginia. 11 pp.

Harris, S.C., P.E. O'Neil and P.K. Lago. 1991. Caddisflies of Alabama. Geological Survey of Alabama, Tuscaloosa, AL. Bulletin 142. 442 pp.

Keyser, A.J., G.E. Hill and E.C. Soehren. October 1998. Effects of Forest Fragment Size, Nest Density, and Proximity to Edge on the Risk of Predation to Ground-Nesting Passerine Birds. Conservation Biology 12(5): 986-994.

Miller, J.H. 2003. Nonnative Invasive Plants of Southern Forests – A Field Guide for Identification and Control. Revised. Gen. Tech. Rep. SRS-62. Asheville, NC:U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 pp.

Simberloff, D. 1993. Species-Area and Fragmentation Effects on Old-growth Forests: Prospects for Longleaf Pine Communities. In: Hermann, S.H., editor. Proceedings of the 18th Tall Timbers Fire Ecology Conference: The Longleaf Pine Ecosystem: Ecology, Restoration and Management, 1991 May 30-June 2, Tallahassee, FL. Tall Timbers Research Station 18: 1-13.

Summerour, B. 1992. Results of Red-cockaded Woodpecker Survey of Fort McClellan, Alabama, 21 March - 3 June, 1992. Jacksonville State University: Jacksonville, AL. 17 pp

Southern Appalachian Man and the Biosphere (SAMAB). 1996. The Southern Appalachian Assessment Terrestrial Technical Report. Report 5 of 5. Atlanta: U.S. Department of Agriculture, Forest Service, Southern Region. 288 pp

The Nature Conservancy (TNC). 2003. The Cumberlands and Southern Ridge and Valley Ecoregion: A Plan for Biodiversity Conservation. The Nature Conservancy. Arlington, Virginia.

U.S. Army. 2003. Final Environmental Condition of Property (ECOP) U.S. Fish and Wildlife Service, Mountain Longleaf National Wildlife Refuge, Fort McClellan, Calhoun County, Alabama. U.S. Army, Fort McClellan, Alabama. 14 pp.

U.S. Army Corps of Engineers (USCOE). 1998. Biological Assessment: Disposal and Reuse of Fort McClellan, Alabama. Prepared by 3D/International, Cincinnati, Ohio. 61 pp.

U.S. Government Printing Office (USGPO), Washington, DC. 1937. Military Reservations-War Department, Series of Pamphlets, by state, dated 1937-1942, U.S. Army Center of Military History, Franklin Building, Washington, D.C.

U.S. Fish and Wildlife Service (USFWS). 2005. Mountain Longleaf National Wildlife Refuge Draft Habitat Management Plan. USFWS, Mountain Longleaf National Wildlife Refuge, Fort McClellan, AL. 142 pp.

U.S. Fish and Wildlife Service (USFWS). 2004. Mountain Longleaf National Wildlife Refuge Public Use Plan. USFWS, Mountain Longleaf National Wildlife Refuge, Fort McClellan, AL. 15 pp.

U.S. Fish and Wildlife Service (USFWS). 2003. Final Environmental Assessment and Land Protection Plan Proposed Establishment of Mountain Longleaf National Wildlife Refuge, Calhoun County, Alabama. USFWS, Southeast Region, Atlanta, GA. 44 pp.

Varner, J. M., J. S. Kush, and R. S. Meldahl. 2000. The Mountain Longleaf Pine Resources of Fort McClellan, Alabama: Final Report on their Status, Ecology, and Management Needs. Final report to Fort McClellan Directorate of Environment. 83 p.

Walker, J.L. 1999. Longleaf Pine Forests and Woodlands: Old Growth Under Fire. In: Miller, Gary L., ed. The Value of Old Growth Forest Ecosystems of the Eastern United States: Conference Proceedings. 1993 August 26-28, Asheville, NC: University of North Carolina, Asheville. p 33-40.