

TIER 2 BIOLOGICAL OPINION

for

SECTION 2

of the

PROPOSED INTERSTATE 69 (I-69) EXTENSION FROM EVANSVILLE TO INDIANAPOLIS

for the

FEDERALLY ENDANGERED INDIANA BAT

traversing portions of

GIBSON, PIKE, and DAVIESS COUNTIES, INDIANA

Submitted to the Federal Highway Administration

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EXECUTIVE SUMMARY

This document contains a Tier 2 Biological Opinion for Section 2 of I-69 and tiers back to the Tier 1 Revised Programmatic Biological Opinion dated August 24, 2006 for the proposed extension of I-69 from Evansville to Indianapolis, Indiana. The Federal Highway Administration reinitiated formal consultation on Tier 1 of the proposed I-69 extension on March 7, 2006 and submitted an addendum to the original Biological Assessment that detailed significant new information regarding potential impacts to the Federally endangered Indiana bat (*Myotis sodalis*) that were not known or available for analysis during the original formal consultation period in 2003.

The effects associated with the proposed construction, operation, and maintenance of Section 2 of I-69 are within the scope of effects contemplated in the Tier 1 Revised Programmatic Biological Opinion. Upon evaluation of the proposed project, we believe incidental take of Indiana bats in the Section 2 Action Area is likely, but the impact of such taking is not likely to jeopardize the continued existence of the Indiana bat and is not likely to adversely modify the bat's designated Critical Habitat. A Tier 2 Incidental Take Statement for Section 2 has been included at the end of this Biological Opinion with its non-discretionary Reasonable and Prudent Measures and associated Terms and Conditions to further minimize the incidental take of Indiana bats in Section 2.

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service or USFWS) Tier 2 Biological Opinion (BO) for Section 2 of the proposed Interstate 69 (I-69) project. The Service's Bloomington, Indiana Field Office (BFO) received the Federal Highway Administration's (FHWA) Tier 2 Biological Assessment (BA) for Section 2 on November 26, 2009 along with a letter requesting the Service to initiate formal consultation on the proposed construction, operation, and maintenance of Section 2 of I-69 from Indianapolis to Evansville, Indiana and its effects on the federally endangered Indiana bat (*Myotis sodalis*). Subsequently, a meeting was held on December 7, 2009 to discuss and clarify certain details of the BA (See Appendix B).

The original formal consultation for Tier 1 of I-69 was concluded with the issuance of the Service's Programmatic BO (PBO) on December 3, 2003. On March 7, 2006, the FHWA requested to reinitiate formal consultation for the Indiana bat and submitted a very thorough and updated Tier 1 BA Addendum that detailed additional impacts to Indiana bats stemming from significant new information regarding this species' presence and abundance within the project's action areas, as revealed during Tier 2 field studies. The Service's August 24, 2006 Revised Tier 1 Programmatic BO (RPBO) replaced the December 3, 2003 PBO.

This Tier 2 BO for Section 2 of I-69 is prepared in accordance with section 7 of the Endangered Species Act (ESA or the Act) of 1973, as amended (16 3, U.S.C. 1531 et seq.) and is the culmination of formal section 7 consultation under the Act. The purpose of formal section 7 consultation is to insure that any action authorized, funded, or carried out by the Federal government is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of any officially designated critical habitat of such species. This Tier 2 BO covers the proposed actions of the FHWA, as this agency will partially fund the road construction associated with this project. To reduce redundancy between the Tier

1 RPBO (dated August 24, 2006) and this section-specific Tier 2 BO, the Service has incorporated portions of the Tier 1 RPBO by reference in this Tier 2 BO. Similarly, portions of the Tier 2 Biological Assessment (Tier 2 BA) for Section 2 have been incorporated by reference in this Tier 2 BO.

The Section 2 Tier 2 BO is primarily based on information provided from the following sources:

- 1) Tier 1 BA [dated July 18, 2003, revised October 27, 2003; prepared by Bernardin-Lochmueller and Associates, Inc.(BLA)],
- 2) Tier 1 BA Addendum (dated March 7, 2006; prepared by BLA),
- 3) Tier 1 Revised Programmatic BO (RPBO) dated August 24, 2006),
- 4) Tier 2 Revised Draft Environmental Impact Statement (DEIS) for Section 2 (dated April 27, 2009),
- 5) Tier 2 BA for Section 2 (dated November 2009),
- 6) Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision (dated April 2007),
- 7) Reports and scientific literature on Indiana bat research conducted in the action area and elsewhere, and
- 8) Meetings, phone calls, e-mails, other written correspondence with FHWA, INDOT, and their consultants. A limited number of field visits and site investigations were also conducted by personnel from the Service's BFO.

In conducting our Tier 2 evaluation, we determined whether (1) this Section of the proposed project falls within the scope of the I-69 Tier 1 RPBO, (2) the effects of this proposed action are consistent with those anticipated in the Tier 1 RPBO, and (3) the appropriate Terms and Conditions associated with the Reasonable and Prudent Measures identified in the Tier 1 Incidental Take Statement (ITS) are being adhered to (See Appendix A and page 114 of the Tier 2 BA). This document serves as the Tier 2 BO for Section 2 of the I-69 Project. As such, it also provides the anticipated level of incidental take and a cumulative tally of incidental take that has been exempted under the Tier 1 RPBO.

Road construction that will occur as part of this proposed project will also require a federal permit(s) from the U.S. Army Corps of Engineers (COE). However, issuance of the COE permit will not result in any impacts to Indiana bats beyond those addressed in this consultation with the FHWA. Therefore, the Service intends to provide a copy of this BO to the COE (and EPA, IDEM and IDNR) to demonstrate that the FHWA has fulfilled its obligations under section 7 of the Act to consult with the Service for Section 2 of the project.

CONSULTATION HISTORY

The proposed action has a background that encompasses several decades of planning and planning studies by INDOT and is outlined in Chapter 1 of the Tier 1 Final Environmental Impact Statement (FEIS) and the Tier 2 DEIS for Section 2 of the I-69 Project. A chronological summary of important consultation events and actions associated with this project is presented in the Section 2 Tier 2 BA and is hereby incorporated by reference. A complete administrative record of this consultation is on file at the BFO.

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

The Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) are proposing to construct a 142-mile extension of I-69 from Evansville to Indianapolis, Indiana. A detailed discussion of the whole project is contained in the Tier 1 RPBO. In Tier 2 of the I-69 project's NEPA process, the Alternative 3C corridor selected in Tier 1 has been divided into six (6) sections:

1. From I-64 (near Evansville) via the SR 57 corridor to SR 64 (near Princeton/Oakland City)
2. From SR 64 (near Princeton/Oakland City) via the SR 57 corridor to US 50 (near Washington)
3. From US 50 (near Washington) via the SR 57 corridor and cross country to US 231 (near the Crane Division, Naval Surface Warfare Center (NSWC Crane))
4. From US 231 (near NSWC Crane) via cross country to SR 37 (south of Bloomington)
5. From SR 37 (south of Bloomington) via SR 37 to SR 39 (Martinsville)
6. From SR 39 (Martinsville) via SR 37 to I-465 (Indianapolis)

This Tier 2 BO for Section 2 of I-69 considers impacts associated with FHWA's and INDOT's preferred alternative to construct, operate, and maintain a new interstate facility within the Alternative 3C corridor in Gibson, Pike and Daviess Counties, Indiana (Figure 1). The Proposed Action for Section 2 of I-69 includes the following:

- Constructing approximately 29 miles of new, 4-lane interstate from one half mile north of SR 64 to one-half miles north of US 50 east of Washington (see Section 2 BA or DEIS for specifications and typical cross-sections)
- Acquiring approximately 1,700 acres of right-of-way (ROW) of which roughly 65% is used as agricultural land
- Mechanical clearing/grubbing/demolition of existing forest/vegetation and man-made structures from right-of-way (typically about 320 feet wide, although a short bifurcated section is proposed). Some construction-related debris may be burned on-site.
- INDOT contractors following safeguards established in INDOT's Standard Specifications (Section 203.08 Borrow or Disposal) that include obtaining required permits, and identifying and avoiding or mitigating impacts at borrow/disposal sites that contain wetlands or archaeological resources. Special Provisions will also include prohibiting tree clearing from April 1 to September 30 within the Summer Action Area of the Indiana bats, as identified in the Tier 2 DEIS for Section 2; and prohibiting the filling of wetlands outside the construction limits.
- Clearing of approximately 227 acres of forest and other trees (>3" diameter-at-breast height/DBH) from the right-of-way (ROW) while Indiana bats are not present (i.e., between 30 September and 1 April)
- Filling/converting of 30.5 acres of wetlands, including emergent (6.68 ac.), forested (16.11 ac.), scrub-shrub (0.38 ac.), and open water ponds (7.33)

- Impacting approximately 64,863 linear feet of stream habitat
- Relocating approximately 15 transmission towers that are situated within the right-of-way for the Preferred Alternative. Only the tower relocations at Daviess County Roads 550 S, 50 E, 450 S, and 250 S as well as Pike County Road 600 N are anticipated to have any additional forest impact. Based on the location of these anticipated relocations, and the adjacent land uses, forest impacts from utility relocations are expected to be less than ten (10) acres for all of Section 2 (five acres at most within the maternity colony areas). Locations of these towers can be found in Appendix B (Atlas) of the Tier 2 BA.
- Constructing four interchanges: SR 61/56 (at Petersburg), Blackburn Road (North Pike County), SR 57 (South Daviess County), and US 50 (at Washington). All the interchanges are proposed to be a full diamond configuration, except the South Daviess interchange, which will be a folded diamond. In order to minimize near future project costs, two of these interchanges, North Pike and South Daviess, are currently being considered for deferral until additional funding becomes available. Under a deferral scenario, the mainline and two of the interchanges (SR 61/56 and US 50) would be built in the initial construction of Section 2. Either or both of the other two interchanges (North Pike and South Daviess) would be constructed at a later date. All land use impacts and accessibility analyses presented here assume the construction of all four interchanges.
- Constructing approximately 9 named stream crossings using bridges (see list in Tier 2 BA) and additional jurisdictional stream crossings using bridges and culverts
- Constructing approximately 20 overpasses/grade separations (see list in Tier 2 BA)
- Relocating 65 residential dwellings, three commercial businesses, and one institution (church)
- Constructing two bridges that will bridge the entire floodplains of the Patoka River and also Flat Creek
- Incorporating wildlife crossings at the Patoka River, Flat Creek, East Fork of the White River and a tributary to Jackson Pond. At Prides Creek, Mud Creek and Veale Creek, the presently-proposed structures crossing these streams are anticipated to provide sufficient opening for deer and all smaller mammals and amphibians. Other bridges and larger culverts will also provide additional crossing opportunities for smaller wildlife. Natural bottoms for box culverts will be used for crossings where feasible.
- At present, roadway lighting is not anticipated on the bridges or any mainline portions of Section 2. Lighting at interchanges will be evaluated, and will be included if warranted for safety reasons. Based on projected traffic volumes, the US 50 interchange would be the most likely to warrant lighting. Consideration will be given during the design phase to using only non-diffuse lighting, as appropriate. Potential light poles would be about 40 feet high.
- Constructing multiple new frontage roads, connector roads, turn-arounds, as well as reconfiguration of some existing roadways. For example, a new 0.75 mile-long

connector road will be built to connect existing Blackburn Road at SR 57 with the new I-69. (See Section 2 DEIS for details).

- Revegetating disturbed areas in accordance with INDOT standard specifications. Woody vegetation will only be used at a reasonable distance beyond the clear zone to ensure a safe facility. Revegetation of disturbed soils in the right-of-way, interchange areas, and medians will utilize native grasses and native wildflowers, where practical.
- Implementing all mitigation and “Conservation Measures” detailed in the Tier 1 RPBO and Appendix D of the Tier 1 BA Addendum (measures pertaining to hibernacula do not apply to Section 2). A summary table of the I-69 Conservation Measures is provided in Appendix A.
- Proposed mitigation for impacts to forests and wetlands in Section 2 are as follows:

<u>Anticipated Mitigation (ac.) *</u>	<u>Description</u>	<u>Theme</u>
353.8**	Upland forest	Replacement
467.4**	Upland forest	Preservation
77.7	Forested wetland	Replacement
15.4	Emergent wetland	Replacement
3.5	Scrub-Shrub wetland	Replacement
64,863 linear feet	Stream Channel	Replacement
Total	917.2 acres	

* Approximately 126 acres of excess upland forest and 24.5 acres of excess forested wetland mitigation anticipated. These excess acreages may be used for mitigation in Section 4.

** Forest mitigation commitment 3:1 with a minimum of 1:1 replacement and the remaining in preservation

- INDOT will monitor and oversee maintenance of Section 2 mitigation lands while they are being established. INDOT will monitor mitigation lands for a minimum of 5 years.
- Operation of the interstate will occur in phases as construction of sections and subsections are completed. Local access and traffic volumes and patterns will change over time as portions of I-69 become operational. Assuming all sections of I-69 are completed by the year 2030 as non-toll facilities, then traffic on some local roadways will appreciably decrease or increase (see DEIS chapter 5.6). For example, by 2030, traffic volume on existing SR 356 west of SR 57 is forecasted to increase by approximately 148% after I-69 is constructed (DEIS page 5-127).
- Section 2 of I-69 would be operated as a non-toll facility and thus no toll readers or other toll-collecting infrastructure will be installed along the interstate.
- Maintenance of the interstate will include the removal and disposal of roadkilled animals and trash, snow plowing, application of road salt and/or sand, and maintenance and mowing of right-of-ways.
- Over time, all sections of I-69 will need to be resurfaced/repaved and bridges will need to be repaired or replaced.

Project Schedule

Construction for Section 2 has not yet been scheduled. However, INDOT is moving forward with final designs for the entire section and it is anticipated that some portions may go to construction as early as 2010 with the entire section being complete by as early as 2012. While construction is anticipated to move forward there are some elements that may be deferred for later construction including the North Pike County and South Daviess County interchanges.

Mitigation

Upland forests impacted by the I-69 Evansville-to-Indianapolis project will be mitigated at a 3:1 ratio. This commitment, made in the Tier 1 FEIS and reaffirmed in the Tier 1 ROD, considers upland forests as all those not classified as wetlands. Mitigation may be in the form of planting unforested areas (with a minimum goal of 1 to 1 replacement) and/or protecting existing forests by fee simple purchase, permanent protective easement, or a combination of actions with a maximum goal of 2 to 1 protective measures or preservation. The 3 to 1 ratio will be achieved for the overall I-69 Evansville-to-Indianapolis project; the ratio for an individual Tier 2 section could be higher or lower than 3 to 1.

Currently, INDOT has identified 12 properties for upland forest preservation or reforestation, for a total of 821.2 acres. Of these 12 properties, nine have already been purchased and the remaining three are in various stages of negotiation and/or finalizing the purchase. Two properties within the Veale Creek maternity area are currently being negotiated. These properties are particularly important based on the low tree cover in the vicinity of this colony, as well as the close proximity of the alignment to the colony's primary roosting area. Seven properties located near the Patoka River will be managed in perpetuity as part of the Patoka River National Wildlife Refuge. The remaining five properties will be managed by INDOT until a long-term managing entity is identified. One additional site, the Columbia Mine tract, is also in the process of being purchased. While no upland forest mitigation credit is proposed for this site, the site will provide wetland and stream mitigation, as well as a large tract of forested wetland preservation. The tract will eventually be managed as part of the Patoka National Wildlife Refuge.

INDOT will be responsible for monitoring and maintaining the mitigation areas while they are being established, as well as addressing long-term management for sites currently without an identified steward. See the Tier 2 Biological Assessment for a detailed description of each mitigation site and additional information.

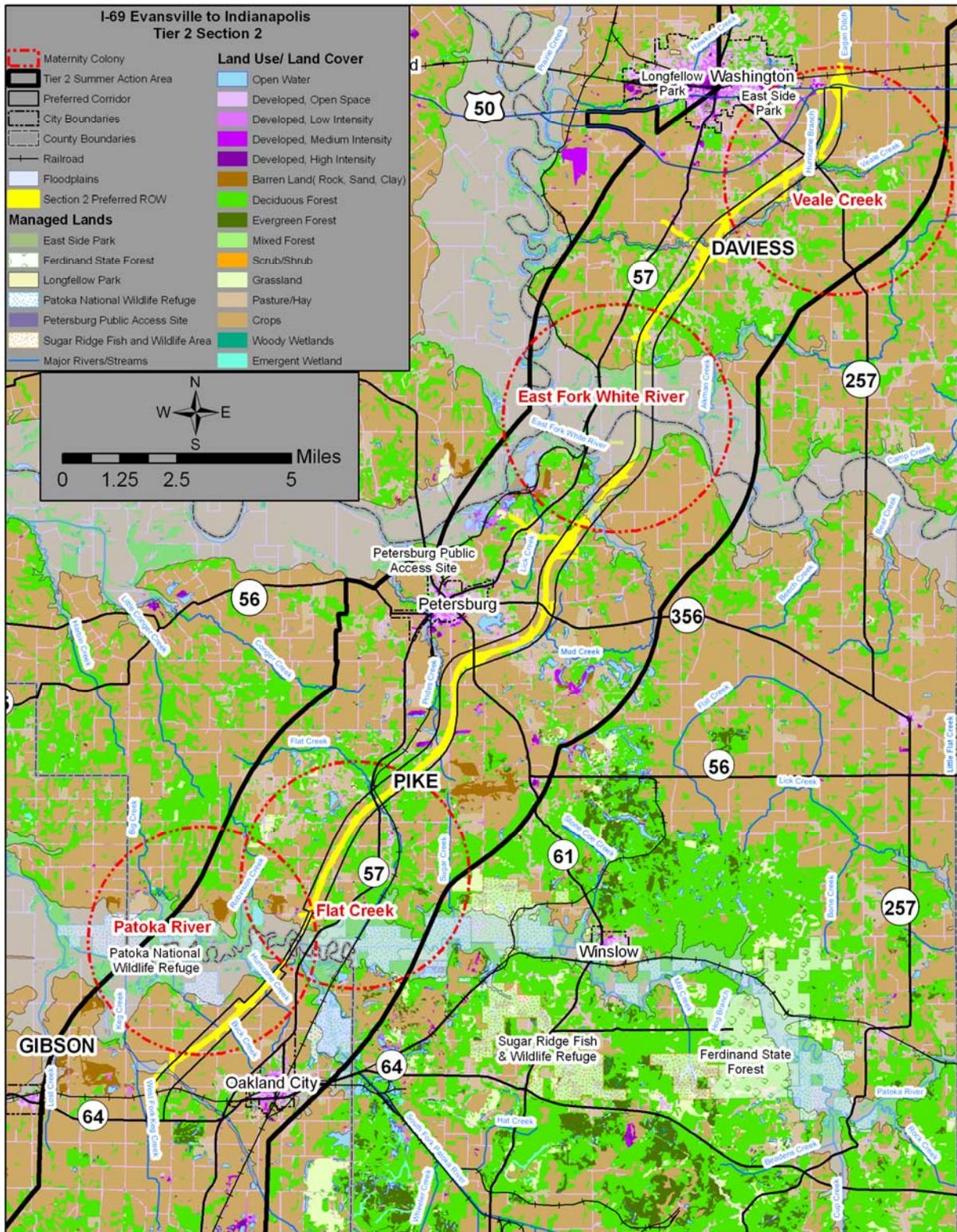


Figure 1. Preferred alignment for Section 2 of I-69, Indiana bat maternity colony areas and the Section 2 Expanded Summer Action Area.

Analytical Framework for Jeopardy Determinations

In accordance with policy and regulation, the jeopardy analysis in this Biological Opinion relies on four components: (1) the Status of the Species, which evaluates the Indiana bat range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which evaluates the condition of the Indiana bat in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the Indiana bat; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the Indiana bat; and (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the Indiana bat. In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the Indiana bat's current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the Indiana bat in the wild. The jeopardy analysis in this Biological Opinion places an emphasis on consideration of the range-wide survival and recovery needs of the Indiana bat and the role of the action area in the survival and recovery of the Indiana bat as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

II. STATUS OF THE SPECIES

Indiana bat species description, life history, population dynamics, status and distribution and threats are fully described on pages 38-54 of the Tier 1 RPBO and are hereby incorporated by reference. On 15 April 2007, the Service released the *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (USFWS 2007), which contains an excellent summary of the current status of the Indiana bat and is hereby incorporated by reference. Furthermore, since the April 2007 release of the Draft Recovery Plan, the Bloomington Field Office of the Service has collated the population data gathered during the 2007 and 2009 biennial winter hibernacula surveys throughout the range and preliminarily determined that the Indiana bat's 2009 range-wide population stands at approximately 391,000 bats, which is a 16.5% decrease over the 2007 range-wide population estimate of 468,000 bats (USFWS, unpublished data, 2009). The range-wide population estimate had been increasing since at least 2001, indicating that the species' long-term decline had perhaps been arrested and possibly reversed (USFWS 2007 and USFWS, unpublished data, 2007). The observed decline in 2009 is partly attributable to the disease White-nose Syndrome (see discussion below), specifically for decreased population estimates in the Northeast. The species' range-wide, regional, state, and hibernacula-specific population trends are being closely monitored by the BFO.

Given the 2009 range-wide Indiana bat population estimate of 391,000, we assume that there are approximately 2,445 to 3,260 maternity colonies throughout the species' entire range [assuming a 50:50 sex ratio (Humphrey et al. 1977) and an average maternity colony size of 60 to 80 adult females (Whitaker and Brack 2002)].

Species Recovery

The existing recovery program for the Indiana bat focuses on protection of hibernacula (USFWS 1983). The proposed recovery program has four broad components: 1) range-wide population

monitoring at the hibernacula with improvements in census techniques; 2) conservation and management of habitat (hibernacula, swarming, and to a degree, summer); 3) further research into the requirements of and threats to the species; and 4) public education and outreach (USFWS 2007). This recovery program continues to have a primary focus on protection of hibernacula but also increases the focus on summer habitat and proposes use of Recovery Units.

Recovery Units

The Service's proposed delineation of Recovery Units relied on a combination of preliminary evidence of population discreteness and genetic differentiation, differences in population trends, and broad-level differences in macrohabitats and land use. When Recovery Unit delimitations suggested by these factors were geographically close to state boundaries, the Recovery Unit borders were shifted to match the state boundaries in order to facilitate future conservation and management. The Indiana Bat Draft Recovery Plan proposes four Recovery Units for the species: Ozark-Central, Midwest, Appalachian Mountains, and Northeast (Figure 2) (USFWS 2007).

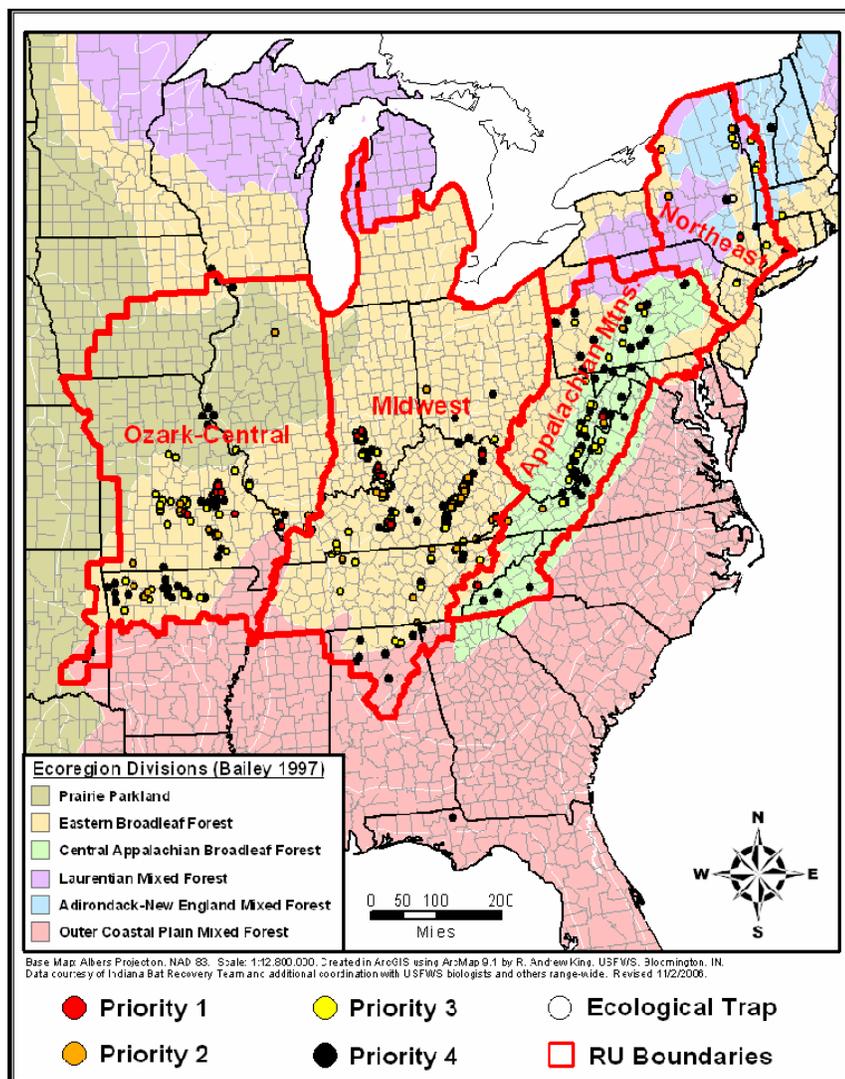


Figure 2. Proposed Indiana bat Recovery Units (Service 2007).

Population estimates for the proposed Midwest Recovery Unit in 2008-2009 were near 262,000; this accounts for two-thirds of the Indiana bat population.

Local Population

As of the winter of 2008-2009, the State of Indiana's 37 hibernacula harbored approximately 190,000 Indiana bats (49% of world-wide population) (USFWS, unpublished data, 2009). In 2009, three of the top four most populous Indiana bat hibernacula were located in Indiana, with Ray's Cave in Greene County being the most populous (n=48,657 bats), followed by Wyandotte Cave in Crawford County (n=45,516 bats) and Jug Hole Cave in Harrison County (n=36,067 bats).

New Threats

Recently a new threat has emerged with serious implications for the wellbeing of North American bats, including the Indiana bat. White-nose Syndrome (WNS) was first documented in a photograph taken in a New York cave in February 2006. Since that time, over 30 sites in nine states (New York, Massachusetts, Vermont, New Hampshire, Connecticut, Virginia, West Virginia, Pennsylvania, and New Jersey) have been documented with WNS, including known Indiana bat hibernacula. In some affected hibernacula in New York and New England, 90 to 100 percent of the bats have died. Some scientists estimate that WNS has killed more than a million hibernating bats (Bat Conservation International 2009).

WNS has been characterized as a condition primarily affecting hibernating bats. Affected bats usually exhibit a white fungus on their muzzles and often on their wings and ears as well (Blehert et. al. 2009). Some affected bats may display abnormal behavior including flying during the day and in cold weather (before insects are available for foraging) and roosting towards a cave's entrance where temperature and humidity are less stable. Many of the affected bats appear to have little-to-no remaining fat reserves which are necessary to survive until spring emergence. Recently the fungus associated with WNS has been identified as a previously undescribed species of the genus *Geomyces* (named *G. destructans*) (Gargas et. al. 2009). The fungus thrives in the cold and humid conditions of bat hibernacula. It is unclear at this point if the fungus is causing the bat deaths, or if it is secondary to the cause of death. The mode of transmission is currently unknown, although biologists suspect it is primarily spread by bat-to-bat contact. In addition, people may unknowingly contribute to the spread of WNS by visiting affected caves.

Currently, WNS appears to be restricted to sites primarily within the proposed Northeast Recovery Unit, as well as several sites within the proposed Appalachian Mountain Recovery Unit. The fungus has been confirmed in eastern pipistrelle, little brown, small-footed, northern long-eared, big brown and Indiana bats. There are many factors regarding WNS that are unknown at this point including if there are species' differences in susceptibility and mortality, how long symptoms may take to manifest, and the long-term effects. Meanwhile, the FWS, States and multiple researchers are continuing to learn more about the disease and options for minimizing its impacts. To date, no WNS has been documented in the proposed Midwest Recovery Unit.

III. ENVIRONMENTAL BASELINE

The environmental baseline for Indiana bats and their habitat in the I-69 Action Area, including Section 2, was fully described on pages 59-79 of the Tier 1 RPBO and is hereby incorporated by reference. Additional baseline information is presented in the Tier 2 DEIS for Section 2 (see Chapter 5 – Environmental Consequences). The following information analyzes the effects of past and ongoing environmental factors affecting Indiana bats and establishes the status of the species within the Section 2 Action Area.

Action Area

“Action area” is defined by regulation as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area is not limited to the “footprint” of the action nor is it limited by the Federal agency’s authority. Rather, it is a biological determination of the reach of the biological, chemical and physical impacts associated with the proposed action. In the Tier 1 RPBO, the Service stated that the Action Areas may need to be expanded or otherwise refined in subsequent Tier 2 BAs as the anticipated reach of direct and indirect effects of each section of I-69 are more clearly recognized and understood. Because INDOT’s Tier 2 analyses for Section 2 (see Figure 5.24-1 in Section 2 DEIS) indicated that I-69 would likely cause/induce some indirect development in Traffic Analysis Zones (TAZs) beyond the 2.5-mile buffer/boundary of the Indiana bat Summer Action Area (SAA) defined in Tier 1, the Service requested that INDOT and FHWA expand the SAA for Section 2 to include these additional areas and INDOT and FHWA agreed (i.e., the “Expanded SAA”; Figure 1). See page 32 of the Tier 1 RPBO for a detailed discussion of the I-69 Action Areas and pages 29-31 of the Section 2 Tier 2 BA for additional rationale behind the expanded Action Area for Section 2.

Indiana Bats within the Section 2 Summer Action Area

In 2004, mist netting surveys were conducted at 30 sites in Section 2. A total of 280 bats were captured, representing seven species. A total of 10 Indiana bats were captured within Section 2 in 2004. This includes two (2) post-lactating females, seven (7) non-reproductive adult females, and one (1) adult male. Although many of the females were determined to be non-reproductive, based on the late capture date (August), we assume that they actually had been reproductive earlier in the summer. The field biologist that had captured these bats in Section 2 concurred that our assumption was reasonable (pers. comm., with M. Gilley, ESI Inc., T 2004).

Nine (9) Indiana bats were radiotagged as a result of the survey, and eight (8) roost trees were identified. Other bats captured included: big brown bats (*Eptesicus fuscus*), eastern red bats (*Lasiurus borealis*), little brown bats (*Myotis lucifugus*), evening bats (*Nycticeius humeralis*), northern bats (*Myotis septentrionalis*), and eastern pipistrelles (*Pipistrellus subflavus*). None of these bats is listed as federally threatened or endangered; however, one is listed as State Endangered (evening bat) and the remaining five are listed as State Special Concern. Sixty-eight bridges in the Section 2 action area were also inspected for bats, but no bats were located.

Additional mist netting surveys were completed during the summer of 2005. The 2005 surveys focused around the location of Indiana bat captures where no roost trees were identified in

2004. Nine (9) mist net sites were surveyed. One (1) Indiana bat was captured in 2005, a non-reproductive female. The non-reproductive female was radiotagged, but could not be successfully tracked to a roost tree. Based on the evidence obtained through the mist netting surveys, there are four maternity colonies in Section 2: Patoka River, Flat Creek, East Fork White River, and Veale Creek.

The sites nearest to the Section 2 Summer Action Area that are designated as critical habitat for the Indiana bat are located approximately 30 miles to the northeast (Ray's Cave in Greene Co.) and over 55 miles to the east-southeast (Wyandotte Cave in Crawford Co.) and therefore are not within the Section 2 action area.

Maternity Colonies within the Section 2 SAA

Based on the minimum colony estimates generated during I-69 Tier 2 studies and other Indiana bat studies within Indiana (see Whitaker and Brack 2002), the Service assumes that each maternity colony likely contains 80 adult females plus their single offspring. This would result in a maximum of 160 bats per colony by mid-June when the young are born and when they become volant (i.e., capable of flight) around mid-July.

Each maternity colony's roosting and foraging area was assumed to fall within a circle with a 2.5-mile radius centered on primary roosts, placed between multiple roosts, or centered on mist net sites of Indiana bat capture if no roosts were identified. A full discussion of the methods and results of these surveys with maps of the maternity colony and other summer habitat in Section 2 is more fully discussed in the Tier 1 BA Addendum and incorporated in the analysis in the Tier 1 Revised BO. The Tier 1 BA Addendum and RPBO also characterize habitat conditions for the four maternity colonies, as does the Tier 2 BA for Section 2 (pages 34-37; 42-45; and Appendix A).

No additional maternity colonies have been identified since publication of the Tier 1 BA Addendum.

Patoka River Maternity Colony

In the Patoka River Maternity Colony, one non-reproductive female Indiana bat was tracked to two roost trees in 2004. One was a live red maple and had an emergence count of zero (0). This tree was located 0.7 miles from the proposed corridor. It was classified as a secondary roost since the emergence count was below 30. This roost tree was approximately 279 feet from the Patoka River. The second roost was a dead tree of an unknown species. This tree had an emergence count of 100 and was classified as a primary roost. This roost tree was approximately 90 feet from the Patoka River and 1.5 miles from the corridor. This colony is assumed to consist of 80 reproductively active adult females and their offspring, with a total of 160 individuals once the young become volant. Based on concurrent emergence counts conducted on August 1, 2004, the Patoka River Maternity Colony is comprised of a minimum of 100 individuals.

A survey done in 1993 by Dr. John Whitaker also found Indiana bats in the vicinity of the Patoka Maternity Colony, including lactating females. As of 2006, both roost trees identified in 2004 were still standing and in similar condition as described in 2004 (J. DuPont, BLA, pers. comm.).

Flat Creek Maternity Colony

In the Flat Creek Maternity Colony, a total of three (3) Indiana bats were captured and radiotagged in 2004. The signals could not be found, therefore no roost trees were found and no emergence counts were conducted. A similar situation occurred in 2005 when a non-reproductive female was radio-tagged, but could not be tracked to a roost tree. A signal picked up by aerial telemetry indicated the bat was near the Snakey Point area of the Patoka NWR. This colony is assumed to consist of 80 reproductively active adult females and their offspring, with a total of 160 individuals once the young become volant.

East Fork White River Maternity Colony

In the East Fork Maternity Colony, a post-lactating female Indiana bat was radio-tagged in 2004. The bat was tracked for two (2) minutes after release heading southwest from the capture site. The bat returned briefly before disappearing. The signal could not be located after that, therefore, no roost trees were identified. In 2005, no Indiana bats were captured, thus none were radio-tagged. This colony is assumed to consist of 80 reproductively active adult females and their offspring, with a total of 160 individuals once the young become volant.

Veale Creek Maternity Colony

Based upon our analysis, one of the colonies that is at greatest long-term risk of becoming non-viable is Veale Creek. The 2.5-mile area surrounding this colony currently has low tree cover (15%) and the I-69 representative alignment runs very close to the colony's primary roosting area. This colony is also near the City of Washington and the proposed interchange of I-69 and U.S. 50.

In the Veale Creek Maternity Colony, an adult male and three (3) of the four (4) non-reproductive females captured in 2004 were radio-tagged. A total of six (6) roost trees were identified, two (2) primary and four (4) secondary. The adult male was tracked to three (3) secondary roost trees, two (2) of the non-reproductive females were tracked to two (2) separate primary roost trees, and the third non-reproductive female was tracked to a secondary roost. The three (3) secondary roosts identified from the male were: a dead American elm approximately 0.2 miles from the corridor and 133 feet from Veale Creek, a dead elm near the first approximately 0.2 miles from the corridor and 84 feet from Veale Creek, and a dead tree of unknown species approximately 0.3 miles from the corridor and 58 feet from Veale Creek. The maximum emergence counts for these secondary roosts were 17, five (5), and three (3) respectively. A non-reproductive female was tracked to a dead elm approximately 1.0 mile from the corridor. The maximum emergence count for this primary roost was 36. A second non-reproductive female was tracked to a live shagbark hickory approximately 0.1 miles from the corridor and 116 feet from Veale Creek. The maximum emergence count for this primary roost was 32. The third radio-tagged non-reproductive female was tracked to a live shagbark hickory approximately 0.2 miles from the corridor and 167 feet from Veale Creek. This secondary roost had a maximum emergence count of two (2). This colony is assumed to consist of 80 reproductively active adult females and their offspring, with a total of 160 individuals once the young become volant. Based on concurrent emergence counts conducted on August 9, 2004, the Veale Creek Maternity Colony is comprised of a minimum of 41 individuals. No surveys were conducted in this maternity colony area in 2005.

As of 2006, one of the roost trees identified in 2004 had fallen (523R1), one had substantial fire damage at the base (523R3 - this tree has likely since fallen based on the fire damage and subsequent storms), and the rest appeared to be in similar condition as reported in 2004. (J. DuPont, BLA, pers. comm.). No primary roost trees had fallen.

Adult Males within the Section 2 SAA

Only one adult male Indiana bat was captured during mist net surveys within the originally defined Section 2 SAA on August 5, 2004 (no male Indiana bats were mist-netted in Section 2 in 2005). In addition, in 1998, two male Indiana bats were captured just east of the town of Winslow. Based on this and because forested portions of the Expanded SAA were not surveyed for bats in 2004 and 2005, the Service will assume that a small number/low density of adult male Indiana bats may occur in these areas. No Indiana bats were found during surveys of bridges within Section 2 and no Indiana bat winter hibernacula (including swarming habitat) are known to occur within the Section 2 action area (i.e., within a 5-mile buffer zone of the preferred Section 2 alignment for I-69).

General Habitat Conditions

Habitat Conditions of the Section 2 Expanded Summer Action Area

In order to evaluate the anticipated reach of direct and indirect affects, the original SAA has been expanded to include those areas where growth induced by the construction and operation of the project is reasonably foreseeable. Estimated forest cover within the Section 2 Expanded SAA is summarized below in Table 1. This information is based on satellite images of Section 2 taken in 2001 (land use coverage made available by USGS in late 2006) as well as field data verified by the Engineering and Environmental Assessment Consultants (EEAC) who prepared the Section 2 DEIS. INDOT's primary I-69 consultant, BLA, has provided the Service with more up-to-date forest coverage data for the Tier 2 analyses and thus the forest acreages reported in this Tier 2 BO supersedes those previously reported in the Tier 1 RPBO and Tier 1 BA Addendum. Note that the "tree cover" estimates previously reported for each of the 13 maternity colonies in the SAA and the hibernacula within the WAA in the documents above were based on 2003 aerial photos made available via the National Agricultural Imagery Program (NAIP) which have a much greater resolution (5m) than the USGS data. The 2006 USGS forest cover data, the 2003 tree cover estimates in the Tier 1 BA Addendum, field verification information produced by the EEACs, and images accessed via Google™ Earth represent the best available data for purposes of this consultation.

The Service will use the forest data summarized in Table 1 as an approximate baseline of currently existing forest habitat available within the Section 2 Expanded SAA (which includes the maternity colony areas, minus the overlap). Based on the amount and distribution of core and edge forest and degree of connectivity among forest patches (see BA Addendum), the majority (at least 2/3) of the forest habitat within the expanded SAA, approximately 24,568 acres, represents moderate to high quality roosting and foraging habitat for Indiana bats. We believe this is a reasonable characterization of habitat because the project is within the core of the Indiana bat's maternity range and based on GIS-based analyses presented in the BA Addendum, field data derived from forest plots and transects collected by BLA (see below) and review of aerial photographs (e.g., via Google™ Earth).

I-69 Project Section Number	Total Acres within Expanded SAA (includes maternity colony area)	Total <u>Forested</u> Acres within Expanded SAA (includes maternity colony)	Percent of the Expanded SAA that is Forested (includes maternity colony)
2	96,558	24,568	25%

Table 1. Estimated amount of forest within the defined Expanded Section 2 Summer Action Area.

Key parameters that may affect the quality of the summer habitat for bats within the action area are the overall percentage of forest cover in a specified area, the size of existing forest patches, and the degree of connectivity among forest patches. Based on a thorough review of literature on Indiana bat summer habitat, Rommé et al. (1995) concluded that areas with less than 5% deciduous forest coverage will not support summering Indiana bats. Localized areas considered as optimal habitat tend to have greater than 30% forest cover.

Based on the GIS analysis conducted by BLA using USGS data (2001 satellite imagery) and some field verified data (EEAC), the percentage of forest habitat per maternity colony area (2.5-mile radius area = 12,566 acres) is: Patoka - approximately 32%; Flat Creek - approximately 50%; East Fork - approximately 23%; and Veale Creek - approximately 18%. There is an overlap of 676 acres of forest between the Patoka and Flat Creek colonies. The remaining Expanded SAA (excluding the maternity colony area) is approximately 17% forested. The tree cover acreage (based on 2003 aerial photos) ranges from approximately 19% in the Veale Creek maternity colony to 43% in the Flat Creek colony.

The current number of total tree cover “patches” for each of the original 13 maternity colony areas in the Alternative 3C corridor of I-69 ranges from 53 patches in the Plummer Creek Colony to 421 patches in the Pigeon Creek Colony (Colony #1). Generally, a higher number of patches translates to more fragmentation and lower connectivity. Few, large class patches, with no mid-size patches and then a scattering of very small patches suggests a high level of connectivity. GIS-based maps depicting tree cover patches and degree of connectivity within the Section 2 maternity colonies are in Appendix A of the Tier 1 BA Addendum and are hereby incorporated by reference.

Analysis of USGS (2001) forest data found 73 forest tracts totaling 991 acres of core forest was available in the Expanded Remaining Summer Action Area (area not including maternity use areas) in Section 2. This is a substantial increase from the 566 acres of core forest reported available in the Tier 1 BA Addendum using the Tier 1 Remaining Summer Action Area and 1990 USGS data. There will be approximately 65.7 acres of core forests impacted by the Preferred Alternative right-of-way. Of these 65.7 acres, 29.7 acres are located within the Remaining Summer Action Area, 35.8 acres are located within the Flat Creek Maternity Colony, 0.2 acres are located within the Patoka River Maternity Colony, 0.1 acre is located within the East Fork of the White River Maternity Colony, and 0.1 acre located in the Veale Creek Maternity Colony. The colony overlap contains 0.2 acre of core forest impacts. This impact is an increase over the finding in the analysis of the representative alignment (RA) in the Tier 1 BA Addendum that found 11 acres of impact to core forests in the remaining summer action area. This difference is due to using a more current and accurate forest layer for the remaining summer action area.

Existing Forest Habitat Conditions within the Preferred Alternative Alignment

To better characterize the forest maturity (i.e., diameter of tree trunks at breast height - DBH), tree species composition, sub-canopy conditions (i.e., degree of vegetative clutter and presence/absence of invasive plant species), and amount of currently available roosting habitat (i.e., number/size/density of suitable snags with exfoliating bark) within the woodlots that will be directly impacted by the preferred Section 2 alignment of I-69, BLA staff conducted surveys along 46 linear transects. These 46 transects were approximately 60 feet wide and ranged from 190 feet to 1,720 feet in length. Twenty-three of the transects were within the proposed right-of-way and accounted for a total of 12.3% (27.9 acres) of the 226.8 acres of forest habitat that will be directly impacted. For comparison, the other 23 transects were within the same woodlots, but outside of the proposed alignment. These samples also totaled 27.9 acres. The transects are assumed to be representative of the existing forest habitat conditions within the 226.8 acres of impacted forest. The resulting snag characteristics and projected snag estimates for Section 2 are presented in Table 2.

Snag Characteristics	Transects within Alignment	Transects Outside Alignment
Total number of snags ($\geq 9''$ DBH) within transect (approx. 60' wide x variable length)	163	99
Average diameter of snags (inches)	12.6 \pm 4.5	13.5 \pm 5.5
Range of snag diameters (inches)	9 – 34	9 – 36
Total area sampled within transects (acres)	27.9	27.9
Density of snags in transect area (snags/acre)	6.4 \pm 4.4	4.6 \pm 4.6
Estimated total number of snags ($\geq 9''$ DBH) that will be cleared within footprint of Preferred Alternative Alignment for Section 2 of I-69 (using an average of 5.5 snags/acre x 226.8 impacted acres)	1,247	
Very rough estimate of total number of snags ($\geq 9''$ DBH) that may be present in forested areas of the Section 2 Expanded SAA, including maternity colony areas (24,568 acres) (an average of 5.5 snags/acre was used)	Section 2 Expanded SAA = 135,124 snags	
% of estimated number of snags in Section 2 Expanded SAA that would be directly impacted by I-69 (using an average of 5.5 snags/acre)	.9%	

Table 2. Snag sizes, densities, and estimated totals based upon line transect surveys conducted within and adjacent to woodlots that will be directly impacted by Section 2 of I-69

BLA estimated the diameters of upper canopy dominant trees along the transects and estimated the percentage of trees that fell into each of three different size classes: small ($< 9''$), medium ($9''$ - $18''$), and large ($> 18''$) trees. As expected, there was very little difference in the size distribution of trees between transects that were within the alignment and those outside the alignment. On average, transects surveyed within the alignment had 44% small, 42% medium, and 13% large trees. For transects surveyed outside the alignment, there were 50% small, 40% medium, and 11% large sized trees. The majority of trees both inside and outside the alignment had small to medium-sized diameters (less than or equal to $18''$ DBH) indicating that most of the woodlots that will be directly impacted by I-69 in Section 2 are relatively young, second-growth stands that had been previously harvested.

In regards to their quality as foraging habitat, 34 of the 46 transects were categorized as having ‘moderate’ or ‘dense’ understory vegetation, a characteristic that can deter foraging Indiana bats, which prefer more open understory conditions. Japanese and/or bush honeysuckle (*Lonicera* spp.), highly invasive plant species that form dense thickets in the understory of woodlots, were present in 17 of the surveyed transects. These species, if left unchecked, can take over and quickly lead to low quality bat foraging habitat. Based on our review of the best available data, it appears the majority of the 226.8 acres that will be permanently lost to construction of I-69 in Section 2 is currently of low to moderate quality for roosting and foraging Indiana bats.

Factors Affecting the Species in the SAA

The following State, local, and private actions within the SAA are likely adversely affecting Indiana bats to variable degrees, and are likely to continue into the reasonably foreseeable future: 1) loss and degradation of roosting and foraging habitat, 2) commercial and private timber harvesting, 3) cutting of snags, 4) degradation of water quality, and 5) roadkill along existing roadways. Stressors specific to the Section 2 SAA include surface coal mining, acid mine drainage, oil-well-waste production, and legal drain maintenance.

Conversely, several activities within the SAA should benefit the Indiana bat into the reasonably foreseeable future, including the management and acquisition and restoration of suitable Indiana bat habitat as part of the Patoka River National Wildlife Refuge. The U.S. Fish and Wildlife Service proposes to acquire 22,083 acres of land along a 30-mile section of the Patoka River from willing sellers. Full acquisition may take 20 years or more. The Patoka River National Wildlife Refuge (PRNWR) would eventually have 6,800 acres and Wildlife Management Areas (WMAs) would be acquired from within an adjacent 15,283-acre “selection area.” As of May 20, 2008, the total refuge project has acquired approximately 6,702 acres. The projected land use changes are to convert upland farmland and bottomland farmland into upland forests and bottomland-forested wetlands. Additional forest land to be added by the Refuge is estimated to be a gain of 1,991 acres (1,317 acres converted from agricultural land and 674 acres from other land uses).

The baseline acreages (e.g., % tree cover), habitat conditions, and general ongoing stressors of the maternity colonies are discussed on pages 73-75 of the Tier 1 RPBO and are hereby incorporated by reference (note that the forest data presented has since been revised). No additional losses of forest habitat within the four Section 2 maternity colony areas or expanded remaining SAA are presently known. Data from the U.S. Forest Service, North Central Research Station’s 2005 report “Indiana Forests: 1999-2003, Part A” indicate that while there has been a loss of continuous forests (resulting in smaller, more fragmented stands), there has been an overall increase in forested land across the state.

IV. EFFECTS OF THE ACTION

Based on our analysis of information provided in your November 2009 Tier 2 BA for Section 2 of I-69, we have determined that the adverse effects of the proposed action are consistent with those contemplated in the August 24, 2006 Tier 1 RPBO. Therefore, the previous discussion of adverse effects and incidental take analyses on pages 81-91 and Appendices A and B of the Tier 1 RPBO remain valid and are hereby incorporated by reference. No additional adverse effects beyond those discussed in the Tier 1 RPBO are anticipated from the Proposed Action. Both the harmful and beneficial effects of the “Tier 2 BA” estimated impacts and proposed mitigation

acreages were taken into consideration for both our incidental take and jeopardy analyses for this Tier 2 BO. Anticipated effects are summarized below.

The total forest loss anticipated due to construction of the preferred alignment is estimated to be 227 acres (approximately 211 acres upland forest + 16 acres forested wetland), which is approximately 19% less than estimated in the Tier 1 RPBO. The 227 acres of forest is composed of portions of numerous woodlots, as well as larger patches of forests near the Patoka River and Flat Creek area (See Section 2 Tier 2 BA, Appendix B). Up to an additional 10 acres of forest may be impacted in several areas due to utility tower relocations (this would make the total loss 15% less than previously estimated). Because FHWA and INDOT were largely successful in avoiding and minimizing impacts to forest habitat, most impacted woodlots in Section 2 will lose only a small portion of their total area, often along their periphery. A commitment has been made to bridge the entire floodplain of the Patoka River, as well as Flat Creek, potentially maintaining habitat connectivity and allowing bats to fly under the road in these areas. Given the relatively high degree of forest fragmentation and generally isolated distribution of existing woodlots in the majority of Section 2, the Service anticipates that Indiana bats are most likely to use/cross over the proposed 28.6 mile interstate in approximately 10, mostly narrow, stretches where more heavily wooded areas exist along the proposed alignment, including the Patoka River, Flat Creek, Mud Creek, East Fork White River, Aikman Creek, and Veale Creek. Therefore, not all of the 227 acres that will be removed for construction of the preferred alignment is likely to serve as Indiana bat habitat. Furthermore, less than half of the affected forest acreage occurs within the maternity colony areas.

In July 2007, BLA staff surveyed trees along 46 transects within 23 of the largest woodlots that would be impacted by Section 2 of I-69 (See Environmental Baseline Section for details). Based upon their findings, it is estimated that approximately 1,247 currently existing snags (i.e., dead trees >9” in diameter with exfoliating bark that may serve as potential primary roost sites for Indiana bats) may be destroyed within the 227 acres that will be permanently cleared for construction of I-69 (Table 2). Even though most of the surveyed woodlots did have some snags/potential roost trees the overall quality of the woodlots as roosting habitat was variable. Furthermore, only a fraction of these snags, those with direct solar exposure (along edges or within canopy openings), are likely to be suitable as potential primary maternity roost trees.

Effects and Risks to Local Bat Populations in the Section 2 SAA

Indiana bats within the Section 2 Expanded Summer Action Area may be exposed to adverse effects and incidentally taken from several I-69 related activities. The following forms of incidental take are possible:

- Harm from permanent direct loss of roosting habitat and loss of habitat connectivity/travel corridors among forested patches in Section 2
- Harass/wound/kill/harm from disturbance and habitat loss associated w/demolition and subsequent relocation of 65 homes, 3 businesses and one church in Section 2 (assuming one or more home owners will choose to construct a new home in a forested area, no seasonal tree-clearing restrictions and Indiana bats assumed present)
- Indirect/induced loss of roosting and foraging habitat (assuming no restrictions/bats present)

- Harass/wound/kill/harm from permanent habitat loss from I-69 related utility relocations (no timing restrictions/bats may be present) (several electric transmission crossings may result in a potential conflict that could result in towers being relocated into wooded areas in Section 2 - less than 10 acres of impact anticipated, up to five within the maternity colony areas)
- Death/kill from direct collision with vehicles traveling at high speeds (i.e., roadkill) on I-69 and/or increased traffic volumes on other local roadways (e.g., SR 356)
- Harassment of bats roosting near construction and/or operation of I-69 from noises/vibrations/disturbance levels causing roost-site abandonment and atypical exposure to day-time predators while fleeing and seeking new shelter during the day-time

Although incidental take may occur in various forms, the total amount of incidental take anticipated of individual bats is quite small. Based on habitat impacts discussed in the Tier 2 BA, the Service anticipates the incidental take to be consistent with or less than that which was determined in the Tier 1 RPBO: No more than 31 Indiana bats from the four maternity colonies in Section 2 (Patoka River – 6; Flat Creek – 9; East Fork White River – 7; Veale Creek – 9) will be taken as a result of all project-related habitat modifications through 2030 (see Table B1 in Tier 1 RPBO) and no more than 8 bats per colony (or approximately 1 bat/2 years/colony) are anticipated to be taken as a result of roadkill from 2013 to 2030. Less than 5 male Indiana bats are expected to be taken during this period as well.

Patoka River Maternity Colony

Of the 227 acres of forest (including forested wetlands) that will be cleared for I-69, approximately 13 acres (four of which are forested wetlands) fall within the 2.5-mile radius of the center of the Patoka River Maternity Colony area/primary Indiana bat roost (including portions within the Flat Creek/Patoka River Colony overlap area). Most of the alignment within the Patoka River Maternity Colony area traverses agricultural land, with the exception of the crossing at the Patoka River. The preferred corridor for Section 2 will not directly affect the forest habitat within the center of the assumed maternity colony use area; however, it does bisect habitat associated with the Patoka River and its floodplain (Figure 3). The shortest connectivity routes to the I-69 impact area are approximately 0.1 miles from the closest bat capture site and 2.5 miles from the primary roost tree. The other two capture sites and alternate roost tree range from 1.3 to 1.6 miles from the alignment, based on connectivity routes. No impact to the identified primary roost tree is anticipated; however, one or more alternate roost trees may be affected.

Because sufficient roosting and foraging habitat will remain within this area, we believe that the amount of proposed tree clearing (13 ac.) is not extensive enough to cause the whole colony to be permanently displaced. At worst, a small proportion of colony members may be temporarily displaced from using portions of their traditional summer range. That is, we expect the action area to continue to support the existing maternity colony. A small number of displaced individuals may be adversely affected or taken by I-69-related habitat alterations. Approximately 19.7 acres of tree cover will be impacted, which is about 0.5% of available tree cover within the maternity colony area.

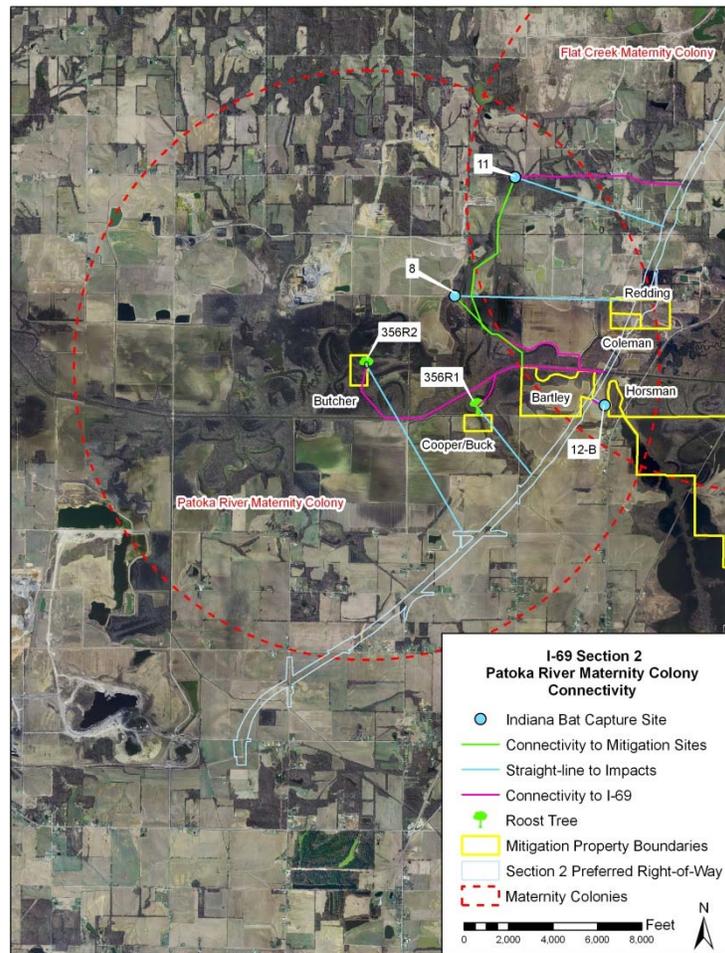


Figure 3. Patoka River Maternity Colony connectivity to the nearest I-69 alignment and mitigation sites.

Indiana bats associated with a maternity colony near the Indianapolis Airport have been observed to readily cross small roads (e.g., dirt, gravel, and paved) while foraging at night, but multilane divided highways were only rarely crossed and most of those crossings occurred when bats followed a stream under Interstate 70 (pers. comm. with Dale W. Sparks, Indiana State University, 2007). Sparks and his colleagues have concluded that if Indiana bats don't cross major interstates and highways often, that the presence of such transportation infrastructure in a landscape could essentially be reducing the amount of possible foraging grounds bats would otherwise be willing to visit, thus reducing the amount of food potentially available to the bats. Following this logic, some of the Patoka River Maternity Colony members may no longer be willing to cross over I-69 while foraging (Note: I-70 in the vicinity of the Indianapolis airport is significantly wider than what I-69 in Section 2 will be); however, INDOT's commitment to bridge the entire Patoka River floodplain (including the South Fork and old oxbow) should significantly reduce any barrier affect the highway may have in this area and allow bats to fly under the road to reach suitable habitat east of the alignment, including several mitigation sites. Fortunately for this colony, the majority of its habitat (including the primary roost tree) is west of the proposed alignment and thus would not require bats to cross the proposed interstate or reduce access to a significant portion of their assumed colony area.

The preferred I-69 alignment cuts across the southeastern portion of the Patoka River Maternity Colony area (Figures 1 and 3). Once Section 2 of I-69 is operational, fast-moving vehicles may

strike bats as they fly across the interstate at night between the months of April and November. We are uncertain how or whether colony members currently travel across or parallel to the proposed interstate alignment. Assuming that some individual bats do and will continue to use this area, we anticipate a small number of bats will be struck by vehicles and killed.

As the Service does not have a standard means for estimating the likelihood of roadkill, in Tier 1 we estimated roadkill by starting with the assumption that all exposed bats (160/colony) had a 0.5% risk of being hit and killed over the course of a 17 year period. For our Tier 2 analysis, we considered the nearness of the proposed alignment to the center of the maternity colony's use area, presence of likely travel corridors providing connectivity to the proposed alignment (Figure 3), and juxtaposition of potential roosting and foraging habitat, capture locations and known roost sites (when available) and considered whether the Tier 1 roadkill estimate was reasonable. Given the positioning of forest habitat relative to the proposed interstate alignment, we believe the Tier 1 estimate remains reasonable and no more than 8 bats will be killed by vehicle collision by 2030 or approximately 1 bat every two years. The loss of 8 individuals from roadkill may cause short-term (i.e., 2 to 3 years) reductions in reproductive success, but we do not anticipate an appreciable long-term change in reproductive success or viability of the Patoka River Maternity Colony. Furthermore, by bridging the floodplain of the Patoka River and providing areas for the bats to cross under the roadway, the likelihood of road-killed bats will be further reduced.

With regard to indirect impacts within the Patoka River Maternity Colony area, based on Traffic Analysis Zones (TAZs), no induced growth (or interchange) is anticipated along this portion of the Section 2 alignment. Further discussion related to indirect impacts can be found starting on page 73 of the Tier 2 BA for Section 2.

Flat Creek Maternity Colony

Approximately 72 acres of forest (including five acres of forested wetland) will be impacted within the Flat Creek Maternity Colony area. This includes seven acres that overlap with the Patoka River Maternity Colony. This is the largest impact of forest within any maternity colony area in Section 2, although this colony has the largest percentage of forest habitat. Estimated tree cover impacts within the colony area are 76.4 acres (including 13.6 acres within the area overlapping the Patoka colony), which is about 1.4% of the available tree coverage within the entire maternity colony. The project corridor bisects the colony area almost in half (Figures 1 and 4). Although suitable habitat is present on both sides of the alignment (particularly in the small colony overlap area), most of the larger tracks of habitat (and bat capture site) are east of the project alignment.

The colony area was centered around one capture point, approximately 0.7 miles east of the proposed roadway impacts. Two other capture locations are located within the Flat Creek Maternity Colony area, west of the alignment; these two locations also fall within the Patoka River Maternity Colony area. No roost trees were identified for any of the bats captured in the Flat Creek Colony. Several mitigation projects are located within the colony area, including over 200 acres of forest preservation just over half a mile east of the central capture location. Based on capture locations, connectivity, and available habitat, it is unlikely that a primary roost tree is within the impact area. In the event that a primary roost or alternate roost is felled by construction activities, additional roosting and foraging habitat will be available within the area.

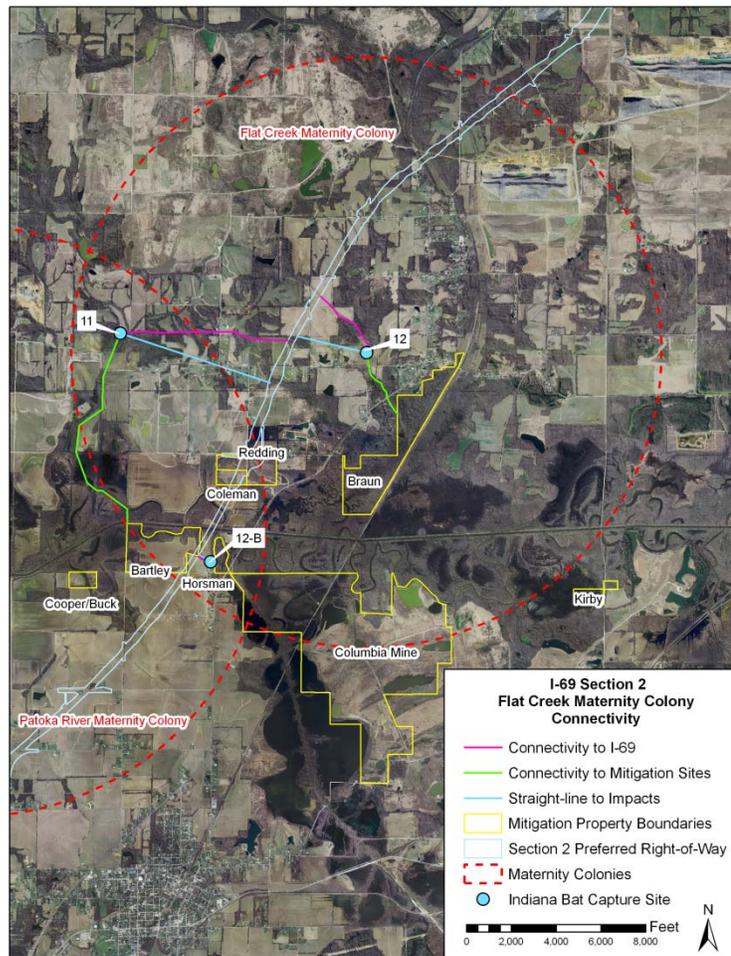


Figure 4. Flat Creek Maternity Colony connectivity to the nearest I-69 alignment and mitigation sites.

Again, once Section 2 of I-69 is operational, fast-moving vehicles may strike bats as they fly across the interstate at night between the months of April and November. Given the positioning of forest habitat relative to the proposed interstate alignment, we believe the Tier 1 estimate for road-kill within the Flat Creek Maternity Colony area remains reasonable and no more than 8 bats will be killed by vehicle collision between 2013 and 2030, or approximately 1 bat every two years (see roadkill estimate discussion above). The loss of 8 individuals from road-kill may cause short-term (i.e., 2 to 3 years) reductions in reproductive success, but we do not anticipate an appreciable long-term change in reproductive success or viability of the Flat Creek Maternity Colony. Bridging the floodplains of the Patoka River and Flat Creek will provide areas for the bats to cross under the roadway therefore reducing the likelihood of road-killed bats. Furthermore, shifting traffic away from SR 57 in this area, which is situated in a more forested portion of the colony area, may benefit the colony as well.

East Fork White River Colony

Approximately 28 acres of forest impact will occur within the East Fork White River Maternity Colony area. This amount includes approximately two acres of forested wetland. The estimated tree cover impacts are 41.9 acres, which account for about 1.3% of the total available tree cover in the colony area. Much of the alignment passes through agricultural areas and crosses the East Fork White River near the center of the colony area. The alignment runs predominately north-

south and bisects the colony area almost in half (Figure 1 and 5). Most of the habitat impacts will be to fragmented woodlots in the northern part of the colony area, and a few in the southern part.

One Indiana bat was captured approximately 0.4 of a mile west of the alignment along the East Fork White River. This site represents the closest distance between known Indiana bats and forest impacts within this colony. No roost trees were identified for this colony therefore it was centered on the capture location. Habitat along much of the EFWR in this area consists of a fairly narrow tree line, particularly near the alignment crossing. Based on connectivity, bat surveys and habitat conditions, it is unlikely that any primary roost trees will be affected by the highway within the 28 acres of forest impacts. It is possible one or more alternate roost tree may be affected, although sufficient roosting and foraging habitat will still remain in this area. Although the maternity area will be bisected, more habitat is available in the western portion of the colony area, near the capture site, than east of the alignment. While a small proportion of the colony could be temporarily displaced, we expect the area to continue to support the existing maternity colony.

Based on the positioning of forest habitat relative to the proposed interstate alignment, there are several locations where bats may cross the interstate. We believe the Tier 1 estimate for roadkill within the East Fork White River Maternity Colony area remains reasonable and anticipate that no more than 8 bats will be killed by vehicle collision between 2013 and 2030, or approximately 1 bat every two years (see road-kill estimate discussion above). The loss of a few individuals due to road-kill may cause short-term (i.e., 2 to 3 years) reductions in reproductive success, but we do not anticipate an appreciable long-term change in reproductive success or viability of the East Fork White River Maternity Colony. Furthermore, the size and design of the East Fork White River bridge should be adequate to allow bats to fly under the roadway and connect to other habitat areas, as well as the proposed mitigation sites (J. DuPont, pers.comm.).

A portion of an induced growth traffic analysis zone (TAZ) is located within the East Fork White River Maternity Colony area near the proposed North Pike interchange. In this TAZ, 0.6 acres of induced employment growth is anticipated. There is sufficient non-forested land to accommodate this expected growth in the area, therefore no impacts to forested habitat are expected.

Veale Creek Maternity Colony

The Veale Creek Maternity Colony has one of the more fragmented forests of all of the maternity colonies and one of the lowest tree cover percentages. Approximately nine acres of forest will be impacted in this maternity colony area, including just over 0.6 acres of forested wetland. The alignment cuts through the northwest quarter of the colony, just east of the town of Washington (Figure 1 and 6). Most of the available habitat is east of the alignment; however, one of the Indiana bat capture locations and most of the roost trees (including a primary roost tree) are very close to the project impact areas (0.5 miles or less). The longest connectivity route to the impact area is 1.3 miles from the second capture location (site #29).

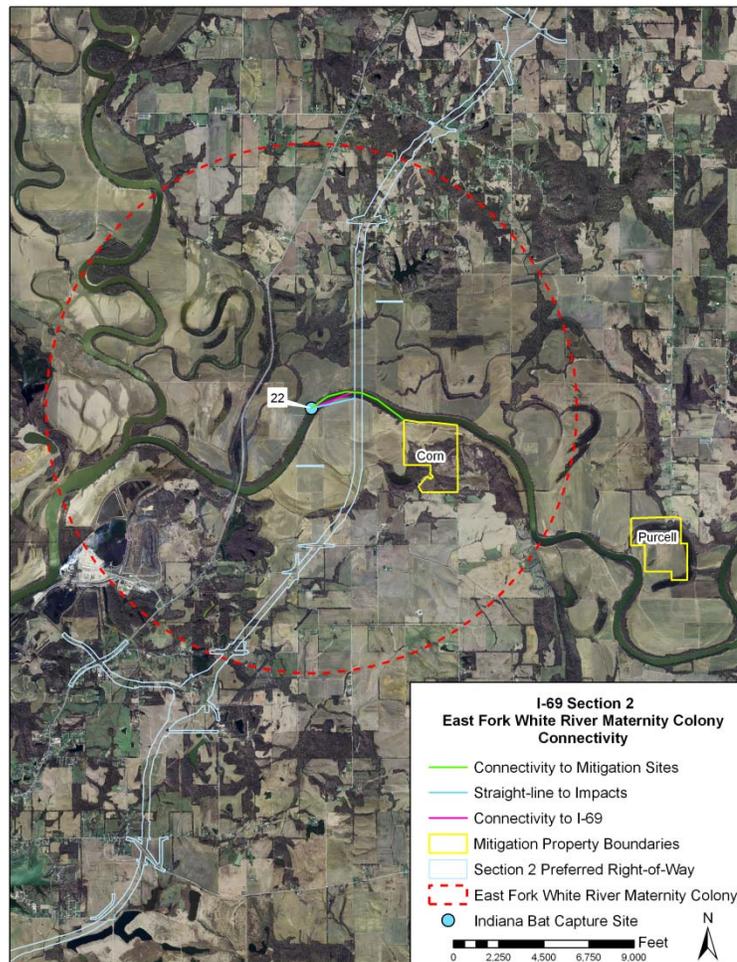


Figure 5. East Fork White River Maternity Colony connectivity to the nearest I-69 alignment and mitigation sites.

Although it is possible that one or more alternate roost trees may be impacted, none of the alternate or primary roost trees that have been identified so far are within the nine acre impact area. The estimated tree cover loss for this colony is 19.6 acres, which is less than 1% of the available tree cover in the maternity colony area.

Connectivity to the interstate via forest and riparian corridors is limited within the Veale Creek Maternity area. The most likely areas for bats to cross the alignment would be along Hurricane Branch, near the roost tree sites, and possibly further southwest, where an unnamed tributary to Veale Creek crosses the proposed interstate. We believe the Tier 1 estimate for roadkill within the Veale Creek Maternity Colony area remains reasonable and anticipate that no more than 8 bats will be killed by vehicle collision between 2013 and 2030, or approximately 1 bat every two years (see road-kill estimate discussion above). The loss of a few individuals due to road-kill may cause short-term (i.e., 2 to 3 years) reductions in reproductive success, but we do not anticipate an appreciable long-term change in reproductive success or viability of the Veale Creek Maternity Colony.

Some induced growth is expected in the Veale Creek Maternity Colony area as a result of the new interstate. We estimate approximately 72 acres of development could occur within the maternity colony area, primarily near and adjacent to the proposed interchange which is also

within the maternity colony area. All of these potential growth areas are predominately agricultural and development is not expected to occur in forested areas. Based on the amount of growth anticipated and the location of the TAZs, we do not believe any incidental take will occur in these areas as a result of induced growth.

Based on the proximity of the known roost trees of this colony to the proposed alignment, some take in the form of harassment due to construction noise/vibration may be possible. Loud noises during the day may cause increased heart rates/respiratory rates and disturbance from the roost. This could lead to roost abandonment and/or atypical exposure to daytime predation. No impacts are anticipated to nighttime foraging activities. These construction activities will be short term and no long term affects are anticipated.

Because the current forest conditions for this colony are somewhat marginal, it is particularly important that mitigation for this colony's forest and wetland impacts be completed within the maternity colony area, if possible. Currently, one mitigation site has been purchased and two sites are being pursued for a total of 145 acres of upland forest and 6 acres of forested wetland. This includes over 100 acres of reforestation near bat capture site #29 (Figure 6).

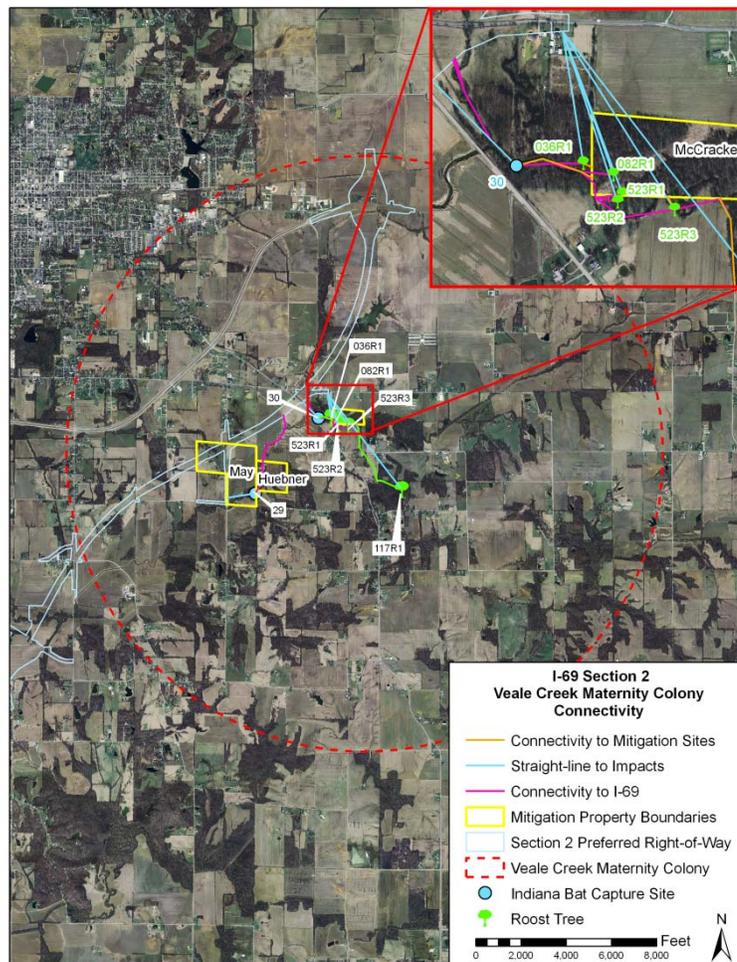


Figure 6. Veale Creek Maternity Colony connectivity to the nearest I-69 alignment mitigation sites.

Adult Males

In the Tier 1 RPBO, we estimated that a maximum of 50 adult males may be taken by the year 2030 as a result of the entire I-69 Proposed Action with the majority (60%) occurring as roadkill, particularly for males remaining within the Winter Action Area (WAA) during the summer. Fourteen adult males were estimated to be taken in the entire portion of the I-69 SAA corridor extending outside of the WAA to the north and south.

One adult male was captured within the originally defined SAA for Section 2 along Veale Creek, within the Veale Creek Maternity Colony area. In addition, two males were captured as part of a separate survey in the mid 1990's a couple of miles east of the action area near the Patoka River (west of the town of Winslow). It is possible that some adult males may occur in forested habitat within the Expanded SAA and other forested areas where no bat surveys were conducted, although we presume they are present in fairly low numbers.

The preferred alignment will impact some potential roosting and foraging habitat and disrupt several potential east-west travel corridors throughout Section 2. Once this section is operational, fast-moving vehicles may strike bats as they fly across the interstate at night between the months of April and November. We are uncertain how or whether male Indiana bats currently travel across or parallel to the proposed interstate alignment. Assuming that some individual bats do and will continue to use this area, we anticipate a small number of male bats will be struck by vehicles and killed; this is the most likely form of incidental take of male Indiana bats in Section 2.

Given the low density of male Indiana bats within the SAA, we anticipate the total number of bats that may be taken as a result of the Proposed Action in the Section 2 SAA to be less than 5 individuals between the years 2013 and 2030, or 1 bat every three and a half years, primarily as a result of roadkill. The potential loss of this very small number of bats will have no measurable or significant short or long-term impacts on local or regional Indiana bat populations in the SAA, Midwest Recovery Unit or beyond.

Indirect/Induced Impacts

A total of 139 acres of induced development is predicted to occur within the Section 2 Expanded Summer Action Area. The expert land use panel identified a total of 22 TAZs around the proposed interchanges near Oakland City, Petersburg and Washington as the probable locations of that induced development. The majority of land use in these areas is agricultural and most proposed development is anticipated to occur in these areas. Regarding the potential for I-69 to spur induced development in Section 2, the Section 2 DEIS states:

“Farmlands, forests, wetlands, and streams are the principal resources that the project’s indirect land use changes would potentially affect. A review of the existing undeveloped land in the TAZs that are expected to experience induced growth indicates that almost all of that land is in agricultural use. As shown previously in Table 5.24-1, 72% of the total area of the TAZs where induced growth is anticipated is agricultural land. This is particularly true in the TAZs where the greatest induced growth is expected. Of the three TAZs with anticipated induced growth in excess of 10 acres - one in the vicinity of the proposed interchange at Petersburg in Pike County (TAZ no. 6300709) and two in the vicinity of the proposed US 50 interchange in Daviess County (TAZs 1400222 and 1400224) – the percentages of the total TAZ areas that are available forest land are 20%, 16% and 4%, respectively. The areas of available agricultural land in these three TAZs are

957 acres, 263 acres, and 290 acres, respectively. The specific locations of the forested lands in these TAZs were also examined using aerial photography, which showed that the forested areas were generally remote from the existing roadway network, in areas that would be less suitable for development than the larger agricultural areas nearer to existing roads and the proposed interchange locations.”

The Service gives deference to the “expert land use panel” on the issue of where induced development is most likely to occur in Section 2. Thus, we do not anticipate any incidental take of Indiana bats in Section 2 as a result of induced development (139 acres) in forested areas.

In summary, the following effects on Indiana bats (particularly maternity colonies) in Section 2 are anticipated:

- Direct habitat modification/loss will occur, but will be minimal with a loss of tree cover ranging from approximately 0.5% to 1.4% within the four maternity colony areas. So, the total amount of forest loss is relatively insignificant. It is also unlikely that these maternity areas would experience a significant long-term decrease in quality of roosting or foraging habitat as a direct result of I-69, with the exception of the Veale Creek colony. Based on available habitat and the location of induced growth TAZs and the interchange, a long-term decrease in habitat quality could occur; mitigation efforts within the colony area are critical and will help to compensate for these impacts.
- Seasonal tree-cutting restrictions will ensure no direct impacts/take occurs from the construction of I-69 during the maternity colony season. INDOT has also extended this restriction to include all borrow areas used by construction contractors.
- Indirect loss of forest or wetland habitat from residential and commercial development is anticipated to be insignificant and discountable in Section 2.
- No known primary or alternate roost trees will be impacted within the Patoka River or Veale Creek Maternity Colonies. Although no primary or alternate roost trees were located for the Flat Creek or East Fork White River colonies, given the capture location of the bats, the location of the I-69 alignment, and results of forest transects conducted by BLA in 2007, it is unlikely that any primary maternity roosts are within the proposed alignment that will be cleared for I-69. Thus no take is anticipated from the loss of a primary roost tree. Loss of one or more alternate roost trees may occur, but this is limited given the location of the proposed alignment.
- Approximately 10 potential east-west travel corridors may be disrupted by the proposed interstate alignment (based on forested corridors and riparian areas being bisected by the alignment), but because the interstate would be located either near the edge of the maternity area, or on one side or the other of a majority of the suitable habitat, we anticipate that this potential adverse effect would impinge on a relatively small proportion of the colony members and not be a significant source of take. Furthermore, the bridge structures at the Patoka River, Flat Creek, and East Fork White River should provide areas for bats to connect to existing habitat and safely cross under the interstate.
- Death/kill from collision with vehicles once road is operational is anticipated on I-69 and other local roadways with increased traffic volume. One bat per colony is projected to be taken every two years, in addition less than five male bats may be taken.
- The maternity colonies and individual adult males have access to ample additional habitat nearby in the unlikely case that some individual bats should become displaced from their traditional foraging/roosting areas.

- I-69 may not induce a significant amount of residential/commercial development in currently forested areas, but it may speed up the rate of development that otherwise would have occurred within the SAA at a slower rate, particularly in the immediate vicinity of and within easy commuting distance of Section 2 interchanges (e.g., US 50).
- Some harassment of bats roosting near construction areas may occur as a result of exposure to novel noises/vibrations/disturbance causing roost-site abandonment and atypical exposure to day-time predators while fleeing and seeking new shelter during the day-time. This will most likely have only short term impacts, if any.
- Proposed forest, wetland, and stream mitigation within and near the maternity areas will ensure that at least 773 acres of suitable roosting and foraging habitat persists in this area in perpetuity (Figures 1-6).
- Long term reproduction and viability are not expected to be impacted and all maternity colonies are likely to persist in the area.

Although there may be some short-term impacts to individuals within the four colonies, these impacts are not likely to affect the colonies' long-term reproduction and viability. Thus, the maternity colonies are likely to persist within the SAA into the reasonably foreseeable future following construction, operation, and maintenance of the I-69 project. Furthermore, with successful implementation and maturation of the proposed mitigation projects and all of the other proposed mitigation efforts and conservation measures, we anticipate that long-term habitat conditions for these colonies will be sustainable.

In Table B1 in Appendix B of the Tier 1 RPBO, the Service deconstructed the Proposed Action and summarized the anticipated direct and indirect environmental consequences and likely responses of exposed Indiana bats. After reviewing the Section 2 BA and conducting the formal consultation for Section 2, the Service has concluded that applicable information within Table B1 remains valid for Section 2 of I-69. In addition to project elements assessed in Table B1, the Service also considered potential adverse effects from the following possible indirect I-69 related actions in Section 2: induced construction/operation of new cell towers and commercial billboards (lighted and unlighted) along I-69. Based on information in the Tier 2 BA for Section 2, no currently present billboards will need to be relocated. Furthermore, because open agricultural land is so plentiful in Section 2, the Service does not anticipate that any new cell towers or billboards are likely to be sited/constructed in currently forested areas in Section 2 and therefore no additional forest loss is anticipated related to these type of actions.

Furthermore, once I-69 becomes operational, local travel patterns will change and some night-time traffic volume will be diverted off of local highways and onto I-69. Because the current unknown rate of roadkill on existing roadways in Section 2 (e.g., nightly traffic on SR 57) should fall once I-69 becomes operational, the overall or net effect of I-69 on roadkill of Indiana bats in the 2 SAA may be neutral

Effects on Habitat Quality

In addition to direct habitat loss (237 acres of forest), proposed actions may result in a decrease in the quality of remaining habitat within the Action Area. Factors that may lead to a loss in the quality of remaining habitat include: increased habitat fragmentation; increased human disturbance (e.g., more lighting associated with road improvements, increased traffic and associated noise levels); foraging habitat over culverted or relocated streams will be relatively

poor until the aquatic community becomes re-established; and water quality in the Action Area may be negatively impacted, at least in the short term during construction activities, and potentially to some degree over the long-term from road salts, motor oil and other road run-off, and various hazardous materials leaked or spilled during traffic accidents. Over time, it is expected that fragmentation of habitat in some portions of the Action Area will increase as new indirect development occurs particularly near proposed interchanges. However, as the mitigation plantings mature into suitable Indiana bat habitat this will be at least partially compensated.

Increased human presence/disturbance in the project area may affect the quality of summer bat habitat, but these effects are expected to be relatively minor. Some Indiana bats in the SAA that have not previously been exposed to artificial lighting, high noise levels and highway traffic may initially avoid habitat near I-69 or use it to a lesser extent (pers. comm. with D. Sparks, Indiana State University, 2007), but this will probably only be a relatively minor adverse effect of the project. No incidental take is anticipated from the additional lights and traffic noise levels that will occur with the operation of Section 2 of I-69.

During construction, water quality may be temporarily adversely affected in Section 2 streams (e.g., increased siltation) where Indiana bats drink and presumably obtain a small portion of their insect prey. Once operational, Section 2 streams and legal drains will receive roadway runoff containing salts (applied by INDOT maintenance staff) and other vehicular-based contaminants, which may further degrade their current conditions, which in some cases are already of poor quality. Anticipated adverse impacts to water quality will be addressed in erosion control plans that INDOT will be implementing during all construction activities, which will help alleviate short-term sedimentation impacts on aquatic insect communities. Because the bulk of the Indiana bats' prey base is made up of terrestrially based insects (i.e., not aquatic-based, Tuttle et al. 2006), short and/or long-term adverse affects to local water quality are not likely to rise to a level where incidental take of Indiana bats is reasonably certain to occur.

Effects of Avoidance, Minimization and Mitigation Measures

The FHWA and INDOT have incorporated measures into the proposed project design to avoid, minimize and mitigate the impacts of the project to the extent practical. Proposed avoidance, minimization and mitigation procedures are discussed in the Revised Tier 1 Forest and Wetland Mitigation and Enhancement Plan (see Appendix D of the Tier 1 BA Addendum). Details of specific mitigation projects in Section 2 are described in the Section 2 Tier 2 BA starting on page 92 (see also Appendices F-S), and overall Conservation Measures developed for the project can be found in the Conservation Measures section of the Tier 1 BA Addendum, as well as the Tier 1 RPBO, and are hereby incorporated by reference. A summary of the proposed Conservation Measures and their current implementation status is provided in Appendix A of this BO.

To minimize and mitigate impacts to bats due to habitat loss in Section 2, existing high quality forested habitat suitable for Indiana bat foraging and roosting, as well as areas suitable for restoration, were identified within the SAA. These include three sites that are part of the I-69 Sections 2 and 3 Umbrella Mitigation Bank, sites acquired by INDOT for preservation, sites acquired by USFWS through INDOT/FHWA funding assistance and sites that have been acquired or are in the acquisition process which have anticipated future restoration and replanting activities. Deeds for the sites that have been secured by INDOT are included in the site specific appendices of the Section 2 Tier 2 BA. Figure 7 shows a map of all the mitigation sites in Section 2. Table 3 shows an overall summary of the credits anticipated at each mitigation site. Once the restorations mature, the sites will provide larger contiguous blocks of

bottomland and upland forests and increased connectivity among other existing blocks of forested habitat and will thereby provide valuable habitat for Indiana bats foraging and roosting in the area.

INDOT will be responsible for monitoring and maintaining the various mitigation areas, where applicable, while they are being established or until a long-term management entity is identified. The environmental benefits of these sites will be significant and will continue to increase as the sites mature. Silvicultural manipulation in these areas will be limited to activities which will enhance the quality of habitat for Indiana bats, as agreed to by the Service's BFO. A restrictive covenant will be recorded for the properties and will disallow manipulation of vegetation (e.g., mowing, timber harvest, timber stand improvement, firewood collecting) in the mitigation area without consultation/prior approval from the Service's BFO. Seven of the 12 forest mitigation sites (not including the Columbia Mine site) are or will be owned and managed by the Patoka River NWR. The Columbia Mine site will also become part of the Patoka River NWR, although no forest mitigation credits are part of this mitigation.

For the entire Section 2 SAA, FHWA and INDOT have exceeded their 3:1 mitigation commitment for upland forest by approximately 126 additional acres (assuming all the proposed mitigation sites within the Veale Creek Maternity Colony are secured), for a mitigation ratio of 3.5:1. If mitigation credits within the Veale Creek colony become available, and there is a need for supplementary mitigation within the Section 4 project area, pursuant to the discussion on page 15 of the Tier 1 RPBO, these upland and/or wetland forest credits may be applied to the Section 4 requirement. Some amount of reforestation will occur within each of the maternity colony areas, along with preservation. For the East Fork and Veale Creek maternity colonies, a significant net gain of forest and forested wetland is proposed which will greatly benefit the colonies, particularly the Veale Creek colony which currently has low tree cover. The Patoka River colony will lose approximately nine acres of upland forest and four acres of wetland forest and the Flat Creek colony will lose about 60 acres of upland forest and five acres of wetland forest (excluding the overlap area). The net gain of upland forest occurs entirely within the overlap area, for a total of 58 acres; therefore, one of these colonies will actually suffer a slight loss of upland forest. Forested wetlands in these two colonies will increase by 50 acres overall. Despite the small shortcoming of upland forest development in the Patoka River/Flat Creek area, with successful implementation of the proposed mitigation projects we anticipate that short and long-term habitat conditions for the four maternity colonies within the Section 2 Summer Action Area, and individual bats within the area, will be sustainable.

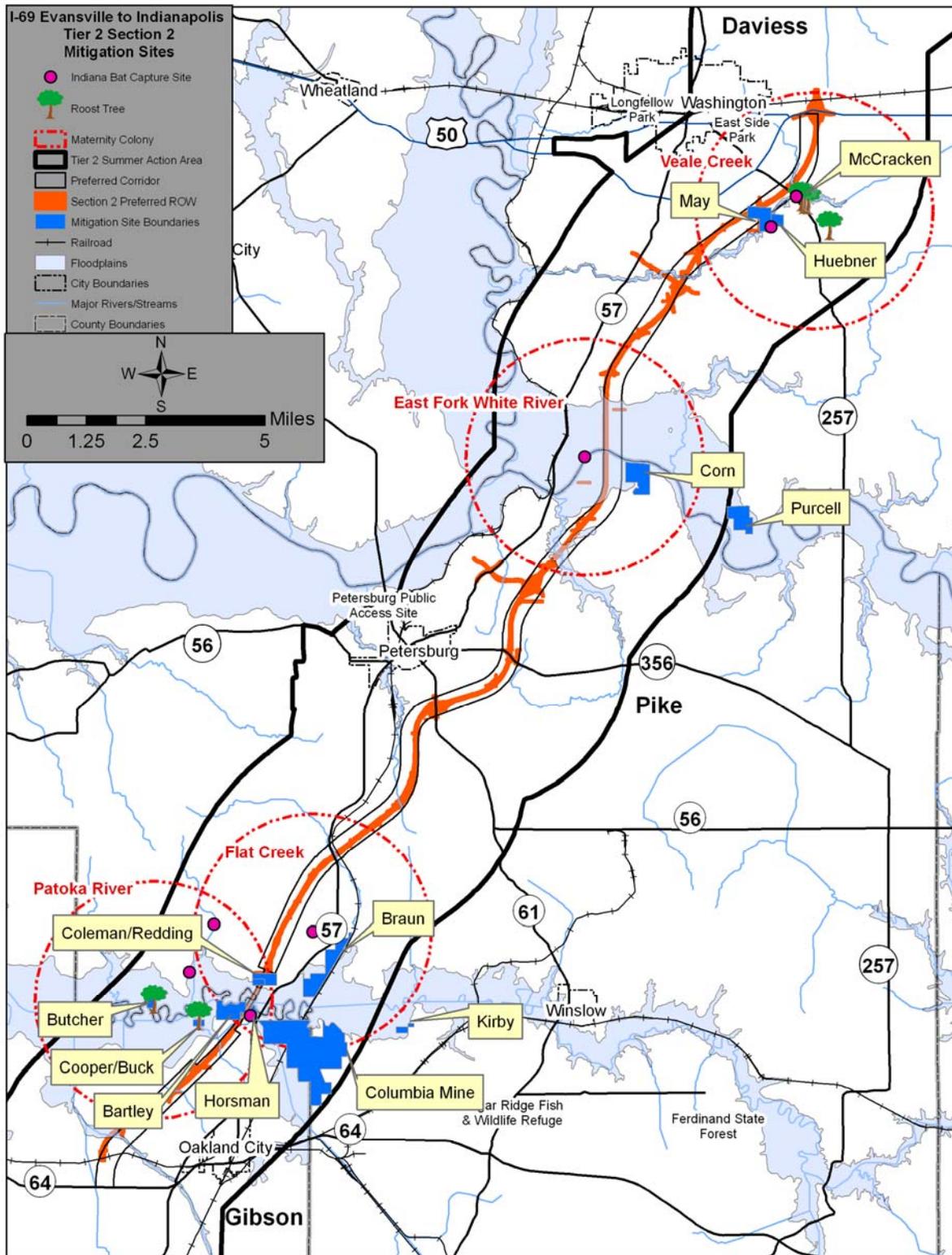


Figure 7. Potential Mitigation Sites in Section 2 of the I-69 Interstate Project.

<i>Table 3. Section 2 Mitigation Site Anticipated Credits Summary</i>							
Mitigation Site	Forest Preservation (acres)	Reforestation (acres)	Total Forest Mitigation (acres)	Emergent Wetlands (acres)	Forested Wetlands (acres)	Scrub-Shrub Wetlands (acres)	Total Wetland Mitigation (acres)**
Patoka River Maternity Colony Mitigation Sites							
Bartley*	63.2	2.4	65.6	9.3	53.0	0.0	62.3
Butcher	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Coleman/Redding*	2.4	55.9	58.3	0.0	0.0	0.0	0.0
Columbia Mine*	0.0	0.0	0.0	0.0	0.0	0.0	450.0****
Cooper/Buck	7.5	0.0	7.5	0.4	11.7	0.0	12.1
Horsman*	15.6	0.0	15.6	0.0	0.0	0.0	0.0
Flat Creek Maternity Colony Mitigation Sites							
Braun	224.5	0.0	224.5	0.0	0.0	0.0	0.0
Kirby	4.2	0.0	4.2	0.0	0.0	0.0	0.0
East Fork Maternity Colony Mitigation Sites							
Corn	71.6	90.4	162.0	1.9	1.4	3.5	6.8
Purcell	34.0	101.8	135.8	2.3	5.8	0.0	8.1
Veale Creek Maternity Colony Mitigation Sites							
Huebner	18.7	17.8	36.5	0.0	1.8	0.0	1.8
May	6.7	85.5	92.2	1.5	4.0	0.0	5.5
McCracken	17.0	0.0	17.0	0.0	0.0	0.0	0.0
Totals	467.4	353.8	821.2***	15.4***	77.7***	3.5***	546.6
*These Mitigation sites are located within both the Patoka River and Flat Creek Maternity Colonies.							
**Unconsolidated Bottom and Aquatic Bed Wetlands will be mitigated for using out of kind mitigation (8.05 acres).							
***There will be excess mitigation of approximately 125.8 acres of forest mitigation, 0.7 acres of emergent wetland mitigation, 24.5 acres of forested wetland mitigation, and 2.2 acres of scrub-shrub mitigation. These excess acreages may be used for mitigation in Section 4.							
****This is preservation only and includes forested, scrub/shrub, emergent, and open water wetlands.							

An extensive bat monitoring and research program has also been committed to by the FHWA and INDOT. Therefore, the four maternity colonies will be studied and monitored the summer prior to and at least five summers post-construction, beginning with the first summer following the start of construction. Final details of the proposed monitoring plan will be developed in consultation with the Service for each affected project section as construction plans and schedules are finalized. During these monitoring efforts, the FHWA and INDOT will locate and identify property owners of newly discovered roost trees and the Service will work with FHWA, INDOT, and the land owners (private or otherwise) to promote conservation of the Indiana bat habitat occurring at each new location.

Finally, FHWA, INDOT and BLA, have worked with the Service's BFO to design an educational poster that will be made publicly available via the internet and interpretive displays about Indiana bats that will eventually be placed in rest stops along I-69. The Draft Indiana bat recovery plan (USFWS 2007) identifies public education and awareness about Indiana bats as a priority activity needed for recovery of the species.

In summary, construction of Section 2 of I-69 will cause direct loss of 244 acres [237 acres of forest (including some loss due to utility relocations) and 7 acres non-forested wetland] of suitable Indiana bat summer habitat (i.e., roosting and foraging habitat and forested travel corridors) but additional habitat loss from indirect development is expected to be negligible. Although short-term reductions in habitat quality may occur, overall long-term habitat restoration and protection are expected to improve the habitat conditions for Indiana bats. The Service anticipates the incidental take to be consistent with or less than that which was determined in the Tier 1 RPBO: No more than 31 Indiana bats from the four maternity colonies in Section 2 will be taken as a result of all project-related habitat modifications through 2030 (see Table B1 in Tier 1 RPBO) and no more than 8 bats per colony (or approximately 1 bat/2 years/colony) are anticipated to be taken as a result of roadkill from 2013 to 2030. Less than 5 male Indiana bats are expected to be taken during that same time period. Therefore, we anticipate the SAA for Section 2 will continue to support the existing maternity colonies into the foreseeable future.

V. CUMULATIVE EFFECTS

In the context of the Endangered Species Act, cumulative effects are defined as the effects of future State, tribal, local or private actions that are "reasonably certain" to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered because they require separate consultation pursuant to Section 7 of the Endangered Species Act (e.g., new surface coal mining permits).

Based on our analysis of information provided in the November 2009 Tier 2 BA for Section 2 of I-69 and subsequent communications, we have determined that the currently anticipated sources of cumulative effects are consistent with those contemplated in the August 24, 2006 Tier 1 RPBO and that the currently anticipated levels of adverse cumulative effects, particularly dredging of legal drains, has been reduced to an insignificant level. No additional adverse effects beyond those discussed in the Tier 1 RPBO are anticipated as a result of cumulative effects. Therefore, most of the previous discussion of adverse effects and incidental take analyses on pages 94-97 and Appendices A and B of the Tier 1 RPBO remain valid and are hereby incorporated by reference. Exceptions are noted below.

For the Tier 1 BA Addendum, in addition to cumulative impacts generated by the REMI model, impacts to tree cover from possible legal drain dredging were estimated and included. These impacts could potentially occur regardless of the I-69 construction. Legal drains were identified through consultation with county officials as those streams legally maintained by the county or maintained through privately funded local groups. For the BA Addendum analysis, impacts were assumed to be 75 feet from either side of a legal drain. The legal drain impacts represented a “worst-case” scenario for tree cover impacts as not all legal drains are likely to be maintained, and maintenance may not result in impacts on both sides of the stream, or the entire 75 feet. Taking this worst-case-scenario approach, BLA originally estimated that there would be a total of 22 acres of tree cover potentially lost as a result of cumulative effects from the maintenance of legal drains within the Patoka River Maternity Colony Area alone.

In the Tier 2 evaluation, county surveyors were contacted regarding the potential for legal drain maintenance within each county. Pike County responded that they had no legal drains that they maintained in the county and none of the Daviess county legal drains were within the Section 2 SAA. Legal drains within the SAA in Gibson County include East Fork of Keg Creek, the Kirk Lateral, the Wallace Lateral, and the West Fork of Keg Creek. The Gibson County Surveyor was contacted on October 20, 2009, and stated in a letter (see Appendix C of the Tier 2 BA) that there are no planned maintenance activities involving tree removal along the legal drains in the Section 2 Project area at this time; however, he did indicate that if maintenance activity on these regulated drains required tree removal, it is estimated that 30-40 feet would be sufficient to accommodate this activity. Analysis for the Tier 2 BA shows 15.2 acres of tree cover within 40 feet on both sides of the legal drains within the Patoka Maternity Colony. There are also 11.3 acres of forest within 40 feet on both sides of legal drains within the Expanded Remaining Summer Action Area. This comes to a total of approximately 26.5 acres of forest within 40 feet on both sides of the legal drains in the Expanded Summer Action Area. Because there are currently no plans for any tree removal along these drains, the impact is not reasonably certain to occur.

Therefore, what was previously considered to be a cumulative impacts (i.e., a 22-acre reduction in tree cover within the Patoka Maternity Colony by 2030 from dredging of legal drains) is no longer a significant concern and no loss of forest habitat or take is currently anticipated from the dredging of county-controlled legal drains. In Table B4 of the Tier 1 RPBO, the Service had previously anticipated the loss of up to 2 adult females/juveniles from the Patoka Maternity Colony from the potential amount of forest loss associated with the dredging of legal drains in Section 2. This very conservative Tier 1 estimate was most likely an overestimate of take since the threatening activity is no longer considered to be reasonably certain to occur after further coordination in Tier 2.

The Patoka River (Houchin’s Ditch) is maintained by a conservancy district. A member of their board was also contacted by phone regarding potential maintenance and clearing activities along the drain. At this time, they do not anticipate any tree clearing along the Patoka River.

We anticipate a decline in bat habitat in some areas of the Summer and Winter Action Areas in the future, although we are not aware of specific development plans in known Indiana bat habitat in Section 2 at this time. If INDOT, FHWA or USFWS become aware of specific projects, impacts to Indiana bats will be addressed through the incidental take permit process, if appropriate.

VI. CONCLUSION

After reviewing the section-specific information, including 1) scope of the project, 2) the environmental baseline for the action area, 3) the status of the Indiana bat and its known and potential occurrence within the action area, 4) the aggregate effects of the proposed construction, operation, and maintenance of the interstate and associated development, and 5) any cumulative effects, it is the Service's biological opinion that Section 2 of the I-69 Project, by itself or when considered in conjunction with the larger I-69 project from Evansville to Indianapolis, is not likely to jeopardize the continued existence of the Indiana bat.

Our basis for this conclusion follows:

- Because I-69 will have a long narrow/linear footprint, the amount of adverse impacts to any one habitat patch or maternity area along its path is minimal when compared to impacts of a similarly sized area that has a non-linear configuration.
- We anticipate very few Indiana bats may be taken as a result of roadkill (no more than 1 bat every 2 years/colony and no more than 5 males over a 17 year period).
- We anticipate that none of the four maternity colonies will be displaced by direct or indirect effects associated with the construction, operation, and maintenance of Section 2.
- The proposed 918 acres of forest and wetland mitigation in Section 2 has been strategically located to improve upon the existing high-quality forest habitat within and near the various maternity colony areas, we believe adverse impacts to the colonies and any adult males occurring in the immediate area will be further minimized and should not be long lasting. Because over 460 acres of existing forest habitat will be protected and 450 acres of forest and wetland habitat will be developed/enhanced the maternity colonies within Section 2 will experience a net gain of habitat as part of the Proposed Action and receive both short and long-term benefits that will continue in perpetuity. In the unlikely event all of the proposed mitigation areas completely fail, the maternity colonies are still likely to persist within the other available habitat within their traditional summer range.
- We do not anticipate any significant impacts to the local population of Indiana bats, the proposed Midwest Recovery Unit population, nor the species within its entire range.

Because of our analysis, we do not believe that the proposed action “would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the Indiana bat by reducing the reproduction, numbers, or distribution of the Indiana bat (50 CFR 402).” For the proposed action to “reduce appreciably” the Indiana bat's survival and recovery, the proposed action would have to impede or stop the process by which the Indiana bat's ecosystems are restored and/or threats to Indiana bat are removed so that self-sustaining and self-regulating populations can be supported as persistent members of native biotic communities (USFWS and NMFS 1998, page 4-35). We do not believe the proposed project impedes or stops the survival and recovery process for the Indiana bat because:

We believe that the proposed roadway construction, operations, and maintenance, while potentially resulting in the incidental take of some individuals, are not a significant threat to the species in the proposed Midwest Recovery Unit nor the species as a whole and, therefore, do not

rise to the level of jeopardy. No component of the proposed action is expected to result in harm, harassment, or mortality at a level that would reduce appreciably the reproduction, numbers, or distribution of the Indiana bat.

SECTION 2 (TIER 2)

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by Service as intentional or negligent 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. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the FHWA or their designee (e.g., INDOT) for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA fails to assume and implement the terms and conditions of the incidental take statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

INDIANA BAT

AMOUNT OR EXTENT OF TAKE

The Service believes it is likely that incidental take of Indiana bats in Section 2 of I-69 will occur as a direct or indirect result of the Proposed Action in the following forms:

- Harm through habitat modification/permanent direct loss of roosting habitat/ alternate roost tree(s) and loss of foraging habitat and connectivity/travel corridors among forested patches in Section 2,
- Harass/wound/kill/harm from disturbance and habitat loss associated w/demolition and subsequent relocation of 65 homes, 3 businesses and one church in Section 2,
- Harass/wound/kill/harm from permanent habitat loss from I-69 related utility relocations,
- Death/kill from direct collision with vehicles traveling at high speeds (i.e., roadkill) on I-69 and/or increased traffic volumes on other local roadways (e.g., SR 356),

- Harassment of bats roosting near construction and/or operation of I-69 from noises/vibrations/disturbance levels causing roost-site abandonment and atypical exposure to day-time predators while fleeing and seeking new shelter during the day-time.

Based on our analysis, the Service believes four Indiana bat maternity colonies occur within the Expanded SAA. Adverse effects on the colonies include habitat loss/modification, short term noise/disturbance, and loss of individuals from roadkill. Although very difficult to predict, we estimated the maximum amount I-69 related incidental take from all four maternity colonies combined from all sources within the Expanded SAA to be no more than 61 individuals (32 from roadkill and an additional 29 adult females/juveniles as harm from habitat loss/modification and/or harassment) during the first 17 years of operation (approx. 2013-2030). Additionally, no more than 5 males bats are anticipated to be taken, primarily as a result of roadkill. On an annual basis, this equates to approximately 4 bats being taken per year. This total number is two less than that developed in the Tier 1 RPBO because indirect impacts are no longer predicted. No significant, long-term adverse effects are anticipated to accrue to any of the maternity colonies, nor to any local populations of adult males.

It is unlikely that direct mortality of small-sized bats from roadkill will be detected, that is, we do not expect that most dead or moribund bats are likely to be found. The same is true for take associated with habitat modification/loss and disturbance; detecting or finding dead individuals is unlikely. However, as outlined in the Tier 1 RPBO, we can track the level of anticipated take by monitoring the amount of habitat modification as a surrogate. The Proposed Action will result in the loss of up to 237 forested acres (this includes up to 10 acres of forest potentially impacted by utility relocations) in Section 2 of I-69. The Service anticipates that reproductive and viability consequences at the maternity colony level are not likely to occur with the proposed amount of habitat modification. If the amount of habitat modification exceeds the specified levels, the trigger for reinitiation has been met. The specified level of habitat modification which triggers reinitiation is defined as exceeding the anticipated 237 acres by more than 10%. Furthermore, the FHWA will keep track of any known Indiana bat roadkills to ensure that the anticipated amount of incidental take is not exceeded.

Currently anticipated levels of adverse impacts to Indiana bat summer habitat/forest in Section 2 are lower than what previously had been considered in the Tier 1 RPBO. The Tier 1 incidental take estimate of 280 acres of forest habitat had been anticipated based upon a worst-case-scenario representative alignment, but in Tier 2, the Preferred Alternative Alignment will only impact an anticipated, 237 forested acres, a 15% reduction and far below the anticipated project-wide total of 2,148 acres of direct forest loss (Table 4). This anticipated level brings the cumulative total of Tier 2 estimated forest habitat loss for the entire I-69 Evansville to Indianapolis project to 333.4 acres (27.4 acres in Section 1, 69 acres in Section 3, and 237 acres in Section 2). For a running summary of habitat impacts per Section, see Appendix D of the Section 2 Tier 2 BA.

Section	Loss of Forest Anticipated in Tier 1 RPBO/BA Addendum for Section 2	Loss of Forest Anticipated in Tier 2 BA & Tier 2 BO for Section 2
2	280 acres	237 acres

Table 4. Estimated direct loss of Tier 2 Forest within the I-69 Section 2 SAA.

Additionally, we anticipate that the Proposed Action will result in the loss of 7.1 acres of non-forested wetlands in Section 2 of I-69 (Table 5). This anticipated level brings the cumulative total of incidental take of Tier 2 estimated non-forested wetlands for the entire I-69 Evansville to Indianapolis project to approximately 12 acres. This impact level is still well below the 20 acres originally anticipated for the entire I-69 Evansville to Indianapolis project in the Tier 1 RPBO and ITS.

Section	Loss of Non-forested Wetlands Anticipated in Tier 1 RPBO/BA Addendum for Section 2	Loss of Non-forested Wetlands in Tier 2 BA & Tier 2 BO for Section 2
2	5 acres	7.1 acres

Table 5. Estimated direct loss of non-forested wetlands within the I-69 Section 2 SAA

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that the aggregate level of anticipated take is not likely to result in jeopardy to the Indiana bat.

TIER 2 REASONABLE AND PRUDENT MEASURES

In addition to the Tier 1 Reasonable and Prudent Measures (RPMs) contained within the 24 August 2006 Incidental Take Statement for Tier 1 of the I-69 Evansville to Indianapolis project, the Service believes the following Tier 2 RPMS are necessary, appropriate, and reasonable for further minimizing incidental take of Indiana bats in Section 2 of I-69:

1. In the Section 2 Tier 2 BA (page 114), the FHWA proposed to implement numerous conservation measures and mitigation efforts as part of their proposed action and these measures are hereby incorporated by reference. These measures will benefit a variety of wildlife species, including Indiana bats. FHWA should take necessary steps to ensure that successful implementation of all conservation measures is achieved to the fullest extent practicable in a timely manner.
2. The implementation status of all the proposed conservation measures, mitigation efforts, and research and any related problems need to be monitored and clearly communicated to the Service on an annual basis.

TIER 2 TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the FHWA (and/or INDOT and their contractors or assigns) must comply with the following Tier 2 Terms and Conditions (T&Cs), which implement the Tier 2 RPMs above. These Tier 2 T&Cs are non-discretionary and are in addition to the Tier 1 T&Cs.

1. Before any construction of Section 2 of I-69 commences within the maternity colony areas, the FHWA, in consultation with the Service must develop detailed, site-specific, final mitigation plans for the Coleman/Redding, Bartley, Huebner, and May mitigation

areas. The mitigation plans will not be conceptual, but rather will contain detailed descriptions for each phase of mitigation including 1) initial construction and establishment, 2) 5-year, post-construction monitoring phase, and 3) long-term management. The Section 2 final mitigation plans will address and/or establish the following: quantifiable criteria and methods for assessing success of all mitigation plantings and functionality of constructed wetlands and streams, approved lists of tree/plant species to be planted (and their relative abundance/%), approved lists of herbicides for weed control, proposed construction schedules, annual post-construction monitoring schedules, and a long-term, ongoing management/stewardship strategy.

To ensure timeliness, the FHWA must begin construction and/or reforestation within the Section 2 Mitigation Areas either before (the most preferable option) or during the first summer reproductive season (1 April – 30 September) immediately after any I-69 related tree clearing or construction begins in Section 2 anywhere within each 2.5-mile radius maternity area (see Figure 7). Once initiated, all Service-approved construction and tree plantings within the Section 2 Mitigation Areas must be completed within 3 calendar years.

2. FHWA will provide the Service with a written annual report that summarizes the previous year's monitoring, conservation and mitigation accomplishments, remaining efforts, and any problems encountered within Section 2. This annual report will be completed throughout the 5-year post-construction monitoring period. The annual report for Section 2 may be a stand-alone document or included as part of the annual report required under the 2006 Tier 1 T&C Number 2.

In conclusion, the Service believes that no more than 66 individuals will be incidentally taken between the years 2013 and 2030 as the result of roadkill and direct habitat loss, modification, and/or disturbance will be limited to approximately 237 acres of forest habitat and 7.1 acres of non-forested wetland habitat within the Section 2 Expanded SAA. Such take will be monitored by reporting known Indiana bat vehicle collisions and tracking the amount of habitat modification. These acreages represent less than a 1% loss of the Section 2 Expanded SAA's forested acreage and will be cleared over a period of at least a couple of years. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the anticipated levels of incidental take (i.e., habitat modification and/or roadkill) are exceeded by more than 10% (or tree clearing occurs during the period April 1-September 30 in the SAA), then such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The FHWA must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action/program on listed species or critical habitat, to help implement recovery plans, or to develop information. Conservation recommendations generally do not focus on a specific project, but rather on an agency's overall program.

The Service provides the following conservation recommendations for the FHWA's consideration; these activities may be conducted at the discretion of FHWA as time and funding allow:

INDIANA BAT CONSERVATION RECOMMENDATIONS

1. Provide funding for scientific research on White-nose syndrome in bats.
2. Working with the Service, develop national best management practices (BMPs) for addressing Indiana bat issues associated with FHWA-funded projects within the range of the Indiana bat.
3. In coordination with the BFO, purchase or otherwise protect additional Indiana bat hibernacula and forested swarming habitat in Indiana.
4. Provide funding to expand on scientific research and educational outreach efforts on Indiana bats in coordination with the Service's BFO.
5. Provide funding to staff a full-time Indiana Bat Conservation Coordinator position within the BFO, which has the Service's national lead for recovering this wide-ranging species.

In order for the Service to be kept informed of actions for minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal programmatic consultation with FHWA on the construction, operation, and maintenance of the Section 2 portion of the I-69 from Evansville to Indianapolis, Indiana and associated development. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action (e.g., highway construction and associated development) are subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

LITERATURE CITED

- Bat Conservation International (BCI). 2009. Scientists struggle to save American bats. BCI News Release, May 29, 2009.
- Blehert, D.S., A.C. Hicks, M. Behr, C. Meteyer, B. Berlowski-Zier, E.L. Buckles, J.T.H. Coleman, S.R. Darling, A. Gargas, R. Niver, J.C. Okoniewski, R.J. Rudd, and W.B. Stone. 2009. Bat white-nose syndrome: an emerging fungal pathogen? *Science* 323 (5911): 227.
- Gargas, A., M.L. Trest, M. Christensen, T.J. Volk, and D.S. Blehert. 2009. *Geomyces destructans* sp. Nov. associated with bat white-nose syndrome. *Mycotaxon* 108:147-154.
- Humphrey, S. R., A. R. Richter, and J. B. Cope. 1977. Summer habitat and ecology of the endangered Indiana bat, *Myotis sodalis*. *Journal of Mammalogy* 58(3):334-346.
- Rommé, R. C., K. Tyrell, and V. Brack, Jr. 1995. Literature summary and habitat suitability index model: components of summer habitat for the Indiana bat, *Myotis sodalis*. Report to Indiana Department of Natural Resources, Federal Aid Project E-1-7, Study No. 8. 38pp.
- Tuttle, N. M., D. P. Benson, and D. W. Sparks. 2006. Diet of *Myotis sodalis* (Indiana bat) at an urban/rural interface. *Northeastern Naturalist* 13:435-442.
- U.S. Fish and Wildlife Service (USFWS). 1983. Recovery Plan for the Indiana Bat. Twin Cities, MN.
- U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). 1998. Endangered Species Consultation Handbook - Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act. Washington, D.C.
- U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. Fort Snelling, Minnesota. 258 pp.
- Whitaker, J. O., Jr. 1996. Survey of summer bat communities and search for endangered bat species at 21 sites along the proposed Bloomington to Evansville highway route in Gibson, Pike, Daviess, Greene, and Monroe counties in southwest Indiana highway corridor - draft EIS appendices. Indiana Department of Transportation, Indianapolis, Indiana.
- Whitaker, J.O., Jr., and V. Brack, Jr. 2002. "Distribution and summer ecology in Indiana" in A. Kurta and J. Kennedy eds. *The Indiana Bat: Biology and Management of an Endangered Species*. Bat Conservation International, Austin, Texas.

APPENDIX A. Tier 1 I-69 Evansville to Indianapolis Conservation Measures for the Indiana Bat (*Myotis sodalis*)

#	Tier 1 Conservation Measures	Status (as of 02/2010)
A. Context Sensitive Solutions		
1	Alignment planning - alignments will be located beyond 0.5 miles from known IBat hibernacula	completed
2	Avoid Blasting within 0.5 miles of IBat hibernacula from 15 September to 15 April	to be completed
3	Survey potential hibernacula for IBats	completed
4	Avoid and minimize impacts to karst hydrology connected to IBat hibernacula	to be completed
5	Tree removal - to avoid direct take of IBats, tree cutting within 5 miles of a known hibernaculum will only be allowed from 15 November to 31 March	to be completed
6	Alignment planning - alignments will be located to minimize impacts to forested areas and core forests	ongoing
7a	Tree cutting - to avoid direct take of IBats, no trees >3 inches DBH will be cut down from 1 April to 30 September	ongoing
7b	To locate IBats within the action area, mist net surveys will be conducted as part of Tier 2 studies. If captured, IBats will be radio-tracked to locate roost trees	completed
8a	Bridge surveys will be conducted in action area as part of Tier 2 studies	completed
8b	Bat friendly bridges will be designed where feasible and appropriate	to be completed
8c	The Patoka River floodplain will be bridged in its entirety to minimize impacts to riparian habitat	to be completed
9	Stream relocations - site-specific plans will be developed including stream mitigation and monitoring plans	ongoing
10	Medians and Alignments - variable-width medians and independent alignments will be used to minimize impacts	ongoing
11	Minimize Interchanges - efforts will be made to minimize interchanges in karst areas	ongoing
12	INDOT will adhere to the multi-agency Wetland and Karst MOUs	ongoing
13a	Water quality - equipment servicing and maintenance areas will be restricted to designated areas away from streams and sinkholes and their immediate watersheds	ongoing
13b	Water quality - road-side ditches will be constructed with filter strips and containment basins	to be completed
13c	Construction equipment will be maintained in proper mechanical condition	ongoing
13d	Roadways will be designed to contain accidental spills	ongoing
13e	Herbicide use will be minimized in identified environmentally sensitive areas	to be completed
13f	Revegetation - disturbed soil areas will be revegetated with native grasses and wildflowers	ongoing
13g	Low Salt Zones - low salt and no salt spray strategy will be developed in karst areas	to be completed
13h	Bridges will be designed with none or a minimum number of in-span drains and water will be directed toward drainage turnouts at the ends of the bridge	to be completed
14	Erosion control measures will be implemented during construction	ongoing
15	Parking and Turning Areas - for heavy equipment will be outside and away from environmentally sensitive areas.	ongoing
B. Restoration / Replacement		
1	Summer Habitat Creation/Enhancement - Wetland and forest mitigation will occur within the action area with priority given to sites within 2.5 miles of IBat capture sites or roost trees. Mitigation sites will be planted with a mixture of native trees that is largely comprised of species that have been identified as having relatively high value as potential Indiana bat roost trees. Tree plantings will be monitored for five years after planting to ensure establishment and protected in perpetuity via conservation easements.	ongoing

APPENDIX A. Continued.

#	Tier 1 Conservation Measures	Status
B. Restoration / Replacement (continued)		
2	Wetland MOU will be followed	ongoing
3	Forest Mitigation - Forest impacts occurring within each of the 13 2.5-mile radius maternity colony areas would be mitigated by replacement (i.e. planting of new forest and purchase of existing) at approximately 3:1, preferably in the vicinity of the known roosting habitat.	ongoing
C. Conservation / Preservation		
1	Hibernacula Purchase - one or more will be purchased to conserve Ibat winter habitat from willing sellers in the action area	to be completed
2	Hibernacula Protection - cave gates, fences, or alarm systems will be constructed to prevent unauthorized human entry	to be completed
3	Autumn/Spring Habitat Purchase - autumn swarming/spring staging habitat will be purchased from willing sellers as part of conservation for Ibat habitat to the greatest extent practicable. Some parcels containing important autumn swarming/spring staging habitat may be acquired near key hibernacula regardless of whether the hibernacula are acquired themselves.	to be completed
4	Summer Habitat Purchase - at fair market value in the Action Area from "willing sellers" to preserve summer habitat. Any acquired summer habitat area would be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements.	ongoing
D. Education / Research / Monitoring		
1	Monitor any caves that had gates installed as an I-69 conservation measure.	to be completed
2	Install warning signs at caves as appropriate.	to be completed
3	Provide \$50,000 to supplement the biennial Ibat winter surveys at known hibernacula in the action area and elsewhere in Indiana	in process
4	Provide \$125,000 for research on the relationship between quality autumn/spring habitat near hibernacula and hibernacula use within/near the Action Area. This research should include methods attempting to track bats at longer distances such as aerial telemetry or a sufficient ground workforce. A research work plan will be developed in consultation with the USFWS.	in process
5	Conduct additional mist net surveys at 50 sites to monitor status of the 13 known Ibat maternity colonies in the action area. Surveys will be completed the summer before construction begins in a given section and will continue each subsequent summer during the construction phase and for at least five summers after construction has been completed. If Indiana bats are captured, radio transmitters will be used in an attempt to locate roost trees, and multiple emergence counts will be made at each located roost tree. These monitoring efforts will be documented and summarized within an annual report prepared for the Service.	ongoing
6	Educational Poster - Total funding of \$25,000 will be provided for the creation of an educational poster or exhibit and/or other educational outreach media to inform the public about the presence and protection of bats, particularly the Indiana bat.	in process
7	Rest Areas - rest areas will be designed with displays to educate the public on the presence and protection of sensitive species and habitats. Attractive displays near picnic areas and buildings will serve to raise public awareness as they utilize the Interstate. Information on the life history of the Indiana bat, protecting karst, and protecting water quality will be included in such displays.	to be completed
8	Access to Patoka River NWR - If reasonable, an interchange will be constructed that would provide access to a potential Visitor's Center at the Patoka River National Wildlife Refuge.	ongoing
9	GIS Information - GIS maps and databases developed and compiled for use in proposed I-69 planning will be made available to the public. This data provides information that can be used to determine suitable habitats, as well as highlight other environmental concerns in local, county, and regional planning. Digital data and on-line maps are available http://igs.indiana.edu/arcims/statewide/index.html .	completed

APPENDIX B.

Supplemental Information from the December 7, 2009 meeting regarding the Section 2, Tier 2 Biological Assessment

Meeting with U.S. Fish and Wildlife Service
At USFWS Bloomington, Indiana Field Office
 December 7, 2009

Attendee	Organization
Robin McWilliams Munson	US Fish and Wildlife Service (USFWS)
Jason DuPont Tom Cervone	Bernardin Lochmueller & Associates (BLA/PMC)

As a representative for FHWA and INDOT preparing the I-69 Biological Assessments, Jason DuPont and Tom Cervone from BLA the Project Management Consultant met with Robin McWilliams Munson of USFWS on December 7, 2009 at the USFWS Bloomington Field Office in conjunction with an I-69 Section 7 consultation coordination meeting. The following summarizes the discussion including clarification and supplemental information for each topic addressed relative to the BA.

USFWS Tier 2 BA Questions/Comments and Responses/Additional Information

Question: Sec. 2 contains a bifurcated section (pg. 6) Where is this area?

Response: The bifurcated section is just south of the SR 61/SR 56 interchange at Petersburg. More specifically it starts just north of where Pike County Road 50 W intersects the Section 2 right-of-way and continues north until just south of Pike County Road 300 N. Refer to the attached map to see this location. This area is across reclaimed strip mined land, and no forest exists within this widened median area. Pending final geotechnical measures which may be implemented during construction, the entire widened median area may be disturbed by construction.

Question: Pg. 35 “The transects were all within the right of way impact areas, with the “outside” transects...” Please clarify.

Response: The “outside” transects were sampled adjacent to the right-of-way, but outside of the planned right-of-way in the habitat that will remain after construction. The reference of “within the right-of-way area” was intended to identify that they were in the immediate proximity to the right-of-way.

Question: Table 3 – Est. average number of snags – how did they calc.? Also, next page the combined total of all transects snags/ac had an n=46?

Response: The estimated number of snags were calculated by finding the area sampled in each transect. The number of snags per acre for each transect was then calculated. These numbers were averaged together and the standard deviation was then found. On the next page, 46 stands for the number of transects that were completed. This was a brief description just to recap what was provided by Tom Cervone via email on Tuesday, December 15, 2009.

Question: Pg. 40 suggests I-69 will not be a barrier for bats to cross. Suggest cite these.

Response: The statement regarding the potential barrier effect not being a major concern is based on two records of Indiana bats crossing major divided highways in Indiana. These records are associated with the work at the Indianapolis Airport as well as I-69 Tier 2 studies. The references for the I-70 record is as follows:
 Sparks, D. 2005. Personal Communication. Center for North American Bat Conservation and Research. Assistant Director.

The SR 37 data is from an unpublished I-69 Section 6 survey as follows:

Hendricks, William D., et al, 2004. Summer Habitat for the Indiana Bat (*Myotis sodalis*) within the Martinsville Hills from Martinsville to Indianapolis, Indiana.

Question: Confirm on pg. 45, the summary is talking about 0.9% of upland forests.

Response: The summary is referring to upland forest. The percentage is calculated based on the total amount of tree cover available in the maternity colonies. The tree cover was used since it was determined to be the best data available for the calculation.

Question: What is the anticipated height of the bridge over the S. Fork Patoka and Patoka River? (pg. 51)

Response: The anticipated height of the bridge over the entire floodplain, including the S. Fork Patoka and Patoka River will range from approximately 20-40 feet.

Question: Pg. 51, 3rd pp, last sentence: Should it be Bartley site, instead of Redding?

Response: It should be the Bartley site. The sentence is trying to convey Indiana bat capture site 11 has the longest distance to any mitigation site with the Bartley site being 2.0 miles away.

Question: Pg. 68 under Noise what is Leq ?

Response: The hourly L_{eq} is defined as the equivalent, steady state sound level, which, in a given period of time (one hour), contains the same acoustical energy as the time-varying sound level during the same time period. This is a time weighted average measurement of noise intensity. A more technical definition of what L_{eq} represents is attached for additional reference.

Question: Based on number of homes/business relocated, do you have info on comparable homes available in the areas where relocations will happen? What support is there that these 65 homes will not rebuild in forested areas?

Response: The table below, which was presented in the Section 2 Revised Tier 2 DEIS, shows the number of homes available in the Section 2 project area. The table shows 234 homes for sale, which would accommodate the anticipated relocated residences. While it is possible that some of these families may choose to build a house rather than relocate into available housing units, we believe that this would be offset by projected population increases utilizing existing available housing. All of the indirect impacts, totaling 561 homes, assumed that new residential homes would be built as opposed to utilizing existing housing. It is possible that some of these families will choose to buy a pre-existing home; however, we have conservatively accounted for each constructing new residences.

	\$0-\$50K	\$50K-\$100K	\$100K-\$150K	\$150K-\$200K	\$200K-\$250K	\$250K+
2 Bedrooms	29	32	5	0	0	0
3 Bedrooms	24	69	25	16	3	3
4+ Bedrooms	3	10	5	4	2	4

Question: Pg. 90, 1st pp, last sentence: Add'l credits in Sec. 2 may be applied to Sec. 4 (or other Sections) if circumstances, as discussed on page 15 (item a) of the Tier 1 RPBO are encountered (i.e. adequate mitigation in the MCA of Sec 4 is not possible, so Sec. 2 extra mitigation will apply). A reference to the Tier 1 RPBO should be incorporated here. See also pg. 111 (2nd pp).

Response: Based on preliminary property owner coordination in the maternity colony areas within Section 4, there will be a need for additional mitigation acreage per the guidelines identified in the Tier 1 RPBO. Due to the interest from willing sellers within the Veale Creek Maternity Colony in Section 2, and the value of these mitigation sites to the Indiana bat, it is anticipated that excess credits secured in this area would be applied to Section 4 based on the need identified and coordination with USFWS per the Tier 1 RPBO which states "where mitigation cannot be provided within the maternity colony roosting and foraging area, any additional mitigation for impacts to the colony will be provided elsewhere within the SAA or at other locations acceptable to the USFWS, FHWA, and INDOT."

Question: What about native veg. at EFWR crossing? Pg. 90

Response: It is likely that the planting of native vegetation will be possible at the East Fork of the White River crossing; however, at this time cannot be guaranteed pending final erosion and sediment control BMPs and construction details. This area will be targeted for native revegetation.

Question: Pg. 97, 1st pp: Shouldn't monitoring be for 10 years? Also noted on 98, 110, 113.

Response: The sites in the Umbrella Mitigation Bank (UMB) are currently committed to 10 years of monitoring. In the Tier 1 RPBO, under the Terms and Conditions, it states that the reporting will continue at least 5 years post-construction or until otherwise agreed to with the service. Because not all sites have been incorporated into the UMB, we have stated the 5 years in the preliminary plans based on the Tier 1 RPBO.

Question: Veale Creek properties pg. 109 -_Emphasize importance of these mitigation sites and the commitment made to find and secure mitigation in this area. Impact analyses for the various colonies are affected by the commitments of reforestation and preservation of forest, esp. around Veale creek (considering location and number of known roost trees and capture sites.)

Response: The Veale Creek maternity colony includes the most identified roost trees of any of the maternity colonies in Section 2. Based on the more limited existing habitat compared to other maternity colonies, it is important that mitigation sites in the Veale Creek colony are identified and secured. The three mitigation sites in the Veale Creek Maternity Colony presented in the BA, though not secure at this time, are still being pursued and are anticipated to be secured. These sites will provide both reforestation and preservation in this maternity colony for long-term habitat benefits. It is anticipated that excess mitigation credits will be applied to Section 4 based on a preliminarily identified need for additional sites.

Question: What is the latest breakdown of land use in the ROW? Ag, developed, upland forest, wetland, open water, etc.

Response: The breakdown of all land use in the right-of-way is as follows.

Ag-1113.4 acres
Upland Forest-209.4 acres
Developed-187.7 acres
Mining-8.7 acres
Open Water (PAB, PUB)-4.32 acres
Wetland (PEM, PSS, PFO)-25.7 acres
Other Upland Habitat-144.9 acres

Question: Pg. 63 says preferred alt. crosses 64,863 linear feet of stream. Pg. 99 says 69,472 linear feet. Can you clarify?

Response: The preferred alternative now crosses 64,863 feet of stream with the refined preferred alternative that was presented in the BA. The number presented on page 99 is a dated number which was not updated. The number on page 99 should also be 64,863.

Question: What is the latest update on the condition of the various roost trees in Sec. 2?

Response: The last survey of the roost trees in Section 2 was completed in May/June of 2006. The results were the following:

- 036R1-There were approximately 6 shagbark hickory trees at the location identified during the survey. The specific roost tree could not be confirmed, but all were still alive and in similar condition. There was no evidence that a tree in the area had recently been cut or toppled.
- 082R1-The tree believed to be the one identified during the survey was still alive
- 117R1-The dead American elm (approx. 12 feet tall) identified during the survey was still standing, had an open cavity in one side, but did not exhibit much if any loose bark
- 356R1-The silver maple at the location identified during the survey was still alive, but was larger than that reported. There was no evidence of any recently cut or toppled trees in the immediate vicinity.
- 356R2-The dead snag in the open was in nearly the same condition as during the survey. There was very little loose bark.
- 523R1-The dead American elm at the location identified during the survey had fallen.
- 523R2-The dead elm at the location identified during the survey was still standing and appeared to be in similar condition as it was at the time of the survey.
- 523R3-The dead snag at the location identified during the survey was still standing, but had substantial fire damage at the base. It is highly unlikely that this tree is still standing following last year's ice storm and winds.