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Mr. Robert T. Jacobs, Regional Forester

U.S. Department of Agriculture

Forest Service, Eastern Region
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Dear Mr. Jacobs:

The U.S. Fish and Wildlife Service (Service) has reviewed the Revised Programmatic Biological Assessment (BA) which evaluates the effects of continued implementation of the 1986 (as amended) Monongahela National Forest Land and Resource Management Plan (Forest Plan) on nine federally listed threatened and endangered species that occur on the Monongahela National Forest (MNF). These species include the threatened Virginia spiraea, Spiraea virginiana; the threatened Bald eagle, Haliaeetus leucocephalus; the threatened Cheat Mountain salamander, Plethodon nettingi; the endangered Virginia big-eared bat, Corynorhinus townsendii virginianus; the endangered Indiana bat, Myotis sodalis; the endangered West Virginia northern flying squirrel, Glaucomys sabrinus fuscus; the endangered Running buffalo clover, Trifolium stoloniferum; the endangered Shale barren rock cress, Arabis serotina; and the threatened Small whorled pogonia, Isotria medioloides. The BA was prepared in compliance with Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq*.) (ESA).

Your letter dated October 5, 2001, which accompanied the BA, requested that the Service concur with the MNF's determinations for eight (8) federally listed species affected by the Forest Plan. The Service's letter dated November 9, 2001 concurred with the following species determinations including, a "No Effect" finding for Virginia spiraea and a "May Affect, Not Likely to Adversely Affect" finding for the Bald eagle, the Cheat Mountain salamander, the Virginia big-eared bat, the West Virginia northern flying squirrel, Running buffalo clover, Shale

barren rock cress, and Small whorled pogonia. Therefore, no further Section 7 consultation pursuant to the ESA is required with the Service regarding the eight (8) aforementioned species. Your letter of October 5, 2001, also determined that implementation of the Forest Plan on the MNF would result in a "May Affect, Likely to Adversely Affect" finding for the Indiana bat, and requested that we initiate formal consultation pursuant to section 7 of the ESA. In our letter dated November 9, 2001, the Service concurred with that "May Affect" finding for the Indiana bat. The Service submitted our draft Biological Opinion (BO) dated January 18, 2002, regarding the Indiana bat. After reviewing and considering the MNF's comments, dated March 1, 2002, to our draft BO, this constitutes the final BO regarding the Indiana bat.

CONSULTATION HISTORY

The Indiana bat began to command attention on Regions 8 and 9 of the Forest Service, including the MNF, early in 1997. Informal consultation pertinent to the Indiana bat began with information sharing and strategy meetings in January and February, 1997. The frequency of meetings and strategy sessions intensified after Kentucky Heartwood Inc. and Heartwood Inc. won a court decision and stopped a timber sale on the Daniel Boone National Forest in Kentucky. In May and June, 1997, the Service and the MNF held several meetings to discuss field sampling (mist netting) strategies and protective measures for future projects on the MNF. Several more meetings and numerous phone conversations took place, especially in November and December, 1997, in a continuing effort to discuss strategies regarding Section 7 consultation. The MNF decided in December, 1997, that a BA would be prepared to evaluate impacts of the Forest Plan on the Indiana bat and the Virginia big-eared bat. To aid in the effort, the MNF, in coordination with the Service and the West Virginia Division of Natural Resources (WVDNR), was planning to develop a life requisite landscape model to determine the importance and location of potential Indiana bat habitat on the MNF. Although several meetings were held in late 1997 to discuss the concept of a landscape model, the idea never came to fruition.

In April, 1998, the Service reviewed a draft BA prepared to evaluate the continued implementation of the Forest Plan on the Indiana bat and the Virginia big-eared bat. After the BA encountered several problems, the MNF decided to postpone the process and include the mist net and radio telemetry data planned to be collected by numerous investigators, including the MNF, during the summer of 1998.

In a meeting held on March 2, 1999, the MNF announced that another BA would be prepared to evaluate the continued implementation of the Forest Plan on all nine federally listed species which occur on the MNF, not just the bats. The MNF submitted a letter dated July 6, 1999, regarding the status of the BA, which was under preparation and due for completion in the fall of 1999. During August and September, 1999, there were several meetings and numerous phone conversations regarding the capture of a young male Indiana bat on the Gauley Ranger District. In-depth discussions between the MNF and the Service ensued regarding how this discovery affected on-going projects and the preparation of the BA. In November and December, 1999,

the Service reviewed and commented on the first draft BA prepared by the MNF to evaluate implementation of the Forest Plan on all nine federally listed species on the MNF.

On February 9, 2000, the Service received the second draft of the BA. Meetings were held on April 5 and 7, 2000, with the MNF to discuss our concerns and recommendations on the second draft. On August 20, 2000, the Service received and reviewed changes to the Indiana bat and West Virginia northern flying squirrel (WVNFS) sections of the second draft BA. The Service submitted comments on the draft changes to the Indiana bat and WVNFS sections by letter dated October 16, 2000. On October 23, 2000, the Service met with the MNF to discuss these comments to the BA, primarily in regard to the West Virginia northern flying squirrel. As a result of this meeting, the Service initiated an extended process to update the Recovery Plan for the WVNFS to enable the MNF to adopt the new proposed plans to manage and protect the squirrel.

The Service received the final BA on January 19, 2001. Because of several outstanding issues, meetings were held on February 26 and March 2, 2001 and a teleconference was conducted on March 9, 2001 to resolve these outstanding issues. Upon resolution of the issues, the MNF agreed to submit a revised BA after receiving the updated Recovery Plan for the WVNFS. The Service submitted a letter dated March 19, 2001 to your office explaining the status of the consultation on the subject BA. On September 6, 2001 the Recovery Plan for the WVNFS was officially updated, and the revised BA was received by the Service on October 5, 2001. The BA determined that continued implementation of the Forest Plan would result in a "May Affect, Likely to Adversely Affect" for the Indiana bat, and subsequently requested formal consultation with the Service. The Service submitted our draft BO dated January 18, 2002, regarding the Indiana bat. The Service received the MNF's comments, dated March 1, 2002, to our draft BO. A final meeting was held on March 18, 2002, to discuss their comments to the draft BO and resolve any outstanding issues regarding the Indiana bat.

BIOLOGICAL OPINION

Description of the Proposed Action

The MNF consists of 909,409 acres of land and water in 10 eastern West Virginia counties. These counties include: Barbour, Grant, Greenbrier, Nicholas, Pendleton, Pocahontas, Preston, Randolph, Tucker and Webster. The MNF is mountainous and heavily forested. The Forest Plan and associated National Environmental Policy Act (NEPA) documentation describe long-range strategies for the MNF. As such, they are programmatic: that is, the Forest Plan provides a framework for future activities and emphasizes the applications of certain management activities on the land, but it does not provide site-specific management decisions. During Forest Plan implementation, individual projects are designed and site specific analyses are developed after appropriate coordination with the public, the WVDNR, and other state or federal agencies, including the Service. Pursuant to Section 7 of the ESA, the MNF develops a Biological

Evaluation and informally consults with the Service on all projects that have potential effects on federally listed species.

The proposed action is the continued implementation of the Forest Plan on the MNF, as amended, and projects predicated upon it. The proposed action includes on-going projects and future site-specific projects, until the current Forest Plan revision is completed. The basic categories of management activities include: timber management (regeneration harvest, thinning and single tree selection, and timber stand improvement), prescribed fire, firewood cutting, gypsy moth control, road construction/reconstruction, recreation, wildlife habitat improvement, fisheries improvement, range, mineral activity and landownership adjustments.

Timber Management

The Forest Plan prescribes timber management on only 36% or 331,160 acres of the MNF. The Forest Plan's projected annual allowable timber sale quantity is 43 million board feet (MMBF), harvested from 6,027 acres. From 1987 to 1998, average annual timber volume sold was 27.3 MMBF harvested from 4,055 acres. The major categories of timber management include: regeneration harvest (clearcut with residuals, two-aged, shelterwood, and seed tree); thinning and single tree selection, and timber stand improvement. The BA projects that timber harvest will not affect more than 6,000 acres per year.

Prescribed Fire

Historically, prescribed fire on the MNF was limited to maintenance of openings or brushy areas for wildlife habitat management. Historic records suggest that oak-hickory forest types are fire dependent. Based on this assumption, approximately one-third of the MNF will have some degree of fire dependency. Therefore, it is likely that a prescribed burning program will be developed for the MNF, including burns to stimulate oak regeneration, but is not likely to exceed 300 acres per year.

Firewood Cutting

Annually, 400-500 firewood permits authorize removal of 800-1000 cords of firewood. Only dead and down trees may be cut for firewood. Firewood is usually hand-carried from cutting location to the vehicle, most firewood is taken from within 150 feet of open roads throughout the MNF or from landing sites on closed timber sales.

Gypsy Moth Control

The last significant gypsy moth defoliation on the MNF lasted from 1990 through 1995. Since then, the fungus, Entomophaga maimaiga has been maintaining low gypsy moth

populations on the MNF. Therefore, except for an on-going non-target study to determine the effects of gypsy moth spraying on other forest dwellers such as: insects, especially moths and butterflies; songbirds, and amphibians, future treatments would be proposed only if gypsy moth populations dramatically increased.

Road Construction/Reconstruction

The three major road types on the MNF are system, temporary, and woods roads. Systems roads are permanent, designed for decades of use. Temporary roads are designed for use during specific projects, and are "put to bed" by installing water bars and seeding the surface after project completion. Woods roads have been created by past activities such as, logging, mining, and railroading. As areas of the MNF are reviewed for potential projects, woods roads are abandoned or converted to trails, wildlife openings, or system roads. From 1987 to 1996, the MNF abandoned 288 miles of woods roads (allowed them to grow up or were obliterated) and converted 281 miles to system roads. The MNF manages approximately 1,786 miles of system roads. New system road construction is projected not to exceed 15 miles per year. This will result in approximately 47 acres of forest disturbance each year.

Recreation

The MNF manages recreational facilities such as, campgrounds, picnic areas, hiking trails, and parking areas across the forest. Annually only a few hazard trees are removed from campgrounds and picnic areas. Recent trail construction projects have primarily involved bridge installation and trail relocation. The MNF builds or relocates 6-10 miles of trails each year.

Sport caving (spelunking) is fairly popular on the MNF. There are 257 inventoried caves on the MNF, only fourteen (14) are heavily used, mainly because of their easy accessibility. Eleven (11) caves contain sensitive animal species and some form of management (signs, fences, or gates) has been initiated on each. Five (5) caves are gated or otherwise (signed) closed to spelunking for all or part of the year to protect federally listed species.

Wildlife Habitat Improvements

Approximately 200 acres of wildlife habitat restoration and enhancement occur annually on the MNF. Approximately 30 acres of this is new wildlife openings which are usually associated with log landings of completed timber sales. Most work on the remaining areas involve mowing, nest box and platform placement, planting mast trees/shrubs, pruning and grafting fruit trees, and releasing soft and hard mast trees/shrubs. A small number of water holes are created annually. Some management activities directly benefit

federally listed species. Examples include: thinnings of conifer plantations to benefit the WVNFS and cave gate construction to protect Indiana bat and Virginia big-eared bat habitat.

Fisheries Improvements

The fisheries program is currently focused on stream inventory and monitoring and aquatic habitat classification. Current and projected water quality improvements primarily are limited to WVDNR's efforts to lime acidic streams. Approximately 125 stream miles are treated annually via direct limestone-fine additions or with limestone drums. This level of treatment is expected to continue. In the future, any fish habitat improvement structure installation is limited primarily to areas where such work will be funded through partnership funds or revenue generated by timber sales.

Range Management

The MNF administers 52 grazing allotments, comprising a total of approximately 7,000 acres. This is not expected to change.

Mineral Activity

Active coal mining on the MNF ceased in the early 1990s, and no coal mine permit applications are pending or known. The MNF plans to restore certain lands impacted by past coal mining. These individual projects could impact between 2-15 acres each, depending on the type of mining that occurred.

A 50,000 acre natural gas storage field was developed in the 1960s beneath the MNF in the Middle Mountain-Glady area. Future expansion and clearing the Glady gas storage field is not anticipated. Natural gas exploration and development in the MNF began in the 1950s. Forty one (41) gas well sites exist on the MNF. Approximately one to four acres has been cleared for each. An additional 108 miles of gas pipeline and 12 miles of access roads exist on MNF. The total clearing of all of these facilities is approximately 620 acres. Planned and potential gas developments over the next 10 years are expected to involve: 1) clearing approximately 140 acres for 68 gas wells, 2) clearing approximately 138 acres for approximately 19 miles of new gas well roads, and 3) clearing approximately 497 acres for 82 miles of gas pipeline from an estimated 43 producing wells. Approximately 78 acres on the MNF is estimated to be affected annually.

Land Ownership Adjustments

Types of land adjustment transactions include purchases, exchanges, donations, Small

Tracts Act sales/interchanges, transfers, condemnations, Town site Sales, and others. Future adjustments are difficult to project. The typical average ranges of acquired land are 20-200 acres per year with infrequent larger acquisitions. Exchanges usually result in little net change to MNF acreage. The primary reason for exchanges is to obtain privately owned land located within otherwise large blocks of MNF land. For both acquisitions and exchanges, other considerations include protection of: rare species and their habitats, heritage resources, riparian areas, and/or other unique resources.

General Biology and Life History of the Species

The following is a comprehensive review of the winter, summer, and fall behavior and habitat requirements of the Indiana bat from the West Virginia Field Office's November 28, 2000 BO for the Indiana bat on the Fernow Experimental Forest (FEF) in Tucker County, West Virginia.

"1. Behavior. Generally, Indiana bats hibernate from October through April (Hall, 1962; LaVal and LaVal, 1980) (September - May in northern areas [U.S. Fish and Wildlife Service 1999]), depending upon local weather conditions (Figure 1) for a depiction of the annual cycle). They hibernate in large, dense clusters, ranging from 300 bats per square foot (3,230 bats/m^2) (Clawson *et al*., 1980) to 484 bats per square foot (5,215 bats/m^2) (Clawson, pers. observ., October 1996). Indiana bats are very loyal to their hibernacula (LaVal and LaVal, 1980).

Upon arrival at hibernating caves in August-September, Indiana bats "swarm," a behavior in which "large numbers of bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in the caves during the day" (Cope and Humphrey, 1977). Swarming continues for several weeks and mating occurs during the latter part of the period. Fat supplies are replenished as the bats forage prior to hibernation. Indiana bats tend to hibernate in the same cave in which they swarm (LaVal *et al*., 1976; Stihler, pers. observ., October 1996), although swarming has occurred in caves other than those in which the bats hibernated (Cope and Humphrey, 1977; MacGregor, pers. observ., October 1996).

During swarming, males remain active over a longer period of time at cave entrances than do females (LaVal and LaVal, 1980), probably to mate with the females as they arrive. After mating, females enter directly into hibernation. A majority of bats of both sexes hibernate by the end of November (by mid-October in northern areas [Kurta, pers. observ., June 1997]), but hibernacula populations may increase throughout the fall and even into early January (Clawson *et al*., 1980).

Figure 1. Indiana bat annual chronology (from U.S. Fish and Wildlife Service 1999).

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Both sexes:											
		Hibernation								Hibernation	
Females:				Emerge	Pregnant			Swarming			
"						Lactating					
Young:						Born	Flying				
Males:				Emerge				Swarming			
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Adult females store sperm through the winter and become pregnant via delayed fertilization soon after emergence from hibernation. Young bats can mate in their first autumn and have offspring the following year, whereas males may not mature until the second year. Limited mating activity occurs throughout the winter and in late April as the bats leave hibernation (Hall, 1962). Females emerge from hibernation ahead of males; most winter populations leave by early May. Some males spend the summer near hibernacula in Missouri (LaVal and LaVal, 1980) and West Virginia (U.S. Fish and Wildlife Service 1999). In spring when fat reserves and food supplies are low, migration is probably hazardous (Tuttle and Stevenson, 1977). Consequently, mortality may be higher in the early spring, immediately following emergence.

Females may arrive in their summer habitats as early as April 15 in Illinois (Gardner *et al*., 1991*a*; Brack, 1979). During this early spring period, a number of roosts (e.g., small cavities) may be used temporarily, until a roost with larger numbers of bats is established. Humphrey *et al*. (1977) determined that Indiana bats first arrived at their maternity roost in early May in Indiana, with substantial numbers arriving in mid-May. Parturition occurs in late June and early July (Easterla and Watkins, 1969; Humphrey *et al*., 1977) and the young are able to fly between mid-July or early August (Mumford and Cope, 1958; Cope *et al*., 1974; Humphrey *et al*., 1977; Clark *et al*., 1987; Gardner *et al*., 1991*a;* Kurta *et al*., 1996).

Most of the documented maternity colonies contained 100 or fewer adult bats. After grouping into nursery colonies, females give birth to a single young in late June or early July. Some males disperse throughout the range and roost individually or in small numbers in the same types of trees and in the same areas as females, while other males remain near their hibernacula. Maternity colonies occupy roost sites in forested riparian, flood plain, or upland habitats, and exhibit strong roost site fidelity (Cope *et al*., 1978; Clark *et al*, 1987; Gardner *et al.* 1991*a*, *b*; Brack, 1983; Callahan *et al*, 1977; U.S. Fish and Wildlife Service 1999).

Young Indiana bats are capable of flight within a month of birth. Young born in late

June may be flying as early as the first week of July (Clark *et al.*, 1987), others from mid- to late July. Indiana bats spend the latter part of the summer accumulating fat reserves for fall migration and hibernation.

Humphrey and Cope (1977) determined that female survivorship in an Indiana population of Indiana bats was 76% for ages one to six years, and 66% for ages six to 10 years; for males, survivorship was 70% for ages one to six years, and 36% for ages six to 10 years. The maximum ages for banded individuals were 15 years for females and 14 years for males. Mortality between birth and weaning has been estimated at 8% (Humphrey *et al.* 1977).

2. Food habits. Indiana bats feed solely on aquatic and terrestrial, flying insects. They are habitat generalists and their selection of prey items reflects the environment in which they forage (LaVal and LaVal 1980). Diet varies seasonally and variation is observed among different ages, sexes, and reproductive-status groups (Belwood, 1979; Lee, 1993). Reproductively active females and juveniles exhibit greater dietary diversity than males and non-reproductively active adult females, perhaps due to higher energy demands. Reproductively active females eat more aquatic insects than do adult males or juveniles (Lee, 1993).

Moths (Lepidoptera) are major prey items identified in several studies (Belwood, 1979; LaVal and LaVal 1980; Brack and LaVal, 1985; Lee, 1993; Gardner and Virgil Brack (BHE Environmental, Inc., Cincinnati, Ohio) (unpubl. data), but caddisflies (Trichoptera) and flies (Diptera) are major prey items documented in another (Kurta and Whitaker, 1998). Another major prey group includes mosquitoes and midges (Belwood, 1979; Gardner and Brack, unpubl. data), especially species that form large mating aggregations above or near water (Belwood, 1979). Other prey include bees, wasps, and flying ants (Hymenoptera), beetles (Coleoptera), leafhoppers (Homoptera), treehoppers (Homoptera), stoneflies (Plecoptera), and lacewings (Neuroptera) (Whitaker, 1972; Belwood, 1979; Gardner and Brack, unpubl. data). Male Indiana bats summering in or near a hibernation cave feed preferentially on moths and beetles. Additionally, caddisflies, flies, mosquitoes, midges, stone flies, leafhoppers, treehoppers, and true bugs are consumed, but in low percentages (U.S. Fish and Wildlife Service 1999). LaVal and Brack (1985) examined fecal pellets of 140 male Indiana bats and identified 83% of the prey items as Lepidoptera and 7% as Coleoptera".

"1. Winter habitat. Indiana bats require specific roost sites in caves or mines (Tuttle and Taylor 1994) that attain appropriate temperatures to hibernate. In southern parts of the bat's range, hibernacula trap large volumes of cold air and the bats hibernate where resulting rock temperatures drop; in northern parts of the range, however, the bats avoid the coldest sites. In both cases, the bats choose roosts with a low risk of freezing. Ideal sites are 50°F (10°C) or below when the bats arrive in October and November. Early

studies identified a preferred mid-winter temperature range of 39-46°F (4-8°C), but a recent examination of long-term data suggests that a slightly lower and narrower range of 37-43°F (3-6°C) may be ideal for the species (U.S. Fish and Wildlife Service 1999). Only a small percentage of available caves provide for this specialized requirement. Stable low temperatures allow the bats to maintain a low rate of metabolism and conserve fat reserves through the winter, until spring (Humphrey, 1978; Richter *et al*., 1993). Indiana bats will occasionally use sites other than caves or mines if microclimate conditions are favorable. Kurta and Termanio (1994) found a single Indiana bat roosting with a large colony of 15,000 bats (mostly little brown and northern long-eared bats) at a hydroelectric dam in Manistee County, Michigan and noted that the temperature was about 4.7 ° C.

Relative humidity at roost sites during hibernation usually is above 74% but below saturation (Hall, 1962; Humphrey, 1978; LaVal *et al*., 1976; Kurta and Teramino 1994), although relative humidity as low as 54% has been observed (Myers, 1964). Humidity may be an important factor in successful hibernation (Thomas and Cloutier, 1992).

Specific cave configurations determine temperature and humidity microclimates, and thus suitability for Indiana bats (Tuttle and Stevenson, 1978; LaVal and LaVal, 1980). Indiana bats select roosts within hibernacula that best meet their needs for cool temperatures; in many hibernacula, these roosting sites are near an entrance, but may be deeper in the cave or mine if that is where cold air flows and is trapped (Tuttle and Stevenson, 1978; U.S. Fish and Wildlife Service 1999).

Indiana bats often hibernate in the same hibernacula with other species of bats, and are occasionally observed clustered with or adjacent to other species including gray bats (*Myotis grisescens*), Virginia big-eared bats (*Plecotus townsendii virginianus*), little brown bats, and northern long-eared bats (Myers 1964; LaVal and LaVal 1980; Kurta and Teramino 1994).

2. Summer habitat. A full, well-integrated understanding of the summer needs of this endangered species is yet to be attained. Early researchers considered flood plain and riparian forest to be the primary roosting and foraging habitats used in the summer by the Indiana bat (Humphrey *et al*., 1977), and these forest types unquestionably are important. More recently, upland forest has been shown to be used by Indiana bats for roosting (Clark *et al*., 1987; Gardner *et al*., 1991*b*; Callahan *et al*., 1997; John MacGregor, Daniel Boone National Forest, Kentucky, in litt. April 14, 1997); and upland forest, old fields, and pastures with scattered trees have been shown to provide foraging habitat (Gardner *et al*., 1991*b*; MacGregor, in litt. April 14, 1997).

Indiana bats occupy highly altered landscapes in many areas in the eastern United States and use ephemeral, mostly dead and dying trees for roosting. Anecdotal evidence

suggests that the Indiana bat may, in fact, respond positively to some degree of habitat disturbance. In northern Missouri, maternity roosts were found in areas that were heavily disturbed (Callahan 1993; Miller 1996). Timber harvest activities neither directly damaged known roosts nor discouraged bats from continuing to forage in an area that had been harvested in Illinois(Gardner *et al*., 1991*a*), and the species has been found roosting in shelterwood cuts in Kentucky (U.S. Fish and Wildlife Service 1999).

Analysis of landscape changes in Missouri, especially in the Ozarks provides strong, convincing evidence that Indiana bats evolved in an open to semi-open savanna-like environment, at least in the western part of the species' range (Marbut 1914; Sauer 1920; Schroeder 1981; Giessman *et al*. 1986; Ladd 1991; Nigh *et al.* 1992; Jacobson and Primm 1997). This is supported by the analysis conducted of several maternity sites by Romme *et al*. (1995) who found that most roosts were located in areas that had a canopy closure of 60 to 80%. Humphrey *et al.* (1977) hypothesized that roost trees were usually located in openings within the forest because they provided the necessary thermoregulatory characteristics.

Within the range of the species, the existence of Indiana bats in a particular area may be governed by the availability of natural roost structures, primarily standing dead trees with loose bark. The suitability of any tree as a roost site is determined by (1) its condition (dead or alive), (2) the quantity of loose bark, (3) the tree's solar exposure and location in relation to other trees, and (4) the tree's spatial relationship to water sources and foraging areas.

A number of tree species have been reported to be used as roosts by Indiana bats. These include: American beech (*Fagus grandifolia*), ashes (*Fraxinus* spp.), black gum (*Nyssa sylvatica*), black locust (*Robinia pseudo-acacia*), cottonwood, elms (*Ulmus* spp.), hickories (*Carya* spp.), maples (*Acer* spp.), oaks (*Quercus* spp.), pines (*Pinus* spp.), sassafras (*Sassafras albidum*), sourwood (*Oxydendrum arboreum*), sweet birch (*Betula lenta*), and yellow buckeye (*Aesculus octandra*) (Cope *et al*., 1974; Humphrey *et al*., 1977; Gardner *et al*., 1991*a, b;* Garner and Gardner 1992; Kurta *et al*., 1993*a*; Romme *et al*. 1995; Kiser and Elliott, 1996; Kiser *et al*., 1996; Kurta *et al*., 1996; MacGregor, in litt., September 3, 1996; Callahan *et al*., 1997; MacGregor in litt. April 14, 1997). Morphological characteristics of the bark of a number of trees make them suitable as roosts for Indiana bats; that is, when dead, senescent, or severely injured (e.g., lightning-struck) trees possess bark that springs away from the trunk upon drying. Additionally, the shaggy bark of some living hickories (*Carya* spp.) and large white oaks (*Quercus alba*) also provide roost sites. The most important characteristics of trees that provide roosts are not species but structure: exfoliating bark with space for bats to roost between the bark and the bole of the tree. The length of persistence of peeling bark varies with the species of tree and the severity of environmental factors to which it is subjected.

Occasionally, tree cavities or hollow portions of tree boles and limbs provide roost sites for Indiana bats (Gardner *et al*., 1991*a*; Kurta *et al*., 1993*b*). A crevice in the top of a lightning-struck tree (Gardner *et al*., 1991*a*), and splits below splintered, broken tree tops have also been used as roosts (U.S. Fish and Wildlife Service 1999).

Indiana bat maternity colonies use multiple roosts, in both dead and living trees. Exposure of roost trees to sunlight and location relative to other trees are important factors in suitability and use. Because cool temperatures can delay the development of fetal and juvenile young (Racey, 1982), selection of maternity roost sites may be critical to reproductive success. Dead trees with east-southeast and south-southwest exposures may allow solar radiation to effectively warm nursery roosts. Roosts in some species of living trees (e.g., shagbark hickory [*Carya ovata*]), on the other hand, may provide better protection from rain water and other unfavorable environmental conditions. Their greater thermal mass holds more favorable temperatures for roosting bats during cool periods (Humphrey *et al*., 1977).

Most roost trees used by a maternity colony are close together. The spatial extent and configuration of a colony's regular use area is probably determined by the availability of suitable roosts. The distances between roosts occupied by bats within a single maternity colony have ranged from just a few meters for nearest distance to another roost to several kilometers (km) and, in one case, five km for furthest distance between roosts (Callahan *et al*., 1997; U.S. Fish and Wildlife Service 1999). Miller (1996) compared habitat variables for sites in northern Missouri where surveys for Indiana bats had been conducted and noted that significantly larger trees [> 30 centimeters (cm) (12 in) diameter breast height (dbh)] were found where reproductively active Indiana bats had been netted, than at sites at where bats had not been captured.

Indiana bat maternity roosts can be described as "primary" or "alternate" based upon the proportion of bats in a colony occupying the roost site, and location in relation to forest canopy cover (Callahan *et al*., 1997; Kurta *et al.*, 1996). Maternity colonies have at least one primary roost (up to three have been identified for a single colony) that is used by the majority of the bats throughout the summer. Colonies also use multiple alternate roosts that are used by small numbers of bats intermittently throughout the summer (U.S. Fish and Wildlife Service 1999). Kurta *et al.* (1996) studied a maternity colony in northern Michigan over a three-year period and noted that roosting bats changed roost trees every 2.9 days and that the number of roosts used by the colony ranged from five to 18.

Primary roosts are located in openings or at the edge of forest stands, while alternate roosts can be in either the open or the interior of forest stands. Thermoregulatory needs may be a factor in roost site selection. Primary roosts are not surrounded by closed canopy and can be warmed by solar radiation, thus providing a favorable microclimate for growth and development of young during normal weather. Alternate roosts tend to be

more shaded, frequently are within forest stands, and are selected when temperatures are above normal or during periods of precipitation. Shagbark hickories seem to be particularly good alternate roosts because they provide cooler roost conditions during periods of high heat and their tight bark shields bats from the encroachment of water into the roost during rain events (Callahan *et al*., 1997). Roost site selection and use may differ between northern and southern parts of the species' range, but to date, such analyses have not been undertaken.

Because roost trees used by Indiana bat roosts are ephemeral, it is not possible to generalize or estimate roost longevity due to the many factors that influence it. Bark may slough off completely or the tree may fall over. Although roosts may only be habitable for one to two years under "natural conditions" for some tree species (Humphrey *et al*. 1977), others with good bark retention such as slippery elm, cottonwood, green ash (*Fraxinus pennsylvanica*), and oaks, may provide roosting habitat four to eight years (Gardner *et al*., 1991*a*; Callahan *et al*., 1997; U.S. Fish and Wildlife Service 1999). Hickories also retain bark well.

Indiana bats exhibit varying degrees of site fidelity to summer colony areas, roosts, and foraging habitat. Females have been documented returning to the same roosts from one year to the next (Humphrey *et al*., 1977; Gardner *et al*., 1991*a,b*; Callahan *et al*., 1997). Kurta *et al*. (1996), however, noted that individuals in a maternity colony in northern Michigan "were not highly faithful to a particular tree." In Illinois, male Indiana bats exhibited some site fidelity to summering areas that they had occupied during previous years (Gardner *et al*., 1991*b*).

The Indiana bat may be more adaptable with regard to roosts than previously believed. Humphrey *et al.* (1977) suggested that previously used summer roosts may be important to the reproductive success of local Indiana bat populations; that if these roosts are lost or unavailable, adult females may be faced with finding suitable maternity sites at a time when they are already stressed from post-hibernation migration and the increased metabolic energy costs of pregnancy. Others, (e.g., Kurta *et al*. 1996) however, have more recently noted that Indiana bats will use multiple roost sites within a maternity colony area. Bats move from one roost to another within a season, in addition to responding to changes in environmental conditions (temperature and precipitation), and when a particular roost becomes unavailable (Gardner *et al*., 1991*a*; Callahan *et al*., 1997). Thus, the species appears to be an adaptable animal that takes advantage of the ephemeral habitat available to it. Nonetheless, it is apparent that a variety of suitable roosts within a colony's occupied summer range should be available to assure the continuance of the colony in that area (Kurta *et al*., 1993*a*; Callahan *et al*., 1997).

3. <u>Fall and spring roosts</u>. Indiana bats use roosts in the spring and fall similar to those selected during the summer. During the fall, when Indiana bats swarm and mate at their

hibernacula, male bats roost in trees nearby during the day and fly to the cave during the night. In Kentucky, Kiser and Elliott (1996) found male Indiana bats roosting primarily in dead trees on upper slopes and ridgetops within 1.5 mi (2.4 km) of their hibernaculum. During September in West Virginia, male Indiana bats roosted within 3.5 miles (mi) (5.6 km) in trees near ridgetops, and often switched roost trees from day to day (U.S. Fish and Wildlife Service 1999). Fall roost trees more often tend to be exposed to sunshine rather than being shaded (U.S. Fish and Wildlife Service 1999).

Upon emergence from hibernation in the spring, some males remain within the vicinity of their hibernacula, where they roost and forage in mature forest; movements of 2.5 - 10 mi (4 - 16 km) have been reported in Kentucky, Missouri, and Virginia respectively (MacGregor, pers. commun., December 1998; Hobson and Holland, 1995; 3D/International, 1996). However, other males leave the area entirely upon emergence in the spring. Females dispersing from a Kentucky hibernaculum in the spring moved 4- 10 mi (6.4- 16 km) within 10 days of emergence (MacGregor, pers. commun., December 1998).

4. Foraging habitat and behavior. Indiana bats forage in and around tree canopy of flood plain, riparian, and upland forest. In riparian areas, Indiana bats primarily forage around and near riparian and flood plain trees (e.g., sycamore [*Platanus occidentalis*], cottonwood, black walnut [*Juglans nigra*], black willow [*Salix nigra*], and oaks), and solitary trees and forest edge on the flood plain (Belwood, 1979; Cope *et al*., 1974; Humphrey *et al*., 1977; Clark *et al*., 1987; Gardner *et al*., 1991*b*). Within flood plain forests where Indiana bats forage, canopy closures range from 30 to 100% (Gardner *et al*., 1991*b*). Cope *et al*. (1978) characterized woody vegetation with a width of at least 30 yards (~ 30 m) on both sides of a stream as excellent foraging habitat. Streams, associated flood plain forests, and impounded bodies of water (e.g., ponds, wetlands, reservoirs) are preferred foraging habitats for pregnant and lactating Indiana bats, some of which may fly up to 1½ mi (2.5 km) from upland roosts (Gardner *et al*., 1991*b*). Indiana bats also forage within the canopy of upland forests, over clearings with early successional vegetation (e.g., old fields), along the borders of croplands, along wooded fencerows, and over farm ponds in pastures (Clark *et al*., 1987; Gardner *et al*., 1991*b*).

The extent of foraging area used by an Indiana bat maternity colony has been reported to range from a linear strip of creek vegetation 0.5 mi (0.8 km) in length (Belwood, 1979; Cope *et al*., 1974; Humphrey *et al*., 1977), to a foraging area 0.75 mi (1.2 km) in length, within which bats flew over the wooded river or around the riverside trees (Cope *et al*., 1978). Indiana bats return nightly to their foraging areas (Gardner *et al*., 1991*b*). Indiana bats usually forage and fly within an air space from 6 - 100 ft (2 - 30 m) above ground level (Humphrey *et al*., 1977). Most Indiana bats caught in mist nets are captured over streams and other flyways at heights greater than 6 ft (2 m) (Gardner *et al*., 1989).

During summer, male Indiana bats that remained near their Missouri hibernacula flew cross-country or upstream toward narrower, more densely wooded riparian areas during nightly foraging bouts, perhaps due to interspecific competition with gray bats (*M. grisescens*). Some male bats also foraged at the edges of small flood plain pastures, within dense forest, and on hillsides and ridgetops; maximum reported distance was 1.2 mi (2 km) (LaVal *et al*., 1976; LaVal *et al.* 1977; LaVal and LaVal, 1980; MacGregor,). In Kentucky, MacGregor (pers. commun., December 1998) reported that the maximum distance males moved from their hibernaculum in the summer was about 2.6 mi (4.2 km). In the fall, male Indiana bats tend to roost and forage in upland and ridgetop forests, but also may forage in valley and riparian forest; movements of 1.8 - 4.2 mi (2.5 - 6.8 km) have been reported in Kentucky and Missouri (Kiser and Elliott, 1996; 3D/International, 1996; MacGregor, in litt. June 1997)."

Review of Endangered Species Information

The Indiana bat was listed as an endangered species on March 11, 1967. The Indiana bat is a migratory species ranging throughout much of the eastern half of the U.S. During winter, Indiana bats are restricted to suitable hibernacula, mainly caves, throughout the karst regions of the east-central U.S. More than 85% of the range-wide population occupies nine Priority One hibernacula (hibernation sites with a recorded population greater than 30,000) in Indiana, Kentucky, and Missouri. Priority Two hibernacula (hibernation sites with a recorded population greater than 500 but less than 30,000) are known from the aforementioned states, in addition to Arkansas, Illinois, New York, Ohio, Tennessee, Virginia, and West Virginia. Hellhole in Pendleton County, West Virginia, is a Priority Two cave with a winter (1999) population of approximately 9,000 bats. Hellhole is officially designated Critical Habitat by the Service. Priority Three hibernacula (less than 500) are known from 17 states. The limestone region of West Virginia in Preston, Tucker, Randolph, Pendleton, Pocahontas, Greenbrier, Monroe and Mercer Counties has approximately 25 Priority Three hibernacula ranging from one to 240 Indiana bats.

Reasons for Decline and Continued Threats

At the present time, the Indiana bat is in sharp decline throughout its range. The reason for the current rate of decline is not known, however, several known human-related factors of the past are probably not responsible. However, based on hibernacula counts, the West Virginia population has increased significantly, more than doubling since about 1980 (USFWS, 1999).

A major cause of Indiana bat decline in the past has been human disturbance during hibernation. Bats enter hibernation with only enough fat reserves to last until spring. If bats are aroused during hibernation, stored fat reserves are used. If disturbance is too frequent fat reserves may be exhausted before the bats are able to forage in the spring and stress or starvation may occur. Indiana bats are more prone to disturbance than most species of bats due to their behavior of

forming large clusters during hibernation. Vandalism in the past has also been a factor. Other factors responsible for Indiana bat declines include: improperly constructed gates modifying cave microclimate, natural hazards resulting in drowning or freezing, destruction of maternity habitat, and chemical contamination (USFWS, 1999).

Environmental Baseline

In the spring, Indiana bats emerge from their hibernacula and utilize cavities, splits or the loose or exfoliated bark of live or dead trees for roosting. Despite a vigorous mist netting effort covering most of West Virginia, no female Indiana bats have been discovered in West Virginia between May 15 and August 15. Through the summer of 2000, approximately 4,210 bats have been captured across West Virginia, especially in the vicinity of the MNF. To date, the best evidence that reproduction of Indiana bats is taking place in West Virginia, is the capture of an immature male Indiana bat in 1999 under a bridge near Richwood in Nicholas County before August 15. A lactating female Indiana bat was reported by Patrick D. Keyser of Westvaco Corporation as having been captured in a mist net on their Experimental Forest in southwestern Randolph County on July 11, 1999. Numerous authorities on the taxonomy of the Indiana bat concluded that identification of the bat was inclusive, based on photographs and its small measurements. Therefore, evidence is inconclusive as to whether female Indiana bats migrate from their hibernacula and utilize any part of West Virginia to bear and rear their offspring. This suggests that if reproduction/maternity use is occurring in West Virginia it is doing so at an extremely low, non-detectable level.

A WVDNR study conducted in 1995 found that male Indiana bats stay in the vicinity of Big Springs Blowing Cave during the summer and fall, and that females, returning from their maternity areas (presently unknown), joined the males after August 15. It was concluded that the FEF was not being used as a maternity area. A total of 1,054 bats of nine species were captured in the vicinity of Big Springs Blowing Cave. A total of 69 Indiana bats were captured during the study, of which five were females. In addition, the WVDNR conducted a telemetry study of four male Indiana bats on the FEF in 1997. Both living and dead trees were selected by the Indiana bats for day roosting. These included northern red oak, red maple, black cherry, yellow poplar, shagbark hickory, white ash, and slippery elm.

While a number of male Indiana bats have been captured or observed in the vicinity of the hibernacula in the summer, only two males have been captured away from the swarming areas. These include the aforementioned immature male near Richwood and an adult male in the Lilly Fork Watershed of Clay County.

Effects to the Indiana bat are analyzed at the level of the entire state of West Virginia and within important biological areas called “Zones of Immediate Concern”(ZIC). ZICs are areas where the Service assumes presence of the Indiana bat. As a result, direct take is more of a concern for projects within a ZIC. The following table describes the size of various ZICs and the time of year Indiana bat presence is assumed:

Zones of Immediate Concern(ZIC)
Zones of Immediate Concern(ZIC)

	Hibernacula ZIC	Maternity Site/Roost Tree ZIC	Summer Capture Location ZIC
Radius of Concern	5-mile	2-mile	2-mile
Assumed Presence	April 1-November 15	May 15-August 15	May 15-August 15

Although it varies from year to year, there are presently approximately 26 known hibernacula spread across the cave/karst regions of eastern West Virginia. These range in size from one to approximately 9,000 Indiana bats. As mentioned earlier, an approximate five-mile radius of a hibernaculum is important foraging and roosting habitat for the Indiana bat during the non-hibernating period, especially in the fall swarming period. Approximately 11 hibernacula, including Hellhole, are located within the Proclamation Boundary of the MNF. However, only three caves: Big Springs Blowing Cave, Cave Hollow/Arbogast Cave, and Two Lick Run Cave have all or most of their entrances on the MNF.

Big Springs Blowing Cave is located on the FEF in Tucker County and during the winter of 2000/2001, 240 Indiana bats hibernated in the cave. Two Lick Run Cave, located in northern Randolph County on the east side of the Shavers Fork River, had a small hibernating population in the winter of 1999/2000 of only three Indiana bats. Cave Hollow/Arbogast Cave system had a hibernating population of 103 Indiana bats in the winter of 2000/2001 (Stihler, pers. comm., 2001).

Effects of the Action

The proposed action is the continued implementation of the 1986 Forest Plan, as amended, on approximately 909,410 acres of the MNF, as amended, and projects predicated upon it. The basic categories of management activities include: timber management (regeneration harvest, thinning and single tree selection, and timber stand improvement), prescribed fire, firewood cutting, gypsy moth control, road construction/reconstruction, recreation, wildlife habitat improvement, fisheries improvement, range, mineral activity and landownership adjustments.

Management activities involving significant tree removal activities will not exceed 6,125 acres on the MNF annually. These management activities include: 6,000 acres for timber management, 47 acres for road construction/reconstruction, and 78 acres for mineral development. Tree removal during the non-hibernation period (April 1 - November 14) may result in mortality (take) of an individual roosting Indiana bat, if a tree that contains a roosting bat is removed intentionally or felled accidentally. If a bat using a roost tree that is removed is

not killed during the removal, the roosting bat would be forced to find an alternative tree, potentially expending a significant amount of energy that would result in harm or harassment of the individual. This also constitutes take.

Prescribed burning will not exceed 300 acres. Prescribed burning may result in burning of occupied roost trees outside of the hibernation period (November 15 - March 31). Smoke generated during prescribed burns could also cause roosting bats harm or death. Burning may cause an individual roosting bat to abandon a traditionally used roost tree.

However, implementation of the terms and conditions associated with the reasonable and prudent measures provided below by the Service, will minimize direct adverse effects to the Indiana bat by maintaining suitable Indiana bat roosting and foraging habitat and protecting Indiana bats from the potential effects of timber harvest and prescribed burning.

Cumulative Effects

Cumulative effects include the combined effects of any future State, local, or private actions that are reasonably certain to occur within the action area covered in this BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Future Federal, State, local and private actions that are reasonably certain to occur within the Action area, i.e., the MNF, will either be carried out by, or will require a permit from, the Forest Service. These actions will therefore require a Section 7 consultation. The Service is not aware of any future State, local, or private actions that could occur within the action area that would not be subject to a Section 7 review. Therefore, cumulative effects, as defined in the ESA, are not expected to occur within the action area and will not be addressed further in the BO.

Conclusion

After reviewing the current status of the Indiana bat, the environmental baseline of the action area, and the anticipated effects of the continued implementation of the 1986 Forest Plan, as amended, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Indiana bat. Critical habitat has been designated for this species, however none will be affected by the proposed action.

Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA, prohibit the take of endangered and threatened species, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly

impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of

Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the MNF so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption of Section 7(o)(2) to apply. The MNF has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the MNF (1) fails to assume and implement the terms and conditions, or (2) fails to require an applicant to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the MNF must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement, pursuant to 50 CFR § 402.14(i)(3).

Level of Take

The Service anticipates that incidental take of Indiana bats as a result of the continued implementation of the 1986 Forest Plan, as amended, will be difficult to quantify and detect, due to the bat's small body size, widely dispersed individuals under loose bark or in cavities of trees, and unknown areal extent and density of their summer roosting population range within the MNF. However, any incidental take of Indiana bats is expected to be in the form of killing, harming, or harassing. Tree removal during the non-hibernation season may result in mortality to individually roosting Indiana bats. Prescribed burning may result in burning of occupied roost trees outside of the hibernation period (April 1 - November 14). Smoke generated during prescribed burns could also cause roosting bats discomfort or death. Burning may cause an individual roosting bat to abandon a traditionally used roost tree.

Monitoring to determine take of individual bats within an expansive area of forested habitat is a complex and difficult task. Unless every individual tree that contains suitable roosting habitat is inspected by a knowledgeable biologist before management activities begin, it would be impossible to know if a roosting Indiana bat is present in an area proposed for harvest. It would also be impossible to evaluate the amount of incidental take of Indiana bats unless a post-harvest inspection is immediately made of every tree that has been removed or disturbed. Inspecting individual trees is not considered by the Service to be a practical survey method and is not recommended as a means to determine incidental take. However, the areal extent of potential

roosting habitat affected can be used as a surrogate to monitor the level of take. Although, to the best of our knowledge, no individually roosting Indiana bats have been incidentally taken to date on the MNF during tree removal or other habitat modifying activities, the possible removal of undiscovered occupied roost tree(s) may result in incidental take of this species. The Service believes that if roosting individuals are present in an area proposed for timber harvest or other disturbance, loss of suitable roosting habitat could result in incidental take of Indiana bats. However, implementation of the terms and conditions associated with the reasonable and prudent measures provided below by the Service, will significantly reduce the potential of incidental take.

This incidental take statement anticipates the taking of an unquantifiable number of Indiana bats from tree removal activities and prescribed burning occurring outside of the hibernation period April 1 - November 14 on the MNF. Tree removal activities include: timber harvest on 6,000 acres, road construction/reconstruction on 47 acres, and mineral development on 78 acres. Therefore, the incidental take statement is based on the tree removal activities occurring on a maximum of 6,125 acres annually and prescribed burning on a maximum of 300 acres annually.

Since the level of incidental take of Indiana bats cannot be adequately determined, incidental take will be anticipated by the loss or abandonment of roost trees occupied by Indiana bats that are contained within the 6,125 acres of trees removed annually and the 300 acres of prescribed annual burning outside of the hibernation period. However, implementation of the terms and conditions associated with the reasonable and prudent measures will reduce the impact of the potential for incidental take. Management activities on the MNF that would increase the number of acres of tree removal or burning during the non-hibernation season would be considered to affect this determination and would require reinitiation of formal consultation.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to further minimize the level of incidental take of Indiana bats on the MNF.

1. Proposed management activities shall be planned, evaluated, and implemented consistent with measures developed to protect the Indiana bat and to reduce adverse impacts from the removal of potentially occupied roost trees and prescribed burns.

2. The Forest Service shall continue to monitor the status of the Indiana bat on the MNF , especially during the non-hibernating season.

3. The Forest Service shall monitor tree removal activities and prescribed burning on the MNF to determine whether mitigation measures to protect the Indiana bat, and the terms and conditions of the BO are being implemented as required.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, the Forest Service must comply with the following terms and conditions. These terms and conditions are non-discretionary.

1. Protect swarming areas (5-mile radii around hibernacula) by establishing management areas and prescriptions that emphasize Indiana bat and allow for activities compatible with Indiana bat management.

2. Each year, report quarterly to the Service the cumulative amount of acres involved in tree removal and prescribed burning.

3. Retain all shagbark hickory trees in cutting units except where public safety concerns exist.

4. Monitor snag retention in cutting units. If there exists an average of less that 6 snags/acre, manually create additional snags.

5. Continue to seek maternity sites and evidence of summer use on the MNF on a watershed basis using survey methods and frequencies that follow guidelines and protocols established by the Service, in consultation with the Service and the WVDNR.

6. Protect all known roost trees on the MNF until such time as they no longer serve as roost trees (e.g., loss of exfoliating bark or cavities, blown down or decay).

7. Where evidence of possible maternity colonies (lactating females or juveniles prior to August 15) is discovered, a temporary 3-year, 2-mile radius buffer will be established around the discovery site. Continue to search for actual maternity colonies within a 2-mile radius of the site through mist netting and radio telemetry for a period of 3 years following the discovery.

8. If monitoring activities result in the discovery of maternity sites on the MNF, roost trees used by a maternity colony will be protected by establishing a zone centered on the maternity roost site. The actual area, not to exceed a 2-mile radius around the colony, will be determined by a combination of topography, known roost tree locations, proximity of permanent water, and a site-specific evaluation of the habitat characteristics associated with the colony. Protective measures shall be established by developing a management strategy in cooperation with the Service and the WVDNR.

9. If any new Indiana bat hibernacula are discovered, the MNF shall develop an appropriate protection plan, which could include signs, fences, or gates.

10. Projects on the MNF may proceed without formal consultation if they occur during the

hibernation period or if site-specific projects proposed for implementation during the non-hibernation period are surveyed for Indiana bats according to protocols established by the Service, and no Indiana bats are detected. When Indiana bats are not detected, it will be assumed that the bats may be present, but in such low numbers that the project is not likely to adversely affect the bat. However, mist netting can not be used in the ZICs, (5-mile radius of a hibernaculum or within a 2-mile radius of a maternity colony/roost tree or capture site). Projects cleared by mist netting must be completed within three years of the netting. Project acres cleared during the hibernation period or cleared outside of the hibernation period through negative mist net results do not count against the annual allowable acres permitted under the programmatic incidental take statement.

11. To ensure that the exemption of incidental take is appropriately documented, the Service will implement a tiered programmatic consultation approach. As individual projects are proposed under the Forest Plan, the MNF shall provide project-specific information to the Service that (1) describes the proposed action and the specific area to be affected, (2) identifies the species that may be affected, (3) describes the manner in which the proposed action may affect listed species, and the anticipated effects, (4) specifies that the "anticipated effects from the proposed project are similar to those anticipated in the programmatic BO", (5) a cumulative total of take that has occurred thus far under the tier I BO, and (6) describes any additional effects, if any, not considered in the tier I consultation.

    The Service will review the information provided by the MNF for each proposed project. If it is determined during this review that a proposed project is not likely to adversely affect listed species, the Service will complete its documentation with a standard concurrence letter that refers to this BO, the tier I programmatic document (i.e., it "tiers"to it), and specifies that the Service concurs that the proposed project is not likely to adversely affect listed species or designated critical habitat. If it is determined that the proposed project is likely to adversely affect listed species or designated critical habitat, then the Service will complete a tier II BO with a project-specific incidental take statement within the annual allotted programmatic incidental take.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. To achieve this goal, the Service recommends the following conservation measures to the MNF.

1. Develop an outreach program specifically directed towards eastern woodland bat species and their conservation needs. The program would target federal, state, and private foresters, land managers and the general public.

2. Retain or create road ruts during log road abandonment, where appropriate, to provide additional sources of drinking water for forest bats.

In order for the Service to be kept informed of actions to minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations, including but not limited to those specified above.

Reinitiation of Formal Consultation

This concludes formal consultation on the continued implementation of the 1986 Forest Plan, as amended, on the MNF. As required by 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this BO; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this BO; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease, pending reinitiation.

The Service appreciates the opportunity to work with the Forest Service in fulfilling our mutual responsibilities under the Endangered Species Act. If you have any questions, please have your staff contact our Endangered Species Specialist, Mr. William Tolin or contact myself directly at (304) 636-6586, or at the letterhead address.

Sincerely,

Jeffrey K. Towner
Field Supervisor

Literature Cited

U.S. Fish and Wildlife Service. 1999. Agency draft Indiana Bat (*Myotis sodalis*) revised recovery plan. 53pp.

U.S. Fish and Wildlife Service. 2000. Biological opinion on the impacts of research activities to the Indiana bat on the Fernow Experimental Forest in Tucker County, West Virginia. Region 5, West Virginia Field Office. 18pp

cc:
Monongahela FS - Cooke
Monongahela FS - Adams
PAFO - Densmore
WVDNR - Taylor/Sargeant
Readers file
Project file
ES:WVFO:Tolin:skd
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