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Environmental Assessment for Amendment to Hoosier National Forest Land and Resource Management Plan for Threatened and Endangered Species

Brown, Crawford, Dubois, Jackson, Lawrence, Martin, Monroe, Orange, and Perry Counties, Indiana

Hoosier National Forest

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Abstract: The proposal involves modifying management direction for the protection of Federally threatened and endangered species known to occur on the Hoosier National Forest.

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Preface

In 1991, the Hoosier National Forest completed a comprehensive land management planning effort with the publishing of the *Hoosier National Forest Land and Resource Management Pl*an (*Forest Plan*), which modified the 1985 *Forest Plan* with a significant amendment. During the planning, we made a concerted effort to seek out public involvement. With the public's help, we identified issues and alternative approaches to management of the Hoosier National Forest. An environmental impact statement (EIS) was prepared in conjunction with the *Forest Plan* to document the analysis. We developed the EIS in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations for implementing NEPA.

The Record of Decision for the final EIS, approved on April 8, 1991 (USDA FS 1991c), represents the first level of decisionmaking related to land and resource management planning. This decision determined the desired future condition of the Hoosier National Forest and established the guidance under which we plan and implement projects.

This environmental assessment (EA) for Plan Amendment 7, Federally threatened and endangered species, documents the environmental effects of amending the 1991 *Forest Plan*. The Hoosier National Forest is proposing to change the management guidelines for Federally threatened and endangered species to assume and implement the terms and conditions provided by the USDI Fish and Wildlife Service. We will employ these standards and guidelines in future site-specific decisions. We initiated this EA to summarize the environmental analysis of the proposed amendment in accordance with NEPA procedures. In it we outline the alternatives for implementing the plan amendment and predict the relevant environmental consequences. The procedures provided interested and affected members of the public the opportunity to participate.

The second and final level of decisionmaking focuses on the analysis and implementation of management practices and projects designed to achieve the goals and objectives of the *Forest Plan*, as amended, in response to site-specific resource needs and situations. This programmatic document provides guidance for such management practices and projects. We will ensure that future projects are consistent with the amended *Forest Plan* and that their planning conforms to NEPA and CEQ regulations, as well as other laws, regulations, and policies.

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Environmental Assessment
Forest Plan Amendment 7

Introduction

The primary responsibility of the USDA Forest Service is to provide healthy, sustainable ecosystems for Americans, present and future. The Hoosier National Forest (Hoosier NF, the Hoosier, or the Forest) manages various resources to sustain the vitality and diversity of the forest and provide many benefits for both humans and ecosystems. This proposal implements the USDA Forest Service natural resource agenda (USDA Forest Service 1998), as it is consistent with sustainable forest management, would protect the natural resources under our stewardship, and would also foster and promote conservation.

This environmental assessment (EA) displays the direct, indirect, and cumulative effects of the proposed Federal action (the proposed amendment), one alternative to the proposed action, and a no action alternative. This project proposes to change the management guidelines on the Hoosier NF for Federally threatened and endangered species by incorporating the terms and conditions of the July 31, 2001 USDI Fish and Wildlife Service's biological opinion of continued implementation of the Hoosier NF *Forest Plan* (USDI FWS 2001).

The purpose of this environmental assessment is to identify and disclose for the decision maker and the public the environmental, social, and economic effects of the proposed action and the other alternatives. The proposed action in this case is to amend the *Forest Plan* (USDA FS 1991b) to incorporate new information and management direction for certain threatened and endangered species.

The Hoosier NF, located in southern Indiana, is the only national forest in Indiana. National Forest System (NFS) lands are located in the following nine counties: Brown, Crawford, Dubois, Jackson, Lawrence, Martin, Monroe, Orange, and Perry.

Purpose of the Proposed Action

The purpose of this project is to add protection measures for the Indiana bat (*Myotis sodalis*) and its habitat by amending the current *Forest Plan* (USDA FS 1991b*)*. This includes incorporating new management guidance for Federally listed threatened and endangered species. We need these additional measures because new information has indicated that some management activities could affect Indiana bat. This awareness led to the development of a Forest Service *Programmatic Biological Assessment for the Hoosier National Forest Land and Resource Management Plan* (Biological Assessment) (USDA FS 2000) and USDI Fish and Wildlife Service *Biological Opinion of the Hoosier National Forest Land and Resource Management Plan* (Biological Opinion) (USDI FWS 2001). This *Forest Plan* amendment would amend portions of Chapter 2 and Appendix C, including the incorporation of terms and conditions from the biological opinion.

Need for the Proposed Action

When new information or research findings become available regarding resources for which the Hoosier has a stewardship obligation, we are required to analyze the relationship of this information with the existing *Forest Plan* (USDA FS 1991b) and, if needed, amend the *Forest Plan* to keep it current and

consistent. The proposed *Forest Plan* amendment would minimize the likelihood of incidental take of Indiana bat in the course of the Hoosier NF implementing otherwise lawful management activities.

The clarifying direction in the proposed amendment to the *Forest Plan* would help the Hoosier NF carry out responsibilities under the Endangered Species Act. This analysis addresses adding new protection measures and management guidelines for threatened and endangered species to those already in the *Forest Plan*. It is not a reauthorization of the entire *Forest Plan* (USDA FS 1991b).

The Hoosier NF prepared a programmatic Biological Assessment to evaluate the effects of ongoing management practices on four Federally listed species known to occur on the Hoosier NF. The Biological Assessment also evaluated the effects on the same species of management activities to implement the *Forest Plan* anticipated to occur in the next five years. Once the Biological Assessment was completed, the Hoosier NF presented it to the Fish and Wildlife Service on April 17, 2000 and requested formal consultation. The Biological Assessment concluded, "…continued implementation of the *Forest Plan* may affect – likely to adversely affect individual Indiana bats using the Hoosier National Forest." The biological assessment also made a "may affect, not likely to adversely affect" determination, since continued implementation of the *Forest Plan* would provide beneficial effects to Indiana bat habitat (USDA FS 2000).

The Fish and Wildlife Service reviewed the Biological Assessment and on July 31, 2001 issued its Biological Opinion, which stated, "…continued implementation of the existing Hoosier National Forest Land and Resource Management Plan is not likely to jeopardize the continued existence of the Indiana bat" (USDI FWS 2001). The cover letter for the Biological Opinion included the following: "The Service concurs with your finding that the continued implementation of the Hoosier National Forest Land and Resource Management Plan, as amended, and projects predicated upon it will not adversely affect the gray bat (*Myotis grisescens*), bald eagle (*Haliaeetus leucocephalus*), and fanshell (*Cyprogenia stegaria*)." The biological opinion did not include the pink mucket pearly mussel (*Lampsilis abrupta = L. orbiculata)* because "species experts believe, and the Service concurs, that the mussel is extirpated from within the proclamation boundary of the Hoosier National Forest" (USDI FWS 2001).

In addition to reasonable and prudent measures and terms and conditions for Indiana bat, the Biological Opinion contains conservation recommendations. Conservation recommendations are not mandatory, but are suggested actions that can aid in the conservation of threatened and endangered species. To the extent that time, funding, and circumstances allow, the Hoosier NF conservation efforts will include the conservation recommendations outlined in the Biological Opinion.

The Hoosier NF has developed a conservation plan for the Federally listed species known to occur on the Forest. The Hoosier NF's conservation plan is the *Forest Plan,* including Appendix C, which this proposed amendment would supplement. The conservation plan clarifies certain aspects of the Hoosier NF's efforts to fulfill its responsibilities for conservation of threatened and endangered species as required by section 7(a)(1) of the Endangered Species Act.

Proposed Action

The Hoosier NF is proposing to amend the current Hoosier National Forest Land and Resource Management Plan (*Forest Plan*) (USDA FS 1991b). This proposed Federal Action would amend the existing *Forest Plan* Goals and Appendix C to incorporate new management guidance for Federally listed threatened and endangered species.

The text of the amendment is included in the description of Alternative A, the proposed action.

Mitigation Measures Included in the Proposed Action

Because the proposed action is programmatic and involves no on-the-ground activities, there is no action to be mitigated. Therefore, we have suggested no mitigation measures for the proposed action. When individual projects are proposed, we will complete site-specific analysis and include any mitigation measures needed for the specific action.

In a different sense, the proposed action is to adopt certain mitigation measures for the Indiana bat and incorporate them into the *Forest Plan* to ensure that project planning and implementation include them.

Decision to be Made

The decision maker is the Forest Supervisor of the Hoosier National Forest. Given the purpose and need, the Forest Supervisor reviews the proposed action, the other alternatives, and the environmental consequences to make the following decisions.

The decision the Forest Supervisor will make is whether to amend the *Forest Plan* as proposed, select an alternative amendment, or leave the *Forest Plan* as it is now. The decision revolves around whether or not to incorporate the reasonable and prudent measures and terms and conditions from the Biological Opinion into the current *Forest Plan*. In addition, the decision will determine whether or not to incorporate into the *Forest Plan* other paragraphs clarifying direction related to threatened and endangered species.

The scope of the decision is confined to a reasonable range of alternatives aimed at amending the *Forest Plan* to respond to the new information referred to in the Need for the Proposed Action.

Forest Plan Background

This proposed amendment is in accordance with the intent of the *Forest Plan,* including direction on page C-1 (USDA FS 1991a); the requirements of 36 CFR 219.8; 36 CFR 219.13; and Forest Service Manual 1922. The Hoosier NF adopted the *Forest Plan* to meet the requirements of the National Forest Management Act (NFMA) of 1976. The proposed amendment, being programmatic in nature, provides overall guidance for managing the Hoosier NF rather than for implementing a specific project at a particular location. An interdisciplinary team (ID team) will conduct further environmental analysis for subsequent site-specific projects that implement the *Forest Plan*.

The *Forest Plan* is not a list of mandatory activities that must be carried out during the planning period. The *Forest Plan* does not authorize, fund, or carry out any project activity. It merely provides the framework for future activities that will move conditions on the national forest toward its desired condition (described for each Management Area in the *Forest Plan*). *Forest Plan* management direction and guidance are simply constraints on future management proposals.

Relationship to Other Documents and Laws

This document incorporates by reference the *Forest Plan* and tiers to the draft (USDA FS 1990) and final (USDA FS 1991a) EISs for the *Forest Plan*. The legal background and authority for forest plan amendments is found in the Forest and Rangeland Renewable Resources Planning Act of 1974 as

amended by NFMA, implementing regulations found in 36 CFR Part 219.10(f), NEPA, and implementing regulations found in 40 CFR 100-1508. Direction specifying who is responsible and why and how to amend a forest plan is found in Forest Service Manual 1922 and Forest Service Handbook 1909.12 Chapter 5.

The Forest Supervisor is the authority in determining whether amendments are significant or not significant (36 CFR 219.6 and 36 CFR 219.10). The Forest Supervisor followed these procedures and determined that this is not a significant amendment to the *Forest Plan* because it does not meet both of the required definitions of significance found in Forest Service Manual 1922.5.

The term "significant" as it pertains to a forest plan amendment is not the same as "significant" in the context of addressing environmental effects in a NEPA analysis—as might be found in the language of a site-specific project EA. "Significant," as it pertains to a forest plan amendment, gauges the impact of a proposed change to a forest plan. To meet the definition of significant, an amendment should meet the following criteria found in Forest Service Manual (FSM) 1922.5:

(1) Substantially alter the long-term relationship between the outputs of multiple-use goods and services (i.e., wildlife habitat, recreational opportunities, timber products) originally projected;
(2) And have an important effect on the entire forest plan or affect the land and resources throughout a large portion of the planning area during the planning period.

This amendment does not meet the criteria for significance in items (1) and (2) above.

(1) The effects section of this EA discloses that there are no substantial effects or substantial changes expected to any of the outputs of the multiple-use goods and services originally projected by the *Forest Plan* by any of the alternatives being analyzed.
(2) Although the amendment is important, its effects are primarily limited to the threatened and endangered species addressed. The actual effect on the entire *Forest Plan* would be minimal. Although there would be effects across the Hoosier NF, they would be almost unnoticeable and generally not measurable, would be dispersed very thinly across portions of the forest, and would occur mostly on a small percentage of the total acreage--such as acres with shagbark or shellbark hickory trees where some of them might otherwise have been removed.

As defined in FSM 1922.5, nonsignificant amendments can result from any one of the following:

(1) Activities that do not significantly alter the multiple-use goals and objectives in the long term.
(2) Adjustments to management area boundaries and prescriptions based on further onsite analysis.
(3) Minor changes to standards and guidelines.
(4) Additional management practices that will contribute to achievement of management prescriptions.

The amendment meets the criteria for a nonsignificant amendment listed above in (1) and (3).

The Hoosier NF has experience with other *Forest Plan* amendments. The environmental analyses found no significant effects for these amendments. The six amendments have been:

- Amendment 1 – Off-road Vehicle Use Areas (April 3, 1987)
- Amendment 2 – *Forest Plan* Amendment (April 8, 1991), significant *Forest Plan* amendment
- Amendment 3 – Revised Charles C. Deam Wilderness Guidance (July 1, 1994)
- Amendment 4 – Revised Forest-wide Trail Management Guidance outside of the Charles C. Deam Wilderness (July 1, 1994)
- Amendment 5 – Special Areas (November 22, 2000)
- Amendment 6 – Otter Creek Wetland (September 13, 2001)

This amendment complies with the Record of Decision for the Forest Plan Amendment signed April 8, 1991 (USDA FS 1991c).

Other Projects

The environmental effects section contains a list of activities (Table 2) estimated to occur in the next five years to implement the *Forest Plan*. The 1991 draft EIS for the *Forest Plan* disclosed the effects of such activities. Other activities and trends are noted in the cumulative effects sections.

Issues Related to the Proposed Action

The interdisciplinary (ID) team identified issues and management concerns related to the proposed action by reviewing *Forest Plan* direction and public input, as well as input from Forest Service personnel.

On December 14, 2001, we sent a request to approximately 1,340 persons and organizations for comments about the proposed action. The letter contained proposed changes in the *Forest Plan* that would incorporate the terms and conditions from the Biological Opinion.

We identified specific comments, issues, and concerns from written letters, telephone calls, and personal contacts. Appendix A lists the names of groups and individuals who responded. The interdisciplinary team reviewed all letters and records of phone calls to identify concerns specific to the proposed action. Appendix A documents and summarizes concerns in these letters and phone calls.

Issues are statements of discussion, dispute, or debate that represent points of unresolved conflict regarding specific environmental effects of the proposed action. We analyzed the public issues, along with the issues identified by the interdisciplinary team, for their significance to the proposed action. Issues determined to be key issues are those that have wide geographic extent, may have long-term effects, or have a high level of interest or resource conflict. The ID team used the key issues to develop alternatives to the proposed action or to determine the appropriate level of analysis for the environmental effects of the alternatives.

We have not considered as key issues those that have already been decided by existing laws or by previous decisions at a higher level. We have not considered as key issues those not relevant to the decision to be made and those based on conjecture rather than scientific evidence. We have also not considered as key issues those issues that have little geographic extent, have short-term effects, and are not highly controversial.

The ID team identified two key (or significant) issues from public comments and internal comments and identified an additional key issue in response to an alternative that the team created. The key issues served as a basis for evaluating the alternatives, including the proposed action, and they were also used to organize and assess environmental consequences.

Nonsignificant Issues and Concerns (Not Studied in Detail)

The Forest Supervisor determined that several issues were not significant on this project. The CEQ NEPA regulations state in Sec. 1501.7: "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review…." With the assistance of the ID team, the Forest Supervisor identified as nonsignificant those issues that were:

- outside the scope of the proposed action;
- already decided by law, regulation, *Forest Plan*, or other higher level decision;
- irrelevant to the decision to be made; or
- conjectural and not supported by scientific or factual evidence.

There are two other reasons why various resource concerns are not candidates to be significant issues related to this particular proposal. First, the programmatic nature of the proposed *Forest Plan* amendment does not prescribe any on-the-ground activity, so there is limited opportunity for environmental effect. Secondly, the draft EIS for the *Forest Plan* disclosed the effects of activities to implement the *Forest Plan* (USDA FS 1990*)*. In the intervening years our knowledge of Indiana bat is the only circumstance related to natural resources on the Hoosier NF known to have changed appreciably in character, as opposed to changes such as forest growth. See also the responses to scoping comments in Appendix A.

Air Quality is not an issue with this proposed action, as this is a programmatic proposal and there is no action proposed that would affect air quality. The Biological Opinion contains no terms and conditions that could have any effect on air quality. Air quality would remain unchanged with any of the alternatives.

Recreation is not a significant issue because the proposed action and the alternatives to it would do nothing that would affect developed or dispersed recreation. There are no actions proposed in the amendment, only limited restrictions on some future management activities. None of the alternatives would affect campgrounds, trails, maintenance of or access to them, opportunities for hiking and other recreational pursuits, or other aspects of recreation on the Forest. We would not expect any of the provisions contained in the alternatives to affect the Recreation Opportunity Spectrum classification for any area.

Visual quality is also not a significant issue, as no action of any alternative would cause a change in the character of the visual landscape. If the terms of the Biological Opinion were implemented, some small areas on the ground would eventually assume a somewhat different appearance, such as a few more large trees or snags, but the general appearance, visual character, and visual quality classifications of land areas on the Hoosier NF would remain unchanged.

No significant issues are associated with **minerals** or **special uses** since they would be unaffected by either the changed wording in the *Forest Plan* or the alternatives to the proposed action. Implementing any of the alternatives would not affect these programs and land uses. The alternatives would also not affect the **land adjustment program**. None of the alternatives proposes any action that would significantly change the general direction or emphasis of the land adjustment program. **Transportation systems** would be unaffected by any of the alternatives.

Any alternative would have no or very negligible effects on the **socio-economic** environment (see the Forest Resource Management section of the Environmental Effects chapter for more specific information related to the economics for timber harvest operators). Neither the proposed action nor the alternatives to it would disturb soils or remove trees. Because the programmatic proposal is to limit and restrict tree removals, there would be no effect on any **heritage resources**. Any future project level activities will be assessed to determine if they constitute an "undertaking" according to the National Historic Preservation Act of 1966, as amended. If an undertaking exists, the archeologists will identify the effects on heritage resources during the National Environmental Policy Act process (Krieger 2002).

The alternatives would also not affect **public health and safety.** There is no issue related to health or safety. **Special areas** are those land areas considered unique by law or classification. Examples of these are wilderness, scenic areas, geologic areas, and research natural areas**.** We evaluated each area, and none of the alternatives would have any appreciable direct, indirect, or cumulative effects on any of them.

The proposed action and alternatives to it would also have no effect on **parklands** or any **prime farmlands**. There is no reason to suspect that there is any issue associated with parklands or farmlands. The Hoosier implements few activities in **wetlands**, and nothing in any of the alternatives would affect those lands; therefore there are no significant issues associated with wetlands and no effects on them.

There are no **wild and scenic rivers** on the Hoosier and no significant issues relating to that subject.

Significant Issues

We defined as significant those issues directly or indirectly caused by implementing the proposed action. After consideration of public and internal input and discussion about possible consequences of the proposed action and the alternatives, the ID team identified the following as significant issues.

Issue 1: Removal of Trees during the Reproductive Season of Indiana Bat

Some people are concerned about cutting and removing trees during the summer season when Indiana bats may be present. April 15 through September 15 is considered the reproductive season for Indiana bat, so the underlying issue is the effect of actions such as timber harvesting on Indiana bat. The population of the bat in Indiana has risen in many recent years, but the most recent tabulated census showed the population had decreased slightly. Foraging habitat is a concern, as is disturbance, but a major concern is the potential for inadvertently removing a tree while one or more Indiana bats are present. We expect that doing so would result in at least injury to the bats and could quite possibly result in mortality.

The appropriate measure is whether an alternative would allow the possibility of removing a tree while an Indiana bat is roosting in it.

Issue 2: Compliance with National Forest Management Act

Failure to amend the *Forest Plan* to incorporate the terms and conditions of the Biological Opinion would leave the Hoosier NF in the existing position of having wording in the *Forest Plan* that is not consistent with the Biological Opinion. The proposed amendment would provide direction concerning conservation of threatened and endangered species occurring in the area of the Forest. Bringing the *Forest Plan* and the Biological Opinion into agreement would allow the Hoosier to comply with direction in NFMA to base national forest management on an approved forest plan while also complying with the reasonable and prudent measures and terms and conditions in the Biological Opinion and thus comply with the Endangered Species Act.

The Endangered Species Act requires all Federal agencies to use their authority to carry out programs for the conservation of threatened and endangered species. The Hoosier NF is concerned that failure to amend the *Forest Plan* might create the perception of a failure to comply with the Act.

The appropriate measure is whether an alternative would help the *Forest Plan* comply with NFMA.

Issue 3: Soil and Water Impacts

The proposal to amend the *Forest Plan* would not affect soil and water. The *Forest Plan* draft and final EIS have already analyzed the effects on soil and water from implementing the *Forest Plan.* However, Issue 1 led to the creation of an alternative that would not remove trees during the period April 15 through September 15, and that implies logging during the period September 16 through April 14. Winter logging could have soil and water impacts, so we have considered this an additional issue.

The measure is whether an alternative would likely result in increased soil and water effects.

Alternatives

Process Used to Develop Alternatives

Each alternative to the proposed action should meet the purpose and need and also address at least one of the significant issues identified in the Significant Issues section of this document.

Following public input activities, the interdisciplinary (ID) team met and discussed issues and alternatives. Given the issues, the team developed three alternatives that respond to the significant issues. Alternative A is the proposed action and Alternative B is the no action alternative. Alternative C would add to the proposed action a prohibition on tree removals during the period from April 15 through September 15.

Alternative A (Proposed Action)

After amending the *Forest Plan*, Alternative A would continue to implement the *Forest Plan*, as amended. Any projects proposed to implement the *Forest Plan* would require environmental analysis and public involvement. Responding to the Biological Assessment and the Biological Opinion, Alternative A would amend the Hoosier NF *Forest Plan* as shown below.

Changes to Goals, Forest Plan page 2.2

INSERT AFTER "GOALS" AND BEFORE "Protect and Manage Ecosystems" ON PAGE 2-2:

Protect and Manage Federally Threatened and Endangered Species

This goal recognizes the value of carrying out programs for the conservation of Federally threatened and endangered fish, wildlife, and plant species. Conservation of threatened and endangered species habitat demonstrates our commitment to the Endangered Species Act of 1973. Conservation of Federally threatened and endangered species is a top priority. This goal includes management of habitat for Federally listed fish, wildlife, and plant species.

Changes to Appendix C, Forest Plan pages C1-C10

AFTER "ENDANGERED, THREATENED AND SENSITIVE SPECIES" ON PAGE C-1 [of the 1991 *Forest Plan*], REPLACE THE HEADING AND THE FIRST THREE PARAGRAPHS WITH THE FOLLOWING HEADING AND THREE PARAGRAPHS:

FEDERALLY ENDANGERED, THREATENED, AND PROPOSED SPECIES

As a Federal agency, the USDA Forest Service has defined responsibilities in supporting recovery objectives for Federally listed endangered, threatened, and proposed species. Populations of these species will receive individualized attention. Management activities that may affect Federally listed species occur in consultation with the USDI Fish and Wildlife Service**.** If additional species that occur on the Hoosier become listed as endangered or threatened, we will consult with USDI Fish and Wildlife Service as appropriate (50 CFR 402.16).

The USDI Fish and Wildlife Service has identified four Federally listed species as having part of their range on the Hoosier National Forest. Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), and eastern fanshell mussel (*Cyprogenia stegaria*) are listed as endangered. Bald eagle (*Haliaeetus leucocephalus*) is listed as threatened.

Indiana bat is widespread in Indiana and occupies much of the eastern half of the United States, from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida. Although there are a limited number of records of it being found on the Hoosier National Forest, its habitat occurs throughout the Forest. Gray bat and eastern fanshell are of limited distribution in Indiana. There is one known record of gray bat and one of fanshell on or near the Hoosier National Forest. There is a single nesting location for bald eagle on the Hoosier National Forest.

AFTER "MANAGEMENT DIRECTION" ON PAGE C-8, REPLACE EVERYTHING UNTIL "REGIONAL SENSITIVE SPECIES AND FOREST SPECIES OF CONCERN" ON PAGE C-10 WITH THE FOLLOWING HEADINGS AND PARAGRAPHS:

Conservation Plan for Federally Threatened, Endangered, and Proposed Species

This plan fulfils Endangered Species Act Section 7(a)(1) obligations for conservation of threatened, endangered, and proposed species. The Hoosier National Forest is committed to conserving, protecting, and maintaining habitat for Federally listed species. The Conservation Plan of the Hoosier National Forest is, first of all, this Land and Resource Management Plan. The foundation of the Hoosier National Forest's Conservation Plan is the allocation of land into Management Areas that have the ecological conditions needed by particular species. A primary purpose of management area allocations is protection of biological diversity, including the conservation of threatened and endangered species. Management Area desired conditions and guidance aid in conserving threatened and endangered species by providing a variety of ecological conditions.

Management Area 2.4 protects the shorelines of lakes, a primary nesting habitat for bald eagle. MA 2.8 provides benefits for a variety of users and resources. This management area allows for vegetation management, which serves a variety of wildlife purposes, including the maintenance or enhancement of roosting habitat for the Indiana bat. MA 5.1 and MA 6.2 provide isolation, opportunity for natural succession, and areas with limited modification. Areas with such characteristics provide important habitat for wildlife, including threatened and endangered species. MA 6.4 primarily provides for natural succession to an old growth (climax) condition and limited modification. The direction for MA 8.1 (Research Natural Areas) includes "providing habitat for endangered species." MA 8.2 areas are Special Areas, and their management emphasizes the protection, perpetuation, or restoration of their special features and values. Special features include barrens, caves, and rock outcrops. The 632-acre Paoli Experimental Forest, which provides opportunities for studying the effects of specific management actions, is presently the only area designated 8.3. Taken together and with other Forest Plan guidance, the management areas provide a variety of habitats for various wildlife and plant species, with emphasis on threatened and endangered species.

To provide habitat for species that utilize climax forest conditions, especially threatened and endangered species, this Forest Plan allocates more than one half of the Forest to having no timber harvest prescriptions. Over half of the Forest is in areas not available for timber harvesting, thus providing undisturbed areas and vegetation that is naturally succeeding to climax conditions.

Recovery plans have been prepared for bald eagle, Indiana bat, gray bat, and eastern fanshell mussel. The USDA Forest Service will work with the USDI Fish and Wildlife Service to identify and meet recovery objectives for the species on the Forest.

The purpose and goal of any conservation plan is recovery of each species such that there is no longer a need to list it as endangered or threatened under criteria found in Section 4(a)(1) of the Endangered Species Act, as amended. Actions of the Hoosier National Forest are directed toward conservation of listed species and, whenever possible, contributing toward recovery objectives outlined in approved Recovery Plans**.**

Relationship to Other Documents

To meet the consultation requirements under Section 7(a)(2), the Hoosier National Forest completed the *Programmatic Biological Assessment for Land and Resource Management Plan Hoosier National Forest* (Biological Assessment) in April 2000. The Fish and Wildlife Service responded with their *Biological Opinion on the Land and Resource Management Plan Hoosier National Forest, Indiana* on July 31, 2001. This Biological Opinion provided terms and conditions to ensure that actions carried out under the direction of the Forest Plan would minimize the potential for incidental take. The Biological Assessment included a list of management activities with amounts (acreages, miles, etc.) estimated to occur in the next five years.

Species-specific recovery plans provide additional guidance for conserving and recovering each endangered or threatened species throughout its range. Each recovery plan has been developed by a team of scientists who are experts on the species being addressed. The Hoosier National Forest encompasses only a small part of the range of each of the four endangered or threatened species, so all recovery objectives may not be applicable to the Forest.

Direction

The Endangered Species Act provides authority for the Hoosier National Forest to be involved in and further the protection and recovery of threatened and endangered species. Section 7(a)(1) states, "All other Federal agencies shall, in accordance with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to Section 4 of this Act."

Section 2(b) of the Endangered Species Act states, "The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for conservation of such endangered species and threatened species…"

The policy of Congress, according to Section 2(c)(1), is "that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of this Act."

Biological evaluations will be conducted as part of site-specific analyses for known populations of Federally listed endangered, threatened, and proposed species (FSM 2672.4). Guidelines and mitigating measures are implemented if a determination is made through a biological evaluation that a species may be affected.

If it is determined that an endangered, threatened, or proposed species may be affected by a management decision, evaluation criteria will be established in consultation with the USDI Fish and Wildlife Service and appropriate State agencies as early in the process as possible. These criteria will identify: (1) what (if any) additional information is needed and (2) what mitigation measures or course

of action is most appropriate for conservation of the species involved. The Forest Service is responsible for collecting additional information if needed.

A coordinated review of available intervention tactics, including "no action," will be made in consultation with the USDI Fish and Wildlife Service and appropriate State agencies at the site-specific project level. Current management direction for the Hoosier is not likely to adversely affect gray bat, eastern fanshell mussel, or bald eagle, as determined by the July 31, 2001 biological opinion from the USDI Fish and Wildlife Service - Bloomington Field Office. That Biological Opinion also concluded that continued implementation of the Forest Plan was "not likely to result in jeopardy" to the Indiana bat.

Some conservation actions may change if a species recovers and is delisted. The Conservation Plan will evolve as we learn more about individual species, their limiting factors and habitat requirements, and the effects of various activities on these species. The following four paragraphs provide direction in various aspects of the management of the Hoosier National Forest with regard to threatened and endangered species.

- Consult with USDI Fish and Wildlife Service to ensure that activities planned and implemented on the Hoosier National Forest meet both the letter and intent of the Endangered Species Act, as amended. Coordinate and cooperate with experts in other agencies, universities, and organizations to identify objectives and projects that will conserve, protect, and recover populations and habitats of threatened and endangered species on the Hoosier National Forest.

- Provide the public opportunities to learn about and appreciate threatened and endangered species so they will understand the importance of activities designed to maintain, protect, and recover these species and their habitats. Cooperate with the research branch of the Forest Service, other agencies, universities, and organizations to determine information needs and provide opportunities to conduct needed research on National Forest System lands. Incorporate relevant research findings into decisionmaking processes. Provide training and continuing education to Hoosier National Forest employees to ensure our workforce has the best scientific information available upon which to base decisions concerning threatened and endangered species on the Forest.

- Devise and implement a plan to guide the silvicultural management of the Forest that is based on sound principles of ecosystem management and works within the capabilities of the land to sustain natural resources, including habitat for, and populations of, threatened and endangered species. Determine and implement management activities that will maintain and improve habitat features for threatened and endangered species.

- Acquire lands that provide habitat for threatened and endangered species through exchange with, or purchase or donation from, willing landowners. Ensure compliance with all laws, regulations, and policies pertaining to endangered and threatened species on the Hoosier National Forest. Cooperate with the USDI Fish and Wildlife Service law enforcement and other law enforcement agencies in enforcing laws and regulations pertaining to endangered and threatened species. Provide accurate and current information about the threatened and endangered species' life history requirements, habitat needs, threats to survival, and population and habitat status on the Hoosier National Forest, in Indiana, and across the species' ranges to ensure a sound basis for decisionmaking.

The following sections for individual species provide further guidelines to be incorporated into all projects planned on National Forest System lands where populations of Federally listed endangered, threatened, or proposed species occur (USDI Fish and Wildlife Service; 50 CFR, Part 17). Additional mitigating measures may be developed at the project level.

Bald Eagle

When vegetation management is planned within one mile of a body of water greater than 40 acres, the USDI Fish and Wildlife Service and Indiana Department of Natural Resources will be consulted about protection of potential nesting, roosting, and feeding areas.

Recommendations for protection and enhancement of nesting, roosting, and feeding areas, developed from ongoing studies in and around the Forest, will be incorporated into management prescriptions.

Aerial flights associated with national forest projects will not be permitted within ¼ mile horizontal distance and 500 feet vertical distance of any active nest.

Human entry during courtship, nest building, incubation, or brooding periods will be discouraged within ¼ mile horizontal distance of an active nest except under one of the following conditions (the USDI Fish and Wildlife Service and Indiana Department of Natural Resources shall be consulted in determining if any of these conditions exist):

- A reduction in size of a bald eagle nest management zone is permissible when a pair of bald eagles is determined to be tolerant of closer human activity. New nest management zone boundaries will be established in consultation with the USDI Fish and Wildlife Service and Indiana Department of Natural Resources.
- Research or management activities essential for the protection or continued survival of a bald eagle pair and their habitat are necessary.
- Topography or other characteristics of a nest site allow for a reduction in size, or indicate need for expansion, of a bald eagle nest management zone.

Accomplishments that aid in the conservation of bald eagle will be reported in the annual Monitoring and Evaluation Report.

Indiana Bat

Timber harvest, timber stand improvement (TSI), and riparian area management guidelines for the Hoosier National Forest are documented in Forest Plan management area guidance and in Appendices B and J. Those guidelines are sound forest management practices and benefit a variety of wildlife species, including Indiana bat.

To be exempt from the prohibitions of section 9 of the Endangered Species Act, the Hoosier National Forest must comply with the following six terms and conditions.

(1) When conducting uneven-aged hardwood timber harvests and completing TSI within hardwood stands, maintain at least 60% canopy cover on a stand-by-stand basis, depending on the size of the stands.

(2) Shagbark (*Carya ovata*) or shellbark hickory (*Carya laciniosa*) trees shall not be harvested or manipulated during TSI activities, unless the density of trees of these two species combined exceeds 16 trees per acre. If present, at least 16 live shagbark and shellbark hickory trees (combined) greater than 11 inches diameter at breast height (DBH) must be maintained per acre.

(3) Snags shall not be removed for TSI purposes, unless they are safety hazards. Firewood cutting permits must clearly state that standing dead trees may not be taken, unless specific

trees are identified in the permit by the USDA Forest Service, to allow for the removal of specific trees under a firewood cutting permit.

(4) To maintain a component of large, over-mature trees in harvest areas, at least three live trees per acre greater than 20 inches DBH of these species should always be maintained in the stand:

- shagbark hickory (*Carya ovata*)
- shellbark hickory (*C. laciniosa*)
- bitternut hickory (*C. cordiformis*)
- silver maple (*Acer saccharinum*)
- green ash (*Fraxinus pennsylvanica*)
- white ash (*F. americana*)
- eastern cottonwood (*Populus deltoides*)
- northern red oak (*Quercus rubra*)
- post oak (*Q. stellata*)
- white oak (*Q. alba*)
- slippery elm (*Ulmus rubra*)
- American elm (*U. americana*)
- black locust (*Robinia pseudoacacia*).

A tree with less than 10% live canopy should be considered a snag. These must be the largest trees of these species remaining in the stand. An additional six live trees per acre greater than 11 inches DBH of the species listed above must also be maintained. The "per acre" requirement can be expressed as the average per acre on a stand-wide basis, depending on the definition of a stand.

If there are no trees greater than 20 inches DBH to leave, then leave 16 live trees per acre, including the largest specimens of the preferred species remaining in the stand.

(5) The USDA Forest Service and USDI Fish and Wildlife Service will continue to implement an appended programmatic consultation approach. Individual projects which have not yet been specifically identified and which impact Indiana bat habitat will be individually reviewed to determine if they are consistent with the programmatic Incidental Take Statement's reasonable and prudent measures and associated terms and conditions, and to ensure that once specific projects are identified, site-specific impacts of the resulting incidental take are minimized.

Habitat manipulation acreage is being used to monitor levels of incidental take for each proposed individual project. The USDA Forest Service will provide the USDI Fish and Wildlife Service's Bloomington Field Office with a description of the project that includes the location, type of activity, and total acreage to be disturbed by an individual project. When reporting the type of activity, it must correspond to one of the following management activities:

- Pine clearcuts 578 acres
- Pine shelterwood cuts 391 acres
- Pine thinning 408 acres
- Hardwood group selection cuts 777 acres
- Harwood single tree selection cuts 518 acres
- Hardwood even-aged salvage cuts 100 acres
- Prescribed fire treatment 7000 acres
- Forest openings maintenance 3311 acres
- Timber stand improvement 2264 acres

- Special use permits 286 acres
- Wildfire management 250 acres
- Road construction 16 acres
- Summer hazard tree removal 100 trees
- Trail construction 15 miles

Each project proposal must report how the individual project increases the cumulative forested acres (or number of trees or miles) affected within each of the above management activities and report on the total acreage (or number of trees or miles) remaining in each management activity. The letter requesting the project-specific review will include the determination that the proposed project is consistent with the programmatic Biological Opinion and Incidental Take Statement and request that the proposed project be appended to the programmatic Biological Opinion.

(6) Any dead bats located on the Hoosier National Forest, regardless of species, will be immediately reported to the Bloomington Field Office of the USDI Fish and Wildlife Service (812) 334-4261 and subsequently transported to that office. No attempt should be made to handle any live bat, regardless of its condition; report bats that appear to be sick or injured to the Bloomington Field Office. The Bloomington Field Office will make a species determination on any dead or moribund bats found on the Hoosier National Forest. If an Indiana bat is identified, the Bloomington Field Office will contact the appropriate USDI Fish and Wildlife Service law enforcement office.

Accomplishments that aid in the conservation of Indiana bat will be reported in the annual Monitoring and Evaluation Report.

Gray Bat

Access to caves found to contain gray bats may be restricted, following site-specific coordination with the USDI Fish and Wildlife Service and other appropriate groups or agencies. Vegetative disturbance will be prohibited within 100 feet of the cave entrance.

Potential foraging streams (defined as any stream continuously containing water through August 1) will be identified during project analyses. These streams will be managed to maintain or encourage a continuous corridor of trees at least one canopy width wide (based on the canopy of a typical mature, bottomland, hardwood species) on both sides of the stream. A forested corridor at least 100 feet wide will be retained between caves and foraging areas (stream or reservoir).

Recommendations for protection and enhancement of gray bat summer foraging habitat developed from ongoing studies in and around the Forest should be incorporated into management prescriptions. Within the Hoosier National Forest, caves found to harbor gray bats will be established as a top priority for acquisition, on a willing seller basis.

Accomplishments that aid in the conservation of gray bat will be reported in the annual Monitoring and Evaluation Report.

Fanshell

Coordinate with USDI Fish and Wildlife Service concerning protection of the species.

Avoid any activity that might negatively affect the known but limited population in the East Fork of the White River.

Guidance will be determined at site-specific project level.

Accomplishments that aid in the conservation of the fanshell will be reported in the annual Monitoring and Evaluation Report.

The paragraphs above represent the end of the revised text for pages C-8 to C-10.

Alternative B (No Action)

This alternative would not amend the *Forest Plan* to incorporate the terms and conditions of the Biological Opinion concerning the continued implementation of the *Forest Plan*. The current *Forest Plan* would remain in effect, and current management would continue. Information derived since the development of the *Forest Plan* would be employed on a case-by-case basis, but no programmatic amendment would be added. Because this alternative would not incorporate the terms and conditions of the Biological Opinion into the *Forest Plan*, it could be perceived to be illegal to implement. This alternative is required by law and serves as a comparison for the other alternatives.

Alternative C (Proposed Action with Seasonal Restriction on Tree Removals)

This alternative would amend the *Forest Plan* as in the proposed action, but responding to Issue 1, it would also add a restriction to prohibit tree removal, except for human health and safety needs, during the period of April 15 through September 15. This time is considered the reproductive period of Indiana bat. If this alternative were selected, the directions for amending the *Forest Plan* would be:

IN ADDITION TO ALL OF THE CHANGES PROPOSED IN ALTERNATIVE A, ON PAGE C-9 AFTER THE OTHER CHANGES IN THE INDIANA BAT SECTION, ADD:

Except for human health and safety needs, tree removal is prohibited during the period of April 15 through September 15.

Alternatives Not Considered in Detail

Federal agencies are required by NEPA to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. One alternative was outside the scope of incorporating into the *Forest Plan* new information concerning Indiana bat. Both of the suggested alternatives were duplicative of alternatives considered in detail, either in this document or in the draft EIS for the *Forest Plan*.

A member of the public suggested an alternative that would remove no snags during the period April 15 through September 15 in order to minimize the opportunity for disturbance to roosting Indiana bats. This suggestion is covered by a term and condition that prohibits removing snags for TSI purposes, unless they pose a safety hazard.

Another alternative suggested was to "stop logging the Hoosier." That alternative would be beyond the scope of this proposal. It would also be duplicative of Alternative E in the 1991 draft EIS for the *Forest Plan (*USDA FS 1990*)*. That alternative was a no-timber-harvest alternative, and the Hoosier analyzed in detail the effects of no timber harvesting. That alternative was not selected during the forest planning process because of its comparison with other alternatives relative to net public benefits.

Comparison of Alternatives

There are three alternative ways of dealing with the terms and conditions of the Biological Opinion. Here is a summary of the major differences between the alternatives and the differences in effects.

The proposed action advocates a limited programmatic decision to minimize certain actions that might affect individual Indiana bats or habitat of the species.

The no action alternative would not amend the *Forest Plan* to incorporate the terms and conditions of the Biological Opinion, and this would likely result in some level of confusion internally, among the public, and between the two agencies—the USDA Forest Service and the USDI Fish and Wildlife Service. This analysis has identified no advantages to selecting the no action alternative.

Both action alternatives would amend the *Forest Plan* to incorporate six terms and conditions from the Biological Opinion and thus take steps to maintain usable habitat for Indiana bat and would also amend the *Forest Plan* to clarify the commitment of the Hoosier NF to protection and recovery of threatened and endangered species. This would not only maintain and enhance habitat for Indiana bat, particularly roost trees, but also likely aid in facilitating cooperation between the Hoosier and the USDI Fish and Wildlife Service. The alternatives would unify the efforts of the Hoosier NF to maintain and recover species listed under the Endangered Species Act. The Proposed Action would accomplish these things while maintaining the Hoosier's ability to accomplish its mission of multiple-use management.

The third alternative way of implementing the Biological Opinion would be to add to the language of the proposed action a prohibition against logging between April 15 and September 15. This would have two results: (1) a more or less complete preclusion of the possibility of removing a tree while a bat is roosting in it and (2) movement of the logging season to the other seven months of the year--September 16 through April 14. The latter would likely result in negative effects on the soil and water and somewhat increase the costs of logging operations. Mitigation needed to protect soil and water resources during winter logging could severely limit our ability to manage the resources.

Two alternative ways have been proposed to incorporate the terms and conditions of the Biological Opinion into the *Forest Plan*. The effects of Alternative C's increased protection for Indiana bat from possible harm from timber harvesting operations include more difficult logging conditions and possible effects to soil and water. Alternative C adds one more measure to protect Indiana bat from the possibility of timber operations removing a tree in which a bat or bats were roosting. Such an event--the removal of a tree with bats roosting in it--would likely have serious consequences for the bat or bats in the tree. The question comes down to estimating the likelihood of such an event.

The Hoosier NF, the USDI Fish and Wildlife Service, and other parties have taken steps to ensure both the presence of Indiana bat habitat and protection of the species from harm by inadvertent cutting or removal of a roost tree that bats are occupying. There are more than 5.7 million potential roost trees on the Hoosier NF (USDA FS 2000), only a small percentage of those trees would ever be removed by Hoosier management, and the Biological Opinion's measures help ensure the continued presence of many

of the most desirable potential roost trees. These factors minimize the possibility of removing a tree with bats roosting in it. The Hoosier continues to coordinate with the USDI Fish and Wildlife Service on each project that has potential to affect Indiana bat or its habitat.

After lengthy study of the bat and of Hoosier NF forest management, the USDI Fish and Wildlife Service issued their biological opinion stating that continued implementation of the Hoosier NF *Forest Plan* "is not likely to jeopardize the continued existence of the Indiana bat." Table 1 summarizes and compares the effects of the three alternatives.

TABLE 1. SUMMARY OF THE EFFECTS OF THE ALTERNATIVES

Resource/ Issue Area	Measure	Alternative A	Alternative B	Alternative C
Indiana bat	Potential for removing tree with bat roosting in it when applying the alternative to projects?	Limited	Limited	Virtually None
Indiana bat	Would it improve habitat and decrease likelihood of harming individual bats?	Yes	No	Yes
NFMA - relations	Tend to complicate and confuse relationships with F&WS and public?	No	Likely	No
NFMA - compliance	Does the alternative allow the *Plan* to comply with NMFA?	Yes	No	Yes
Soil and water	Would the alternative be likely to increase negative soil and water effects?	No	No	Yes, in winter
Recreation program	Any effects on developed or dispersed recreation?	No or limited effects	No or limited effects	No or limited effects
Minerals	Any effects on the minerals program?	No effects	No effects	No effects
Special uses management	Any effects on special uses program?	Nil to minimal	No effects	Nil to minimal
Harvest economics	Would the alternative increase timber operators' costs?	No	No	Yes
Local Economics	Any change in the local economy if the alternative were implemented?	No	No	Nil to minimal
Fanshell mussel	Are increased disturbances (soil and water) in its habitat likely?	None	None	Slight
Spring nesting birds	Would there be increased disturbance from winter logging operations?	No	No	Likely
Barrens	Would the alternative diminish the HNF's ability to restore barrens?	Somewhat	No	Somewhat
Ability to manage resources	Would the alternative diminish our ability to perform resource management?	No	No	Yes

Environmental Effects

This section presents the environmental effects of implementing each alternative. The effects discussions are in response to the issues identified earlier. Knowing the expected environmental consequences of proposed activities gives the decision maker a basis for selecting which actions to implement. The need for an environmental impact statement would be based on what environmental effects are expected from the proposed actions.

The effects on plant and animal habitat, including the effects on Regional Forester sensitive species, forest species of concern, and management indicator species, are shown to document compliance with the *Forest Plan* and other direction concerning species and habitats. The effects on timber management are shown because most of the conditions proposed for incorporation into the *Forest Plan* relate directly to forest vegetation.

Because of the programmatic nature of this proposal, none of the alternatives analyzed is expected to result in substantial changes to any multiple-use goods and services output originally projected by the *Forest Plan.*

At this programmatic level, the draft (USDA FS 1990) and final (USDA FS 1991a) EIS for the *Forest Plan* presented the effects of activities to implement the *Forest Plan*, including those in Table 2. Because the only new information or changed condition regarding Hoosier NF natural resources is related to Indiana bat, the analysis in the draft and final EIS for the *Forest Plan* remains valid for resources other than Indiana bat. This document is tiered to the Draft and Final EIS for the Hoosier NF *Forest Plan*.

Issue 1: Removal of Trees during the Reproductive Season of Indiana Bat

Affected Environment

The Hoosier has some of the best Indiana bat habitat in Indiana. The potentially affected resource is the availability of snags as potential habitat for the bats. At issue is whether or not the proposed action—and, in the case of cumulative effects, other actions—would be likely to affect that habitat or Indiana bats using it.

Standing snags and den trees are available throughout the Forest. Great numbers of potential roost trees of all sizes and species are available across the Forest. In fact, an appendix to the Biological Assessment notes that there are more than 133 million potential roost trees of 21 hardwood species in Indiana and more than 5.7 million on NFS land—that is, on the Hoosier (USDA FS 2000). That appendix considered trees greater than nine inches in diameter at breast height to be potential roost trees. That number of potential roost trees does not include trees in areas such as the Charles C. Deam Wilderness, Paoli Experimental Forest, and Pioneer Mothers Research Natural Area (USDA FS 2000). The Hoosier NF has allocated about half of the forest to nondisturbing types of uses.

In late spring and summer, pregnant females congregate at maternity colonies. Females, maternity roosts, or colonies have been found in a variety of vegetative conditions, including openings (USDI FWS 1999, Gardner *et al*. 1991, Kurta *et al* 1993, Callahan *et al.* 1997). Gardner (1991) found a high degree of within-season site fidelity to specific trees by individual bats. There was, however, no evidence that bats necessarily returned to same trees in subsequent years. Recent evidence indicates that male, female, and juvenile Indiana bats forage in the canopy of both riparian and nonriparian woodlands (USDI FWS 1999).

The bats typically prefer forests with old growth characteristics, *i.e.* large trees, scattered canopy gaps, and open understories.

Biologists have found male Indiana bats roosting in trees as small as three inches in diameter (Romme *et al*. 1995). This led Romme *et al*. (1995) to speculate that the presence of loose bark is a more important criterion for use than tree species for male bats. Shagbark hickory (*Carya ovata*) is a preferred roost tree, but other trees having flaking or exfoliating bark are also used. Snags provide important roosts and are naturally ephemeral, providing suitable roost characteristics for only a few years.

Optimum foraging habitat for Indiana bats is considered to be forests with canopy closure of 50 to 70 percent and relatively open understories, *i.e.* less than 40 percent of the trees in an area are 5 to 12 centimeters in diameter at breast height (Romme *et al*. 1995). The bats forage within the canopy, over early successional vegetation, and above pastures and cropland. Scientists conducting surveys have not located any maternity colonies on the Forest. The closest area with evidence of reproductive bats is in Bartholomew County, approximately 15 miles from the nearest NFS land (Larson 2003a).

Effects of Alternative A

Alternative A, the proposed action, would incorporate the reasonable and prudent measures and the terms and conditions of the Biological Opinion into an amendment to the *Forest Plan*.

Direct and Indirect Effects

The effect of amending the *Forest Plan* to incorporate six terms and conditions in the Biological Opinion would be greater protection of potential Indiana bat habitat. The Biological Opinion's terms and conditions proposed for incorporation in the *Forest Plan* relate to the retention of trees.

Condition number one in the Biological Opinion is what the Hoosier NF is already trying to achieve silviculturally. Over time a few stands would be expected to have greater canopy cover than at present, which should improve the habitat for Indiana bats. Throughout the forest, 60 percent canopy cover is already common and is typically the aim of silvicultural treatments (Thake 2002). Rather than being new direction, condition number one confirms present silvicultural direction with respect to desired canopy cover and embraces it in the *Forest Plan* as policy, under specified conditions. As pointed out in the biological evaluation for the amendment, this ensures protection of this component of Indiana bat habitat.

If the Hoosier were to operate under the proposed amendment for a period of many decades, condition number two, in combination with condition number four, would result in more hickory trees than there would otherwise have been. It would likely take decades for this effect to become apparent even to a serious observer, as the increased number of hickory trees would be slight and only in scattered locations. Maintaining large shagbark and shellbark hickory trees will improve the roosting habitat opportunities for the Indiana bat (Larson 2003a).

In the long term, leaving nearly all snags in place, as required by Biological Opinion condition number three, will result in greater numbers of snags. A greater number of snags will increase the potential for maternity roost trees.

Condition number four requires the Hoosier to maintain three live trees per acre greater than 20 inches DBH and six live trees greater than 11 inches DBH in harvest areas, in tree species on the list in the Biological Opinion. This will result in an increased number of large trees on the Forest. Since a large percentage of the forest is not available to TSI and timber harvesting and only about three percent of the Forest is estimated to undergo timber treatments in a five-year period, only a small portion of the forest

would be subject to any potential change. No change would be expected in the functioning of the forest. Leaving nine trees per acre of the species and diameters specified will ensure the availability of potential roost trees and maternity roost trees into the future (Larson 2003).

The intent, as well as the expectation, of amending the *Forest Plan* to include the terms and conditions of the Biological Opinion is a decreased likelihood of adverse effects on the Indiana bat from implementing the *Forest Plan*.

Cumulative Effects

The proposed action would have a positive beneficial effect on Indiana bat habitat, but the Hoosier is charged with predicting the cumulative effects—the proposed action in combination with past, ongoing, and reasonably foreseeable future activities. The general area of consideration for cumulative effects on Indiana bat is the nine counties in which NFS lands are found. The Biological Assessment examined the effects on Indiana bat of the activities in Table 2.

The Hoosier National Forest is managing for a perpetual supply of potential roost trees across the forest. *Forest Plan* management direction and guidance promote retention of standing dead trees and live den trees of all diameters in all timber harvesting and other activities. The bats will continue to use—that is, roost in—a portion of the snags retained on the forest. Uneven-aged harvest areas may attract bats because of the more open canopy and increased isolation of potential roosts (Larson 2003a).

A large majority of what could be potential Indiana bat maternity habitat is not NFS land. Continued loss of bottomland forest to human development in the surrounding parts of Indiana would further decrease available maternity roosting habitat. Although loss of floodplain forest to urban or agricultural development might continue on other ownerships, there are no activities implementing the *Forest Plan* that would convert riparian forest to nonforest.

As indicated in the Biological Assessment, past activities on private land that have probably affected Indiana bats in southern Indiana, as well as the rest of the lower Midwest, include conversion of riparian foraging and roosting areas to agricultural or residential uses, timber harvest of foraging and roosting areas, and disturbance to hibernacula through flooding, ceiling collapse, or human presence. Past activities on NFS lands that have probably affected Indiana bats include timber harvest in both riparian and upland foraging and roosting habitat (USDA FS 2000).

Table 2 lists reasonably foreseeable management activities that are projected to occur in the next five years to implement the *Forest Plan*.

TABLE 2. PROJECTED MANAGEMENT ACTIVITIES OVER 5 YEARS AND ACRES OF THEM

Management Activity	Forested acres affected	Description Of Activity
Timber harvest	578	pine clearcuts; all trees within a stand are removed at one time
Timber harvest	391	pine shelterwood cuts; only the largest and most vigorous hardwood trees are not cut; they are removed later once seedlings are established
Timber harvest	408	pine thinning; all trees are removed except hardwood trees greater that 4 inches in diameter
Timber harvest	777	hardwood group selection; small groups of trees < 1 acre are removed within a stand

TABLE 2. PROJECTED MANAGEMENT ACTIVITIES OVER 5 YEARS AND ACRES OF THEM		
Management Activity	**Forested acres affected**	**Description Of Activity**
Timber harvest	518	hardwood single tree selection; individual trees are removed throughout the stand
Timber harvest	100	hardwood even-aged salvage; individual cuts < 5 acres that have been severely damaged by natural disturbances
Total timber harvest (total of rows above)	2,772	total acres within approximately 90 separate stands
Prescribed fire	7,000	management of plant communities; which includes hazardous fuel reduction that requires construction of firebreaks by hand or machine, lop and scatter, chipping, crushing with mechanical equipment, mechanical or hand piling for later burning
Wildlife habitat improvement	3,311	forest openings maintenance; by brush hogging, edge maintenance chainsaw work, and prescribed burning
Timber stand improvement	2,264	follow-up after timber harvest listed above and other areas; includes pruning, grapevine control, and burning
Special use permits	286	tree removal for right-of-way clearing and access across Forest land
Manage wildfire	250	tree and brush clearing for fire line construction and back fire burning to control wildfires
Road construction	16	tree removal for access to timber harvest areas and dam access
Summer hazard tree removal	100 trees	removal of trees between April 15 and September 15 that pose a threat to human safety, usually near recreation areas and along trails and roads
Trail construction	15 miles	new construction of 15 miles of multiple use trails

The timber harvesting listed in Table 2 is less than that allowed in the *Forest Plan*. The *Forest Plan* draft and final EIS analyzed the effects of the listed activities. New information concerning Indiana bat came forth in more recent years. The Biological Assessment analyzed the effects of the activities in Table 2 on Indiana bat in light of the new information. This document incorporates the entire biological assessment by reference, and we have used information from it in many places in this document (USDA FS 2000).

The activities in Table 2 have been determined to be likely to modify Indiana bat habitat. Before an activity in that table would be implemented, it would undergo its own public involvement and environmental analysis process. The Biological Assessment also found that continued implementation of the *Forest Plan* would result in beneficial effects on Indiana bat habitat (USDA FS 2000).

The programmatic Biological Assessment evaluated the effects of ongoing management activities to implement the *Forest Plan*, including actions affecting foraging habitat of Indiana bat. Depending on the activity or natural event, canopy closure in some areas could fall below 50 percent and be less than optimum as foraging habitat. This short-term reduction in habitat would be eliminated as residual trees grew and newly regenerated trees occupied the growing space. The Hoosier is attempting to manage for large areas of mature, large-diameter trees. Timber harvest on lands of other ownership can be expected to have the same potential for direct "take" of Indiana bats as harvest on NFS land, and others owners may not protect standing snags and den trees to the extent that the Hoosier National Forest does (Larson 2003a).

One proposed future activity on NFS land is the conversion of non-native pines to native hardwoods. Native hardwoods would provide better foraging and roosting habitat than pine plantations, so this should benefit Indiana bat. Implementation of *Forest Plan* activities that require the clearing or disturbance of trees could result in alteration of foraging habitat, forcing bats to fly farther to forage. The management activities listed in Table 2, any of which may require tree removals, may result in the loss of some traditional summer roost trees and alter currently suitable summer roosting and foraging habitat for Indiana bats. Loss of traditional roost sites would require females to expend energy locating new roosting habitat when they return after migrating from their winter hibernacula. Weight loss and stress associated with hibernation, migration, and pregnancy could potentially result in lower reproductive success or lower survival of juvenile bats (USDI FWS 2001).

Erosion, siltation, and sedimentation resulting from management activities could affect the production of aquatic insects, a portion of the prey base of Indiana bats. The *Forest Plan*, however, includes standards and guidelines for riparian areas, and continued utilization of these practices would minimize any erosion, siltation, and sedimentation. In addition, very little management is conducted within riparian corridors. Thus we expect no appreciable effect on the aquatic insect portion of the Indiana bat prey base because of Hoosier NF management activities, let alone resulting from the proposed amendment.

Since the entire Forest is within the range of the species, it is possible the bats could be anywhere on the Hoosier during spring and summer and into the fall. Although cutting an Indiana bat roost tree when bats are in the tree would likely result in bats being injured or killed, such an occurrence is considered very unlikely due to the large number of roost trees compared with the small number of Indiana bats. In addition to the very large number of potential roost trees and the limited cutting expected, the season of timber removals on many lands of other ownership has shifted to the September 16 to April 14 period. Combined, these factors indicate little likelihood of removing a roost tree or maternity roost tree while bats are using it.

The Hoosier estimates timber harvesting will occur on only a very small percentage of its lands over a five-year period. If all of the timber harvesting in Table 2 were actually done, the acreage of even-aged management would be less than 1 percent (just over 0.5 percent) of the Forest in a five-year period. About 61 percent of the limited harvesting projected for a five-year period would utilize uneven-aged management; most of the remaining acreage would treat only pine, and 100 acres are anticipated for hardwood salvage.

Considering the vast number of potential roost trees available, the small percent of NFS land affected by tree removals in a five-year period, and the availability of roost trees on forestlands other than the Hoosier NF, there is little to no risk of running out of usable potential roost trees. Removal of some potential roost trees each year will continue to be offset by the creation of new potential roost trees through growth, natural mortality, and fire. As noted above, the Hoosier NF has more than 5.7 million potential roost trees of 21 specified hardwood species (USDA FS 2000).

The Biological Assessment analyzed the effects of the activities listed in Table 2 and included a determination that continued implementation of the *Forest Plan* "MAY AFFECT – LIKELY TO ADVERSELY AFFECT" populations of Indiana bat using the Hoosier NF. It also made a second determination, based on the effects on habitat, that continued implementation of the *Forest Plan* "MAY AFFECT—NOT LIKELY TO ADVERSELY AFFECT." The Biological Opinion determined that continued implementation of the *Forest Plan* is not likely to jeopardize the continued existence of the Indiana bat.

Other activities—past, present, and future--that could affect Indiana bat include change of land use to industrial purposes and highway construction and use. The estimated cumulative effect of all past, present, and reasonably foreseeable actions on all land ownerships is to limit and possibly reduce the population of Indiana bat, as evidenced by the decline in their population. The effect of the action

proposed in this document, however, is to counteract some of those effects and improve potential habitat for the species (Larson 2003a).

In combination with other activities on both NFS land and other ownerships, the slight effect on tree species composition because of the proposed amendment could help continue the composition changes that have been ongoing for centuries. Timber harvesting, agricultural crop production, and livestock grazing continue to occur on private land. Most private forestland is harvested every 10 to 20 years (Unversaw 2002). The short cutting cycles on many lands of other ownership increase the importance of NFS lands as potential Indiana bat habitat.

Land use in the encompassing area is another way to view cumulative effects. Data extracted from the National Agricultural Statistics CD - Indiana 2000 indicates the current land use percentages for the sixth order watersheds that include portions of the Hoosier NF. The total acreage of those sixth order watersheds is 1,635,496 acres. The distribution of land uses shown in Table 3 suggests that there should be opportunity to maintain habitat for a number of wildlife species, including Indiana bat, if the nondeveloped acreage is managed in a manner conducive to the welfare of those species.

TABLE 3. LAND USES BY PERCENT WITHIN WATERSHEDS THAT INCLUDE THE HOOSIER NF

Land Use	Percent
Urban	1.16%
Plowed at least once a year	12.35%
Vegetation largely removed at least once per year	2.28%
Unplowed, no mechanical removal of vegetation	29.20%
Forested	52.24%
Wetlands	2.77%

Most of the Hoosier NF would fit into the land use categories of Wetlands or Forested, but the acreage of the Forest is less than 200,000 acres, so for every acre of NFS land in these watersheds, there are approximately three and a half acres of forested land not in NFS ownership.

The Biological Opinion's terms and conditions may tend to counteract some of the other potential forces acting on Indiana bat habitat. Other national forests in the north central section of the country have also adopted, or might be expected to adopt, measures to enhance and protect Indiana bat habitat. The cumulative effect of measures such as this proposed amendment would be enhanced and improved roosting habitat—both foraging and maternity—for Indiana bat and likely a more viable population of the species.

Effects of Alternative B

Alternative B is the no action alternative. It would not amend the *Forest Plan* to incorporate the terms and conditions of the Biological Opinion.

Direct and Indirect Effects

Alternative B would not impair Indiana bat habitat nor would it put the populations at risk from its activities. It would also not clarify policy and direction related to the protection of Indiana bat.

The indirect effect would be the Hoosier continuing to deal with project proposals on a case-by-case basis in relation to the Biological Opinion. Results of that might be internal confusion and misunderstandings between the USDA Forest Service and USDI Fish and Wildlife Service concerning management related to Indiana bat and other threatened and endangered species. Public confusion and misunderstanding

about the Hoosier's role in relation to threatened and endangered species and the Endangered Species Act may increase. The resulting confusion could indirectly affect habitat management and delay actions that could benefit the species.

Because the terms and conditions of the Biological Opinion are mandatory, implementing the no action alternative should have no direct effects on Indiana bat. The Hoosier NF would still implement the terms and conditions. The effects of Alternative B on Indiana bat would be very nearly the same as the effects of Alternative A.

Cumulative Effects

The cumulative effects to Indiana bat and to its habitat would be the same as the cumulative effects shown under Alternative A, except that the proposed amendment would not be incorporated into the *Forest Plan*.

Effects of Alternative C

Alternative C would incorporate the reasonable and prudent measures and the terms and conditions of the Biological Opinion into the *Forest Plan* and, in addition, include in the amendment words that would institute seasonal restrictions on tree removals. It would require that no trees be removed during the period of April 15 through September 15, except where there is danger to human health or safety.

Direct and Indirect Effects

The effects of Alternative C would be largely the same as the effects of Alternative A. The effects due to removing a tree with an Indiana bat in it, however, would be precluded with Alternative C because of the restriction on the timing of tree removals. Alternative C would prohibit tree removals during the reproductive season of the Indiana bat, so there should be no, or at least minimal, risk of removing a tree on the Hoosier NF when one or more Indiana bats were roosting in it.

Alternative C would accrue the benefits of active forest management –such as thinning, prescribed burning, and maintenance of openings. Maintaining and improving foraging habitat during the September 16 to April 14 period might be somewhat challenging, but it should certainly be possible.

An indirect effect of prohibiting tree removals during the spring and summer would be the commencement of winter logging. Winter logging would be expected to have effects on other resources, but the logging would have little or no direct effect on Indiana bat since the tree removal activities would take place when the bats would be hibernating. Since more management activities would occur during the winter than presently occur, there would be less disturbance and less potential for incidental take. That is, there should be a reduced effect on Indiana bat if the seasonal restrictions on tree removals in Alternative C were adopted.

Because of the programmatic nature of the proposed amendment and its incorporation of the Biological Opinion's terms and conditions, which deal primarily with the retention of trees and species composition, implementing either Alternative A or Alternative C would have no direct or indirect effect on potential hibernacula.

Cumulative Effects

The cumulative effects of this alternative would be largely the same as those of Alternative A. The adoption of this alternative in combination with the shift to winter logging would mean a decreased risk of injuring or killing a bat.

Issue 2: Compliance with NFMA

Affected Environment

The *Forest Plan* does not currently comply with the Biological Opinion. Although the Hoosier NF is required to implement the Biological Opinion, the difference between the *Forest Plan* and the Biological Opinion creates a situation where one could perceive a conflict. The National Forest Management Act (NFMA) directs that actions or management restrictions such as those in the Biological Opinion should be based on a forest plan. Thus the Hoosier NF is currently unable to fully comply with NFMA direction.

Effects of Alternative A

The proposed action would amend the *Forest Plan* to include the reasonable and prudent measures and terms and conditions of the Biological Opinion.

Direct and Indirect Effects

The effect of this amendment would be a clarification of management direction and compliance with NFMA. Future management plans would include the added protection for Indiana bats and their habitat specified in the reasonable and prudent measures and terms and conditions of the Biological Opinion.

Cumulative Effects

The cumulative effect of the proposed amendment and the six previous *Forest Plan* amendments would be a more up-to-date and responsive guidance document. The amendments clarify direction and increase protection for various resources. Cumulatively, the proposed amendment and actions such as the other *Forest Plan* amendments would increase compliance with NFMA and allow the Hoosier NF to clearly state its commitment to fulfilling its responsibilities under the Endangered Species Act.

Effects of Alternative B

Direct and Indirect Effects

Alternative B, the no action alternative, would not amend the *Forest Plan*, and the Hoosier would continue to deal with project proposals and the contents of the Biological Opinion on a case-by-case basis. The direct effect would be no programmatic amendment to incorporate the directions of the Biological Opinion, and thus the Hoosier NF would not have a forest plan that complied with NFMA direction to base management on a valid forest plan.

A likely indirect effect of that would be confusion within the USDA Forest Service and among members of the public concerning management direction. Perceptions of differences of direction between the existing *Forest Plan* and the Biological Opinion could lead to worsened relationships. Exactly what the consequences would be in regards to human behavior and agency effectiveness are difficult to estimate, but a sense of confusion would likely ensue and lead to decreased effectiveness of the Hoosier.

Cumulative Effects

A possible cumulative effect of no action in combination with other past, present, and reasonably foreseeable actions would be the accumulation of work for both Federal agencies, the USDA Forest Service and the USDI Fish and Wildlife Service. The more serious effect, however, would be the possible public confusion and misunderstanding about policy direction regarding threatened and endangered species.

Effects of Alternative C

Alternative C would amend the *Forest Plan* to include the reasonable and prudent measures and terms and conditions of the Biological Opinion.

Direct and Indirect Effects

The effects on the issue of compliance with NFMA are the same as the effects of Alternative A.

Cumulative Effects

Alternative C would comply with NFMA the same as Alternative A.

Issue 3: Soil and Water Impacts

Affected Environment

As noted in the *Forest Plan*, all the soils on the Hoosier NF have been inventoried. The Hoosier NF lies between two major watersheds, the Ohio River and the Wabash River. The quality of surface water is variable, depending on the local contamination from residential, commercial, and agricultural effluent. Headwater streams draining from NFS lands are generally of high quality. Sediments, nutrients, bacteria, and domestic and agricultural sewage during periods of surface runoff intermittently pollute the middle and lower reaches of streams (USDA FS 1991b).

The elevation of the Hoosier ranges from 383 feet along the Ohio River to 959 feet near Houston. Most of the Forest is on uplands that are strongly sloping to very steep. Loess deposits near the Ohio River reach about 10 feet, but the deposits are thinner over the remainder of the area, often two to three feet thick. Flooding of the nearly level bottomlands along rivers occurs periodically (USDA FS 2000).

The potentially affected components of the environment are the soil and the water. The issue is whether the proposed amendment or alternatives to it would increase soil movement, otherwise worsen soil conditions, or degrade water quality.

Effects of Alternative A

Direct and Indirect Effects

The proposed action would take no actions that could affect the soils or water. Maintaining 60% canopy cover under certain circumstances, slightly increasing the number of hickory trees over time, retaining more snags, and slightly increasing the number of large trees over time cannot be expected to have effects on soil and water. The effects on any aspect of the water cycle would be too few, too small, and too separated in space to expect them to have any effects on water quantity or water quality from either a small area of the forest or the forest as a whole. There are no soil-disturbing activities in the proposal, and none of the terms and conditions of the Biological Opinion would have any discernable effects on soils.

Cumulative Effects

Since there would be no direct or indirect effects on soil or water, there would be no cumulative effects of this action plus similar actions. Many activities and forces affect the soils within the Hoosier NF—including agriculture, road building and maintenance, highway use, and home construction. These activities and their effects on soils would continue with or without the proposed *Forest Plan* amendment.

Nothing in the proposed action is expected to, or at all likely to, result in any change in the trajectory of changes in soil and water conditions that have been occurring since the time of settlement of the area.

Effects of Alternative B

Direct and Indirect Effects

Although a no action alternative may certainly have effects, in this case there would certainly be no effects on soil and water resulting from a failure to adopt the proposed *Forest Plan* amendment.

Cumulative Effects

Because there would be no direct or indirect effects on soil and water, there would be no cumulative effects on soils and water of selecting no action on this and other similar proposals. The statements under cumulative effects for Alternative A apply equally to Alternative B.

Effects of Alternative C

Alternative C would not remove trees during the period April 15 through September 15. Instead it would restrict harvesting operations to the period of September 16 to April 14.

Direct and Indirect Effects

The effects of logging during the wetter season of the year would include soil compaction and soil erosion. If soils were saturated, equipment would cause more damage, such as compaction and soil movement. Studies have shown adverse impacts from harvesting timber when soil conditions are extremely wet. Soil erosion and compaction caused by logging when soils were saturated would reduce the long-term soil productivity, have a negative effect on tree regeneration, and degrade the sites.

During the winter months in some years, the soils may be dry enough for short periods to operate without detrimental compaction and soil movement, but such winters are rare (pers. communication Thake 2002). The time of year is not the important factor; instead, the soil being saturated with moisture is what invites soil compaction and soil movement. In this area, the winter months are typically the months with the wettest soils because the temperatures do not usually allow the soils to dry out.

Machine logging may compact the soil to such an extent that the growth rate of the subsequent regeneration is reduced. Soil compaction has been shown to reduce growth more on fine-textured soils than on loamy sands. When fine-textured soils are wet, they can be damaged by compaction from the use of heavy equipment (Pritchett 1979). Many of the local soils are fine textured, and often, depending on the landscape position, these soils have perched water tables over a cemented layer called a fragipan. This results in soils often saturated with moisture during the coolest months. Compaction of the top layers of soil may kill seedlings or greatly reduce their growth. On somewhat poorly or poorly drained soils, such as noted above, skidding should be done only during dry weather (Moehring and Rawls1970).

Compaction of the soil increases bulk density and decreases soil porosity, infiltration rates, and soil permeability, resulting in root damage and reduced tree growth, vigor, and long-term site productivity (Dey 1993). Rutting and displacement (or mixing) of topsoil with the subsoil can result from logging when the soils are saturated. Mixing of mineral and organic soil is not generally considered detrimental displacement, but the effects would need to be assessed on a case-by-case basis.

Logging when soil conditions are extremely wet would also have effects on water quality, as more soil would be moved by water and therefore, potentially, more sediment would be carried by the streams. Various mitigation measures could be placed on logging when the soils are extremely wet, but it has been noted that such measures are not always effective on wet sites. Other researchers have noted that more serious levels of compaction were avoided by operating when the soil moisture was low (Reisinger 1992).

On the Hoosier NF, logging during the winter months has been limited in recent years to a sale on the Paoli Experimental Forest in 1993-94. During that sale, the skidding and loading produced rutting that could create negative soil and water effects (pers. communication Weigel 2002).

Cumulative Effects

The cumulative effects on soil and water of shifting to winter logging in combination with other past, present, and reasonably foreseeable future activities would be increased amounts of soil movement, soil compaction, and sedimentation. Some landowners in the area have switched to winter logging, and they have found:

- a need for a dozer on the site at all times to repair damage to the soil,
- potential for deeper ruts, and thus compacted soil (the damage may be hidden by dozer work),
- loggers being shut down 10-20 percent of the time,
- a need to extend contracts since so much of the former logging season is now unavailable,
- a tendency to be less restrictive in shutting down logging operations to get the work done, since waiting for optimum conditions might not allow the work to be completed,
- and generally worse logging conditions (pers. communication Hobson 2002).

If such effects were produced on the Hoosier NF as well as on additional private lands, the results would include increased soil compaction and likely increased soil movement and sedimentation.

Foreseeable activities and forces affecting the soils within the area of the Hoosier NF include agriculture, road building and maintenance, highway use, and home construction. Cumulatively, this alternative

combined with other past, ongoing, and reasonably foreseeable activities would result in a soil landscape altered from what likely existed a few centuries ago.

Plants and Wildlife

Affected Environment

The majority of the Hoosier is located within the Humid Temperate Domain, Hot Continental Division, Eastern Broadleaf Forest Province, Shawnee Hills Section (McNab and Avers 1994). The Forest is located where the Eastern moisture-loving hardwood forests meet Midwestern oak-hickory forests (Braun 1950).

Table 4 lists the species within different species groups to indicate the variety of species and habitats present on the Hoosier. Many different natural communities and species are present, some on the edges of their geographical ranges. The diverse habitats provide homes for a wide variety of plant and animal species.

TABLE 4. NUMBER OF SPECIES ON THE HOOSIER BY SPECIES GROUP

Species group	Number of species
Mammals	42
Birds	275
Reptiles	27
Amphibians	26
Fish	105
Mussels	16
Nonnative animals	12
Native plants	618
Nonnative plants	87

Endangered, Threatened, and Proposed Species

The USDI Fish and Wildlife Service identified four Federally listed species as having part of their range on the Hoosier NF--the threatened bald eagle (*Haliaeetus leucocephalus)*, the endangered Indiana bat (*Myotis sodalis*), the endangered gray bat (*Myotis grisescens*), and the endangered eastern fanshell mussel (*Cyprogenia stegaria = C. irrorata*). The Biological Assessment evaluated the potential effects of ongoing management practices on the same four species and included detailed habitat descriptions for them and other information relevant to protecting and recovering these species. This section of the EA summarizes the Biological Evaluation for Endangered and Threatened Species-Forest Plan Seventh Amendment.

Within the framework of *Forest Plan* goals, the Biological Assessment identified 19 management opportunities. Within that context, the Biological Assessment described *Forest Plan* implementation activities that had occurred on the Hoosier and analyzed the effects of continued implementation of each activity category on Federally listed species.

The evaluation of the direct, indirect, and cumulative effects by each alternative for Indiana bat is included in the first issue segment of the environmental effects section of this EA.

Concurring with the Biological Assessment, the cover letter for the USDI Fish and Wildlife Service's Biological Opinion stated that the continued implementation of the *Forest Plan* and projects predicated upon it would "not adversely affect the gray bat (*Myotis grisescens)*, bald eagle (*Haliaeetus leucocephalu*s), and fanshell (*Cyprogenia stegaria)"* (USDI FWS 2001).

Effects of Alternative A

The proposed action would amend the *Forest Plan* to include the terms and conditions of the Biological Opinion. The proposed amendment would include recognition of the value of providing habitat for threatened and endangered plant and animal species and note that protecting these species is a top priority.

Direct and Indirect Effects

Implementing this alternative would not change management guidelines regarding gray bat (*Myotis grisescens*) as stated in Appendix C of the *Forest Plan*. The Biological Opinion did not include any terms and conditions for this species, but applying the terms and conditions for Indiana bat in the Biological Opinion would in the long term increase canopy cover, increase the numbers of hickory trees, and retain snags across the Forest. Those measures would improve overall foraging habitat for gray bat. Maintaining larger trees would enhance summer foraging habitat for gray bats. Implementing this alternative would have no effect on potential hibernacula or the gray bat's summer roosting habitat (caves).

Implementing this alternative would not change management guidelines for bald eagle (*Haliaeetus leucocephalus*) found in Appendix C of the *Forest Plan*. There are no terms and conditions for bald eagle in the Biological Opinion. Maintaining more snags for Indiana bat would in the long term benefit bald eagles, which use snags as perch and roost trees or for nesting if the trees are near large bodies of water. Larger tree size, older trees, and greater canopy closure are all structural attributes that would benefit bald eagle by increasing the opportunity for potential roost sites.

The fanshell mussel (*Cyprogenia stegaria*) exists at one location on the Hoosier NF, the main stem of the East Fork of the White River in Martin and Lawrence Counties. According to the fanshell recovery plan, biologists believe that the small and isolated fanshell population there is not a reproducing population (USDI FWS 1991). The proposed amendment makes no changes to the management direction that guidance for the fanshell mussel is determined at the site-specific level. As with the species mentioned above, the Biological Opinion issued no terms and conditions for the fanshell. The Biological Opinion's terms and conditions for Indiana bat relate primarily to the retention of trees, and applying them would aid in preventing soil movement. None of the conditions would negatively affect fanshell mussel.

Cumulative Effects

Since the actions of the proposed amendment would tend to benefit gray bats, the cumulative effects of the proposal plus other past, ongoing, and reasonably foreseeable future activities would be better bat habitat than there would be without the amendment. The Biological Assessment determined that all of the projected management activities would have no effect, be "discountable or insignificant," or else have a beneficial effect on gray bat.

Only the projected activities in Table 2 with the least favorable effects on gray bat are noted in this paragraph. The changes in vegetation following timber harvest could shift the type of flying insects in the area, but would not be likely to cause a change in overall numbers of prey insects. The Hoosier does not currently use pesticides that would affect either the bats or their insect prey. An unknown gray bat hibernaculum or summer roost could exist on the Forest, but prescribed burns as carried out on the Hoosier NF would be extremely unlikely to result in smoke affecting gray bat caves. Wildfires are

unlikely to result in adverse effects, and fires may increase the insect biomass in the area (USDA FS 2000).

There is little likelihood of gray bat hibernacula or summer roosts on the Hoosier. Private landowners have converted many streamside forest communities to agriculture and developments. Although the loss of floodplain forest to human uses continues on other ownerships and decreases available foraging habitat, activities implementing the *Forest Plan* would not convert riparian forest to nonforest.

Past activities on private land that have probably affected gray bats in southern Indiana include conversion of riparian foraging areas to agricultural or residential uses, timber harvesting in foraging areas, and disturbance to hibernacula through flooding, ceiling collapse, or human presence. Past activities on NFS lands that have probably affected gray bats include timber harvesting in riparian foraging habitat.

The Biological Assessment considered the cumulative effects on potential gray bat summer roosting habitat, foraging habitat, travel corridors, and winter hibernacula from implementing the *Forest Plan* in combination with other landowner activities in southern Indiana. It determined that on that scale effects from *Forest Plan* implementation would be unlikely or else could not be meaningfully measured (USDA FS 2000).

The Biological Assessment determined that there would be no effects to bald eagle from some activities, and the effects of other activities would be either beneficial or "considered discountable." Although some roosts may become unsuitable or require cutting during fireline construction or prescribed burning, the prescribed fires would create other new snags, so there would be minimal effects on eagle habitat. The removal of such trees would result in a short-term loss of a small amount of potential roosting habitat. Except for hazard trees, the direction of the proposed amendment is to leave snags in place. Because a huge number of potential roost trees are available across the Hoosier and timber harvesting would occur on only a small percentage of the Forest during a five-year period, the Biological Assessment determined that the loss of potential roost trees would be insignificant in terms of sustained roosting habitat (USDA FS 2000). It is also highly unlikely that loggers would inadvertently harvest a communal night roost tree.

A large portion of the watersheds of the rivers and lakes frequented by bald eagles is in other ownership. Land use activities occurring on lands of other ownerships can affect water quality in rivers and lakes, including those frequented by bald eagles. Past activities on private land that have likely affected the bald eagle include conversion of land to agricultural or residential uses, timber harvesting, and the construction of water impoundments such as Lake Monroe or Patoka Lake.

Present or reasonably foreseeable future activities on private land that may have an impact on this species include construction or use of roads, continued agricultural use of most of the riparian areas, timber harvesting, and activities associated with nearby residences (USDA FS 2000). These activities have all been ongoing for decades, and the population of bald eagles has been increasing.

Although there are no direct or indirect effects on the fanshell from the proposed amendment, the effects of other actions are disclosed here. Because of the special nature of the East Fork of the White River, the Hoosier NF would not take actions likely to increase sedimentation in its watershed.

The Biological Assessment determined that some management activities would have no effect, some would be beneficial, and the effects of others would be "considered discountable and insignificant." Activities that might result in sediment reaching streams from ground disturbances include timber harvesting, fire management (firelines), mineral activities, special use permits (rights-of-way), and transportation systems. Mitigation measures, management direction, and guidance within Appendices J and K of the *Forest Plan* serve to protect aquatic resources from silt and sediments entering streams. The

potential for sediment from forest management activities to reach the main stem of the East Fork is very small, and the potential for excess sediment to be enough to adversely affect fanshell habitat is remote.

Pesticide use on the Hoosier is at a low level. The Hoosier has previously applied aquatic herbicides in developed recreation areas outside the East Fork White River basin and will likely do so again in the future. The Indiana Department of Natural Resources may prescribe rotenone to renovate fisheries in selected fishing ponds and lakes in the future, perhaps some in the headwaters of the East Fork's tributaries. However, rotenone deteriorates rapidly and biologists typically apply it only in stable conditions. The Biological Assessment determined that the effect on the fanshell is not measurable because of the low level of use, the care taken to avoid drift, and the low potential for these chemicals to enter streams.

The Biological Assessment also evaluated activities such as acid mine drainage from an abandoned coal mine on NFS land in the East Fork basin. The water from the mine discharges at a slow rate and is naturally diluted by Plaster Creek, so there is no effect to water quality in East Fork or to the fanshell. Continued development of private forestlands for homes and vacation residences, timber harvesting, and other activities may add to the sediment and pollution loads in the East Fork.

In southern Indiana, past activities that have affected fanshell include conversion of land to agricultural or residential uses, timber harvesting, and the construction of large reservoirs like Lake Monroe. Past activities on NFS land that may have affected fanshell include timber harvesting in riparian habitat. Present or reasonably foreseeable future activities on private land that may affect this species include construction or use of roads, agricultural use of most riparian areas, timber harvesting, and stream channel maintenance.

Effects of Alternative B

This alternative would not amend the *Forest Plan* to incorporate the terms and conditions of the Biological Opinion concerning the continued implementation of the *Forest Plan.* The current *Forest Plan* would remain in effect, and current management would continue. On a case-by-case basis, the Hoosier would employ new information, such as the Biological Opinion.

Direct and Indirect Effects

No activities are associated with this alternative; thus there would be no effects to the gray bat. The Hoosier would continue to incorporate into projects the guidelines in the *Forest Plan* regarding gray bat. With no action, there would be no activity to affect the bald eagle and the Hoosier would continue following the management direction for bald eagle in Appendix C of the *Forest Plan*. We anticipate no effects to the fanshell mussel. The *Forest Plan* states that guidance for the fanshell shall be determined at the project level.

Cumulative Effects

The statements under Alternative A concerning cumulative effects for gray bat, bald eagle, and fanshell mussel also apply to this alternative. That is, other activities and trends in the area, including forest management activities on the Hoosier NF, would continue on their present trajectory.

Effects of Alternative C

Alternative C would incorporate the terms and conditions of the Biological Opinion into the *Forest Plan* and include in the amendment a requirement to prohibit tree removal during the period of April 15 through September 15, except where there is danger to human health or safety.

Direct and Indirect Effects

Generally, the effects to gray bat of implementing this alternative would be the same as the effects of Alternative A. The effects would also include the effects described under Alternative C for Indiana bat, as gray bats too would be hibernating during the winter when timber operations would occur. Similarly, by restricting logging during the summer months, there would be less disturbance to gray bats while they are foraging and traveling from roosts in caves. Since no hibernacula or roosting sites exist on the Hoosier, Alternative C's winter logging is unlikely to cause additional disturbance to gray bats.

The effects to bald eagle resulting from Alternative A would also apply to this alternative. In addition, by restricting logging to the winter and early spring seasons when eagles are nesting and using winter roost sites, disturbance might increase during critical times for the species. Mitigation and protection measures in the *Forest Plan,* however, provide protection of bald eagle nesting, roosting, and feeding areas. Currently, the area of the single nest site and winter roost area near Lake Monroe is adjacent to the wilderness, where no logging would occur. Therefore, this alternative is unlikely to increase disturbance to the species.

Alternative C would have the same effects on the fanshell that Alternative A would. Alternative C's effects on soil and water are disclosed above under the third issue; some of those effects would also be relevant for the fanshell. Although logging in extremely wet conditions might potentially increase the entry of sediment into streams, implementing this alternative would not change existing mitigation and protection measures in the *Forest Plan* that minimize the amount of sediment entering streams.

Cumulative Effects

The cumulative effects on gray bat from implementing this alternative would be virtually the same as the effects of implementing Alternative A. Cumulative effects mentioned under Alternative C for Indiana bat would also be valid for gray bat. These effects include the potential for increased disturbance of hibernating bats, which could be harmful or even critical. On the other hand, prohibiting logging during the active season of gray bat would create an environment with less potential for disturbance and impacts to the species.

The cumulative effects on bald eagle described in Alternative A would also apply equally to implementing Alternative C. As the numbers of bald eagles increase in southern Indiana and the eagles build new nests in or adjacent to management areas where logging activities may occur, there would be potential for increased amounts of disturbance to eagles during nesting and at winter roost sites. Eagles typically return each year to previously used nests and roosts, so this expansion would occur slowly over a long timeframe. The Hoosier would continue protecting nest sites as directed in the *Forest Plan* regardless of their location, so the primary cumulative effect from winter logging is the possibility that these increased activities may adversely impact communal night roosts. However, very little tree removal is ever planned in areas where eagles would be likely to roost. In addition, snags are protected across the Forest, and a large amount of mature forest cover exists on the Forest. These factors, plus the availability of a large number of alternate roost trees and field inspections of project sites, make the inadvertent harvest of a communal night roost tree highly unlikely.

Likewise, the cumulative effects described for the fanshell in Alternative A would also result from this alternative. The restriction that limits logging only to the winter season on NFS land combined with

logging already being done on lands of other ownership may collectively increase soil movement and sedimentation in southern Indiana. However, the Hoosier NF would not take actions that would be likely to increase sedimentation in this watershed. Therefore, the potential for sedimentation from forest management activities to reach the main stem of the East Fork is very small, and the potential for excess sediment to be enough to adversely affect fanshell habitat is so remote as to be discountable.

Regional Forester Sensitive Species, Forest Species of Concern, and Management Indicator Species

The Regional Forester sensitive species (RFSS) list (February 29, 2000 update) documents 78 sensitive species occurring on the Hoosier NF. These species occur in nine community types and habitats across the forest. The Biological Evaluation for Regional Forester Sensitive Species for this proposal (Larson 2003b) briefly describes each of the nine communities, and then analyzes the effects of implementing each of the alternatives on the different communities. Another document does the same for the forest species of concern found in the different communities (Larson 2003c). The nine communities are: mesic forest, dry forest, barrens, open lands, rivers, cliffs, caves, wetlands, and "wide-ranging species." This section of the EA summarizes four biological report documents for this proposal—Biological Evaluation for Endangered and Threatened Species (Larson 2003a), Biological Evaluation for Regional Forester Sensitive Species (Larson 2003b), Forest Species of Concern – *Forest Plan* Seventh Amendment (Larson 2003c), and Management Indicator Species - *Forest Plan* Seventh Amendment (Larson, 2003d).

The Hoosier recognizes cliffs, caves, and wetlands as special habitats. Because the primary focus in both action alternatives would be to apply the Biological Opinion's terms and conditions dealing with retention of trees and species composition, none of the activities associated with these alternatives would have any effects to these three habitat communities or their associated species.

The February 29, 2000 revision of the RFSS list incorporated many of the forest species of concern (FSOC) listed in the *Forest Plan.* The Hoosier will continue adhering to direction and guidance in the *Forest Plan* regarding all listed FSOC and will analyze the effects on species in site-specific project level documents. Hoosier biologists evaluate the effects of activities only on currently state-listed species from the FSOC list in Appendix C of the *Forest Plan*. These species occur in the same habitat communities listed in the previous RFSS section, except no FSOC are listed for caves.

Management indicator species (MIS) are, according to the *Forest Plan*, species believed to be vulnerable to population decline and species most likely to provide an indication of management actions through population change. The *Forest Plan* lists the MIS on p. C-13. In the recent analysis for the Forest-wide Openings Maintenance EA, we documented the trends of all MIS forestwide and discovered no trends that caused concern (USDA FS 1999), and we have also analyzed the possible effects on those species of this proposed amendment (Larson 2003d).

The effects anticipated to occur to the RFSS, FSOC, and MIS are described below. The direct and indirect effects are the changes in habitat conditions that would be anticipated to result from implementing the Biological Opinion's terms and conditions.

Effects of Alternative A

Direct and Indirect Effects

Applying the Biological Opinion's terms and conditions would have little or no effect on overall habitat for species of the open lands community—American badger (*Taxidea taxus*), Henslow's sparrow (*Ammodramus henslowii*), and migrant loggerhead shrike (*Lanius ludovicianus migrans*). It would also have no effect on the two wide-ranging animal species—bobcat (*Lynx rufus*) and evening bat (*Nycticeius humeralis*). In addition, some forest species of concern occur in the same habitats -- barn owl (*Tyto alba*), Bush's sedge (*Carex bushii*), bristly foxtail (*Setaria geniculata*), early ladies'-treses (*Spranthes vernalis*), second rush (*Juncus secundus*), and yellow nodding ladies'-tresses (Spiranthes ochroleuca). The same types of effects are expected with those species.

Applying the conditions in the Biological Opinion would have little or no effect on the following species found in mesic forests or in dry forests with canopy cover greater than 60 percent: (American ginseng (*Panax quinquefolius*), blue monkshood (*aconitum uncinatum*), butternut (*Juglans cinerea*), cerulean warbler (*Dendroica cerulea*), eastern featherbells (*Stenanthium gramineum*), Illinois wood-sorrel (*Oxalis illinoensis*), large yellow lady's slipper (*Cypripedium pubescens*), large-leaved phlox (*Phlox amplifolia*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), rock skullcap (*Scutellaria saxatilis*), southeastern myotis (*Myotis austroriparius*), valerian (*Valeriana pauciflora*), West Virginia white (*Pieris virginiensis*), Yadkin panic-grass (*Panicum yadkinense*), Allegheny-spurge (*Pachysandra procumbens*), barren strawberry (*Waldsteinia fragarioides*), hair grass (*Muhlenbergia glabrifloris*), Illinois bramble (*Rubus centralis*), small skullcap (*Scutellaria parvula var. parvula*), timber rattlesnake (*Crotalus horridus*), trailing arbutus (*Epigaea repens*), white thoroughwort (*Eupatorium album*), Bell's roadside skipper (*Amblyscirtes belli*), Canada lily (*Lilium canadense*), cleft phlox (*Phlox bifida ssp. stellaria*), Ofer Hollow reed-grass (*Calamogrostis porteri var. insperata*), prairie parsley (*polytaenia nuttallii*), and trailing tick-trefoil (*Desmodium humifusum*). The minimum canopy cover required according to the *Forest Plan* amendment would be expected to have little or no effect on overall habitat for mesic forest community species. A similar determination applies to the slight but possible change in species composition across the forest due to increasing numbers of hickory trees. Species found within this forested habitat exist in specific micro sites, especially plant species, and implementing this alternative would not contribute to any loss of known habitat.

Most of the desirable tree species for Indiana bat listed in condition four seldom occur in barrens. Species found in this community include Bachman's sparrow (*Aimophila aestivalis*), bluehearts (*Buchnera americana*) cluster fescue (*Festuca paradoxa*), grass-leaved rush (*Juncus marginatus var. marginatus*), limestone adder's tongue (*Ophioglossum engelmannii*), mottled duskywing (*Erynnis martialis*), purple false-foxglove (*Agalinis skinneriana*), roundstem false-foxglove (*Agalinis gattingeri*), royal catchfly (*Silene regia*), swamp metalmark (Calephelis muticum), and yellow gentian (*Gentian alba*). Post oak may increase its presence, but the other species are very rarely found there. Any changes would likely occur in forested stands adjacent to barrens. Management activities that maintain and create habitat for these species would continue; therefore, anticipated effects to barrens species are discountable.

We anticipate little or no effect to species of the dry forest community. Some of these species--Bell's roadside skipper, Canada lily, cleft phlox, Ofer Hollow reed-grass, prairie parsley, and trailing tick-trefoil--can also occur in more open habitats such as barrens or open forests. Implementing this alternative may reduce available habitat for those species by requiring canopy cover of 60 percent or greater in future forest management projects where uneven-aged harvesting is prescribed. Implementing this alternative would still allow management activities such as maintaining forest openings, limited even-aged timber harvesting, and prescribed fire that could maintain and create new habitat for these species. Some reduction in available habitat may occur for barren or dry forest species and diminish the ability to

restore barren habitat because of these restrictions. Because of this change in habitat, a few species may be negatively, but not appreciably, affected (Larson 2003b). Anticipated effects to these species are discountable.

None of the Biological Opinion's terms and conditions would result in any negative effects to species occurring in rivers. These include the following mollusks—black sandshell (*Ligumia recta*), lilliput (*Toxolasma parvus*), Ohio pigtoe (*Pleurobema cordatum*), purple lilliput (*Toxolasma lividus*), pyuramid pigtoe (*Pleurobema rubrum*), rabbitsfoot (*Quadrula cylindrical*), rock pocketbook (*Arcidens confragosus*), round hickorynut (*Obovaria subrotunda*), salamander mussel (*Simpsonaias ambigua*), snuffbox (*Epioblasma triquetra*) wavy-rayed lampmussel (*Lampsilis fasciola*), and yellow sandshell (*Lampsilis teres*). Other species include sand darter (*Ammocrypta pellucida*), lake sturgeon (*Adipenser fulvescens*), Tippecanoe darter (*Etheostema tippecanoe*), and heart-leaved plantain (*Plantago cordata*). FSOC occur in the same habitat communities described for RFSS, so we anticipate the same effects.

Species occurring in open lands include barn owl, Bush's sedge, bristly foxtail, early ladies'-tresses, second rush, and yellow nodding ladies'-tresses.

Barren species include coppery St. John's-wort (*Hypericum denticulatum*), golden Alexanders (*Zizia aptera*), and rough white lettuce (*Prenanthes aspera*). These species can also occur in open areas with alkaline soils.

Mesic forest species are broad-winged hawk (*Buteo platypterus*), hooded warbler (*Wilsonia citrina*), Kentucky wisteria (*Wisteria macrostachya*), red-shouldered hawk (*Buteo lineatus*), sharp-shinned hawk (*Accipiter striatus*), treelike clubmoss (*Lycopodium dendroideum*), umbrella magnolia (*Magnolia tripetala*), and yellowwood (*Cladrastis lutea*).

Dry forest species include Bewick's wren (*Thryomanes bewickii*), black-and-white warbler (*Mniotilta varia*), heartleaf noseburn (*Tragia cordata*), sourwood (*Oxydendrum arboreum*), and worm-eating warbler (*Helmitheros vermivorus*). Some dry forest species typically occur in conditions that are more open and sometimes exist in barrens. These species include angel-pod (*Gonolobus olbiquus*), Carolina thistle (*Cirsium carolinianum*), crow-poison (*Nothoscordum bivalve*), Illinois pinweed (*Lechea racemulosa*), Nuttall's bush-clover (*Lespedeza X nuttallii*), orange coneflower (*Rudbeckia fulgida*), rough green snake (*Opheodrys aestivus*), Small's snakeroot (*Sanicula smallii*), southern dewberry (*Rubus enslenii*), and southern skullcap (*Scutellaria parvula var. australis*).

Applying the Biological Opinion's terms and conditions may in the long-term increase canopy cover and the number of snags and hickory trees in forest habitat across the Hoosier NF. Habitat for species requiring open canopy conditions could possibly be reduced, but ongoing management activities could maintain and create new habitat for these species. Therefore, there would be little or no effect to these species. The effects to FSOC can be found in the appropriate community in the RFSS section (Larson 2003c).

The effects of this alternative on MIS are the same as described above in the appropriate RFSS habitat communities. Several of these species inhabit a broad range of habitats. Therefore, minor changes are likely in the habitat of all individual MIS because of implementing this alternative, except for the broad species group of cave invertebrates, cliff plant associations, and wetlands. The changes would be those shown in the RFSS section above. The restrictions in the *Forest Plan* amendment would be expected to have no effect on the continued viability of any of the species (Larson 2003d).

Species found in openings and nearby brushy areas include American woodcock (*Scolopax minor*), prairie warbler (*Dendroica discolor*), ruffed grouse (*Bonasa umbellus*), and yellow-breasted chat (*Icteria virens*). No individual species are listed for the barrens and glades community group.

Species inhabiting primarily mesic or dry forest communities include Acadian flycatcher (*Empidonax virescens*), gray squirrel (*Sciurus carolinensis*), pleated woodpecker (*Dryocopus pileatus*), pine warbler (*Dendroica pinus*), scarlet tanager (*Piranga olivacea*), wild turkey (*Meleagris gallopavo*), and wood thrush (*Hylocichla mustellina*).

Aquatic stream or river species include bluegill (*Lepomis macrochirus*), grass pickerel (*Esox americanus*), largemouth bass (*Micropteris salmoides*), pugnose minnow (*Opsopoeodus emiliae*), redfin shiner (*Lythrurus umbratilis*), rock bass (*Ambloplites rupestris*), smallmouth bass (*Micropteris dolomieu*), southern redbelly dace (*Phoxinus erythrogaster*), and stream invertebrates. Other species that occur within stream corridors include Louisiana waterthrush (*Seiurus motacilla*), raccoon (*Procyon lotor*), and wood duck (*Aix sponsa*).

Cumulative Effects

The greatest threat to most open land sites is the encroachment of woody species, which would eventually make these areas unusable for species needing large openings. Many openings are in a degraded condition. Although some temporary disturbance to sensitive species could occur during implementation of the activities to maintain forest openings, these effects would either not be measurable or else be discountable.

Woody plant encroachment due to lack of frequent fires also threatens open lands, barrens, and dry forest habitat adjacent to barren communities and also their associated species. Conversion of pine (non-native) stands to hardwoods would benefit sensitive species associated with this habitat by opening the canopy and reducing woody vegetation. In the long term, the Hoosier might not be able to maintain open lands and barren habitat at current levels due to acreage limits placed upon management activities.

Mesic forest and dry forest habitat communities constitute the greater part of the wide diversity of habitat used by the two wide-ranging species on the Hoosier-- bobcat and evening bat. Some reduction in available habitat may occur for barren or dry forest species, because of the Biological Opinion's condition of retaining 60 percent canopy. This restriction could diminish the Forest's ability to restore barren habitat and maintain habitat in some of the dry forest for some species needing more open forest habitat. Because of this change in habitat, a few species may be negatively, but not appreciably, affected (Larson 2003b).

Statements in the cumulative effects section for the fanshell also apply to sensitive species (named above) in the river habitat community, because effects to all aquatic species are closely related. The primary objective of the Biological Assessment was to document the effects of ongoing management on the four Federally listed species, but it also evaluated the effects on several habitat communities. Many of these communities also provide habitat for sensitive species. Activities that might result in sediment reaching streams are listed for the fanshell. Measures in Appendices J and K of the *Forest Plan* that serve to protect aquatic resources from silt and sediments entering streams also aid sensitive species in this habitat community. The one plant species grouped within this community (heart-leaved plantain) is not known to occur on the Hoosier. No forest activities would occur in its potential habitat (marshes), as this habitat is similar to wetland habitat, which is protected from vegetation management for a distance of 100 feet.

The projected harvest total of 2,772 acres is about one and a half percent of the total 188,453 acres of forest stands on the Hoosier NF. Most of the potential habitat for all of these species would remain unaffected by management activities. Additionally, as described above, many forest activities would maintain, improve, and restore habitat across the forest for the benefit of the species occurring in these communities. No scientific information has been located suggesting that ongoing management activities would threaten the continued viability of any sensitive species.

Past activities that have probably affected river communities, mesic and dry forests, and their associated species within the Forest boundary include timber harvesting and conversion to agricultural or residential uses. Past channeling of streams has also affected rivers and the sensitive species found within them. Similar past activities, as well as some under-planting with pine species, have occurred in barrens. The primary past activities affecting open lands include the conversion to agricultural or residential uses. Introduction and spread of exotic and invasive plants have also affected open lands and barrens. All of these past activities collectively have affected wide-ranging species because of the broad diversity of habitats that they utilize. Similar past activities affecting these habitat communities, and their associated species, have occurred on private lands of southern Indiana to a much greater degree.

Present or reasonably foreseeable future activities that may have an impact on these communities include the construction or use of roads, continued agricultural use, timber harvesting, and activities associated with nearby residences. Since these habitats occur at scattered locations throughout the proclaimed Forest boundary on both private and NFS lands, land use decisions made by other owners affect these habitat communities as much or more than activities carried out on the Hoosier.

Because FSOC occur in habitat communities that correspond to those described for RFSS, the cumulative effects presented above would apply equally to FSOC.

Likewise, MIS occur in habitat communities equivalent to those of the RFSS and FSOC, so the effects stated in the RFSS section are valid for the MIS.

In addition to aquatic species, Louisiana waterthrush, wood duck, and raccoon also occur in riparian corridors. Timber harvesting would occur only rarely and under very specific conditions in these riparian corridors on NFS lands. Continued loss of bottomland forest to human development in the surrounding parts of Indiana would further affect habitat for these species.

Effects of Alternative B

Direct, Indirect, and Cumulative Effects

There are no activities associated with this alternative, thus no direct or indirect effects to these species. The Hoosier would continue to incorporate the management guidelines currently stated in Appendix C of the *Forest Plan* regarding RFSS, FSOC, and MIS into all future projects. The cumulative effects conclusions for the various species and species groups found under Alternative A apply equally to this alternative.

Effects of Alternative C

Direct, Indirect, and Cumulative Effects

Generally, the effects described in Alternative A for RFSS would also apply to implementing Alternative C, including especially the cumulative effects. Restrictions on logging during the summer months may increase the amount of disturbance on nesting birds in the spring months, primarily in forested habitats. Potentially, logging in extremely wet conditions may increase the amount of sediments flowing into streams and therefore potentially affect aquatic RFSS. However, implementing this alternative would not change existing mitigation and protection measures in the *Forest Plan* that minimize the amount of sediment entering streams. Since winter logging activities would occur when plants are senescent or dormant, there would be less impact to these species. In addition, biological evaluations conducted at a site-specific project level analysis would continue to provide protection and any necessary mitigation

measures for each species.

These FSOC occur in the same habitat communities as described for RFSS, so the cumulative effects presented above would apply equally to FSOC.

Cumulative Effects to MIS would be the same as presented above in the RFSS section.

Forest Resource Management

Forested conditions are common on the Hoosier NF. Table 5 presents the distribution of vegetation communities, and Table 6 shows the distribution of age classes of forested stands. Approximately 96 percent of the acreage of the Hoosier is in stands with forest cover. Forest openings, utility corridors, roads, facilities, and water comprise approximately 6,763 acres of the total 196,484 acres.

TABLE 5. VEGETATIVE COMMUNITIES BY PERCENT

Vegetation Community	Percent of the HNF
Oak-hickory forest (at various successional stages)	47
Yellow poplar	15
Mixed upland hardwood (mostly sugar maple-beech or cove hardwood)	15
Pine plantations	17
Bottomland hardwood forest (elm-ash-cottonwood)	1
Open habitats*	3.5*

*Currently only 2.6 percent of the Hoosier NF is being maintained in open conditions.

TABLE 6. STAND AGES BY PERCENT

Age Class	Percent of the HNF
Over 80 years old	46
61-80 years old	19
41-60 years old	15
11-40 years old	19
0-10 years old	<1

Since acquisition of the majority of the Hoosier in the mid 1930's to late 1950's, when many trees were young saplings or poles, the forest has grown older and denser. Less than half of the NFS land on the Hoosier NF lies within management areas deemed suitable for commercial timber management.

Effects of Alternative A

Direct and Indirect Effects

The Biological Opinion's term and condition number one would result over time in a few stands having greater canopy cover than they presently have. At present canopy covers of 60 percent or greater are common throughout the forest and are the typical aim of silvicultural treatments (Thake 2002).

The wording of term and condition number one in the Biological Opinion would prohibit the use of uneven-aged timber management to reduce canopy cover in barrens and adjacent dry forests that already have less than 60 percent canopy cover. The canopy cover needs to be reduced in much of this barrens

and dry forest habitat to improve conditions for the species found in these open habitats. The Biological

Opinion's restrictions may diminish the ability to restore barren habitat.

Terms and conditions number two and four would likely result in more hickory trees eventually. This effect would be limited in scale and area, as there are only a limited number of hickory trees on the Hoosier. Any increase above what would otherwise have occurred would be found only on lands where timber is harvested. It would take decades for this effect to become large enough to shift the species composition on even small areas of the Forest. The increased number of hickory trees would be slight.

Leaving nearly all snags in place would result in more snags and eventually increase the number of fallen trees on the forest floor. Firewood gatherers might utilize some of those fallen trees. The fallen trees would not be likely to result in an appreciable increase in the fire danger; if they led to greater fire danger locally, the excess fuels could be treated.

Term and condition number four requires the Hoosier to maintain three live trees per acre greater than 20 inches DBH and six live trees greater than 11 inches DBH in harvest areas in those trees species listed in the Biological Opinion. This would result in an increased number of large trees on the Forest. Isolated spots would slowly take on a slightly different appearance than they might otherwise have had. Since only about three percent of the Hoosier would undergo timber treatments in a five-year period, only a small portion of the forest would be subject to any potential change, and no change would be expected in the functioning of the forest or its resources.

The Hoosier is not currently issuing firewood permits but may resume issuing firewood permits in the future. Most fuelwood removed in recent years has been from trees that are already on the ground (Thake 2002). This suggests that the proposed amendment would not be likely to cause any significant effect on the availability of firewood on the Forest.

Implementing the direction of the Biological Opinion would not likely change in an appreciable manner the timber program, the overall timber volumes, or the type of harvesting. The language of the Biological Opinion would tend to reduce the volume of hickory offered for sale, but the volume of hickory has been low enough that there should be no substantial effect, and an equal volume of some other species would generally be available. Similar volumes would likely be offered for sale. The timber operators would be able to remove the volume sold, perhaps with slightly increased equipment costs. Payments to the state would not be expected to change. All of the counties where the Hoosier is located have selected the alternative of no longer having those payments determined by the value of timber receipts.

Cumulative Effects

Other forces and actions have been reducing the volume harvested on lands of other ownership. Only a limited portion of the Hoosier is available for timber harvesting. The timber harvest season has shifted to the winter months on some lands of other ownerships. The cumulative effect of the proposed amendment in combination with situations, such as those in the two preceding sentences, would likely be a somewhat limited availability of timber for harvesting.

Effects of Alternative B

Direct, Indirect and Cumulative Effects

Alternative B in combination would have the same cumulative effects as Alternative A. Alternative B would continue to implement the existing *Forest Plan* with no amendment to incorporate the terms and conditions of the Biological Opinion. Since the terms and conditions are mandatory, failing to incorporate them into the *Forest Plan* would not increase the timber volumes harvested. The effects

would be about the same as those of Alternative A except there would likely be a sense of confusion about operating when the *Forest Plan* would not be in accord with the terms and conditions of the Biological Opinion.

Effects of Alternative C

In addition to the effects of Alternative A, Alternative C would be expected to result in somewhat increased logging costs. These increased costs may not occur, would be expected to be slight, and would be subtle and diffuse enough to preclude quantification. The alternative would also probably lead to some operational difficulties. Based on experiences on lands of other ownership, those difficulties could probably be overcome. The effects of Alternative A would also result from Alternative C.

Loggers might be affected if the logging season were shifted to the September 16 through April 14 period, as is proposed in Alternative C. Production would tend to be slower, and there would be increased "wear and tear" on the loggers' woods equipment. The increased costs would be small as a percentage of the total costs, and some operators are presently making this shift.

Cumulative Effects

The cumulative effects of Alternative A would also result from Alternative C. Restricting logging to the September 16 to April 14 period would be added to many other changes that modify economics and lifestyles, both locally and across the country. The Hoosier has set up management areas where timber harvesting is not allowed and established regulations to protect the forest during timber harvest operations. Over time and on various ownerships, timberland has shifted to other uses. All of these activities have changed and continue to change the nature of timber harvesting in this area and the economics of those associated with it. Alternative C would have at most a limited effect on local economics.

Other Concerns

The proposed project is not expected to have any effects on public health or safety. The proposed amendment is not expected to affect, and certainly not in any appreciable manner, any unique characteristics within the Hoosier. Implementing the proposed amendment is not likely to result in noticeable effects on such features as rivers, wetlands, farmlands, or cultural resources.

The scientifically observable effects of the terms and conditions in the proposed amendment are not expected to be highly controversial; that is, the effects on the human environment are not highly uncertain. This decision does not represent a decision or precedent for future actions, such as projects to implement the Forest Plan. Such proposals would be subject to their own environmental analyses and require a decision based on the merits, costs, and consequences of such proposals.

There is no reason to think that this *Forest Plan* amendment would disproportionately affect minority or low-income populations. Public involvement for the proposed programmatic amendment did not identify any adversely impacted local minority or low-income populations.

Based on U.S. Census Data and State estimates, Indiana consists of 9.6% minority and 8.7% low-income populations.

TABLE 7 MINORITY AND LOW-INCOME CENSUS DATA		
County	**Percent Minority**	**Percent at or below Poverty Level**
Brown	0.4	7.7
Crawford	0.5	13.5
Dubois	0.4	4.5
Jackson	1.5	7.6
Lawrence	0.9	8.8
Martin	0.5	10.6
Monroe	6.6	10.6
Orange	1.1	11.6
Perry	1.8	8.1

The percentages of minority and low-income populations in the nine counties that contain NFS land on the Hoosier National Forest are all less than twice that of the percentages of the State population. The demographic information in Table 7 indicates that these counties are not qualified as environmental justice communities.

Accomplishment of Purpose and Need

The no action alternative would fail to accomplish the purpose and need for the project (minimizing the take of Indiana bat), but either of the two action alternatives would accomplish the purpose and need. Either action alternative would incorporate new information into the *Forest Plan*, including six terms and conditions of the Biological Opinion. This would thus minimize the likelihood of incidental take of Indiana bat in the course of implementing the Hoosier NF *Forest Plan.* Either action alternative would also provide clarifying direction regarding the Hoosier NF's strategy to assist in conserving and protecting Federally listed threatened and endangered species.

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U.S. Department of Agriculture, Forest Service. 2000. Programmatic biological assessment on continued implementation of the Forest Plan. Administrative Report. On file with: Forest Supervisor, Hoosier National Forest, 811 Constitution Ave., Bedford, IN 47421. 109 p.

USDI Fish and Wildlife Service. 1991. Fanshell (*Cyprogenia stegaria (=C. irrorata*)) Recovery Plan. Atlanta, GA. 37 pp.

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USDI Fish and Wildlife Service. 2001. Biological Opinion on the Land and Resource Management Plan Hoosier National Forest, Indiana. 21 p.

Weigel, Dale. 2002. Personal communication—email to Ron Ellis August 1, 2002. On file with: Forest Supervisor, Hoosier National Forest, 811 Constitution Ave., Bedford, IN 47421.

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Appendix A

Public Comments from Initial Scoping

The ID team categorized each response received during the scoping process to identify specific comments, issues, and concerns. Then the team identified and sorted the comments. Each comment is followed by a summary of how the comment was addressed in the analysis.

In the following pages, we group comments into three general areas. "**C**" indicates a comment, and "**R**" indicates the USDA Forest Service response. Direct quotes are within quotation marks, and paraphrased comments are without quotation marks. In parentheses we list the comment response number. When we list several response numbers, the quote is from the first, but the ID team believes the quote represents the additional comments.

Table 8 lists those who responded during the public scoping process. A complete list of the individuals contacted is in the project file.

TABLE 8. COMMENTS RECEIVED FROM INITIAL SCOPING

Name	Organization	Response #
Allen, Jim		8
Bensman, Jim	Heartwood	19
Brugh, Mercedes		3
Bump, Adam	Ruffed Grouse Society	11
Davis, Adam		27
Donham, Mark	Heartwood Forestwatch	15
Form letter		6
Garvey, Greg		16
Hankin, Howard	NRCS, Washington, DC	2
Hanson, Fred		18
Kahlo, Clarke		21
Lualdi, Steven		10
Mahler, Andy		17
Martin, Jeff		7
Martin, Joshua	Indiana Forest Alliance	5
McDonald, Todd		30
Mittenthal, Suzanne		23
Montgomery, William		4
Moskowitz, Karyn		25
Muller, Nicholas		9
Nunes, Teresa		12
O'Donnell, Molly		22
Redoutey, Karolyn		28
Shaw, Linda		14
Skinner, Amanda		13
Stoll, Mary		20
Tennies, Phil		1

TABLE 8. COMMENTS RECEIVED FROM INITIAL SCOPING		
Name	**Organization**	**Response #**
Waggoner, Penelope		26
Wood, Troy		29
Zawacki, Michael		24

Concerns about Indiana bat

I-1 C. Some commenters suggested, "The proposed amendment is weak and conveniently selective in its application of documented science on the Indiana bat and does not provide adequate protection for endangered species. The global population of Indiana bats continues to decline despite the protection of wintering hibernacula. This suggests that processes operating during the breeding season may limit the population. Thus the Indiana bat's existence will be in jeopardy unless breeding habitat is protected." (05, 06, 13, 15, 17, 20, 21, 22, 23, 24, 25, 26, 29)

> **R.** There is no scientific basis to support this conclusion. The Hoosier NF reviewed current literature about Indiana bat during the preparation of the programmatic Biological Assessment for continued *Forest Plan* implementation and cited over twenty recent scientific articles and field studies in the final document. The USDI Fish and Wildlife Service (FWS) determined in its Biological Opinion on the Land and Resource Management Plan, Hoosier National Forest, Indiana that continued implementation of the *Forest Plan* would not be likely to jeopardize the continued existence of Indiana bat.

I-2 C. Some commenters believe that the "Biological Opinion fails to base its terms and conditions related to the Indiana bat on the best scientific and commercial data available." The main reason given was that they found the recently released draft revised recovery plan for Indiana bat unacceptable, and therefore further plans, amendments and opinions based on the draft are unacceptable. They stated that the proposed amendment was based on the Biological Opinion, which was in turn based on the draft revision to the recovery plan for the Indiana bat, and was therefore unacceptable. (05, 06, 13, 15, 17, 19, 20, 25, 26, 28)

> **R.** The commenters' assertion that the proposed amendment is based solely on the Biological Opinion and that the Biological Opinion is based solely on the draft recovery plan is erroneous. The draft recovery plan is only one document used by the USDI Fish and Wildlife Service in developing the Biological Opinion. In addition to reviewing the Biological Assessment prepared by the Hoosier staff to develop the Biological Opinion, the USDI Fish and Wildlife Service used additional scientific studies and made an analysis of the scientific literature. The Biological Assessment contains 74 different references cited, and the Biological Opinion contains 23 of them.
>
> The proposed action is based on the best available science. The Hoosier developed the proposed action following a lengthy process that included the consultation process with USDI Fish and Wildlife Service and a review of the available scientific literature. As mentioned in the previous paragraph, the two agencies included a thorough analysis of the scientific literature in the development of the Biological Assessment and the Biological Opinion. The Hoosier NF is not aware of any additional scientific literature beyond what has already been examined, and the commenters have not presented any specific studies.

I-3 C. A commenter asserts the Hoosier fails to consider the effects of activities such as road construction, land exchange, insecticide use, and fire lines that may result in taking of Indiana bats. (05, 17)

R. Fire line construction and road construction are included in the list of *Forest Plan* implementation activities for which the Hoosier NF requested formal consultation, and the USDI Fish and Wildlife Service included them in its Biological Opinion. The USDI Fish and Wildlife Service concluded that a variety of other activities, specifically including land exchange and insecticide application, would "not result in the alteration of Indiana bat habitat and, therefore, are not likely to adversely affect the Indiana bat."

I-4 C. One commenter believes that there would be inadequate protection for pines, "despite the documented discovery of an Indiana bat roosting in a dead white pine." (05)

R. Two Indiana bats were tracked to shortleaf pine snags during a study on the forest. The Biological Assessment and the Biological Opinion both say that no snags would be removed during pine timber harvest unless they constitute a safety hazard. This *Forest Plan* amendment proposes no removal of trees, so there is no suggestion of a consequence of the proposed action. Any proposal to harvest or remove trees would be accompanied by its own public involvement opportunities and environmental analysis.

I-5 C. "The Forest Service lacks adequate monitoring data on endangered species over the Forest." (05, 06, 13, 15, 17, 19, 20, 24, 25, 26, 27, 28, 29)

R. Each project area is surveyed for appropriate habitat. We presume that Indiana bats may occur Forestwide because of the scattered distribution of records. Mitigations for implemented projects are used to avoid any take of Indiana bat. *Forest Plan* monitoring reports are available for many years.

I-6 C. "The FWS describes storm-damaged stands as degraded habitat for Indiana bats. However such stands provide many dead and dying roost trees for bats…" (05, 06, 13, 15, 17, 20, 24, 25, 26, 27, 28, 29)

R. The Biological Opinion describes salvage areas as "severely degraded habitat as a result of the storm event.…" This is a paraphrasing of the description of storm events in the Biological Assessment leaving "small to very large areas of dead, down or severely damaged trees." Under the terms of the Biological Opinion, snags would be removed only when a tree constitutes a safety hazard.

I-7 C. "The Forest Service has failed to include the FWS's Terms and Conditions #5 and #6 in its proposed amendment." (05)

R. The text of this EA--and thus the proposed amendment to the *Forest Plan*--incorporates all six terms and conditions from the Biological Opinion.

I-8 C. "Any trees that are cut…should not be taken during the summer roosting season." (05)

R. The Biological Opinion lists Hoosier NF management activities estimated to occur in the next five years that would result in modification of Indiana bat habitat. The Biological Opinion says "the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat." Alternative C proposed no harvesting between April 15 and September 15, and the EA analyzes that alternative.

I-9 C. One commenter suggested following a method similar to that of the Mark Twain National Forest to address Indiana bat issues—that is, management zones around known hibernacula and maternity roosts. (11)

R. The Hoosier NF has no known maternity colonies and only two very small, recently discovered hibernaculum. The hibernaculum are located in areas where timber harvest is prohibited. Thus it would be meaningless to follow the Mark Twain NF direction.

I-10 C. "The proposed amendment actually removes essential language from the current LRMP directed towards protection of cave and riparian habitat for the bat." (05)

R. Although language about riparian areas and caves would be removed from the current *Forest Plan*, the language replacing it is more restrictive because it includes all NFS lands, not just those near caves or in riparian areas. It should also be noted that there are strict standards and guidelines in the *Forest Plan* for caves and karst features.

I-11 C. Some commenters say that both the gray bat and the Indiana bat, "can only be detected through mist net studies and the Biological Opinion states that there have not been sufficient mist net studies to make a determination on either species. And even so, mist nets are not dependable for determining the lack of presence. Indiana bats, by their nature, are proficient at avoiding obstacles as they have evolved to forage in the forest. They are known to be very adept in avoiding nets. Therefore, especially in the forests of Indiana, the agency should assume that they are present, and leave the stands unmanaged." (13, 15, 17)

R. We are assuming Indiana bats are likely to be present Forestwide, and we use mitigation measures designed to avoid any impacts to the species or its habitat. The Biological Assessment and the subsequent Biological Opinion have concluded that *Forest Plan* implementation may continue without jeopardy to Indiana bat. We do not know of any scientific evidence that Indiana bats avoid mist nets.

I-12 C. "We also believe that the FS and the FWS must determine the threshold for the entire species for what would constitute a point of no return after which no takes are incidental. We believe that establishing this threshold for survival is required by the consultation regs, and makes sense when determining whether or not incidental take is appropriate." (15)

R. The Hoosier NF followed consultation procedures, including preparing a biological assessment and obtaining a biological opinion. The USDI Fish and Wildlife Service determined in its Biological Opinion that *Forest Plan* implementation may continue without jeopardizing the existence of Indiana bat. The purpose of this analysis is to determine and disclose the effects of various ways of incorporating--or not incorporating--the USDI Fish and Wildlife Service's Biological Opinion.

I-13 C. "…we wish to point out the USFWS cannot legally issue a take statement for the Forest Plan. The Forest Service must get the ITS at the project level… It is also clear that the ESA would be violated if the USFWS issued an Incidental Take Statement for consultation on the Forest Plan or future undisclosed site-specific projects." (19, 15)

R. An incidental take statement authorizes takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 C.F.R. 402.02). There is nothing in the Endangered Species Act that prohibits the USDI Fish and Wildlife Service from issuing an incidental take statement on a forest plan.

An incidental take statement issued after a programmatic review offers a comprehensive look across the landscape and gives a clearer picture of how each individual project fits into the management plan for the Indiana bat. It also avoids the piecemeal approach of individual projects addressed without a big picture look of the total management activity acres occurring across the Hoosier.

To ensure that the impacts of take associated with future projects are appropriately minimized and that the exemption of incidental take is appropriately documented, the USDA Forest Service and USDI Fish and Wildlife Service will implement an appended programmatic consultation approach. Under that approach, the programmatic Biological Opinion and Incidental Take Statement will exempt incidental take that results from site-specific actions implementing the *Forest Plan*. However, projects of a type that has not been categorized as to amount of activity to take place and that impacts Indiana bat habitat will be individually reviewed to determine if they are consistent with the programmatic Incidental Take Statement's reasonable and prudent measures and associated terms and conditions, and also to ensure that once specific projects are identified, site specific impacts of the resulting incidental take are minimized. If an individual project is found to be consistent with the programmatic consultation, it will be appended to the Biological Opinion and Incidental Take Statement, along with any project-specific reasonable and prudent measures and terms and conditions that are needed to fulfill the requirements of section 7(a)(2).

The following individual projects have been appended to the this programmatic Biological Opinion and Incidental Take Statement: Boone Creek Barrens Restoration Project (February 11, 2002), Tornado Blowdown Fuels Reduction (March 25, 2002), Special Use Permit to install a 2000-foot buried powerline May 2, 2002), Special Use Permit for Patoka Lake Regional Water and Sewer (May 2, 2002), Special Use Permits for two radio communications towers (May 2, 2002), Road Construction to the Indian Lake Dam (May 2, 2002), grapevine removal (July 24, 2002), special use trail construction (August 16, 2002), Breedlove easement (September 9, 2002), Narrows Riparian Restoration (September 24, 2002), Pioneer Mothers' Parking Area (October 2002), Paoli Experimental Forest TSI (December 11, 2002), Boone Creek Prescribed Fire Modification (December 11, 2002), and Indian Lake Road clarification (January 17, 2003).

I-14 C. "The Forest Service has sought and acquired initial approval for an "Incidental Take Permit" from the Fish and Wildlife Service which would allow road building, logging and other forest fragmenting and habitat destroying practices despite the fact that doing so will harass, harm or kill individual Indiana bats. How many such incidental take permits have been issued across the bats' range and what has been the cumulative effect of this authorized killing? How many more bats will die as a direct or indirect effect of the following anticipated regime of destruction?" The writer then listed the activities in Table 2 in the EA. (17)

R. As part of its Biological Opinion, the USDI Fish and Wildlife Service issued the Hoosier NF an Incidental Take Statement for continued implementation of the *Forest Plan*. The same Biological Opinion provides terms and conditions that help minimize any risk to individual Indiana bats, and it states that continued implementation of the *Forest Plan* is not likely to jeopardize the continued existence of the Indiana bat. The purpose of this analysis is to determine and disclose the effects of various ways of incorporating (or not incorporating) the USDI Fish and Wildlife Service's Biological Opinion. Locating and compiling records of all Incidental Take Statements issued to various state, Federal, and other entities is beyond the scope of this analysis.

I-15 C. One commenter suggested, "The optimal forest canopy density for Indiana bats would appear to be higher than the currently proposed 60% for both roost considerations and food supply." (18)

R. The Biological Assessment referred to the findings of Romme *et al*.(1995) that the optimum foraging habitat for Indiana bat is considered to be forest with canopy closure of 50 to70 percent and relatively open understories. The first term and condition of the Biological Opinion requires uneven-aged hardwood timber harvest and timber stand improvement (TSI) activities within hardwood stands to maintain at least 60 percent canopy cover. The suggestion that the forest canopy density should be higher than 60 percent is not supported by the scientific information available. Most stands on the Hoosier have canopy closure of 100 percent.

I-16 C. "Language needs to be included as to which months timber logging, TSI, or firewood cutting would be allowed to eliminate noise disturbance of Indiana bats." (18)

R. The timing of tree removals would differ, depending on the alternative selected for implementation. See the Alternatives section for information concerning the timing of tree removals. 3D International, Inc. reportedly studied the effects of noise on hibernating and foraging Indiana bats at Fort Leonard Wood, Missouri. The study concluded that a variety of types and intensities of noise created during ongoing Department of Defense training was unlikely to adversely affect either hibernating or foraging Indiana bats. Bats continued to forage in and near night-firing exercises.

Sounds created by activities allowed by the *Forest Plan*, such as vehicles, chainsaws, recreationists, and hunters, are unlikely to surpass in intensity or duration the sounds evaluated for Fort Leonard Wood. In addition, the limestone geology of the Hoosier NF is similar to that of Fort Leonard Wood, where it was found that the geology tended to absorb ground vibrations. Indiana bat maternity roosts have been found in areas where various types of human disturbance were occurring (Gardner et al. 1991), including cattle grazing, hay fields, residences, and a clearcut harvest. Several known roost trees have been located near lightly traveled, low maintenance roads (Gardner et al. 1991).

I-17 C. "Language needs to be included to explain how the FS will identify trees (snags) used in the previous year as a maternity colony roost so that these will not be cut which pleases undo stress on the pregnant females." (18)

R. According to the Biological Assessment, no maternity colonies have been documented as occurring on the Hoosier. The Biological Opinion stipulates that TSI activities are allowed to remove snags only if they are safety hazards. Holders of firewood permits would also not be permitted to remove standing dead trees, except in limited circumstances when the specific individual trees to be removed are identified. The combination of these requirements provides protection for any maternity colony roost tree that might exist.

I-18 C. An Environmental Impact Statement is needed because the Biological Assessment prepared by the Forest identified the potential to adversely affect listed species. (05, 15)

R. The Biological Assessment and this EA, although related, have two separate purposes. The Biological Assessment analyzed the effects of implementing the *Forest Plan* through various management activities. The commenter is correct that the potential to adversely affect the Indiana bat was identified. That is why the Hoosier and USDI Fish and Wildlife Service entered into formal consultation, resulting in the Biological Opinion.

The purpose of this document is to examine the effects of incorporating new information about the impacts of forest management on Federally listed threatened and endangered species on the Hoosier NF, including information found in the Biological Assessment, the Biological Opinion, and all reference material used in the development of those documents. The purpose of this document is not to examine the effects of forest management activities but to examine the effects of the proposed *Forest Plan* amendment. Preparing an EA does not preclude the possibility of preparing an Environmental Impact Statement if the environmental effects of a proposed action are determined to be significant. An EA is one mechanism for documenting the analysis and determining whether there are significant effects associated with the proposal. If this EA were to determine that there would be significant effects from the proposed amendment, an EIS would be prepared.

I-19 C. One commenter asked: "…just how does the Forest Service know that these guidelines will result in a sufficient and continuous supply of roost trees?"(19)

> **R.** We estimate over five million potential roost trees are present on the Hoosier NF, and approximately 133 million are found within the state of Indiana. A query of the Hoosier NF's stand database indicated that there are over two million dead trees in Brown, Jackson, Lawrence, Martin, Monroe, Orange and Perry Counties, and a great number of those trees are of large diameter. So there is a very large supply of potential roost trees, and the mortality rates suggest that the supply will continue. A query of FIA data indicated that more than 1.9 million board feet of trees in stands of large diameter sawtimber was considered "mortality trees" in recent years—that is, recently dead. The query concerned national forest land in the nine Indiana counties where national forest land is located. This indicates that trees continue to die in quantities that will supply potential roost trees.

I-20 C. One commenter questioned the claim in the proposed amendment that "timber harvest, timber stand improvement (TSI) and riparian area management guidelines…. are sound forest management practices and benefit a variety of wildlife species, including Indiana bat." (19)

> **R.** The Biological Assessment indicated that there was potential for adverse impacts and determined that continued implementation of the *Forest Plan* "MAY AFFECT-LIKELY TO ADVERSELY AFFECT" populations of Indiana bat using the Hoosier NF. Immediately following that statement in the Biological Assessment was a statement that "A MAY AFFECT-NOT LIKELY TO ADVERSELY AFFECT determination is also made since there will be potential BENEFICIAL effects on Indiana bat habitat through continued implementation of the *Forest Plan*, as amended." The determinations have been based on the best available science.
>
> An action may have potential to injure an individual of a species but benefit its habitat. In the interest of full disclosure, both potential effects were mentioned in the Biological Assessment.

I-21 C. "the indiana bat has evolved to live in climax forests, relatively undisturbed." (30)

> **R.** The implication of the commenter's statement—that Indiana bat prospers only in undisturbed forest regardless of its structure or density—is not supported by the scientific evidence.

Concerns Related to Other Species or Species in General

O-1 C. One commenter is concerned about low ruffed grouse populations and gamebird habitat in general. (01)

> **R.** We are also concerned about habitat for these species. The USDA Forest Service has a mandate to manage habitat for all native and desired nonnative plants and animals within the forest planning area. There is nothing in the proposed action that can be expected to affect game bird habitat.

O-2 C. One commenter asked why several state listed plants and animals, particularly gastropods, were not covered in the proposed amendment. (04)

> **R.** This amendment concerns the Federally listed species on the Hoosier NF–bald eagle, fanshell, gray bat, and Indiana bat. None of the Federally listed snails has been documented as occurring on the Forest.

O-3 C. "The Forest Service's decision not to consider the pink mucket pearly mussel (*Lampsilis orbiculata*) is inconsistent with its mission and forest plan goals to maintain habitat for native species." (05)

> **R.** The USDI Fish and Wildlife Service provides the list of Federally listed species that the Hoosier NF is to address in environmental documents. The Biological Opinion states that this mussel was not included because it is believed to be extirpated from within the Hoosier proclamation boundary.

O-4 C. One commenter was concerned about the need to manage for early successional forest wildlife and stated, "Even-aged regeneration techniques provide essential habitat for a variety of species and help maintain ecosystem health and biodiversity within the Forest." (11)

> **R**. The Biological Assessment and the Biological Opinion allow for a maximum of 100 acres of even-aged hardwood timber salvage harvest and 578 acres of pine clearcuts. Site-specific project environmental analyses will review essential habitat for a variety of species and maintain ecosystem health and biodiversity.

O-5 C. One commenter expressed that they "are very concerned that further disturbances of the national forest will lead to lower numbers of endangered species and disturbance of other animals' habitats. We do not understand how greed can so often overshadow common sence and ethics. Citizens have fought so hard to preserve Hoosier National Forest only to have amendments be proposed to weaken its protection. We have read both sides of the argument and are not satisfied that the type of cutting that is proposed is consistent with conservation. Altering an endangered species' habitat can be tantamount to destroying it." (12)

> **R**. The Hoosier NF is also concerned about endangered species and animal habitats. There are no management actions associated with this proposed *Forest Plan* amendment. Any projects that propose management would be scoped for public comments and undergo environmental analysis. The reasonable and prudent measures and terms and conditions provided in the Biological Opinion will ensure that habitat for endangered species will be available with management.

O-6 C. "I am concerned what the loss of unbroken habitat will do to the ability of songbirds to flourish. Every road cut into the forest enables the horrible cowbird to move in on and destroy some of our most precious bird species. The cowbird lives on the edges of the forest and cutting roads and making clearings gives it access to the forests' interiors." (14)

> **R**. There are no on-the-ground actions proposed *Forest Plan* in this amendment. Any projects that proposed active management would be scoped for public comments and undergo environmental analysis.

.**General Comments, Forest Plan Amendment 7**

G-1 C. One commenter pointed out some inconsistencies in capitalization within the draft text sent out in the scoping package. (02)

> **R.** Thank you for pointing this out. The inconsistencies have been corrected in the EA.

G-2 C. Some commenters believe "resource extraction should not be considered at all" or that no logging should occur on the Forest. (03, 07, 09, 10, 14, 15, 18, 19)

> **R.** The proposed *Forest Plan* amendment does not propose logging. Logging can be a valuable tool in resource management when used in the right manner at the right time and in the right place.

Habitat for many species of wildlife can become quite degraded if nothing opens up the forest, if the understory becomes too crowded, or if certain forest age classes become too scarce. The USDA Forest Service operates under a multiple-use mandate, and those uses include watersheds, wildlife habitat, recreation, and so forth, any of which may need tree removals to improve or maintain conditions. The *Forest Plan* considered an alternative in line with the commenter's suggestion.

G-3 C. "A tree that constitutes a 'safety hazard' is not defined." (05, 17)

R. Any tree that is in relatively imminent danger of falling and might be reasonably expected to threaten human health or safety by falling; for example, a tree with excessive lean in a campground, might be considered a safety hazard. The Biological Opinion states: "Trees which pose a danger to human safety should be removed. These trees are usually found in recreation areas and along trails and roads. Due to the low number of single trees being removed… this action has a low potential for negatively impacting Indiana bats."

G-4 C. "The current Forest Plan is outdated and due for complete revision. The values of the public and the scientific information available have changed." (06, 13, 15, 17, 20, 21, 24, 25, 28, 29)

R. Yes, values and scientific information may have changed. Those are among the reasons for this amendment and the *Forest Plan* revision currently in progress.

G-5 C. "I fully support the management of the Hoosier national Forest to improve the health and vigor of the forest while being sensitive to endangered species. Timber harvest should be planned on a regular basis to not only provide a renewable resource that is in great demand, but also to create diversity within the forest. The income generated can help reduce the tax burden that public lands place on the taxpayers through recreation and other programs. Timber management should be conducted in a way to be revenue positive.

"Forest plans should be used to guide the management and allow for public input. The process should not be used to allow special interest groups to make management decisions. They should be used to allow the public to provide advice on these decisions and to seek additional information that may otherwise be overlooked. A better effort on everyone's part is needed to be sure that comments are representative of the public in general and not just special interest." (08)

R. Thank you for your comments.

G-6 C. "The Amendment suffers from a fatal flaw common to most HNF analysis: that HNF activities will bear a close relationship to what the HNF says it is planning in their NEPA public analysis documents." (16)

R. No activities are proposed with this *Forest Plan* amendment. When projects are proposed, there will be public involvement as well as environmental analysis of the effects of the proposed projects.

G-7 C. "[T]he timber sale contracts for the 1997 Salvage Rider sales on the HNF sold nearly twice as much hardwood as the Environmental Analyses preceding the sales said would be sold. Moreover, the contracts' definition of salvage trees was more liberal than that expressed in the EAs. Please include the contracts and EAs for the Salvage Rider sales in the Administrative Record for the Plan Amendment, as well as the EAs and contracts for all other sales on the HNF. Please address this disparity." (16)

R. The comments do not address the proposed action and are beyond the scope of this analysis.

G-8 C. "The issue of how snags will be protected from firewood cutters needs to be addressed." (18)

R. Firewood cutting permits, when they are made available, will rarely allow for the cutting of standing dead trees and then only of trees specifically identified by the USDA Forest Service. Law enforcement will be watchful of violations of this prohibition, investigate violations, and take steps to prosecute the violators. In the last five years, 173 firewood permits were issued, totaling about 350 cords of firewood. Most firewood taken from the Hoosier NF has been downed material. In addition, private landowners sometimes receive permits to remove dead or leaning trees that are likely to fall on their fences or other structures.

G-9 C. "The analysis needs to develop alternatives with more protection than the minimum required by the BO." (19)

R. See the Conservation Plan for Federally Threatened, Endangered, and Proposed Species, which is part of the proposed *Forest Plan* amendment. It provides programmatic protection for the four threatened and endangered species found on the Hoosier. Alternative C in the EA goes well beyond the requirements of the BO and excludes tree removal during the warmer period of the year (April 15 to September 15).

G-10 C. One commenter wanted a change in the wording proposed in the December scoping for the proposed amendment. The sentence read: "Protection of Federal threatened and endangered species is high priority." The commenter said, "…'high priority' must be changed to 'top priority.'" (19)

R. In accordance with the Forest Service Manual, the wording has been changed to "a top priority."

G-11 C. One commenter stated, "Natural amenities that standing forests provide are much more important to the public than wood products…." (25)

R. The natural amenities that a forest provides are definitely important. The *Forest Plan* recognizes the natural amenities of forests, and management area allocation provides for both amenities and ecosystem functioning. To maintain forest functions, active management is sometimes needed.

G-12 C. A commenter stated, "There is an extreme shortage of anything approaching natural areas in this completely overrun state." (29)

R. Thank you for your comment.

Appendix B

Glossary

DBH—the diameter of the stem of a tree measured at breast height (4.5 feet) (Helms 1998).

biological assessment—the information prepared by or under the direction of the Federal agency concerning listed and proposed species and designated and proposed critical habitat that may be present in the action area and the evaluation potential effects of the action on such species and habitat (50 CFR 402.02).

biological opinion—a document which includes: (1) the opinion of the Fish and Wildlife Service or the National Marine Fisheries Service as to whether or not a Federal action is likely to jeopardize the continued existed of listed species, or result in the destruction or adverse modification of designated critical habitat; (2) a summary of the information on which the opinion is based; and (3) a detailed discussion of the effects of the action on listed species or designated critical habitat (USDI FWS 1998).

den tree – a tree that contains a weather-tight cavity for wildlife (Helms 1998).

forest plan—a long range plan for management of a designated area of National Forest System lands. This amended plan would provide management direction for all management programs and practices, resources uses, and resource protection measures on these lands (USDA FS 1991b).

heritage resources – the physical remains of districts, sites, structures, networks, or objects used by humans in the past. They may be historic or prehistoric, archaeological or architectural in nature. Cultural resources on the National Forest include hunting, quarrying, plant gathering, and living areas from the prehistoric period. Historic era sites are associated with farming, logging, oil exploration, and a variety of individual pursuits. Cultural resources are land based and are nonrenewable (USDA FS 1991b).

incidental take—takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02).

issue—a point of discussion, debate, or dispute [about environmental effects] (Forest Service Forest Plan Implementation course).

listed [species]—any species of fish, wildlife, or plant which has been determined to be endangered or threatened under section 4 of the Act [ESA] (50 CFR 402.02).

programmatic consultation—consultation addressing an agency's multiple actions on a program, regional, or other basis (USDI FWS 1998).

project—an organized effort to achieve an objective identified by location, activities, outputs, effects, and time period and responsibilities for execution (USDA FS 1991b).

shade-intolerant species—those plant species that do not grow well in a shaded environment (USDA FS 1991b).

shade-tolerant species—those plant species that grow well in a shaded environment. Usually tolerance decreases with age (USDA FS 1991b).

shelterwood—a regeneration method used in even-aged management. It involves the cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment (Helms 1998).

succession—the gradual development of a plant community. This involves an orderly process of biotic community development with changes in species, structure, and community processes with time (USDA FS 1991b).

take—[under ESA,] to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect an animal or to attempt to engage in any such conduct (ESA of 1973). Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by FWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (USDI FWS 1998).

Appendix C

Public Comments on the (April 10, 2003) Pre-decisional EA

The interdisciplinary team categorized each response received during the 30-day comment period to identify specific comments, issues, and concerns. The team then identified and sorted the comments. Each comment is followed by a summary of how the comment was addressed in the analysis.

In the following pages, we group comments by issues.

- "C" indicates a comment.
- "R" indicates the USDA Forest Service response.
- Direct quotes are within quotation marks.
- Paraphrased comments are without quotation marks.

There is also a 'general' heading, which lists non-specific and miscellaneous comments. We list the comment response number in parentheses. When we list several response numbers, the quote is from at least the first corresponding name in Table 9; however, the ID team believes the quote represents the additional comments.

Approximately 1,459 groups, individuals, and neighbors were contacted regarding the proposed amendment. The following table lists those who responded during the comment period. A complete listing of the individuals contacted can be found in the administrative record.

TABLE 9. COMMENTS RECEIVED ON PRE-DECISIONAL EA

Name	Organization	Response #
Bensman, Jim	Heartwood Forest Watch	9
Blair, John	Valley Watch, Inc.	7
Bump, Adam	The Ruffed Grouse Society	5
Bussabarger, Harold		2
DuMond, Bill		4
Form Letter	Various Individuals	6
Hammond, Donald J.		3
Mahler, Andy		11
Martin, Joshua	Indiana Forest Alliance, American Lands Alliance	10
Short, Duane		8
Worrel, Chris & Erica		1

The interdisciplinary team grouped comments in the following categories, and the categories appear in this appendix in the following order:

- Indiana Bat
- Killing Bats
- Gray Bat
- Fanshell Mussel

- Threatened and Endangered Species
- Early Successional Habitat
- Support for Alternative A
- Support for Alternative B
- Support for Alternative C
- General
- Public Involvement
- Consider No Harvesting
- EIS
- Authorizing Timber Harvest?
- Forest Plan Obsolete?
- Expressing Dissatisfaction
- Timber Harvest Level
- Mitigations, Restrictions, Options
- German Ridge

Indiana Bat

I-1 C: One commenter questioned our statement in the environmental assessment (EA) that guidelines in the *Forest Plan* management areas guidance and Appendices B and J "are sound forest management practices and benefit a variety of wildlife species, including Indiana bat." He wrote; "Based on what? If this was true, there would be no need for formal consultation with the USFWS. Your own BA also directly contradicts this claim…. The courts found that logging would harm the bats." (9)

> **R:** Consultation with the USDI Fish and Wildlife Service (Fish and Wildlife Service) is required. Management consistent with the proposed amendment and criteria such as that found in the *Forest Plan* provides for improvements to Indiana bat habitat while minimizing risk to bats. The consequences of implementing the conditions in the proposed amendment were disclosed in the EA. Fundamental to the protection of any species, and the Indiana bat is no exception, is the protection and provision of suitable habitats. Sufficient open area within and under the tree canopy, the presence of usable snags, large trees, and desirable tree species provide habitat features intended to meet the life history requirements of the Indiana bat.
>
> We do not know what court case the commenter may be referring to, but recent scientific research indicates that bat habitat can be maintained through such means as logging. One such recent study found "roost trees were in highly fragmented forests. Roosting habitat existed among more patches of agricultural/grassland, compared with random locations" (Carter *et al*. 2002). Another study noted in its conclusion "colonies probably tolerate considerable alteration of the landscape" (Miller *et al*. 2002).
>
> The Hoosier National Forest Biological Assessment indicates potential risks to the bats from logging, but also includes a statement that
>
>> "A MAY AFFECT- NOT LIKELY TO ADVERSELY AFFECT determination is also made since there will be potential BENEFICIAL effects on Indiana bat habitat through continued implementation of the *Forest Plan*, as amended" (USDA Forest Service 2000, pg vii).

The Fish and Wildlife Service formally evaluated the Biological Assessment in the form of a Biological Opinion (USDI FWS 2001). That document concluded that:

> "only a small fraction of the Hoosier's 188,453 acres of forested land will be altered by the continued implementation of the *Forest Plan*. Pine harvest will … result in a long-term benefit to the Indiana bat…."

The Biological Opinion further characterizes the guidelines within the Biological Assessment and the *Forest Plan* as

> "sound forest management practices and benefit a variety of wildlife species, including Indiana bat."

As mentioned in the previous Response to Comments (Appendix A), these determinations have been based on the best available science. The Forest has relied on the expert opinion of independent research recorded in the scientific literature, the results of independent researchers engaged by the Forest, and expert opinion within state and other Federal resource agencies. Recognizing that an action may potentially injure an individual while benefiting the larger habitat of a species, the Forest chose to describe both potential effects in the interest of full disclosure.

I-2 C: "For example, the guidelines for the Indiana bat do not protect the species. They allow cutting of actual and potential roost trees, of future roost trees, and allow for significant modification of foraging habitat. This will harm a species that is already critically endangered. Allowing such actions in the Hoosier… will jeopardize the continued existence of the species, and no further taking should be considered incidental." (6, 8, 10, 11)

R: Respectfully, we must disagree. The Hoosier has gone to great lengths to gather information concerning the Indiana bat, surveying for the species, consulting extensively with the Fish and Wildlife Service, and in other ways ensuring that we protect and provide suitable habitat. The Forest regards the protection and provision of suitable habitats as the fundamental means by which the future viability of Indiana bat may be ensured. In weighing the exceptionally low risk to any one individual bat posed by management against the benefit achieved by improving habitat to the population of Indiana bats at large, it is certain that we can best serve the Indiana bat through careful habitat management.

The Biological Opinion and the proposed amendment allow for the management of bat foraging habitat. Tree removals and burning are important tools in maintaining and enhancing the conditions that scientists have described as typically used by Indiana bats. We are serious in our efforts to provide those habitat conditions that provide adequate foraging opportunity for the Indiana bat. These treatments provide canopy conditions that allow bats to successfully penetrate the forest and forage there. The potential effects of the proposed amendment on listed species are disclosed in the EA on page 18 to 24 and pages 29 to 34. In addition, the project record contains a document, Biological Evaluation for Endangered and Threatened Species—*Forest Plan* Seventh Amendment, that further details similar considerations.

The Fish and Wildlife Service's Biological Opinion considers and allows the cutting of trees and does so in the context of ensuring suitable habitats for the Indiana bat. However, the Biological Opinion does not represent the Service's only input regarding land

management of the Hoosier. Each project that may potentially affect the Indiana bat must go through an 'append' consultation process with the Fish and Wildlife Service. As part of the append consultation process, the Fish and Wildlife Service is informed of each project that may potentially affect the Indiana bat. Consequently, the Fish and Wildlife Service can and does issue supplementary site-specific measures to further protect the Indiana bat. In other words, in addition to the programmatic approval by the Fish and Wildlife Service expressed within the Biological Opinion, the Hoosier endeavors to obtain the same judgment of "sound management practices" on a project-by-project basis.

The Fish and Wildlife Service also has the authority and responsibility for issuing Incidental Take Statements. The Fish and Wildlife Service considered *Forest Plan* activities and the possibility that a tree could be felled with one or more Indiana bats in it. It also considered Indiana bat habitats. The Biological Opinion included guidelines that will:

- ensure adequate canopy cover in hardwood stands to provide Indiana bat foraging habitat;
- provide roosting habitat by greatly minimizing the removal of shagbark hickory (*Carya ovata*) and shellbark hickory (*Carya lacinosa*) trees;
- maintain roosting habitat by prohibiting snag removal except under very limited circumstances;
- ensure a continuous supply of large roost trees for the bat by maintaining a component of large, over-mature trees in forest stands;
- provide for monitoring and reporting,
- and take other steps to ensure that impacts of incidental take associated with proposed projects are appropriately minimized.

Incidental take is defined in the regulations as "takings that [may] result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency" (50 CFR 402.02). Having an Incidental Take Statement does not mean that any Hoosier activities will result in the death of any bats. However slight the risk, the intent of consultation with the Fish and Wildlife Service as well as project analysis by the Hoosier, is to avoid, or at least minimize the risk of, injury to any bat. With respect to incidental take, the Fish and Wildlife Service has concluded that

> "the continued implementation of the existing Hoosier National Land and Resource Management Plan is not likely to jeopardize the continued existence of the Indiana bat."

I-3 C: One commenter expressed dissatisfaction concerning our summary of why we expect a sufficient and continuous supply of roost trees. He wrote, "These claims violate the ESA's requirement to use the best scientific and commercial data available. They also violate the USDA and OMB Information Quality Guidelines. As such, we request a correction. While it is certainly true that Indiana bats roost in snags, one cannot conclude from this fact that all snags are potential roost trees. As our comments pointed out, Indiana bats have more requirements.... The Forest Service, however, concludes all snags are potential roost trees when they clearly are not." He also claimed we had violated the Endangered Species Act requirement to use the best scientific data available when the EA and Response to Comment (Appendix A) mentioned the millions of trees of differing sizes and conditions found in Indiana and on the Hoosier. (9)

R: In various places in the EA, we disclosed qualities Indiana bats seem to select in roost

trees. Certainly all possible roost trees are not equal. That is why the Biological Opinion and the Biological Assessment stressed the importance of certain tree species. An important result of this awareness is this proposed amendment. Please refer to pages 12 to 14 of the EA for proposed requirements on activities on the Hoosier that would help ensure the presence of not only potential roost trees but also roost trees that should have characteristics suitable for Indiana bats.

Indiana bats have been found roosting in a great variety of species of trees and in trees of various condition. The EA does not claim that all of the potential roost trees are of the species most desired by Indiana bats nor that they all meet the bats' preference criteria. But, since bats have been found roosting in a variety of species and tree conditions, it is reasonable to regard them as potential roost trees.

The database query that estimated mortality trees in the local counties was limited to oaks and hickories, as was the query of total live trees on the Forest by size class (Thake 2002). In attempting to keep the EA brief, we did not include in the EA the fact that this query was limited to oaks and hickories. That information combined with the numbers of large trees in the area of the Hoosier indicates that potential roost trees are, and will continue to be, available to Indiana bats.

This EA for amending the *Forest Plan* with regard to threatened and endangered species was developed by an interdisciplinary team of agency scientists, resource specialists, and others using the best available scientific information. The ID team was aware of the information guidelines and gave full attention to the quality of the scientific information used in developing this NEPA document.

The clarifications in this response may help the commenter and other readers understand the abundance of snags within the area of the NFS lands and the presence of desired tree species.

I-4 C: "The population of Indiana bats and its future potential will not be adequately protected when commercial logging is allowed to occur in its extremely rare summer habitat. It is highly likely that individual bats will be killed by the proposed level of commercial logging when logging is not prohibited during any part of their roosting time" (10)

R: First of all, the EA summarized information about the extent of trees and snags available. See Response to Comment I-19 in Appendix A. That is, there appears to be a relative abundance of Indiana bat summer habitat. Secondly, we respectfully disagree about the protection provided by this *Forest Plan* amendment. As was noted in the Biological Assessment, nothing the Hoosier by itself can do would guarantee the survival of Indiana bat populations, but we are taking important steps to protect (minimize the possibility of harm to) individuals and at the same time maintain needed habitat for them.

With the degree of care inherent in the proposed measures, we do not consider it highly likely that bats would be killed. Since the death of a bat or bats remains a possibility, we consulted with the Fish and Wildlife Service and are incorporating that agency's terms and conditions into our *Forest Plan* to minimize the opportunity for such a result. Although harm to an individual bat would certainly be undesirable, it is the species that must be protected, and the Fish and Wildlife Service found that

> "the continued implementation of the existing Hoosier National Forest Land and Resource Management Plan is not likely to jeopardize the continued existence of the Indiana bat."

I-5 C: "The science used is selective and ignores even the evidence of local forest Service employees who discovered an Indiana bat in a pine stand on the Hoosier. This example and other science, such as roost tree fidelity and population decline, that might increase controversy over the proposed activities have been conveniently ignored so as to avoid having to prepare a full blown EIS." (6, 8, 9, 10, 11)

R: The value of native hardwoods (as opposed to non-native or exotic, and in some cases invasive, pines) is unequivocal. At the very least, the maintenance of exotic vegetation types seems counter to the mandate of ecosystem sustainability. Certainly it is possible on occasion to find an Indiana bat within a pine stand. However, we suggest that the life history of the bat is more uniquely associated with the central hardwood forest. Therefore, the replacement of pines with native hardwood habitat should ultimately benefit the bat.

By way of example, a recent landscape analysis of summer habitat has evaluated the suitability of pines as Indiana bat summer habitat (Carter *et al*. 2002). This study concluded that:

> "The area and number of patches of coniferous forest did not differ between roosting and random sites."

Page 22 of the EA refers to the loss of roost sites potentially requiring females to expend energy locating new roosting habitat when they return from their winter hibernacula, and it says, "Weight loss and stress associated with hibernation, migration, and pregnancy could potentially result in lower reproductive success or lower survival of juvenile bats." Loss of an individual tree is not an occurrence outside of the natural order. Trees eventually die and fall. What the proposed amendment would do is preclude most harvesting of the most desired roost tree species and all but eliminate the cutting of any snags. These, as well as other measures in the proposed amendment, are important in minimizing the possibility that a roost tree might be cut. On page 4, the EA addresses the population of bats in Indiana, and on page 22 it notes under cumulative effects the decline of the general population. Also see the response to comments I-2 and I-3.

I-6 C: "The Identification of Significant Issues from page 7 only raises 3 issues as significant. At least, disturbance and loss of summer roosting HABITAT should be included as well." (10)

R: The EA focuses somewhat on the removal of trees during the reproductive season of the bat, but the description of that issue (EA, p. 7) included disturbance and foraging habitat as concerns. Both disturbance and foraging habitat were addressed at various places in the EA—disturbance on pages 18, 24, and 52, for example, and foraging habitat on pages such as 9, 15, 19, 20, 22, and 23. Certainly both disturbance and loss of summer roosting habitat were evaluated and disclosed.

I-7 C: A commenter noted that the EA claimed no evidence of bats necessarily returning to the same trees in subsequent years. "The EA, however, fails to consider all the research we have pointed out in the past that indicates they do. Likewise, we have sent the Forest Service a letter from Dr. Whitaker that disputes this claim." (9)

R: Recent research (Gumbert *et al*. 2002) suggests that the high fidelity of Indiana bats to habitat areas near hibernacula may be expressed as fidelity to groups of roost trees "over multiple seasons or years." It seems clear that Indiana bats use multiple roosts, may use the same roosts seasonally, and may use the same or similar roosts from year to year as long as those roost trees are available. This loose fidelity and the use of multiple trees is thought to be an adaptive response to the ephemeral nature of snags. That is, as snags decay, fall , and are lost, bats move to another or similar roost tree within their range. Nonetheless, this underscores the necessity of managing for roost trees, and snags in particular, which we have addressed in the EA and have reiterated in these comments (see above response to comments I-2, I-3, I-4, I-5, and I-6).

The statement in the EA (Issue 1, paragraph 3, sentence 4) was not as complete or clear as it could have been and erred in leaving the impression that bats generally do not return to the same roost trees. The statement in the EA regarding the year-to-year fidelity of Indiana bats to roost trees (sentence number 4 in the above-cited paragraph) is hereby replaced with the following sentence: "It appears that at least some Indiana bats may use the same roost tree or group of trees from year to year as long as those roost trees are available." This change does not necessitate any further change in the amendment or in the analysis, as snags would be well protected by the proposed amendment. Many other potential roost trees, including most trees of species most likely to produce desirable roost trees after they die, would also be protected.

I-8 C: A commenter suggested that the Hoosier was confusing NEPA and ESA requirements when the EA referred to the Fish and Wildlife Service's Biological Opinion and pointed out the purpose of the EA and analysis (determining and disclosing the effects of various ways of incorporating—or not incorporating—the Fish and Wildlife Service's Biological Opinion). (9)

R: The EA analyzed and disclosed the effects of incorporating the terms and conditions of the Biological Opinion into the *Forest Plan*. The Biological Assessment and Biological Opinion are important documents in the project record, since they provide a good deal of information concerning threatened and endangered species. See also the response to comment I-2.

I-9 C: In response to the Response to Comment I-11 C, one commenter asked, "Then how does the Forest Service explain the discrepancy in the amount of Indiana bats in an area differ with mist net and Anabat surveys? Why have so many Anabat surveys found Indiana bats when mist netting did not catch them? What about common sense and logic? Why would it not be logical to conclude bats that feed in the open would not be easier to catch than a bat such as the Indiana bat that feeds in treetops? To survive, an Indiana bat has to be able to avoid branches in a tree while an open area feeder does not." (9)

R: The Anabat detector and mist nets are generally used for different, but complementary, purposes. Anabat detectors are capable of detecting the presence of bats; mist nets are frequently used when it is necessary to handle bats, as when bats are tagged or marked or when there is a legitimate need to equip bats with radio transmitters. A mist net examines a very specific and limited area, close to the ground. Its area is quite limited in space and area. The Anabat detector examines a much broader area, in both horizontal and vertical space.

I-10 C: "There are two separate Federal Actions involved: the continued management of the

Forest and the adding of the Amendment to the *Forest Plan*. The EA addresses the Amendment to the Plan, while the Biological Assessment addressed the Federal Action of the on-going management of the Forest. A Biological Assessment is not a NEPA document so it does not fulfill the Forest Service's NEPA obligation to consider if a SEIS for the *Forest Plan* is required. The existing Plan EIS did not address the adverse effects to the listed species the Biological Assessment identifies. The Forest Service has a legal obligation to prepare a SEIS due to these adverse effects." (9)

> **R:** The Hoosier is under no illusion regarding the National Environmental Policy Act (NEPA) status of the Biological Assessment (BA). Nonetheless, the Biological Assessment is an important reference that documents analysis of the effects of the proposed action (the *Forest Plan* amendment), including the continued implementation of the *Forest Plan*. The EA did not rely solely on the Biological Assessment for its determinations of effects, but the EA did quote from, utilize, and reference the BA, and therefore we chose to place it in its entirety in the project record for information and review. Please refer to the Biological Assessment, the Biological Opinion, and the cumulative effects analyses in the EA to see the effects of continued implementation of the *Forest Plan.* The EA discloses effects and provides a basis for determining whether or not an EIS is needed.

Killing bats

K-1 C: "We would also like to point out that the USFWS has not undertaken this inquiry—it simply keeps allowing people to kill Indiana bats while their population crashes to extinction." (9)

> **R:** The Forest Service appreciates your concern about the well-being of the Indiana bat. We would, however, like to distinguish between the deliberate killing of bats as suggested above and the substantially minimal risk of the death of a bat occurring in the pursuit of otherwise lawful, and in many cases environmentally desirable, activities. We have discussed at length both the programmatic review of management activities found in the Biological Opinion of the Fish and Wildlife Service and the project-by-project 'append' consultation process with the Fish and Wildlife Service, which addresses this concern (see also the response to comment I-2).
>
> Indiana bats occur throughout the Midwest and the eastern United States; records of occurrence suggest a current distribution encompassing 27 states. Surveys of hibernacula in 2001 suggested a rangewide population of approximately 380,000 Indiana bats (Clawson 2002). This represents a rangewide population decline of 57%, down from 880,000 individuals since surveys began following the listing of the Indiana bat in 1967 (Clawson 2002).
>
> Numbers of bats have declined across the range of the bat, and particularly so in Kentucky. Between 1960 and 2001, the number of bats observed in Kentucky hibernacula has declined by approximately 200,000 individuals. With this exception, however, the number of Indiana bats within the Midwest states appear to have increased within the last decade. Indiana populations have increased from approximately 160,000 bats in 1960 to an estimated 173,000 bats in 2001. Over the same period, the number of Indiana bats increased from an estimated 14,800 to 19,300 in Illinois (Clawson 2002). In the 10 years between 1990 population estimates and 2000/2001 surveys, the number of hibernating Indiana bats declined from an estimated 78,700 to 47,900 in Kentucky, while increasing

from 14,900 to 19,300 in Illinois, and from 163,500 to 173,100 in Indiana (Clawson 2002). These most recent trends suggest that the stability of Indiana and Illinois populations currently exceed those inhabiting hibernacula in Kentucky.

Currently, half of all known Indiana bats occupy hibernacula within the State of Indiana. Indiana and Kentucky each contain three of the nine Priority One Hibernacula, together providing winter habitat for more than 85 percent of the known population of Indiana bats. Illinois, Indiana, and Kentucky all harbor Priority Two and Priority Three Hibernacula (USDI Fish and Wildlife Service 1999; Table 2). Priority One Hibernacula each support more than 30,000 wintering bats; Priority Two Hibernacula are those hibernacula supporting between 500 and 30,000 bats; and Priority Three Hibernacula support fewer than 500 wintering bats.

Persecution, intentional and inadvertent human disturbance of hibernating bats, and vandalism to cave structures have all contributed to Indiana bat declines. In Kentucky, the exclusion of Indiana bats from caves and changes in airflow due to improper cave gates and structures have also contributed to declines. Bats inhabiting mines have been lost in collapse of mine ceilings (Brady *et al.* 1983). In addition to the apparent sensitivity to cave microclimate and the role of disturbance, simplification of landscapes (USDI Fish and Wildlife Service 1999) and accumulation of pesticide residues may also influence bat populations (Brady *et al.* 1983).

K-2 C: The commenter claims we ignored his comment (I-14C) [in response to scoping—in Appendix A] about the "Incidental Take Permit." His original comment concluded "How many more bats will die as a direct result of the following anticipated regime of destruction?" (9)

R: Our response re-stated information about the Fish and Wildlife Service's biological opinion, pointed out the purpose of this particular analysis, and concluded that locating and compiling records of all Incidental Take Statements issued to various state, Federal, and other entities across the entire range of the Indiana bat is beyond the scope of this analysis (Appendix A, response to comment I-14). We would again suggest that monitoring the permit activity of the Fish and Wildlife Service across the range of the Indiana bat is beyond the authority of the Hoosier National Forest.

Furthermore, we suggest that the Endangered Species Act and the National Forest Management Act enjoin the Forest Service to provide suitable habitats for the Indiana bat as well as other species. This may require the Hoosier to actively manage habitats through such activities as controlled burns and the replacement of non-native exotic vegetation with native plant communities. In order to safeguard species such as the Indiana bat, these management actions have been reviewed programmatically and would also be reviewed on a case-by-case basis by the Fish and Wildlife Service. Please refer to the responses above to comments I-2, I-3, I-4, I-5, I-6, I-7, K-1 and K-2.

Gray Bat

G-1 C: "As far as the gray bat is concerned, the EA is not convincing that the species does not use the forest at certain times of its development. For example, studies at Land Between the Lakes found these bats ranging over 30 miles from known cave homes. It is virtually impossible that these bats would travel that distance in one night and return to a cave. Even bat expert Merlin Tuttle suggests that young gray bats may use the forest when learning to fly. Also, the

impacts of tree removal on the foraging habitat of gray bats is inadequately considered." (6, 8, 9, 10, 11)

> **R:** Although the EA notes that there is little likelihood of gray bat hibernacula or summer roosts occurring on the Hoosier, it does allow for that possibility. A summary of impacts to the habitat of gray bats is provided in the body of the EA (see pages 30-33). The Biological Assessment goes into considerably more detail concerning the gray bat and effects to it, and the Fish and Wildlife Service's cover letter for the Biological Opinion concurred with our finding in the Biological Assessment that the continued implementation of the *Forest Plan* and projects predicated upon it would not adversely affect the gray bat (*Myotis grisescens*).

Fanshell Mussel

F-1 C: "In regard to the Fanshell mussel, the Forest Service and the Fish and Wildlife Service needs to minimize the sedimentation going into the White River. Logging in that watershed on the steep, highly erodible national forest will not contribute to the protection of the species." (6, 8, 9, 10, 11)

> **R:** The Hoosier does minimize the sediment going into White River from NFS lands. There is nothing in the proposal that would be expected to result in impacts to the fanshell mussel. The *Forest Plan* notes that guidance is to be determined at the site-specific level. That remains applicable. Soil-disturbing activities in that watershed would need to consider the effects upon the fanshell.

F-2 C: "There needs to be a coordinated effort between agricultural, urban development, and forest interests to protect the fragile water quality in that watershed, and this plan does not provide that." (6, 8, 9. 10, 11)

> **R:** Although the water quality in the watershed referred to varies considerably, we agree that coordinating efforts to protect our natural environment, and particularly the environment of an endangered species like the fanshell mussel, is desirable. The Hoosier coordinates frequently and meaningfully with a variety of other agencies and with private landowners.
>
> The proposed amendment notes the continuing coordination the Hoosier has been doing with such parties as the Fish and Wildlife Service and Indiana Department of Natural Resources.

Threatened and Endangered Species

T-1 C: "As the Courts have reminded the Forest Service in our lawsuits, it [protection of Federal threatened and endangered species] is required to be the top priority. The Forest Service also fails to recognize the FSM uses "top priority" not "a top priority." (9)

> **R:** You are correct that protection of Federal threatened and endangered species is our top priority. That is why this EA was developed and why we consult with the Fish and Wildlife Service—to ensure that our actions not only don't jeopardize but actually benefit listed species. See our response to I-2. Not only is this amendment proposing standards and guidelines to aid in the protection and conservation of threatened and endangered

species, but the Hoosier has previously taken many actions to advance the welfare of threatened and endangered species (USDA Forest Service 2002). However, it is still true that by Congressional mandate the Forest Service has additional priorities. For example, the Forest Service is still obligated to follow such laws as the Multiple Use-Sustained Yield Act, the National Forest Management Act, the National Environmental Policy Act, and the Organic Administration Act of 1897.

The next to the last sentence of the introductory paragraph of the proposed amendment is hereby changed to read: "Conservation of Federally threatened and endangered species is our top priority." This clarification requires no further change in the amendment or the analysis.

T-2 C: "The EA fails to address the impact activities such as logging will have on the listed species. As mentioned above, the Forest Service has a NEPA obligation to address the on-going management of the Forest in light of the new information about these listed species." (9)

R: Please refer to the EA pages 18 to 23 and 29 to 34 where we address this concern. Also see response to I-2 above.

T-3 C: "The Forest Service fails to take into account that they also have a duty to conserve endangered species and give top priority to their protection and recovery. This is much more than just not jeopardizing the species. We, however, believe the Forest Service is jeopardizing the Indiana bat." (9)

R: We agree that we have an important duty to conserve and protect endangered species and actively manage habitat for them.

We acknowledge the opinion of the respondent but suggest that management activities on the Hoosier are both reasonable and prudent with respect to protection of the Indiana bat. Please refer to the comments above for further related discussion (I-2, I-3, I-4, I-5, I-6, I-7, I-8, I-9, K-1, and K-2).

T-4 C: "The Forest Service appears to be confused on what the "Federal action" is. The Federal action is the approval of the *Forest Plan*. New information and changed circumstances necessitate the need to revisit the FEIS to see if it needs to be revised." (9)

R: With this amendment, we would update the *Forest Plan* with additional and changed standards. As noted in the EA on page 4, we looked at the nature of the changes, and the Forest Supervisor determined that this is a non-significant amendment (see Forest Service Manual 1922.51). The *Forest Plan* was previously approved. In this process we identified new information pertinent to threatened and endangered species, consulted with the Fish and Wildlife Service (resulting in a Biological Assessment and Biological Opinion), proposed an amendment to the *Forest Plan* (which would incorporate new guidance, such as the terms and conditions of the Biological Opinion), analyzed the effects of the proposed amendment and alternatives to it, and considered cumulative effects.

T-5 C: "The EA fails to address the impact activities such as logging will have on the listed species." (9)

R: The EA addresses the environmental effects of continuing to implement the *Forest*

Plan, including the activities in Table 2. See the response to T-2 and see especially pages 20-23 of the EA.

Early Successional Habitat

E-1 C: "Early successional species will continue to decline on the Forest and in Indiana with continued decline in management. The amount of early successional habitat (stands 1-10 years of age) has declined by 79% from 1986-1998 on private land in Indiana according to Federal Inventory and Analysis data (http:/www.srsfia.usfs.msstate.edu/scripts/ew.htm) …. Currently the Forest has less than 1% of its entire area in forested cover less than 10 years of age (Table 6). The proposed harvesting, if all is achieved, will maintain only [0].5% of the Forest in early successional habitat. This is not an acceptable level. The Forest currently has over half of its acreage designated to provide late successional habitats, care needs to be taken to ensure that early successional habitats are maintained." (5)

R: Although this comment does not pertain to the Proposed Action, we agree that early successional habitat is likely to decline in the absence of active forest management. It is also true that management on lands of various ownerships has declined. Consequently, many of the species associated with these habitats, including those neotropical migrant songbirds dependent upon disturbed habitats, have similarly declined.

E-2 C: "In Indiana, 38% of early successional nesting species have declined significantly from 1980-2001 as compared to 20% of mature woodland nesting species (Sauer *et al*. 2002). In addition, many mature forest nesting species have been found to utilize early successional habitat after nesting (Anders *et al*. 1998, Pagen *et al*. 1999, Vega-Rivera *et al*. 1998). Recent data from the Indiana DNR indicates dramatic declines in ruffed grouse throughout Indiana. Grouse populations are currently 91% lower than they were in 1979 (Backs 2002). American woodcock have declined by 1.6% per year since 1968 in the Central Flyway due primarily to habitat loss (Kelley 2002). The Forest should seek to achieve balance in forest management and seek the best course of action to provide for all species without favoring a single species to the detriment of entire communities dependent on disturbance." (5)

R: We acknowledge your concern and the accuracy of your assessment of the status of these and other species dependent upon early successional habitats. However, this particular proposal is directed at the maintenance of habitat for Indiana bats and other listed species and so our discussion is necessarily limited to those issues directly related to management of threatened and endangered species.

E-3 C: "The Society is encouraged that the Forest projects that some timber harvesting will occur on the Forest over the next five years which may provide some early successional forest habitat." (5)

R: Yes, in accordance with activities anticipated in the *Forest Plan,* the Forest expects to maintain some early successional habitat.

E-4 C: "Private land forest management does not appear to be providing early successional forest habitats. The Hoosier should seek to provide all habitats, [since] it cannot be assumed that some habitats are being provided for on private lands while others are not." (5)

R: We concur with your assessment of management on private lands and the role of the Forest in maintaining a component of early successional habitat. It is not only difficult to determine the plans and intentions of private land owners but also those intentions and plans change with changes in ownership and economic conditions. Consequently, the Hoosier intends to continue maintaining habitat for early successional species as well as providing habitat for species preferring other vegetative conditions.

Support for Alternative A

A-1 C: "After a review of the plan, I concur with your selecting alternative 'A' as best for our Hoosier." (3)

R: Thank you for your comment.

Support for Alternative B

B-1 C: "The selection of the No Action alternative appears to provide similar protection as found acceptable on the Mark Twain." (5)

R: You might be misinterpreting what was done on the Mark Twain National Forest. Management of the Hoosier and the welfare of Indiana bats have been looked at in depth in the Biological Assessment, the Biological Opinion, and this EA. Although we have been accused of taking only minimal action to protect the bat and its habitat, this amendment includes a number of actions that will protect the bat and allow us to manage habitat for it and other species. In following this amendment, we would provide additional protection for threatened and endangered species while also managing for multiple resources and multiple uses.

Support for Alternative C

C-1 C: "I don't suppose you could implement A and C. That would be my choice, but if not, whichever will better protect HNF's endangered and threatened species." (1)

R: Thank you for your comment.

C-2 C: One commenter expressed the idea that it would be good to stop cutting between April and September 15 to help the wildlife. (2)

R: Thank you for your comment.

C-3 C: "…we could design winter logging parameters that would reduce the impact of the activity to make Alternative C much more attractive." (10)

R: To successfully operate during the winter months, one needs dry or frozen ground. In a severe winter, we might get a week or so of frozen ground in the forest. Most years do not provide that condition. The normal winter condition is soil saturated with moisture. When favorable conditions occur and logging has been authorized, logging in the winter is allowed.

C-4 C: "I favor Alternative C, which includes the Action Plan plus restrict logging during the period April 15th to September 15th." (4)

R: Thank you for your comment.

General

GEN-1 C: "The Society supports efforts to maintain biological diversity and the maintenance of critical wildlife habitat." (5)

R: Thank you for your comment. We not only support such efforts but also initiate activities to further those important objectives.

GEN-2 C: "Please add the name of Valley Watch, Inc. to the comments (to be) filed by American Lands/Indiana Forest Alliance and Heartwood." (7)

R: Thank you for your interest in the Hoosier.

GEN-3 C: "Please count this letter, with full weight, as a request that T & E species be protected by the Hoosier National Forest according to both the spirit and letter of the FS's own rules and regulations and to satisfy the responsibilities set forth in the Endangered Species Act." (8)

R: Thank you for your interest. We don't so much "count" letters as consider the content of them. The Hoosier takes seriously its responsibilities to protect and conserve threatened and endangered species, as is indicated the discussion above (see responses to comments T-1, T-2, and T-3).

GEN-4 C: "We also request that the Forest Service extend the comment period. The other National Forests have provided longer comment periods. We have not been able to adequately review all the documents." (9)

R: Opportunity has been provided for comments. In the interest of communicating with the public, we provided a comment period on the pre-decisional EA even though it was not required by policy.

GEN-5 C: "We are also including our appeal of the Daniel Boone IB Amendment." "We are sending a CD with Indiana bat studies to place on the administrative record." (9)

R: The CD with the Indiana bat studies was received and is appreciated, even though most of the studies were already in our possession. Normally we would not place the CD in the project record, as there was no indication in the materials provided as to how they specifically apply to our proposed amendment. In order for us to include copies of documents sent to us in a project record, we need to receive information that clarifies the relevance of each document and how it specifically relates to the particular proposed project (what findings on the CD or other documents relate to what specific aspects of the proposed *Forest Plan* amendment). Such information would allow us to better understand the intended meaning and reduce the possibility of misunderstanding.

In this case, however, we did review the contents of the CD. This is because the commenter may not have been fully informed about the need for specifics when responding. Again, in the future for such compilations of documents to be included in a project record, they will need to be accompanied by specifics of what information in which document relates to what specific part of the particular proposed action being addressed.

As far as recent scientific information is required, note also that the pre-decisional EA was sent to a list of approximately 130 individuals involved in bat research or otherwise involved with bats. The list of names (included in the project record and filed there with the pre-decisional EA) was taken from the list of attendees at a bat symposium, and it included many top bat scientists in the country, particularly the eastern United States. None of those scientists or researchers submitted comments concerning the proposed amendment.

GEN-6 C: "I have been recognized for my involvement in forest protection efforts, including, most recently, with an Orange County Golden Deeds award. I live in the forest and spend time in it every day." (11)

R: Thank you for your comments. We appreciate your involvement with nature and are glad that we have had a part to play in providing some of the opportunities you and others have to spend time in the forest.

GEN-7 C: "The Society is unclear as to why our suggestion to model the proposed amendment after the Mark Twain National Forest's approach to Indiana bat management was classified as 'meaningless.'" (5)

R: Thank you for the opportunity to clarify the intent of our earlier response. We acknowledge the poor choice of wording used to respond to your previous suggestion. Since the Hoosier has only one known Priority 3 hibernacula and no lactating female bats have been found on the Forest, we concluded that management based on zones around such habitat features would not be applicable on the Hoosier National Forest.

The intent of this proposal is to amend the *Forest Plan* to incorporate the guidance in the Biological Opinion from the Fish and Wildlife Service. Zones were not proposed in the guidance. The guidance in the Mark Twain NF's biological opinion was different from that provided to the Hoosier.

Public Involvement

P-1 C: "These guidelines should undergo a more intensive session of public involvement and study as provided by the EIS process." (6, 8, 10, 11)

R: The amendment was first sent out, in December 2001, to a list of 1,519 names. The pre-decisional EA was made available to 1,459 persons or organizations. In addition, the public was notified about the availability of the EA by publishing a public legal notice for public comment on April 13, 2003 in the Sunday Hoosier Times newspaper. The EA was also available on our website at http://www.fs.fed.us/r9/hoosier/projects.htm. The Hoosier Quarterly also contained a description of the amendment in six issues.

P-2 C: In response to the Hoosier's response to comment I-4 C (in Appendix A), one commenter wrote: "The Forest Service fails to take into account the fact that the Bush regime is trying to eliminate public involvement and environmental analysis for timber sales done with a CE. The Forest Service needs to address this, as what the EA claims will not be true if the Forest Service has its way." (9)

> **R:** The Hoosier has not been informed by the Bush administration that either public involvement or environmental analyses are to be discontinued. New categories of exclusion from preparing an environmental impact statement or environmental assessment have, during the processing of the comments, been published, but environmental analysis would still be required before a timber sale or other activities with appreciable ground disturbance could be approved. Public involvement and environmental analysis are important components of our decisionmaking process.

P-3 C: "Please reflect on how much support and good will the Forest Service has enjoyed these past few years, as you have pursued a management direction more consistent with the clearly expressed desires of the people in Indiana and elsewhere, that the Hoosier National Forest be protected for its biodiversity, watershed protection, recreational and ecological values." (11)

> **R:** We are not sure what management direction you perceive us to have taken previously. This is a programmatic document and does not itself propose any new or additional project activities. We too value the Hoosier for its biodiversity, the protection it offers to watersheds, the various habitat types and conditions it provides, and the ecological and recreational values it serves and observe that management is sometimes needed to help maintain them.

Consider No Harvesting

N-1 C: "…our scoping comments explained why this alternative [no logging on the Hoosier] needs to be considered. The Forest Service has failed to address these reasons. The beyond the scope response makes no sense what-so-ever. By definition, what the Forest Service claims could not possibly be true. The CEQ Regulations define scope as, 'Scope consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement' 40 CFR section 1508.25. The Forest Service's statement about the alternative in the Plan DEIS is correct. The Forest Service, however, fails to explain the relevance of this…. failed to consider this and other alternatives to give more protection to the Indiana bats." (9)

> **R:** The previously suggested alternative was to eliminate logging on the Hoosier "to give more protection to the Indiana bats." This proposal appears to be based on a concern that roosting Indiana bats may inadvertently be killed during logging. This is exactly the premise used to formulate Alternative C. Alternative C would prohibit logging during the period April 15 through September 15; in other words, this alternative would eliminate logging during the time when Indiana bats typically roost in trees. Given the identical intent, rationale, and outcomes relative to Indiana bats of these two alternatives, the suggested alternative was considered duplicative of Alternative C.

EIS

EIS-1 C: "It is impossible to determine the impact to endangered species of the level of disturbance proposed without preparation of an environmental impact statement." (10)

> **R:** Whether an analysis is documented in an environmental impact statement or an environmental assessment does not determine the validity of its conclusions. This analysis, including the Biological Assessment, the Biological Opinion, and the environmental assessment, have analyzed and disclosed the impacts on the threatened and endangered species. As indicated in the FONSI, those potential effects have not been found to warrant an EIS.

EIS-2 C: "I urge you to withdraw the April 10, 2003 Environmental Assessment for Amendment to Hoosier National Forest and Resource Management Plan for Threatened and Endangered Species (T and E Species) and do a full Environmental Impact Statement, as required by the National Environmental Policy Act." (11)

> **R:** Please refer to the response to the previous comment. The entirety of this appendix, the EA, and the project record show that the Hoosier has complied with the National Environmental Policy Act in this amendment to the *Forest Plan*.

Authorizing Timber Harvest?

ATH-1 C: "…the EA is inadequate in its environmental impact analysis of the many thousands of acres of damaging activities that this proposal authorizes. It is important to emphasize that there has been little or no logging on the Hoosier in the past almost 2 decades. This creates an important status quo that needs to be preserved while this dispute is being resolved. There is nothing in the EA which substantiates any serious harm that has occurred to the environment because of the near absence of logging in the Hoosier for the past two decades. Yet, seemingly out of the blue, the Forest Service now proposes to log 1477 acres of pines including clearcutting, to log 1395 acres of hardwoods including clearcutting, to burn 7000 acres, and to build 16 miles of new road, among other disturbance activity in just a five year period, and then alleges that the impacts of this will be insignificant." (6, 8, 10, 11)

> **R:** The EA makes clear that this is a programmatic amendment to the *Forest Plan* for the purpose of dealing with new information concerning the behavior and habitat of Indiana bats. The amendment does not propose new or additional timber harvesting or any other ground-disturbing activity. The mention of such activities is not "out of the blue," as they were authorized in the 1991 *Forest Plan*. Since the EA was not proposing any new timber harvesting or any additional ground-disturbing activities, there was no need to substantiate harm that may occur to the forest in the absence of such management. Again, as stated in the EA, this proposal authorizes no new on-the-ground activities. The EA considered the effect of previously authorized activities on a variety of species because we had new information concerning the Indiana bat and considered it prudent to review the effects on other species while reviewing the potential effects on Indiana bats.
>
> Since an EA or EIS is intended to be a concise document, we did not include all of the details included in the Biological Assessment concerning effects on threatened and

endangered species from continuing to implement the *Forest Plan*. We summarized and referenced not only that Biological Assessment but also two biological evaluations and two other documents (Forest Species of Concern – Forest Plan Seventh Amendment, and Management Indicator Species – Forest Plan Seventh Amendment) discussing the effects on various species. The EA determined at the programmatic level that continuing to implement the *Forest Plan* would not significantly affect the Indiana bat species. It also clearly stated that any such activity to implement the *Forest Plan* would need its own site-specific environmental analysis before such an activity could be implemented.

ATH-2 C: "When that is added to the fact that the proposal authorizes 7000 acres of prescribed fire in the Hoosier in that same time period, when nothing near that amount of land has been purposely burned on the forest in the last twenty years, the proposed finding of no significant gains in absurdity." (6, 8, 10, 11)

R: The previous response stated that the proposed amendment would not authorize on-the-ground activity. This is a programmatic amendment and does not authorize any new prescribed burning, timber harvesting, or any other such activity. The cumulative effects sections for Indiana bat and the other threatened and endangered species in the EA included the effects of a variety of activities that would implement the *Forest Plan*, activities that the Plan had authorized in a programmatic manner. This amendment adds standards and guidelines for the protection and conservation of threatened and endangered species.

Forest Plan Obsolete?

FPO-1 C: This is especially true when one considers that the Hoosier forest plan is obsolete and out-dated, and the forest is in the process of revising it entirely."
FPO-2 C: "The forest plan is out of date and is being entirely revised. To complete a specific amendment just before the entire new plan is studied in depth with an environmental impact statement is illogical unless it is simply a way to do more logging with an out of date forest plan. Will the T and E guidelines be an issue of review in the draft EIS of the new forest plan or will it be waved through?"(6, 8, 10, 11)

R: Forest plans have been determined to be valid until they are replaced. Although we have identified ways to improve the *Forest Plan* during our revision process, it is not obsolete. It is still in effect and still provides meaningful protection for the natural resources on the Hoosier.

Forest plans are meant to evolve and grow as our understanding grows. We have gained new understanding of Indiana bat behavior and habitats and, given that new knowledge, are incorporating measures into the *Forest Plan* to provide for protection and conservation of the species. We have provided opportunity for comments and issues related to the *Forest Plan*, and we have provided opportunity for comments and issues related to this proposed *Forest Plan* amendment concerning threatened and endangered species. One could say that this amendment revises a portion of the *Forest Plan* and that the *Forest Plan* revision will revise other portions of the *Plan*.

Providing amendments such as this proposed amendment ensures that the *Forest Plan* does not become obsolete and outdated.

Expressing Dissatisfaction

ED-1 C: "To try and do this significant amendment with a finding of no significant impact is arbitrary and capricious."(6, 8, 10, 11)

> **R:** The EA explained why this proposed amend is not a significant amendment. The EA includes analysis of potential effects, including cumulative effects. In its Biological Opinion, the Fish and Wildlife Service provided the terms and conditions that the proposed amendment would add to the *Forest Plan*. On May 20, 2003, the United States Environmental Protection Agency wrote us that the "document was given a cursory review, and we determined that there were no significant concerns meriting comment" (Westlake 2003).
>
> Although citing these other Federal agencies does not prove there are no concerns, it does provide evidence that there are those who are not inclined to think the conclusion is "arbitrary and capricious."

ED-2 C: "I am deeply disappointed by the turn of events represented by the proposed *Forest Plan* Amendment …. And hope it is not too late to reconsider…." (11)

> **R:** Your letter suggests that an important reason for feeling disappointed is your perception that the amendment authorizes timber harvesting and other activities. If so, please see the responses to comments I-2 and ATH-1. This proposed amendment to the *Forest Plan* for threatened and endangered species makes no proposal for timber harvesting beyond what was already in the *Forest Plan* as previously approved in 1991.

ED-3: "The reason this amendment came about is that the Hoosier had failed to properly promulgate standards for protecting T and E species on the Hoosier in their forest plans." (6, 8, 10, 11)

> **R:** This represents a misunderstanding. The *Forest Plan* for the Hoosier National Forest was approved in 1991. Since that time, new information has indicated that Indiana bats utilize types of habitat in addition to those that had previously been known. The Hoosier consulted with the Fish and Wildlife Service at length to determine, in light of the new knowledge, what the effects of continued implementation would be on the Indiana bat. The Fish and Wildlife Service provided a Biological Opinion that included terms and conditions for Hoosier management activities.

Timber Harvest Level

TH-1 C: "The Society would have liked to have seen *Forest Plan* timber harvesting levels analyzed in the EA. It is unclear why the Forest has decreased the acreage of timber to be harvested in the next five years." (5)

> **R:** This EA makes no proposal to harvest timber beyond that already approved in the *Forest Plan*. Timber harvesting is not the resource or use the analysis was directed toward. During consultation with the Fish and Wildlife Service and the development of the Biological Assessment and Biological Opinion, the Hoosier provided a list of activities with potential to affect Indiana bats. The Hoosier estimated acreages of various activities that could be completed during a five-year period, based on resources, personnel, and the

need. The Fish and Wildlife Service Biological Opinion was based on that list of activities.

TH-2 C: "Management to maintain these communities and provide for the species that thrive in disturbance maintained habitats should not be neglected when these habitats can be maintained without jeopardizing the Indiana bat. The draft Indiana Bat Recovery Plan states: 'uneven-aged management or even-aged management that includes provisions for snag retention may be used (page 31)'. Miller *et al*. (2002) found that Indiana bats prefer summer roosting trees on the edges of forests or in openings. Even aged management can provide these conditions. By maintaining Plan levels of timber harvesting in the areas of the Hoosier open to harvesting (less that half the total Forest area) early successional habitats can be maintained. The remaining Forest area (over half the total area) is already providing mature Forest habitats and is currently protecting known maternity and hibernacula for Indiana bat." (5)

> **R:** The limited harvest level included in the Fish and Wildlife Service's Biological Opinion includes both even-aged and uneven-aged management. The Hoosier seeks to provide a variety of size classes and conditions. Not all of the Forest that is off-limits to timber harvesting is currently providing mature forest habitat, but mature forest habitat is developing there. See additional comments under Early Successional Habitat.

Mitigations, Restrictions, Options

MRO-1 C: "…we are concerned that the proposed amendment places undue and unnecessary restrictions on vegetation management without adequate justification and to the detriment of many disturbance dependent species. We believe imposing the restrictions for timber harvesting outlined in the EA on specific areas of the Forest may be a better way to protect the Indiana bat and maintain important forest habitats and communities." (5)

> **R:** The Fish and Wildlife Service has issued guidance regarding Hoosier National Forest management activities. Management for the protection and recovery of threatened and endangered species is the top priority, and it is incumbent upon us to follow guidance from the Fish and Wildlife Service and to carry out our responsibilities under the Endangered Species Act concerning threatened and endangered species.

MRO-2 C: "Additionally, our comments pointed out that the USFWS has indicated uneven-aged management alternatives would be less harmful to the listed species…. The Response to Comments does not address this issue even though it purports to." (9)

> **R:** First of all, the existing *Forest Plan* provides for uneven-aged management as well as even-aged management. The EA points out how relatively little timber harvesting would be done on the Hoosier the next few years. Regeneration of some forest types is much more successful with even-aged management, as well as providing for a period of time early successional habitat.
>
> Secondly, the EA did address uneven-aged management and harvesting, even though such actions were not part of the proposed action. The EA (page 20) notes that "uneven-aged harvest areas may attract bats because of the more open canopy and increased isolation of potential roosts." It also notes (page 22) that approximately "61 percent of the limited harvesting projected for a five-year period would utilize uneven-aged management"—and not all of the remainder would be even-aged management. In the Effects chapter, the EA notes on pages 35-36 that if the proposed amendment were incorporated into the *Forest*

Plan (the requirement of canopy cover of 60 percent or greater), uneven-aged harvesting might result in reduced available habitat for species of the dry community. Instead, the dry community and the barrens community need to have the canopy cover reduced.

In view of the preponderance of uneven-aged management in the action alternatives and the inclusion of analysis of its effects, such as in the preceding paragraph, the Hoosier certainly did consider uneven-aged management and is planning to implement such management to enhance native plant species and maintain habitat for various wildlife species, including such species as Indiana bat. Also see studies such as that referred to in the response to comment TH-2.

MRO-3 C: "The Forest Service fails to explain how the mitigation will prevent any Indiana bat from being taken. If that is true, why did the Forest Service ask for an Incidental Take Permit? They may make it less likely, but they will not avoid it. The Forest Service refused to consider an alternative (i.e., end logging) that would avoid the take…. The EA claims, 'The proposed action would have a positive beneficial effect on Indian bat habitat…' EA at 20. This is not true …. Killing and harming them as the amendment and Incidental Take Statement allows is not beneficial to the species. While the Amendment may possibly lessen some impacts, it does not eliminate the harm to the species…. It cannot go claiming killing the bats is good for the bats." (9)

R: The requirements in the proposed amendment would reduce the risk that a bat might be killed. The commenter was addressing a response to a scoping comment, but our use of the word "avoid" does not mean "prevent any Indiana bat from being taken." We have considered the scientific information available and conclude that the measures in the amendment would greatly reduce the potential of accidentally taking an Indiana bat.

The EA includes an alternative that would prohibit logging on the Hoosier from April 15 through September 15. That alternative would avoid take. Alternative A (Proposed Action) seeks to obtain the same end (protection and perpetuation of the Indiana bat population) through other means while also taking steps to maintain Indiana bat habitat. The conditions in the proposed *Forest Plan* amendment, in combination with efforts to maintain Indiana bat habitat (including sufficient openness in the tree canopy that bats can navigate and capture their prey), provide means of aiding the protection and recovery of the bat population. We do not propose to kill bats; quite to the contrary, we are taking numerous steps to avoid the possibility that a bat or bats may be accidentally killed during management activities, including those directed at improving and maintaining Indiana bat habitat. See also the responses to comment I-1, I-2, and K-1.

Incidental take is defined in the regulations as "takings that [may] result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency" (50 CFR 402.02). Having an Incidental Take Statement does not mean that any Hoosier activities will result in the death of any bats. However slight the risk, the intent of consultation with the Fish and Wildlife Service as well as project analysis by the Hoosier, is to avoid injury to any bat. With respect to incidental take, the Fish and Wildlife Service has concluded that

> "the continued implementation of the existing Hoosier National Land and Resource Management Plan is not likely to jeopardize the continued existence of the Indiana bat."

MRO-4 C: "If additional protection [beyond that provided by the No Action alternative] for maternity areas or hibernacula which may be found in the future, the Forest should seek to develop an alternative which provides protection for future maternity areas or hibernacula should they be found in the Forest." (5)

> **R:** The protection afforded by the Proposed Action would provide a basis for protection of Indiana bat maternity areas or hibernacula that might be discovered in the future and at the same time allow for vegetative management that would provide habitat for other species, such as those needing or preferring early successional habitat.
>
> If new information related to Indiana bat or other threatened or endangered species should become available, the information will be adapted into project plans if the implied activities are permitted by the *Forest Plan*. There is also the potential for amending the *Forest Plan* again.

MRO-5 C: "How does the amendment intend to ensure adequate mitigation on timber projects and other activities that are categorically excluded from NEPA when it gives such blanket deferment to the project level planning?" (10)

> **R:** First of all, this *Forest Plan* amendment is binding on all Forest projects, including the direction that threatened and endangered species is top priority. Second, appreciable projects, including on-the-ground timber-related activities, are still subject to NEPA. A categorical exclusion is part of NEPA. On the Hoosier we consider the potential harm to Indiana bats on all projects and take steps to minimize the risk.
>
> This amendment considered and disclosed the potential effects of such activities, and the guidance in the amendment would apply to all projects, regardless of the type of NEPA planning that would apply to the individual project.

German Ridge

GR-1C: "There are processes happening out of order. How can the German Ridge timber sale be moving forward when there still exists no decision on mitigation measures for the Indiana bat? It reveals the agencies path to a predetermined outcome." (10)

> **R:** The scoping for the Plan amendment was completed long before the German Ridge Notice of Intent was published in the Federal Register. By that time, the general shape of the proposed Plan amendment was known, as alternatives had been developed and issues identified. Publishing an intent to do an EIS for vegetative treatments on German Ridge did not mean that there was only one course for the Forest Service to pursue on German Ridge. Not only was there a great deal of time and opportunity to incorporate mitigation measures, but there was also plenty of time to develop alternatives to the proposed action, including of course No Action.

Appendix D

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