

**BIOLOGICAL ASSESSMENT/EVALUATION
SUPPLEMENT
FEDERALLY-LISTED SPECIES**

**Mark Twain National Forest
*Potosi/Fredericktown District***

St. Genevieve, St. Francois, Madison, and Bollinger Counties, Missouri

East Fredericktown

INTRODUCTION 2
PROPOSED MANAGEMENT ACTION 3
CONSULTATION HISTORY 4
SPECIES CONSIDERED AND EVALUATED..... 5
ENVIRONMENTAL BASELINE..... 7
EFFECTS OF PROPOSED MANAGEMENT ACTION..... 10
Alternative 1 10
Alternative 2 15
Alternative 3 20
SUMMARY OF DETERMINATIONS..... 22
CONSULTATION WITH OTHERS..... 23
BAE AUTHOR..... 24
REFERENCES AND DATA SOURCES..... 24
Appendix A – Map of Bat Survey Locations..... 26
Appendix B – Bat Survey Data..... 27

BIOLOGICAL ASSESSMENT/EVALUATION SUPPLEMENT FEDERALLY-LISTED SPECIES

Mark Twain National Forest
Potosi/Fredericktown District
St. Genevieve, St. Francois, Madison, and Bollinger Counties, Missouri

East Fredericktown

INTRODUCTION

This Biological Assessment/Evaluation (BAE) Supplement incorporates new information that has become available since the completion of a previous BAE (Mills 2003; referred to hereafter as the “2003 BAE”) for the East Fredericktown Analysis Area. This new information is the result of recent field surveys (bat surveys) that have been conducted within the project area, and elsewhere on the Mark Twain National Forest. These field surveys verified the presence of the federally endangered Indiana bat within the project area and provided new information about this species that was not available during preparation of the 2003 BAE.

Also considered in this BAE Supplement are changes that were made to the proposed Alternatives 1 and 2 after the 2003 BAE had been completed.

The purpose of this BAE Supplement is to incorporate this new information and re-address and document the potential effects that planned management activities within the East Fredericktown Analysis Area may have upon federally proposed, endangered, or threatened species and their habitats within the Mark Twain National Forest. The objectives of this BAE Supplement are:

- a) to ensure that Forest Service actions do not contribute to a loss of viability or cause a trend toward federal listing of any species;
- b) to comply with the requirements of the Endangered Species Act and ensure that actions of Federal agencies do not jeopardize or adversely modify critical habitat of federally listed or proposed species;
- c) 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.

PROPOSED MANAGEMENT ACTION

Changes to the Proposed Action: Since completion of the 2003 BAE for this project, there has been a change made to Alternatives 1 and 2. These changes are:

- Reducing the number of acres proposed for Shelterwood cuts by 61 acres (dropped Compartment 572, Stand 15 [17 acres]; Compartment 580 Stand 23 [18 acres]; and Compartment 582, Stand 8 [26 acres])
- Reducing the number of acres proposed for Sanitation cuts by 24 acres (dropped Compartment 580, Stand 22 [24 acres])
- Adding the above acres that were dropped from treatment to the designated Old Growth acres, thereby increasing the acres of designated Old Growth from 1,608 acres to 1,693 acres.

The above changes are reflected in Tables 1 and 2 below.

No other changes have been made to Alternatives 1, 2 and 3, as they were described in the 2003 BAE for this project. Therefore, refer to the 2003 BAE for further details regarding the proposed actions for each alternative, including protective measures to be incorporated into each alternative.

Table 1. Summary of activities proposed for Alternative 1 (Non-commercial Treatment)

Proposed Activity	Approximate Area Affected
Heavy Mechanical Treatment (Seedtree Cut)	850 acres
Moderate Mechanical Treatment (Shelterwood Cut)	1,482 acres
Moderate Mechanical Treatment (Sanitation/Salvage Cut)	898 acres
Moderate Mechanical Treatment (Selection with Groups)	362 acres
Moderate Mechanical Treatment (Thinning)	1,077 acres
<i>Subtotal (Mechanical Treatments)</i>	<i>4,669 acres</i>
Prescribed burning	2,603 acres
Miles of dozer-constructed fireline	5.4 miles
Old growth designated	1,693 acres
Vernal ponds constructed	30 ponds
Permanent ponds maintained	4 ponds
Dumps removed	11 sites
Trail reconstructed	0.6 miles
Areas with erosion control activities	19 stands

Table 2. Summary of activities proposed for Alternative 2 (Modified Proposed Action)

Proposed Activity	Approximate Area Affected
Timber Harvest (Seedtree Cut)	850 acres
Timber Harvest (Shelterwood Cut)	1,482 acres
Timber Harvest (Sanitation/Salvage/Overstory removal Cut)	963 acres
Timber Harvest (Selection with Groups Cut)	362 acres
Timber Harvest (Thinning)	1,077 acres
<i>Subtotal (Timber Harvest)</i>	<i>4,734 acres</i>
Release (Pine saplings)	173 acres
Crop Tree Release	1,607 acres
Temporary roads constructed	24.3 miles
Roads reconstructed	9.5 miles
Existing roads decommissioned	45.8 miles
Prescribed burning	2,603 acres
Miles of dozer-constructed fireline	5.4 miles
Old growth designated	1,693 acres
Vernal ponds constructed	30 ponds
Permanent ponds maintained	4 ponds
Glades restored	33 sites
Dumps removed	11 sites
Trail reconstructed	0.6 miles
Areas with erosion control activities	19 stands

Project Location: Refer to 2003 BAE.

Project Management Prescription Areas: Refer to 2003 BAE.

Project Area Size: Refer to 2003 BAE.

Land Type Associations in Project Area: Refer to 2003 BAE.

CONSULTATION HISTORY

In 1984, the Forest Service requested formal consultation with the U.S. Fish and Wildlife Service (FWS) on the Forest Plan. On August 8, 1985 FWS issued a non-jeopardy Biological Opinion for seven federally-listed species. In 1998, the Forest Service reinitiated programmatic consultation for continued implementation of the Forest Plan. Further consultation was needed to incorporate information gathered about federal threatened and endangered species over the past decade. A programmatic Biological Assessment (BA) that included ten federally-listed species was submitted to FWS in September 1998. Determinations of “no affect” or “not likely to adversely affect” were

made for six of the ten species. These determinations were concurred with by FWS during informal consultation. On June 23, 1999, FWS issued a non-jeopardy Biological Opinion for bald eagle, gray bat, Indiana bat and Mead's milkweed. This BAE for the East Fredericktown project area is being prepared under the guidance and direction of these past consultations.

In April 2003, a Scoping Notice describing the proposed actions for the East Fredericktown project area was sent to the FWS for comment. No comments specific to this Scoping Notice were received. Upon completion of the 2003 BAE in August, a copy of it was sent to the FWS for review. Upon receipt of the 2003 BAE, the FWS responded informally with a request for a copy of the Draft Environmental Impact Statement (DEIS) for the East Fredericktown project. The FWS also informally requested that additional surveys for Indiana bat be conducted within the project area. As a result of these requests, it was decided that review of the 2003 BAE by the FWS would be delayed until additional bat surveys had been completed within the project area, and until the DEIS had been completed.

This BAE Supplement incorporates the new information that resulted from these additional bat surveys, and will be submitted to the FWS along with the DEIS for the East Fredericktown project, for their review. No actions specific to this project will be implemented without the concurrence of the FWS. No other federal or state agencies are directly involved in this proposal.

SPECIES CONSIDERED AND EVALUATED

Twelve species were considered in the 2003 BAE. These species represented federally-listed species identified by the FWS in their letter to the Forest Supervisor, dated 31 July 2002, as being near or on the Mark Twain National Forest.

Of these twelve species, only the Indiana bat (*Myotis sodalis*) is further evaluated in this BAE Supplement. The remaining eleven species are not discussed further because neither the additional field surveys nor the modifications to Alternatives 1 and 2 resulted in a change in the environmental baseline or effects for these species. Therefore, refer to the 2003 BAE for the status and effects of the proposed East Fredericktown project upon these other eleven species.

Definition of the Project Area: The "project area" is defined as the area in which activities associated with one or more of the alternatives could potentially have a direct, indirect, or foreseeable cumulative effect upon a federally-listed species or habitat in which the species is likely to occur. For this analysis, the project area includes all lands within East Fredericktown Analysis Area.

SURVEY INFORMATION

Bat Surveys: Field surveys for bats have been conducted on the National Forest since 1980. From 1980-1997, these surveys consisted of checking suitable caves for bats, and monitoring the endangered bat populations of caves on the National Forest that were used as hibernacula.

From 1997 until present, summer surveys for bats, using mistnets and acoustic detectors, have been conducted on and near the Mark Twain National Forest. These surveys are intended to determine where, and for what purpose, bats (including Indiana bats) occupy the forested lands on and near the National Forest. To date, these surveys have indicated that Indiana bats do occupy forested lands, but are not common. A summary of survey data collected from 1997 through midsummer 2004 indicates that 10 Indiana bats had been captured near the National Forest and 2 captured on National Forest. These surveys represented >400 mistnet sites and >2,500 hours of mistnetting, plus >300 acoustic detector sites and >3,500 hours of acoustic detection. Therefore, capture of Indiana bats during field surveys is very uncommon, which indicates that they are not abundant in the areas that were surveyed.

On 20 May 2004, an adult male Indiana bat was captured in a mistnet over a small pond on the north end of the project area, on National Forest. The capture site was located in an overstocked (average basal area = 150, average dbh = 8 inches) pine plantation (Compartment 581, Stand 10) that is scheduled to be thinned in Alternatives 1 and 2 of this proposed project. This was the first record of an Indiana bat from within the project area. The bat was fitted with a radio transmitter and tracked to its roost tree daily, from 20 May to 30 May 2004. On 30 May 2004, the bat's transmitter was found on the ground, below the roost tree that it had been occupying for the previous six consecutive days. All told, this individual bat used four separate roost trees, all on a pine-dominated ridgetop within the project area, as follows:

Roost Tree Data				
Date of use	Species	Condition	Diameter at breast height (DBH)	Distance from capture site
21 May 2004	Shortleaf Pine (<i>Pinus echinata</i>)	Dead, little bark remaining	5.7 inches	0.22 mile
22 May 2004	Shortleaf Pine (<i>Pinus echinata</i>)	Dead, little bark remaining	6.5 inches	0.44 mile
23 May 2004	Shortleaf Pine (<i>Pinus echinata</i>)	Dead, little bark remaining; has fallen and is "hung up" in other trees	6.0 inches	0.78 mile
24-30 May 2004	Shortleaf Pine (<i>Pinus echinata</i>)	Dead, little bark remaining	13.1 inches	0.67 mile

Sybill Amelon conducted mist net surveys in the project area on the following dates: 27

May 2003, 20 May 2004, 24 May 2004, and 28 May 2004. A total of 4 nets were set up in 2003, and a total of 16 nets were set up in 2004. Other than the above-mentioned male Indiana bat, no federally listed bats were found during these surveys (Amelon, pers. comm.). Refer to the map and table in Appendices A and B of this BAE Supplement for exact locations and data from these surveys, including photos of the roost trees.

Many acoustic detectors (Anabats) were also used in the project area during 2003 and 2004. These detectors were used to determine points of high bat abundance. The detectors were distributed across the project area. No federally listed bats were detected using this method (Amelon, pers. comm.).

Contrary to what was stated in the 2003 BAE, no bat surveys were conducted in the project area during June of 2003.

Other Surveys: Since completion of the 2003 BAE, additional site-specific field surveys (not related to bat surveys) have been conducted within the project area.

Contracted botanical surveys within the project area were completed at the end of 2003. On 22 October 2003, the Forest Botanist (Dave Moore), contract botanist Alan Brant, and District Biologist (Lynda Mills) made a field visit to Johns Creek, and identified several fens and unique botanical communities. No federally listed species were located during these surveys.

On 30 and 31 March 2004, and 5 and 21 April 2004, the District Biologist made field visits to several potential old growth stands within the project area. No federally listed species were located during these surveys.

Refer to the 2003 BAE for details regarding surveys conducted within the project area prior to completion of the 2003 BAE.

ENVIRONMENTAL BASELINE

Indiana Bat

General habitat requirements – The Indiana bat occupies a wide variety of roost sites and environments. During cold periods, generally November through March, Indiana bats hibernate in a handful of caves and mines. During warmer weather, however, the Indiana bat frequents areas outside its caves and utilizes standing snags and hollow or loose bark trees, and, occasionally, abandoned buildings, as roost sites and maternity colony sites. In the fall, Indiana bats will migrate to their hibernacula, and roost in close proximity to these caves. This period during which the Indiana bats gather close to their hibernacula is referred to as the “swarming period”.

Distribution on the MTNF –For analysis purposes, I have assumed that Indiana bats may occur anywhere on the National Forest where suitable caves and roosting habitat as

described previously exists. The entire Mark Twain National Forest is within the documented range of the Indiana bat throughout the year.

None of the National Forest has been designated by the USFWS as critical habitat for this species.

Hibernacula: There are two Priority III Indiana bat hibernacula known on the Mark Twain National Forest, one of which is located on the Potosi-Fredericktown District. Other hibernacula are also located near the National Forest. Therefore, there are several locations on and near parts of the National Forest that support large numbers of hibernating Indiana bats.

Maternity Habitat: Until the summer of 2003, it was generally assumed that, in Missouri, Indiana bat maternity roost trees were most likely located north of the Missouri River in the upper two tiers of counties within the prairie regions, and not near or on the Mark Twain National Forest. Until that time, other than at Ft. Leonard Wood, no reproductively active female Indiana bats had been found on or very near the Mark Twain National Forest (the only other known maternity colony located near the National Forest was in Illinois, along the Mississippi River corridor).

However, during the summer of 2003, 2 reproductively active female Indiana bats were captured near the National Forest at Lake Wappapello, and one pregnant Indiana bat was captured in the Silver Mines Recreation Area, on the National Forest. The latter was the first documented record of a reproductively active female Indiana bat from the Mark Twain National Forest. Capture of this bat and those at Lake Wappapello began to support the theory that Indiana bat maternity sites may occur on the Mark Twain National Forest, particularly on the Potosi-Fredericktown and Poplar Bluff Ranger Districts.

On May 20, 2004, additional surveys near Lake Wappapello resulted in the capture of two reproductively active female Indiana bats. These bats were fitted with radio-transmitters and subsequent radio-tracking of one of these females revealed the location of a maternity colony on the National Forest on the Poplar Bluff district.

Male Roosting Habitat: Generally, it has been assumed that most male Indiana bats remain within 5 miles of their hibernaculum during the summer, in forested areas with some canopy gaps that allow moderate sunlight to warm roost trees. However, recent research also indicates that some male bats will travel great distances from their hibernacula in the spring and summer (Romme', et. al. 2002, US Forest Service 1998). The male Indiana bat captured on 20 May 2004 within the East Fredericktown project was likely this case. This particular male Indiana bat roosted approximately 30 miles from the closest known Indiana bat hibernaculum (Pilot Knob Mine). This was the first record of a male Indiana bat roosting on National Forest, although 2 other male Indiana bats had been captured during September 2002 near National Forest at Lake Wappapello.

Male Indiana bats also may be less selective in habitat requirements during the summer than females. Whereas females tend to occupy bottomland or riparian habitats that have suitable, fairly large diameter, roost trees that can be used for maternity colonies, males

tend to occupy either upland or bottomland forest during the summer, and may use any tree that offers a suitable roosting site (i.e., loose bark or slits), regardless of its size or location.

Fall Swarming Habitat: On the National Forest, fall swarming habitat would most likely occur within 5 miles of Indiana bat hibernacula. Studies of Indiana bats indicate that during the autumn (usually late August through October), Indiana bats migrate back to their hibernacula. Males typically roost in trees during the day and fly to the cave during the night. It is during this period that males mate with females as the females arrive at the hibernacula.

Occurrence within project area – The only record of an Indiana bat within the project area is the male Indiana bat that was captured on 20 May 2004 and radio-tracked through 30 May 2004. There are no other records of Indiana bats from within the project area.

Hibernacula: The largest known Indiana bat hibernaculum in Missouri is also the closest known Indiana bat colony to the project area (Pilot Knob Mine). Pilot Knob Mine is located approximately 22.3 miles to the west of the project area. It would be surprising, however, and not very likely, to discover an Indiana bat hibernaculum within the project area due to the fact that no suitable caves or mines are known to occur within the project area.

Maternity Habitat and Male Roosting Habitat: The closest record of a reproductively active female Indiana bat is from the Silver Mines Recreation Area, where a pregnant Indiana bat was captured in May 2003 foraging over Turkey Creek near its confluence with the St. Francis River (S.Amelon, pers. comm.). No maternity colonies were located as a result of this capture. This site is located approximately 12.5 miles west of the project area. Suitable maternity habitat for Indiana bats would most likely occur in the forested bottomland areas of the East Fredericktown project area, particularly along large streams and rivers.

All of the forest in the East Fredericktown project area is considered suitable roosting habitat for male Indiana bats. The male Indiana bat captured on 20 May 2004 was found foraging in upland forest, dominated by pine pole timber and hardwood saw timber. The roost trees occupied by this individual ranged from 5.7 to 13.1" diameter at breast height, and were all dead pines with sloughing bark.

There is potential for discovery of a maternity site or foraging individuals within the project area because of the extensively forested condition of the project area, which supplies an innumerable amount of roosting habitat in the form of hollow, split, or loose barked trees. Some potential roosting habitat also exists in the form of abandoned structures located on private lands within the project area. Foraging and roosting Indiana bats, particularly males, could occur anywhere within the project area outside their hibernation period.

Fall Swarming Habitat: None of the East Fredericktown project area is within 5 miles of a known Indiana bat hibernaculum. Therefore, there is not likely to be any fall swarming

habitat within the project area.

The BE program (Reports 2 & 3) identified Indiana bat as being known or expected in one of the four LTAs within the project area (LTA HA). Within this LTA, the BE program identified 12,399 acres of suitable habitat for this species, however, only 679 acres of this is located within the project area. Some of this habitat may be less suitable for female Indiana bats (for maternity sites) than for male Indiana bats. Interestingly, none of the forest stands in which the male Indiana bat was captured or roosted in May 2004 were identified by the BE Program as suitable habitat for this species.

EFFECTS OF PROPOSED MANAGEMENT ACTION

The effects discussed below for each alternative are consistent with those that were presented in the 2003 BAE; they also consider the new information and changes to the proposed alternatives that were made after its completion.

Indiana Bat

Alternative 1

Direct Effects: The activities proposed in Alternative 1 would not be expected to have any direct effects upon Indiana bats during their hibernation or fall and spring swarming periods (generally October thru April), or upon their hibernacula because no hibernacula are known to occur within or near the project area. The closest hibernaculum (Pilot Knob Mine) is approximately 22 miles from the project area and, therefore, neither it, nor the habitat likely to be used for spring and fall “swarming” (generally 5 miles from the hibernaculum) would be impacted by any of the proposed activities in Alternative 1. There is also no potential hibernation habitat within the project area, since no caves have been located within the project area. Therefore, no direct effects upon wintering habitat for the Indiana bat are anticipated as the result of activities proposed in Alternative 1.

There is a potential for directly impacting Indiana bats, however, during their summer roosting period (generally May thru September). Activities proposed that may have a direct adverse effect upon Indiana bats include mechanical timber treatment, prescribed burning, dozerline construction, and trail reconstruction. These activities all have the potential of impacting bats that may be roosting in trees during the summer, particularly trees with characteristics that make them favorable for bat use. These direct adverse impacts could be the killing of roosting bats when trees are felled or burned, or abandonment of roost sites caused by disturbance created by activity associated with these treatments.

Many of the stands that would be treated with mechanical methods and/or prescribed burning contain suitable potential roost trees for Indiana bats. Given the fact that a pregnant Indiana bat was captured in similar habitat approximately 12 miles from the project area, it is also being assumed that these stands may contain Indiana bat maternity colonies, in which a single tree may offer roosting habitat for several females and their young. The number of acres of forested habitat that would be treated in this alternative and that that offers potential summer habitat for Indiana bats can be found in Table 3.

Table 3. As of June 29, 2004, forested acres offering suitable habitat for Indiana bat use that would be affected by Alternative 1 (Acres per FY is estimated)

Treatment	Forest Total Acres Incid Take Allowed Each FY	Total Ac Proposed	FY 2005		FY 2006		FY 2007		FY 2008		FY 2009	
			EFred	Forest Total								
TIMBER HARVEST-Mechanical Treatment	20,000	4,669	1000	7210	1000	5621	1000	4974	1000	*	669	*
RX FIRE-Prescribed Burning & Dozerline Construction	12,000	2,603	1325	11,162	722	9322	270	7380	286	*	1325	*
WL HAB IMP- Pond Devel.	2,000	6	1	848	1	9	2	12	1	*	1	*

*Indiana bat take database computes cumulative take acres only up to year 2007.

In order to minimize the potential for this direct adverse impact upon summer roosting Indiana bats, several protective measures have been incorporated into Alternative 1. These protective measures (refer to Appendix B in 2003 BAE) would protect the majority of trees that offer the best potential roosting and maternity habitat for Indiana bats. For example, all hollow or decaying dead trees will be retained in all mechanical treatment units, unless they pose a threat to human safety. Other trees to be protected include all shagbark and shellbark hickories, sycamores, and lightning-struck trees. In addition, a minimum basal area of trees will be retained in these units to provide a future supply of roost trees and for protection of existing roost trees from windthrow. By implementing these protective measures, the risk of directly harming a roosting Indiana bat during mechanical treatment activities is greatly reduced.

Because it would be impracticable to protect all suitable roost trees within the prescribed burn areas from burning, a protective measure has also been developed specific to prescribed burning in order to minimize the adverse direct impact that burning may have upon roosting Indiana bats. This measure requires that all burning activities occur outside of the Indiana bat maternity season of May 15-August 15. Although burning may still occur during the period when bats may be within the project area, by prohibiting burning during the maternity period, the chances of flightless young being harmed if their roost tree burns is greatly reduced because Indiana bat research has indicated that young are usually mobile by end of July (U.S. Fish and Wildlife Service 1999). There is still a potential that an occupied roost tree may be burned and individual bats harmed as a result

of this burning, however, it is probably more likely that should an occupied roost tree begin to burn or smoke accumulations become too heavy, that the bats would fly out of the tree to an adjacent, unburned area. Given the fact that the prescribed burn areas proposed are surrounded by adjacent, forested habitat of similar composition, this is not considered an unlikely scenario, since suitable roost trees are likely scattered across the forested area. It is also assumed that the loss of suitable roost trees to burning activities would be offset by the creation of new snags as a result of the burn, allowing a continual supply of suitable roost trees within the prescribed burn area over the long term.

Other activities proposed within this alternative such as dump cleanup, erosion control, and pond construction/rehab, would not be expected to have a direct adverse effect upon Indiana bats because they would not likely involve any felling or disturbance to suitable roost trees.

Indirect Effects: The activities proposed in Alternative 1 are not expected to have any indirect effect upon Indiana bat hibernating, or fall/spring swarming habitat for the same reasons as stated above for the potential for direct effects.

However, there are indirect effects upon Indiana bat summer roosting and foraging habitat that are anticipated if Alternative 1 is implemented. These indirect effects include changes in the availability and quality of suitable foraging habitat for Indiana bats within the project area, as well as changes in the availability of suitable roost trees within the project area. Activities proposed within this alternative that are likely to contribute to these indirect effects include mechanical timber treatments, prescribed burning, old growth designation and pond construction/rehabilitation. Some of these indirect effects may be adverse, while others would be beneficial.

Adverse indirect effects may be created by mechanical treatment of timber stands that result in a temporary loss of suitable foraging habitat. Foraging habitat may be indirectly adversely affected by activities that result in less than a 30% canopy closure (U.S. Forest Service 2002). Activities in Alternative 1 that are likely to create stands in this condition include mechanical treatment of stands that use seed tree cut techniques.

Because Alternative 1 proposes several hundred acres of mechanical treatment of timber stands, in which trees would be cut but not removed, there is some increased potential for a severe wildfire within the project area. The heavy fuel loads left in these stands following mechanical treatment would increase this potential. Heavy fuel loads could contribute to an intense, hard to control wildfire in the project area. Such a wildfire has the potential of temporarily reducing large areas of currently suitable habitat throughout the project area. However, the chances of such a wildfire occurring would be hard to predict and therefore, these indirect effects may not be “reasonably certain to occur”.

In some cases, foraging habitat may be indirectly improved by the mechanical treatment activities and prescribed burning. Many of the forest stands within the project area have a greater than 100 basal area and are considered heavily stocked and dense. Studies have shown that Indiana bats tend to prefer more open, less heavily stocked forest stands for foraging habitat; generally forest stands with 50-70% canopy cover are considered optimum for Indiana bat foraging (U.S. Forest Service 1998). These canopy conditions

would be created by mechanical treatments implementing the thinning techniques. The forest stand in which the Indiana bat was captured during May 2004 would fall within this category and is proposed for thinning. The other techniques that would be used for mechanical treatment (shelterwood cut, sanitation/salvage cut, and selection with groups) would be expected to leave a > 40% canopy cover, which would be considered suitable Indiana bat foraging habitat.

Prescribed burning may also indirectly improve foraging habitat for Indiana bats. Prescribed burning, especially when an area is burned repetitively over the long term, would create a more open, woodland-type stand, in many of the stands currently heavily stocked. This effect would be similar to some of the mechanical treatments that would create a more open canopy of 50-70%. Prescribed burning has further indirect benefits to Indiana bats when done at a landscape level because it creates a mosaic pattern of open and less open forest with a scattered distribution of snags and dying trees. This mosaic often creates more opportunities for Indiana bats to select from a variety of roost tree settings and foraging habitat conditions, and generally creates a higher quality, more long-term foraging and roosting habitat (U.S. Forest Service 1998; LMills, pers. experience).

According to the BE Program, Alternative 1 will affect suitable Indiana bat foraging habitat as follows:

Acres Destroyed	Acres Reduced	Acres Maintained	Acres Created	Acres Enhanced
0	28	99	33	0

Based upon the BE program, these acres would only be affected in LTA HA.

Other activities that may have an indirect beneficial effect upon the Indiana bat that are proposed in Alternative 1 are the creation of 30 vernal ponds within the project area and the maintenance of 4 permanent ponds. These ponds would be constructed to supplement the existing upland water sources within the project area, many of which are road ruts and ditches. Since road ruts and ditches tend to be drained during heavy road use or road maintenance activities, the creation of these ponds would help mitigate that loss and provide foraging Indiana bats that may be within the project area with a continual supply of upland water. The availability of upland water sources is an important factor in creating suitable Indiana bat habitat, since research has indicated that Indiana bats frequent upland ponds and road ruts regularly during the summer months, particularly if they are pregnant or lactating (L.Mills, pers. experience).

Other beneficial indirect effects upon the Indiana bat with implementation of Alternative 1 would be the designation of 1,693 acres of old growth. While designation of old growth may preclude the development of better foraging habitat because most old growth stands tend to approach > 100% canopy cover, it will likely increase the availability of suitable roost trees within the project area, particularly for maternity use. Old growth areas will eventually develop a structure that includes many large diameter trees. Some of these trees would likely become suitable for maternity roosts. Most of the old growth that would be designated in Alternative 1 would also be located in bottomland areas, along riparian zones and most maternity roosts have been found in elm-ash-cottonwood communities, typical of riparian zones. Studies of maternity habitat in Missouri have

recommended that forest management practices that favor creation and retention of suitable roost trees include a component of old growth (U.S. Forest Service 1998).

Cumulative Effects: Based upon known past, present and foreseeable effects, the implementation of Alternative 1 is not likely to have an adverse cumulative effect upon the Indiana bat or its habitat. This alternative would not have any cumulative effect upon cave use by Indiana bats because it does not affect any habitat within 5 miles of a known Indiana bat cave. None of the activities proposed in this alternative would contribute to a permanent loss of foraging habitat for Indiana bats. Continued conversion of private forestland to agriculture or residences within the range of the Indiana bat may result in the cumulative loss of foraging and roosting habitat over the long term; however, these activities on private lands are not within the jurisdiction of the U.S. Forest Service and are not necessarily influenced by this proposal. Activities such as mechanical treatment of forest stands and burning may lead to a cumulative short-term loss of some habitat components considered desirable for Indiana bats, however, this negative impacts would be offset by the beneficial impact these activities would also have upon Indiana bat habitat. For example, the loss of some suitable foraging habitat for Indiana bat as the result of seedtree cutting techniques would be offset by the increase of suitable foraging habitat created by thinning or prescribed burning techniques.

Summary of Compliance with FWS BO: The June 23, 1999 Biological Opinion requires compliance with Terms and Conditions developed to protect and maintain the Indiana bat and its habitat on the MTNF. Alternative 1 complies with those Terms and Conditions as follows:

- All known Indiana bat caves remain protected from human disturbance.
- The alternative does not impact the designated old growth and mature forest around Indiana bat caves.
- The alternative complies with minimum basal area and leave tree requirements specified in the BO and FLRMP.
- The project will not involve activities within 0.25 mile of a known Indiana bat maternity site or any Area of Influence (AOI) for Indiana bats.
- The alternative will not affect management recovery strategies for caves or lands on or adjacent to the MTNF.
- Prescribed burning activities proposed will comply with BO terms and conditions.
- Project does not affect ongoing Indiana bat monitoring, surveys or research activities.
- Project will not exceed allowable “take” during any given fiscal year.

Determination of Effect and Rationale: Because some of the activities proposed in Alternative 1 may result in felling, knocking over, burning, or other disturbance to suitable roost trees while they may be occupied by Indiana bats, as well as temporarily reduce the availability of suitable foraging habitat for this species where it presently occurs, Alternative 1 *may have an adverse effect* upon individual Indiana bats and/or their habitat. While the potential for adverse impacts to Indiana bats as a result of these kinds of activities is considered very low, it is not considered negligible and discountable because several hundred acres that will be treated by activities that may be potentially adverse.

However, many of the activities proposed in Alternative 1 may also have a beneficial indirect effect upon the Indiana bat and its habitat.

Alternative 2

Direct Effects: The activities proposed in Alternative 2 would not be expected to have any direct effects upon Indiana bats during their hibernation or fall and spring swarming periods (generally October thru April), or upon their hibernacula because no hibernacula are known to occur within or near the project area. The closest hibernaculum (Pilot Knob Mine) is approximately 22 miles from the project area and, therefore, neither it, nor the habitat likely to be used for spring and fall “swarming” (generally 5 miles within a hibernaculum) would be impacted by any of the proposed activities in Alternative 2. There is also no potential hibernation habitat within the project area, since no caves have been located within the project area. Therefore, no direct effect upon wintering habitat for the Indiana bat is anticipated as the result of activities proposed in Alternative 2.

There is a potential for directly impacting Indiana bats, however, during their summer roosting period (generally May thru September). Activities proposed that may have a direct adverse effect upon Indiana bats include timber harvesting, crop tree release, pine sapling release, temporary road construction, prescribed burning, dozerline construction, glade restoration, and trail reconstruction. These activities all have the potential of impacting bats that may be roosting in trees during the summer, particularly trees with characteristics that make them favorable for bat use. These direct adverse impacts could be the killing of roosting bats when trees are felled or burned, or abandonment of roost sites caused by disturbance created by activities associated with these treatments.

Many of the stands that would be affected by tree felling activities or prescribed burning contain suitable potential roost trees for Indiana bats. Stands proposed for timber harvesting and prescribed burning would have the greatest potential for suitable roost trees, because these stands tend to have larger diameter, older trees than stands and areas proposed for crop tree, pine sapling release, or glade restoration. Given the fact that a pregnant Indiana bat was captured in similar habitat approximately 12 miles from the project area, it is also being assumed that these stands may contain Indiana bat maternity colonies, in which a single tree may offer roosting habitat for several females and their young. The number of acres of forested habitat that would be treated in this alternative and that that offers potential summer habitat for Indiana bats can be found in Table 4.

Table 4. As of June 29, 2004, forested acres offering suitable habitat for Indiana bat use that would be affected by Alternative 2 (Acres per FY is estimated).

Treatment	Forest Total Acres Incid Take Allowed Each FY	Total Ac Proposed in Project Area	FY 2005		FY 2006		FY 2007		FY 2008		FY 2009	
			EFred	Forest Total								
TIMBER HARVEST	20,000	4,734	1000	7210	1000	5621	1000	4974	1000	*	734	*
TSI-CTR and Pine release	4,000	1,780	228	3072	572	1622	400	700	400	*	180	*
ROAD CN-Temp Road Const./Recon.	25	95 (24.3mi temp+9.5 mi recon)	19	22	19	22	19	22	19	*	19	*
RX FIRE-Prescribed burning & Dozerline Construction	12,000	2,603	1325	11162	722	9322	270	7380	286	*	1325	*
WL HAB IMP-Glade restoration/Pond Devel.	2,000	39 (33 glade + 6 pond)	3	848	9	9	12	12	11	*	4	*
SW IMP-Trail reconstruction	150	0.3 (0.6mi)	0.3	25	0	17	0	17	0	*	0	*

*Indiana bat take database computes cumulative take acres only up to year 2007.

In order to minimize the potential for this direct adverse impact upon summer roosting Indiana bats, several protective measures have been incorporated into Alternative 2. These protective measures (refer to Appendix B in the 2003 BAE) would protect the majority of trees that offer the best potential roosting and maternity habitat for Indiana bats. For example, all unmerchantable dead trees (generally, the best dead trees for Indiana bat use are unmerchantable because they are hollow or decayed), will be retained in all timber harvest units and TSI unit, unless they pose a threat to human safety. Other trees to be protected include all shagbark and shellbark hickories, sycamores, and lightning-struck trees. In addition, a minimum basal area of trees will be retained in these units to provide a future supply of roost trees and for protection of existing roost trees from windthrow. By implementing these protective measures, the risk of directly harming a roosting Indiana bat during timber harvest activities is greatly reduced. Activities such as glade restoration trail reconstruction would also strive to protect these trees when possible and would not be likely to impact very many suitable roost trees since they would not involve tree felling on many acres.

Because it would be impracticable to protect all suitable roost trees within the prescribed burn areas from burning, a protective measure has also been developed to minimize the adverse direct impact that burning may have upon roosting Indiana bats. This measure requires that all burning activities occur outside of the Indiana bat maternity season of May 15-August 15. Although burning may still occur during the period when bats may be within the project area, by prohibiting burning during the maternity period, the chances of flightless young being harmed if their roost tree burns is greatly reduced

because Indiana bat research has indicated that young are usually mobile by end of July (U.S. Fish and Wildlife Service 1999). There is still a potential that an occupied roost tree may be burned and individual bats harmed as a result of this burning, however, it is probably more likely that should an occupied roost tree begin to burn or smoke accumulations become too heavy, that the bats would fly out of the tree to an adjacent, unburned area. Given the fact that the prescribed burn areas proposed are surrounded by adjacent, forested habitat of similar composition, this is not considered an unlikely scenario, since suitable roost trees are likely scattered across the forested area. It is also assumed that the loss of suitable roost trees to burning activities would be offset by the creation of new snags as a result of the burn, allowing for a continual supply of suitable roost trees within the prescribed burn area over the long term.

Other activities proposed within this alternative such as dump cleanup, erosion control, and pond construction/rehab, would not be expected to have a direct adverse effect upon Indiana bats because they would not likely involve any felling or disturbance to suitable roost trees.

Indirect Effects: The activities proposed in Alternative 2 are not expected to have any indirect effect upon Indiana bat hibernating, or fall/spring swarming habitat for the same reasons as stated above for the potential for direct effects.

However, there are indirect effects upon Indiana bat summer roosting and foraging habitat that are anticipated if Alternative 2 is implemented. These indirect effects include changes in the availability and quality of suitable foraging habitat for Indiana bats within the project area, as well as changes in the availability of suitable roost trees within the project area. Activities proposed within this alternative that are likely to contribute to these indirect effects include timber harvesting, crop tree release, pine sapling release, temporary road construction, prescribed burning, old growth designation, glade restoration, and pond construction/maintenance. Some of these indirect effects may be adverse, while others would be beneficial.

Adverse indirect effects may be created by timber harvest activities that would result in a temporary loss of suitable foraging habitat. Foraging habitat may be indirectly adversely affected when timber harvesting results in less than a 30% canopy closure (U.S. Forest Service 2002). Activities in Alternative 2 that are likely to create stands in this condition include timber harvesting that uses the seed tree cut technique. Temporary road construction also may slightly reduce foraging habitat if temporary roads are created in existing suitable foraging habitat. However, these temporary roads may also be used as travel corridors for foraging Indiana bats.

In some cases, foraging habitat may be indirectly improved by timber harvesting, crop tree and pine sapling release, glade restoration and prescribed burning. Many of the forest stands within the project have a greater than 100 basal area and are considered heavily stocked and dense. Several of these stands would be treated in this alternative with methods that would reduce this basal area. Studies have shown that Indiana bats tend to prefer more open, less heavily stocked forest stands for foraging habitat; generally forest stands with 50-70% canopy cover are considered optimum for Indiana bat foraging (U.S. Forest Service 1998). These canopy conditions would be created by timber

harvesting implementing the thinning techniques, and possibly by glade restoration activities, crop tree release, and pine sapling release. The forest stand in which the Indiana bat was captured during May 2004 would fall within this category and is proposed for thinning. The other techniques that would be used for timber harvesting (shelterwood cut, sanitation/salvage cut/overstory removal, and selection with groups) would be expected to leave a > 40% canopy cover, which would be considered suitable Indiana bat foraging habitat.

Prescribed burning may also indirectly improve foraging habitat for Indiana bats. Prescribed burning, especially when an area is burned repetitively over the long term, would create a more open, woodland-type stand, in many of the stands currently heavily stocked. This effect would be similar to some of the mechanical treatments that would create a more open canopy of 50-70%. Prescribed burning has further indirect benefits to Indiana bats when done at a landscape level because it creates a mosaic pattern of open and less open forest with a scattered distribution of snags and dying trees. This mosaic often creates more opportunities for Indiana bats to select from a variety of roost tree settings and foraging habitat conditions, and generally creates a higher quality, more long-term foraging and roosting habitat (U.S. Forest Service 1998; LMills, pers. experience).

According to the BE Program, Alternative 2 will affect suitable Indiana bat foraging habitat as follows:

Acres Destroyed	Acres Reduced	Acres Maintained	Acres Created	Acres Enhanced
0	28	162	33	0

Based upon the BE program, these acres would only be affected in LTA HA.

Other activities that may have an indirect beneficial effect upon the Indiana bat that are proposed in Alternative 2 are the creation of 30 vernal ponds within the project area and the maintenance of 4 permanent ponds. These ponds will be constructed to supplement the existing upland water sources within the project area, many of which are road ruts and ditches. Since road ruts and ditches tend to be drained during heavy road use, road decommissioning, temporary road construction, or road maintenance activities, the creation of these ponds will help mitigate that loss and provide foraging Indiana bats that may be within the project area with a continual supply of upland water. The availability of upland water sources is an important factor in creating suitable Indiana bat habitat, since research has indicated that Indiana bats frequent upland ponds and road ruts regularly during the summer months, particularly if they are pregnant or lactating (L. Mills, pers. experience).

Other beneficial indirect effects upon the Indiana bat with implementation of Alternative 2 would be the designation of 1,693 acres of old growth. While designation of old growth may preclude the development of better foraging habitat because most old growth stands tend to approach > 100% canopy cover, it will likely increase the availability of suitable roost trees within the project area, particularly for maternity use. Old growth areas will eventually develop a structure that includes many large diameter trees. Some of these trees would likely become suitable for maternity roosts. Most of the old growth that would be designated in Alternative 2 would also be located in bottomland areas,

along riparian zones and most maternity roosts have been found in elm-ash-cottonwood communities, typical of riparian zones. Studies of maternity habitat in Missouri have recommended that forest management practices that favor creation and retention of suitable roost trees and include a component of old growth (U.S. Forest Service 1998).

Cumulative Effects: Based upon known past, present, and foreseeable effects, the implementation of Alternative 2 is not likely to have an adverse cumulative effect upon the Indiana bat or its habitat. This alternative would not have any cumulative effect upon cave use by Indiana bats because it does not affect any habitat within 5 miles of a known Indiana bat cave. None of the activities proposed in this alternative would contribute to a permanent loss of foraging habitat for Indiana bats. Continued conversion of private forestland to agriculture or residences within the range of the Indiana bat may result in the cumulative loss of foraging and roosting habitat over the long term, however, these activities on private lands are not within the jurisdiction of the US Forest Service and are not necessarily influenced by this proposal. Some of the activities proposed in Alternative 2 may lead to a cumulative short-term loss of some habitat components considered desirable for Indiana bats, however, this negative impact would be offset by the beneficial impact other activities proposed in Alternative 2 would have upon Indiana bat habitat. For example, the loss of some suitable foraging habitat for Indiana bat as the result of seedtree cutting techniques would be offset by the increase of suitable foraging habitat created by thinning or prescribed burning techniques.

Summary of Compliance with FWS BO: The June 23, 1999 Biological Opinion requires compliance with Terms and Conditions developed to protect and maintain the Indiana bat and its habitat on the MTNF. Alternative 2 complies with those Terms and Conditions as follows:

- All known Indiana bat caves remain protected from human disturbance.
- The alternative does not impact the designated old growth and mature forest around Indiana bat caves.
- The alternative complies with minimum basal area and leave tree requirements specified in the BO and FLRMP.
- The project will not involve activities within 0.25 mile of a known Indiana bat maternity site or any Area of Influence (AOI) for Indiana bats.
- The alternative will not affect management recovery strategies for caves or lands on or adjacent to the MTNF.
- Prescribed burning activities proposed will comply with BO terms and conditions.
- Project does not affect ongoing Indiana bat monitoring, surveys or research activities.
- Project will not exceed allowable “take” during any given fiscal year.

Determination of Effect and Rationale: Because some of the activities proposed in Alternative 2 may result in felling, knocking over, burning, or other disturbance to suitable roost trees while they may be occupied by Indiana bats, as well as temporarily reduce the availability of suitable foraging habitat for this species where it presently occurs, Alternative 2 *may have an adverse effect* upon individual Indiana bats and/or their habitat. While the potential for adverse impacts to Indiana bats as a result of these kinds of activities is considered very low, it is not considered negligible and discountable

because of the several hundred acres that would be treated by activities that may be potentially adverse. However, many of the activities proposed in Alternative 2 may also have a beneficial indirect effect upon the Indiana bat and its habitat.

Alternative 3

Direct Effects: Alternative 3 would not be expected to have any direct effects upon Indiana bats during their hibernation or fall and spring swarming periods (generally October thru April), or upon their hibernacula because no hibernacula are known to occur within or near the project area. The closest hibernaculum (Pilot Knob Mine) to the project area is approximately 22 miles from the project area and, therefore, neither it, nor the habitat likely to be used for spring and fall “swarming” (generally 5 miles within a hibernaculum) would be affected by this alternative. There is also no potential hibernation habitat within the project area, since no caves have been located within the project area. Therefore, no direct effect upon wintering habitat for the Indiana bat is anticipated as the result of activities proposed in Alternative 3.

However, Indiana bats may occur within the project area during their summer roosting period (generally May thru September). During this time, Indiana bats may be using trees within the project area as roosts and maternity colonies. If so, the bats are vulnerable to activities that may disturb these roost trees, such as tree felling, burning, etc. Under Alternative 3, no activities are proposed that would directly disturb any suitable Indiana bat roost trees and 0 acres of forested habitat would be directly affected by this alternative. Therefore, there are no anticipated direct effects upon Indiana bat summer habitat if Alternative 3 is implemented.

Indirect Effects: The activities proposed in Alternative 3 are not expected to have any indirect effect upon Indiana bat hibernating, or fall/spring swarming habitat for the same reasons as stated above for the potential for direct effects.

However, there are indirect effects upon Indiana bat summer roosting and foraging habitat that are anticipated if Alternative 3 is implemented. These indirect effects include changes in the availability and quality of suitable foraging habitat for Indiana bats within the project area, as well as changes in the availability of suitable roost trees within the project area.

Under Alternative 3, no activities would occur within the project area that would improve the health and resistance of existing forest stands. Many of these stands are currently suffering from or highly susceptible to infestations of red oak borers and other insects. If no treatment occurs within these stands, it is anticipated that several hundred acres may be affected by these insect infestations, resulting in die-off of many oaks, particularly scarlet and black oaks (D.Dostal, pers.comm.). In the short-term, this may improve foraging and roosting habitat for the Indiana bat, because it would result in more open canopied stands and a high number of standing dead trees that could be used as roosts and maternity sites. Over the long-term, however, if no treatment occurs, these stands are likely to gradually succeed to more closed canopy conditions, especially with the exclusion of fire. Closed canopy (> 70%) would be considered less than optimum

foraging habitat for Indiana bats.

The anticipated die-off of trees due to lack of treatment may also contribute to more intense wildfires within the project area. Fuels would build-up with the forested stands as they succumb to disease and insects. Intense wildfires would have the potential of creating large areas of < 30% canopy cover, which would not be considered suitable Indiana bat foraging habitat. Exclusion of controlled prescribed burning within these stands would also increase the potential for wildfires to become intense and difficult to control. The chances of a wildfire occurring within the project area, however, are virtually impossible to predict, and so, these possible indirect effects may be considered speculative and are not considered “reasonably certain to occur”.

Overall, Alternative 3 is not expected to improve habitat conditions within the project area for the Indiana bat. While there would be no direct loss of existing foraging habitat within the project area under this alternative, implementation of Alternative 3 may still contribute to an indirect loss of foraging habitat within the project area by failure to treat currently overstocked, unhealthy forest stands. Under Alternative 3, there would be no increase in upland ponds for Indiana bat use, and existing ponds would not be maintained, eventually leading to a decrease in the availability of upland water sources. The availability of roost trees within the project area is anticipated to remain relatively constant or increase, since this alternative would allow existing forest stands to continue to mature and create conditions likely to lead to an increase in the number of dying trees within the project area.

According to the BE Program, Alternative 3 will affect suitable Indiana bat foraging habitat as follows:

Acres Destroyed	Acres Reduced	Acres Maintained	Acres Created	Acres Enhanced
0	0	190	0	0

Based upon the BE program, these acres would only be affected in LTA HA.

Cumulative Effects: Based upon known past, present, and foreseeable effects, the implementation of Alternative 3 is not likely to have an adverse cumulative effect upon the Indiana bat or its habitat. This alternative would not have any cumulative effect upon cave use by Indiana bats because it does not affect any habitat within 5 miles of a known Indiana bat cave. None of the activities proposed in this alternative would contribute to a permanent loss of foraging habitat for Indiana bats. Continued conversion of private forestland to agriculture or residences within the range of the Indiana bat may result in the cumulative loss of foraging and roosting habitat over the long term, however, these activities on private lands are not within the jurisdiction of the U.S. Forest Service and are not necessarily influenced by this proposal.

However, failure to take actions that would improve the resistance of forest stands to insects, wildfire, and disease may lead to a cumulative short-term loss of some suitable foraging habitat within the project area, however, this loss would be offset by the availability of suitable foraging habitat elsewhere in the project area, since not all stands would likely be vulnerable to these forces.

Summary of Compliance with FWS BO: The June 23, 1999 Biological Opinion requires compliance with Terms and Conditions developed to protect and maintain the Indiana bat and its habitat on the MTNF. Alternative 3 complies with those Terms and Conditions as follows:

- All known Indiana bat caves remain protected from human disturbance.
- The alternative does not impact the designated old growth and mature forest around Indiana bat caves.
- The alternative complies with minimum basal area and leave tree requirements specified in the BO and FLRMP.
- The project will not involve activities within 0.25 mile of a known Indiana bat maternity site or any Area of Influence (AOI) for Indiana bats.
- The alternative will not affect management recovery strategies for caves or lands on or adjacent to the MTNF.
- There are no prescribed burning activities proposed.
- Project does not affect ongoing Indiana bat monitoring, surveys or research activities.
- The alternative will not exceed allowable “take” during any given fiscal year because it does not implement any activities that would directly affect forested habitat.

Determination of Effect and Rationale: Alternative 3 would have *no direct effect* and *is not likely to indirectly adversely affect* the Indiana bat or potential habitat for this species. The potential for indirect effects upon some potential habitat for this species may be increased under this alternative because no activities would occur to improve the health and conditions of forested stands within the project area, making them susceptible to intense wildfires, insect outbreaks, disease, or other forces. However, this potential cannot be measured and may be considered speculative. The implementation of Alternative 3 is expected to have *no cumulative adverse effect* upon the Indiana bat because it is not expected to influence potential recovery of this species throughout its range and would comply with the FWS BO Terms and Conditions.

SUMMARY OF DETERMINATIONS

The summary of determinations below is based upon the proposed management action as described in this BAE. *Should any change in the proposed management action as outlined in this BAE occur after the date that this evaluation is signed, all effects upon these federally-listed species may warrant re-evaluation before project implementation may continue.* Changes that would require a re-evaluation of effects upon these species include but may not be limited to:

- any change in the proposed action that may increase the potential for adverse effects upon federally-listed species beyond what has been disclosed in this evaluation;
- unknown or previously unaddressed federally-listed species or their habitats are discovered in the project area.

Alternative 1

Species	Species present in project area?	Habitat present in project area?	Habitat affected by project?	Determination
Indiana bat	Yes; documented May 04; known to roost in suitable trees on NFS and may roost on pvt lands in project area; forages in project area.	Yes; suitable roost trees present on NFS and pvt lands in project area; foraging habitat present.	Yes; will involve burning and felling of some suitable roost trees during time they may be occupied.	May adversely affect but no additional effects beyond those evaluated in the programmatic BA/BO.

Alternative 2

Species	Species present in project area?	Habitat present in project area?	Habitat affected by project?	Determination
Indiana bat	Yes; documented May 04; known to roost in suitable trees on NFS and may roost on pvt lands in project area; forages in project area.	Yes; suitable roost trees present on NFS and pvt lands in project area; foraging habitat present.	Yes; will involve burning and felling of some suitable roost trees during time they may be occupied.	May adversely affect but no additional effects beyond those evaluated in the programmatic BA/BO.

Alternative 3

Species	Species present in project area?	Habitat present in project area?	Habitat affected by project?	Determination
Indiana bat	Yes; documented May 04; known to roost in suitable trees on NFS and may roost on pvt lands in project area; forages in project area.	Yes; suitable roost trees present on NFS and pvt lands in project area; foraging habitat present.	Not likely; potential effects from wildfire and other forces unpredictable and immeasurable.	May affect-Is not likely to adversely affect.

CONSULTATION WITH OTHERS

Amelon, Sybill. Biologist. US Forest Service, North Central Research Station, Columbia, Missouri.

Davidson, Theresa. Biologist. US Fish and Wildlife Service, Ava Field Office, Ava, Missouri.

Eberly, Jody. Forest Biologist, US Forest Service, Mark Twain National Forest, Rolla, Missouri.

Fraleay, Janet. Acting District Ranger, US Forest Service, Mark Twain National Forest, Potosi, Missouri.

McGuire, Thomas. NEPA Coordinator and Project Leader. US Forest Service, Mark Twain National Forest, Potosi, Missouri.

Stuart, Katherine. District Ranger. US Forest Service, Mark Twain National Forest, Potosi, Missouri.

Walker, Joe. Timber and Recreation Program Manager. US Forest Service, Mark Twain National Forest, Potosi, Missouri.

BAE AUTHOR

/S/Lynda M. Mills

Lynda M. Mills
Wildlife Biologist

US Forest Service
Mark Twain National Forest
PO Box 188, Hwy 8 West
Potosi, MO 63664
Contact: lyndamills@fs.fed.us

14 July 2004

Date

REFERENCES AND DATA SOURCES

Amelon, Sybill. 2003. Draft Summary Report of Bat Monitoring Activities for Potosi-Fredericktown Ranger District, Mark Twain National Forest. November 2003.

Mills, Lynda. 2003. Biological Assessment/Evaluation Federally-listed Species, East Fredericktown. Signed 6 August 2003.

Missouri Department of Conservation 2003. Missouri species of conservation concern checklist. Jefferson City, Missouri. 28 pp.

Romme', R.C., Henry, A.B, King, R.A, Glueck, T. and K. Tyrell. 2002. Home range near hibernacula in spring and autumn, pages 153-1588 in Kurta, A. and J. Kennedy, eds. 2002. The Indiana bat: biology and management of an endangered species. Bat Conservation International, Austin, Texas.

U.S. Fish and Wildlife Service, 1999. Biological Opinion on the Impacts of Forest Management and Other Activities to the Gray Bat, Bald Eagle, Indiana Bat, and Mead's Milkweed on the Mark Twain National Forest, Missouri, Columbia, Missouri, June 23, 1999.

U.S. Fish and Wildlife Service, 2002a. Request of listing of federally threatened, endangered, and proposed species for the Mark Twain National Forest. Response to letter from Forest Supervisor. July 31, 2002.

U.S. Forest Service, Ecological Land Classification Aquatic Subsystem, Mark Twain National Forest.

U.S. Forest Service. 1981. Ecological Land Classification Terrestrial Subsystem, Mark Twain National Forest, December.

U.S. Forest Service. 1986. Mark Twain National Forest Land and Resource Management Plan, as amended. 234pp.

U.S. Forest Service, 1998. Mark Twain National Forest Programmatic Biological Assessment, Eastern Region, Milwaukee, Wisconsin, September 1998

U.S. Forest Service. 2001. Monitoring report for desired future condition, management indicator species, federal threatened, endangered and proposed, and regional forester sensitive species for the Mark Twain National Forest. October.

US Forest Service, 2002. Final Environmental Impact Statement, Oak Decline and Forest Health. Mark Twain National Forest.

DATABASES

Potosi/Fredericktown Ranger District CDS database

Missouri Department of Conservation, Missouri Fish & Wildlife Information System, 2001. <http://www.conservation.state.mo.us/nathiso/mofwis>

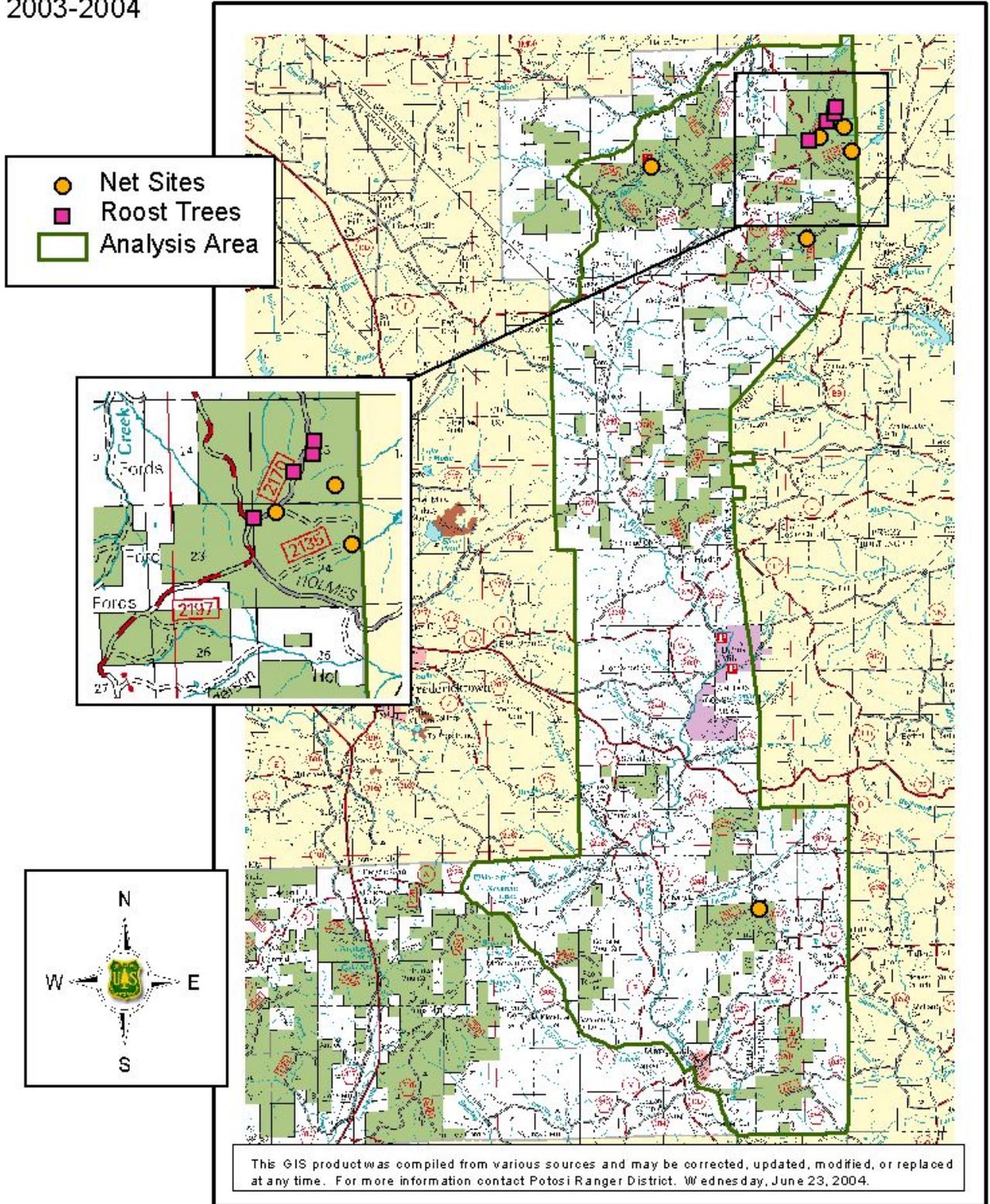
Missouri Department of Conservation, Missouri Natural Heritage Database. 2003 data transfer to the Mark Twain National Forest.

Mark Twain National Forest Computerized BE Program.

Appendix A – Map of Bat Survey Locations

East Fredericktown Analysis Area
Bat Survey Locations
2003-2004

Mark Twain National Forest
Potosi-Fredericktown Ranger District



Appendix B – Bat Survey Data
Summary of Mist Net Bat Survey Results conducted in the
East Fredericktown Analysis Area
2003 – 2004

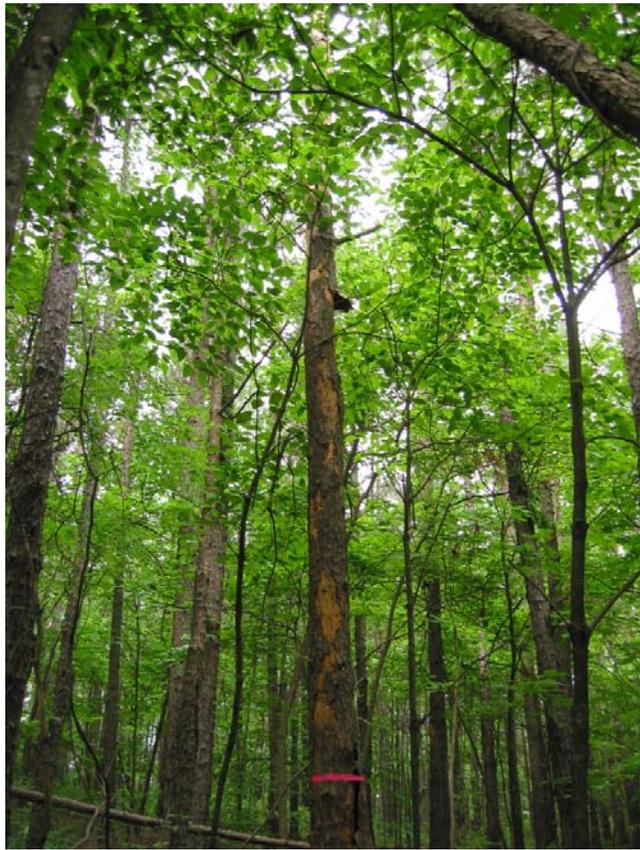
Date	Species & # of Individuals Captured	# Nets Set Up	Location of Nets
27 May 2003	<i>Lasiurus borealis</i> – 1 <i>Myotis septentrionalis</i> - 1	2	Upland forest pond Mudhole on woods road in upland forest
27 May 2003	<i>Myotis septentrionalis</i> - 2 <i>Lasionycteris noctivagans</i> – 1 <i>Pipistrellus subflavus</i> - 1	2	Mudholes on woods road in upland forest
20 May 2004	<i>Pipistrellus subflavus</i> – 1 <i>Lasiurus borealis</i> – 1 <i>Myotis septentrionalis</i> - 5	2	Upland forest pond Mudhole on woods road in upland forest
20 May 2004	<i>Lasiurus borealis</i> – 1 <i>Myotis septentrionalis</i> – 6 <i>Pipistrellus subflavus</i> – 3 <i>Myotis sodalis</i> - 1	2	Upland forest pond
24 May 2004	<i>Myotis septentrionalis</i> - 2	5	Bottomland forest over small stream ford
28 May 2004	<i>Lasiurus borealis</i> - 4	6	Bottomland forest near an artesian well
28 May 2004	<i>Nycticeius humeralis</i> - 1	1	Ford over Bidwell Creek



MALE INDIANA BAT CAPTURE SITE (POND), 20 MAY 2004



INDIANA BAT ROOST TREE, 21 MAY 2004



INDIANA BAT ROOST TREE, 22 MAY 2004



Roosting here, on lower side

INDIANA BAT ROOST TREE, 23 MAY 2004



INDIANA BAT ROOST TREE, 24-30 MAY 2004



CLOSE-UP OF INDIANA BAT UNDER BARK