TIER 2 BIOLOGICAL OPINION

for

SECTION 4

of the

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

for the

FEDERALLY ENDANGERED INDIANA BAT

traversing portions of

GREENE AND MONROE COUNTIES, INDIANA

Submitted to the Federal Highway Administration

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EXECUTIVE SUMMARY

This document contains a Tier 2 Biological Opinion for Section 4 of I-69 and tiers back to the Tier 1 Revised Programmatic Biological Opinion dated August 24, 2006 and its recent amendment (May 25, 2011) for the proposed extension of I-69 from Evansville to Indianapolis, Indiana. The Federal Highway Administration originally 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. Subsequently, on April 11, 2011, the Federal Highway Administration again reinitiated Tier 1 consultation based on new maternity colony information, as well as documentation of the newly discovered disease White Nose Syndrome within the action area. On May 25, 2011, the U.S. Fish and Wildlife Service issued an amendment to the August 24, 2006 Tier 1 RPBO, including a revised Incidental Take Statement.

The effects associated with the proposed construction, operation, and maintenance of Section 4 of I-69 are within the scope of effects contemplated in the recently amended Tier 1 Revised Programmatic Biological Opinion (2011). Upon evaluation of the proposed project, we believe incidental take of Indiana bats in the Section 4 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 4 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 4.

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service or USFWS) Tier 2 Biological Opinion (BO) for Section 4 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 4 on November 1, 2010 along with a letter requesting the Service to initiate formal consultation on the proposed construction, operation, and maintenance of Section 4 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 November 10, 2010 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. On April 11, 2011 the FHWA again requested to reinitiate formal consultation for Tier 1 based on new maternity colony information and documented presence of the devastating disease White Nose Syndrome (WNS). The USFWS issued an amendment to the 2006 Tier 1 RPBO on May 25, 2011, which includes an updated Incidental Take Statement.

This Tier 2 BO for Section 4 of I-69 is prepared in accordance with section 7 of the Endangered Species Act (ESA or the Act) of 1973, as amended (16 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 amended May 25, 2011) and this section-specific Tier 2 BO, the Service has incorporated portions of the Tier 1RPBO and its recent amendment by reference in this Tier 2 BO. Similarly, portions of the Tier 2 Biological Assessment (Tier 2 BA) for Section 4 have been incorporated by reference in this Tier 2 BO.

The Section 4 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 Draft Environmental Impact Statement (DEIS) for Section 4 (dated July, 2010),
5) Tier 2 BA for Section 4 (dated November 1, 2010),
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,
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, and
9) Tier 1 RPBO amendment (dated May 25, 2011)

In conducting our Tier 2 evaluation, we determined whether (1) this Section of the proposed project falls within the scope of the I-69 amended Tier 1RPBO, (2) the effects of this proposed action are consistent with those anticipated in the amended Tier 1RPBO, and (3) the appropriate Terms and Conditions associated with the Reasonable and Prudent Measures identified in the amended Tier 1 Incidental Take Statement (ITS) are being adhered to (See Appendix A of this document and page 176 of the Section 4 Tier 2 BA for the list of conservation measures). This document serves as the Tier 2 BO for Section 4 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 amended 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 4 of the project.

CONSULTATION HISTORY

The proposed action has a background that encompasses several decades of planning and environmental 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 4 of the I-69 Project. A chronological summary of important consultation events and actions associated with this project is presented in the Section 4 Tier 2 BA (pg. 4) and is hereby incorporated by reference. In addition to this summary, on April 11, 2011 the FWHA requested a reinitiation of the Tier 1 consultation. 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) is 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. The Service issued an amendment to the Tier 1 RPBO on May 25, 2011, including a revised ITS.

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 4 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 Greene and Monroe Counties, Indiana (Figure 1). The Proposed Action for Section 4 of I-69 includes the following:

- Constructing approximately 26.7 miles of new, 4-lane interstate from US 231 in Greene County to SR 37 in Monroe County (see Section 4 BA or DEIS for specifications and typical cross-sections)
- Acquiring approximately 1,800 acres of right-of-way (ROW) of which roughly 60% is forested
- Mechanical clearing/grubbing/demolition of existing forest/vegetation and man-made structures from right-of-way (typically about 500 feet wide). 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 (SAA) for the Indiana bats and from April 1 to November 15 within the Winter Action Area (WAA), as identified in the Tier 2 DEIS for Section 4; and prohibiting the filling of wetlands outside the construction limits.
- Clearing of approximately 1,090 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 1 October and 31March (SAA) or 16 November and 31 March (WAA)]

- Filling/converting of approximately 13 acres of wetlands, including emergent (5.3 ac.), forested (3.7 ac.), scrub-shrub (0.5 ac.), and open water ponds (3.2 ac.)
- Impacting approximately 112,800 linear feet of stream habitat
- Impacting approximately 87 to 106 known karst features; the Karst MOU (1994) will be implemented throughout the project area
- Relocating approximately 10 transmission towers that are situated within the right-of-way for the Preferred Alternative. All of the tower relocations are anticipated to have some forest impacts. Based on the location of these anticipated relocations, and the adjacent land uses, forest impacts from utility relocations are expected to be less than 20 acres for all of Section 4. Two of the locations appear to be within the Little Clifty Branch maternity colony area. Locations of these towers can be found in Appendix B (Atlas) of the Tier 2 BA.
- Constructing three interchanges: SR 45, Greene/Monroe County Line and SR 37 (at Bloomington). A connector road has been developed to connect the Greene/Monroe County Line Interchange to SR 45 and SR 445.
- Constructing approximately 12 named stream crossings using bridges (see list in Tier 2 BA) and 34 additional jurisdictional stream crossings using 3-sided structures and culverts
- Constructing approximately 16 overpasses/grade separations (see list in Tier 2 BA)
- Relocating over 65 residential dwellings and five commercial businesses
- Incorporating wildlife crossings at Doan's Creek, Dowden Branch, Bogard Creek, Flyblow Branch, Black Ankle Creek, Plummer Creek, Clifty Branch, Mitchell Creek, Indian Creek, Clear Creek, Happy Creek (Clear Creek Tributary), and May Creek (Clear Creek Tributary). The presently-proposed structures crossing these streams are anticipated to provide sufficient opening for deer or other 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. Additional potential wildlife crossings may be provided at overpass locations over Carter Road, Breeden Road, Rockport Road, Lodge Road, Tramway Road and Bolin Lane.
- At present, roadway lighting is not anticipated on the bridges or any mainline portions of Section 4. Lighting at interchanges will be evaluated, and will be included if warranted for safety reasons. Lighting at the SR 45 Interchange, County Line Interchange, and the SR 37 Interchange will be considered. Any lights installed will be approximately 40 feet or higher above the highway
- Constructing multiple new frontage roads, connector roads, turn-arounds, as well as reconfiguration of some existing roadways. For example, a new 1.2 mile-long connector road will be built to connect existing SR 45/SR 445 with the new I-69 in eastern Greene County (See Section 4 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. A summary table of the I-69 Conservation Measures is provided in Appendix A.

- Proposed mitigation for impacts to forests and wetlands in Section 4 are as follows:

Required Mitigation (ac.)*	Description	Theme
1191.50**	Upland forest	Replacement
2383.10**	Upland forest	Preservation
12.12	Forested wetland	Replacement
11.68	Emergent wetland	Replacement
1.50	Scrub-Shrub wetland	Replacement
112,801 linear feet	Stream Channel	Replacement

Total: 3,599.9 acres

* Needed mitigation acreage includes a 10% buffer over projected impacts.
**Forest mitigation commitment 3:1 with a minimum of 1:1 replacement and the remaining in preservation; currently approximately 1,260 ac. of forest replacement and 2,537 ac. of forest preservation is anticipated.

- INDOT will monitor and oversee maintenance of Section 4 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 and in some instances increase (see DEIS chapter 5.6).
- Section 4 of I-69 will 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 4 has been scheduled to begin in 2011 with an anticipated completion date of 2014.

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 easements, 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 3:1.

Currently, INDOT has identified 36 properties for upland forest preservation or reforestation, for a total of 3,806 acres (this includes only actual acreage of forest identified for preservation and/or construction, not extra-credit acreage; also includes two properties located in Section 2, but credited in Section 4). As of June 29, 2011, 18 properties (including two with known Indiana bat hibernacula) have been secured for a total of 1,742 acres. Five properties have a fee simple purchase and the other thirteen have recorded permanent conservation easements. Two properties are in Section 2 within the Veale Creek maternity colony area; prior approval was granted for the FHWA and INDOT to receive upland forest credit in Section 4 for these Section 2 properties. These properties are particularly important based on the low tree cover in the vicinity of the Veale Creek maternity colony, as well as the close proximity of the alignment to the colony's primary roosting area. The remaining 18 properties are in various stages of the acquisition process, including two properties with signed letters of intent to sell to the INDOT for permanent protection. (An additional 151 acres of forest mitigation credit has been agreed upon based on the purchase of two Priority 1A hibernacula in the action area as included in the above number.)

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. Table 8 provides a list of the properties being pursued as well as the breakdown of anticipated mitigation acreage for each site. See the Section 4 Tier 2 BA for detailed descriptions, photos, maps and other information for each mitigation site.
and have been added since the BA as shown in Table 8.

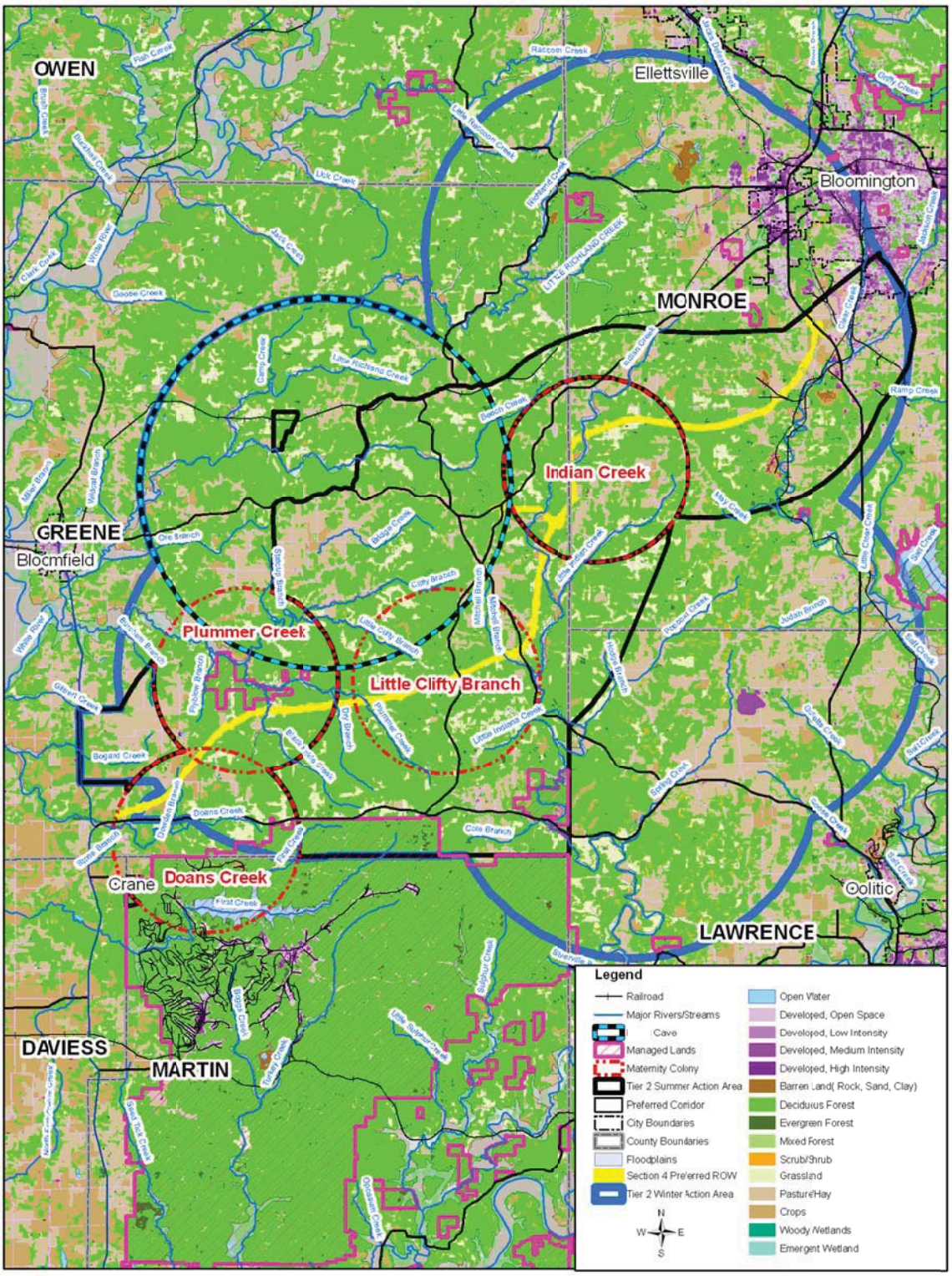


Figure 1. Preferred alignment for Section 4 of I-69, Indiana bat maternity colony areas, the Section 4 Expanded Summer Action Area and Expanded Winter Action Area (which together make up the formal Action Area).

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 Section 7 consultation process, the FHWA, INDOT and the USFWS Bloomington Field Office (BFO) jointly developed two seasonally based action areas for the Indiana bat, the summer impact area is referred to as the Summer Action Area (SAA) and the winter impact area is referred to as the Winter Action Area (WAA). The SAA for the Indiana bat has been generally defined as a 5-mile band, 2.5 miles either side of the centerline of Alternative 3C, that runs the entire length of the proposed project. The WAA for Indiana bats is the total area that falls within a 5-mile radius centered on each of the known Indiana bat hibernacula that have entrances located within 5 miles of the proposed 3C corridor because indirect effects to swarming bats could reach that distance. These two impact areas combined comprise the project's Action Area.

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 4 (see Figure 5.24-1, page 5-687, in Section 4 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 SAA defined in Tier 1, the Service requested that INDOT and FHWA expand the SAA for Section 4 to include these additional areas and INDOT and FHWA agreed (*i.e.*, the "Expanded SAA"; Figure 1). The same rationale was used to develop the Expanded WAA as well. See page 32 of the Tier 1 RPBO for a detailed discussion of the I-69 Action Area and pages 25-26 of the Section 4 Tier 2 BA for additional rationale behind the expanded Action Area for Section 4.

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 Status

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. Since the completion of the Tier 1 RPBO in 2006, new species information and population data is available. This newest information is reflected in the recent amendment to the Tier 1 RPBO (dated May 25, 2011 and sent to FHWA May 31, 2011); following is a brief summary of this most recent information and current status of the species.

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. In addition, the Bloomington Field Office (BFO) recently completed a 5-Year Review of the Indiana bat (USFWS 2009), which summarizes the current status of the species, progress towards recovery, and remaining threats to the bat. Both the draft recovery plan and 5-Year Review are available on the Service's Indiana bat website at http://www.fws.gov/midwest/Endangered/mammals/inba/index.html and are hereby incorporated by reference. The 5-Year Review found that the required recovery criteria for the Indiana bat had not been achieved and thus it should remain at its current 'endangered' status. The Recovery Priority Number for the Indiana bat was changed from "8" to "5", reflecting a species that currently faces a high degree of threat and has a low recovery potential.

Since the April 2007 release of the Draft Recovery Plan (and the 2006 Tier 1 RPBO), the USFWS BFO has collated the population data gathered during the 2007 and 2009 biennial winter hibernacula surveys throughout the range. Based on these surveys, it was determined that the Indiana bat's 2009 range-wide population stands at approximately 414,031 bats, which is a decrease over the 2007 range-wide population estimate of 469,489 bats (USFWS, unpublished data, 2011). It is important to note that Indiana's population estimate was recently revised for 2009 based upon newly obtained photo-analysis results at five of the major hibernacula in the state. This new analysis method added approximately 25,000 bats to the original 2009 estimate. Prior to 2007-2009, the range-wide, biennial population estimates had been increasing since at least 2001, indicating that the species' long-term decline had been, at least temporarily, arrested and likely reversed (USFWS, unpublished data, 2010). The observed range-wide decline in 2009 is partly attributable to the recently described disease dubbed White-Nose Syndrome (see discussion below), especially for decreased population estimates in the Northeast; however, some unexplained population declines have also occurred at some key hibernacula in Indiana and Kentucky as well. Just over half of the 2009 range-wide population hibernated in caves within the bat's namesake state of Indiana. 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 approximately 414,031, we assume that there are approximately 2,588 to 3,450 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)]. At present, the Service has location records for approximately 269 maternity colonies (USFWS 2007), which, based on the

assumptions above, represents 8 to 11% of the assumed number of maternity colonies in existence.

Recovery Efforts

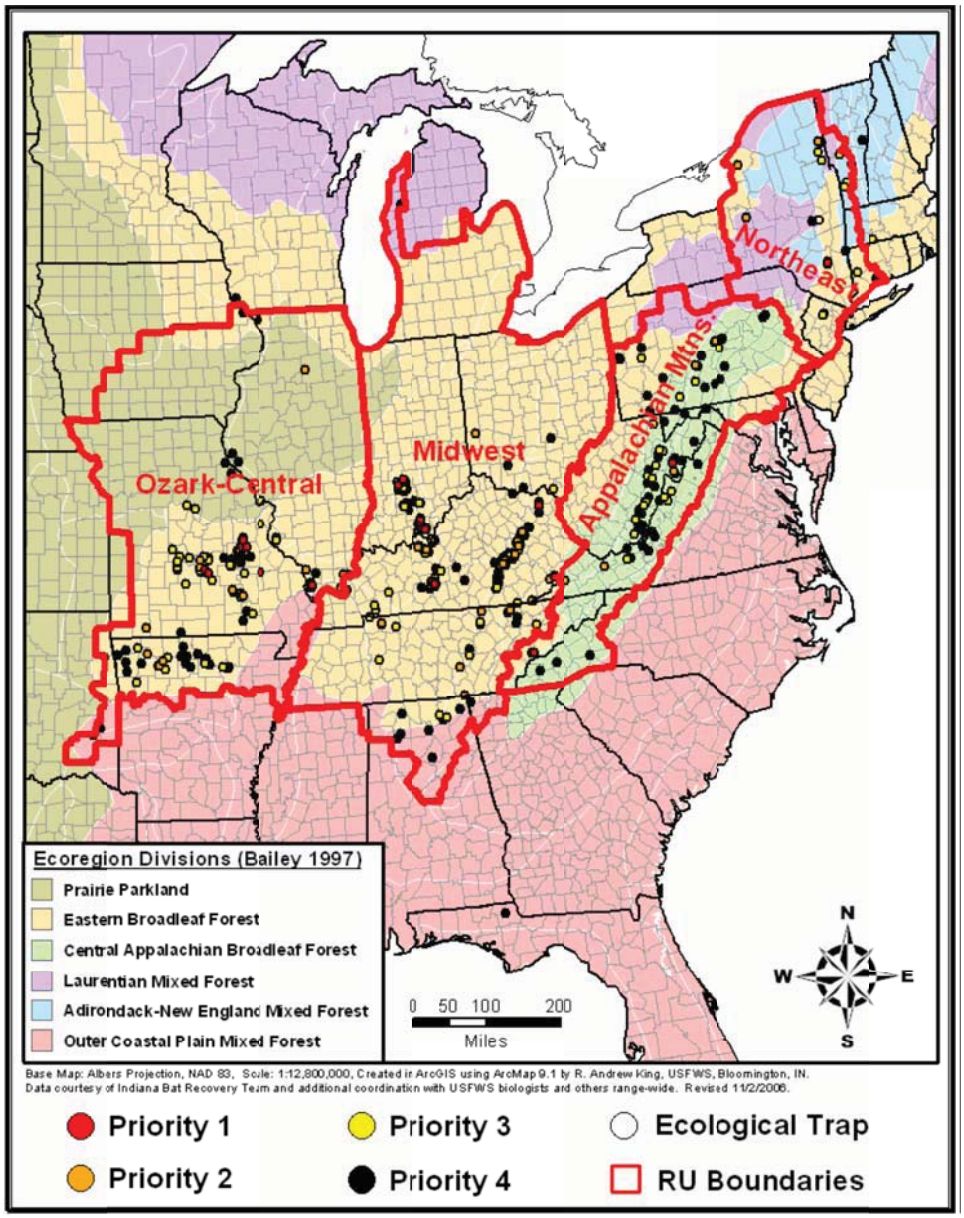
The existing recovery program for the Indiana bat focuses on protection of hibernacula (USFWS 1983). The proposed recovery program has four broad components: 1) range-wide population monitoring at the hibernacula with improvements in census techniques; 2) conservation and management of habitat (hibernacula, 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 to establish and focus recovery efforts.

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). The Interstate 69 project falls within the proposed Midwest RU. The 2009 Indiana bat population estimate for the Midwest Recovery Unit is 284,016. Although this is a decrease from 2007 (320,300), over the last 10 years the Midwest Recovery Unit has seen an overall increase in the Indiana bat population.

Indiana bat Status in Indiana

Historic hibernating population levels in Indiana were comprehensive enough to estimate on a statewide level for the first time in 1981, resulting in an estimate of 151,676 hibernating bats (USFWS, unpublished data, 2010). Since that time, the statewide estimate fell to a low of 104,680 bats in 1985 and then rose steadily until the 2007 survey when it reached 238,009 bats. In 2009, the state-wide population was estimated to be approximately 215,277 bats, which is a decrease based on 2007. In 2009, Indiana's 37 hibernacula harbored approximately 52% of the range-wide population of Indiana bats and approximately 76% of the Midwest Recovery Unit population. The State's two most populous Indiana bat hibernacula are Cave (n=59,250 bats in 2009) and Cave (n=52,610 bats in 2009), which are located approximately 5 miles and 70 miles from the I-69 project corridor, respectively. Because such a high proportion of Indiana bats winter in Indiana, the status of this species in Indiana greatly influences the status of the species within the Midwest RU and rangewide.



17).

New Threats

Recently a new threat has emerged with serious implications for the well-being of North American bats, including the Indiana bat. White-Nose Syndrome was first documented in a photograph taken in a New York cave in February 2006. Since that time, over 160 sites in 17 states (New York, Massachusetts, Vermont, New Hampshire, Connecticut, Virginia, West Virginia, Pennsylvania, New Jersey, Maryland, Missouri, Oklahoma, Tennessee, North Carolina, Indiana, Ohio, and Kentucky) and three Canadian provinces (Ontario, Quebec, and New Brunswick) have been documented with WNS, including over 50 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 (BCI 2009). The Northeast Recovery Unit population of Indiana bats has suffered an approximate

60% decline (loss of at least 32,292 bats, primarily in New York) between 2007 and 2010 (USFWS unpublished data 2011) much of which is attributed to WNS.

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 temperatures are much colder and 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*; G.d.) (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 directly, or if it is secondary to the cause of death. All of the possible modes of transmission are not currently known, 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 and subsequently transporting fungal spores to unaffected caves via their clothing and gear. Interestingly, G.d. has been documented growing on hibernating bats in several European countries, but the fungus does not appear to be causing widespread mortality there (Puechmaille *et al.* 2010). Within the U.S., WNS has been confirmed in the Indiana bat, little brown bat, small-footed bat, northern long-eared bat, southeastern bat, tricolored bat and big brown bat. The G.d. fungus has also been detected on two additional bat species: gray bats and cave myotis.

Despite all of the unanswered questions about WNS, there are now four years of population monitoring data which provide valuable insights into the effects of WNS. Considering WNS has been affecting hibernating bat populations for the longest in New York (since February 2006), data from that State may provide the best indication of the effects of this disease on bats, including Indiana bats. By 2009, all known Indiana bat hibernacula in New York, except for a recently-discovered site (Priority 3 or 4 Hibernaculum) in Orange County (Mine), had been documented with WNS. However, the apparent effects of WNS on Indiana bats varied between affected hibernacula. Some Indiana bat hibernating populations have declined by 92 to 100% (Hicks *et al*. 2008), while counts of Indiana bats at other WNS-affected New York hibernacula (*e.g.*, and Mine) have remained somewhat steady (USFWS unpublished data, 2011).

Biologists with New York State Department of Environmental Conservation conducted photographic surveys of all New York Indiana bat hibernacula in March 2008, to compare with the 2006-2007 counts. There were some notable differences in the population trends between affected sites. For example, Indiana bat numbers and roosting locations appeared normal at both and in 2008 (Service unpublished data). However, at Cave, Indiana bats appeared to be where expected at the end of March 2008, but preliminary analyses indicate that there were approximately 600-800 fewer individuals that season compared to the 2006-2007 count of 1,932 Indiana bats (a decrease of 30-40%). Preliminary 2008-2009 winter counts were back up to 1,719 Indiana bats, although in 2010, survey results indicate the colony was down to only 509 bats, an approximate 74% decrease from 2007. Recent numbers for this colony in 2011 were approximately 430.

Another significant decline (100%) was observed at Cave, where Indiana bats had been documented during every survey since 1981. In 2004-2005, 685 Indiana bats were observed at the site, but no Indiana bats (living or dead) were found at Cave during surveys in 2007,

2008, or 2009 (Hicks and Newman 2007, A. Hicks, NYSDEC, pers. comm.). Cave has been classified as an ecological trap hibernaculum in the Indiana Bat Draft Recovery Plan (USFWS 2007) due to the history of occasional flooding and freezing events at this site; however, the total and persistent loss of all Indiana bats at this site is unprecedented.

The 2007-2008 counts at the and hibernacula were down by 92-99% when compared to 2006-2007 mid-winter surveys. In 2006-2007, there were approximately 13,014 and 1,003 Indiana bats in the and hibernacula, respectively. In April 2008, counts were closer to 124 and 80 Indiana bats, respectively (Hicks *et al*. 2008). Count data collected during the February 2009 survey found 341 and 32 Indiana bats at the and hibernacula, respectively. In 2010, preliminary counts at found 190 bats and 26 bats at for overall declines of approximately 97% to 98% since 2006-2007. which is in the same complex of hibernacula, had declined by only 29% (24,307 to 17,255) from 2007 to 2009; however, preliminary survey data in 2010 found only 8,152 bats hibernating at the site, a decline of almost 64% from 2007 (USFWS unpublished data). One deviation from the post-WNS population trend data from New York is the Mine site. The population at this WNS-affected site has remained stable, and actually slightly increased from 9,393 bats in 2007 to 10,678 bats in 2010, despite being positive for G.d. (USFWS unpublished data, 2011).

Up until recently, WNS has primarily been documented within the Northeast and Appalachian Mountain Recovery Units (RUs) (Figure 2). However, in the winter of 2009-2010, *G. destructans* was detected on bats in Missouri, which is in the Ozark-Central RU, and WNS was confirmed in three caves in central Tennessee, which falls within the Midwest RU. In addition, one site has recently been confirmed with WNS in both Ohio and Kentucky, and at least three sites, including three separate species, have been confirmed with WNS in Indiana (USFWS 2011). The Midwest RU covers the states of Indiana, Kentucky, Ohio and portions of Alabama, Georgia, Michigan and Tennessee (Figure 2). To date, WNS has not been found in Alabama or Michigan. There are many factors regarding WNS that remain unknown including if there are species' and/or regional differences in susceptibility and mortality rates, how long symptoms may take to manifest, and the long-term population effects. Meanwhile, the Service, States and multiple researchers are continuing to learn more about the disease and options for minimizing its spread and impacts. To date, no WNS-related mortality has been documented in the Ozark RU and no mortality to Indiana bats has been found in the Midwest RU; however, based on the pattern seen in the northeast and Appalachians, we believe the disease will continue to spread throughout these regions within the next several winters, with some level of mortality likely to occur. For more information on WNS see http://www.fws.gov/WhiteNoseSyndrome/.

Lastly, there is growing concern that Indiana bats (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Until the fall of 2009, no known mortality of an Indiana bat had been associated with the operation of a wind turbine/farm. The first documented wind-turbine mortality event occurred during the fall migration period in 2009 at a wind farm in Benton County, Indiana. The Service is now working with wind farm operators to avoid and minimize incidental take of bats and assess the magnitude of the threat. There are no known wind farms within the I-69 project area. For more information see http://www.fws.gov/midwest/News/release.cfm?rid=177.

III. ENVIRONMENTAL BASELINE

The environmental baseline for Indiana bats and their habitat in the I-69 Action Areas, including Section 4, 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 4 (see Chapter 5– Environmental Consequences) and the Tier 2 BA, including forest characteristics, hibernacula descriptions, and estimated hibernacula recharge areas. A summary of this information is presented below. The following information also summarizes the effects of past and ongoing environmental factors affecting Indiana bats and reviews and updates the status of the species within the Section 4 Action Area.

Critical habitat for the Indiana bat is within the project area. Cave has been designated as critical habitat for the Indiana bat and is approximately five miles west of the I69 corridor in the northern portion of Section 4. The connector road that extends from the County Line Interchange to SR 45/SR 445 is approximately 4 miles from the Cave entrance and within the Cave winter use area (WUA), which consists of a 5-mile radius area centered around the main entrance to the cave (this has also been referred to as the Winter Action Area for Cave in past documents). Cave in Crawford County, also designated critical habitat, is approximately 70 miles from the southern end of Section 4 and therefore not within the Section 4 Action Area.

Indiana Bats within the Section 4 Action Area

In 2004, mist-netting surveys were conducted at 30 sites in Section 4 of the I-69 project. A total of 252 bats were captured, representing seven species. A total of 9 Indiana bats were captured within Section 4 in 2004. This includes one pregnant female, one lactating female, and seven adult males. Three Indiana bats were radio-tagged as a result, and five roost trees were identified. Other bats captured included: big brown bats (*Eptesicus fuscus*), eastern red bats (*Lasiurus borealis*), little brown bats (*Myotis lucifugus*), hoary bats (*Lasiurus cinereus*), northern bats (*Myotis septentrionalis*), and eastern pipistrelles (*Pipistrellus subflavus*). Sixty-six bridges in the Section 4 Action Area were also inspected for bats. Only one bridge had any bats roosting underneath; it had two northern bats.

Additional mist netting surveys were completed during the summer of 2005. The 2005 surveys were focused around the locations of Indiana bat captures in 2004. The sites chosen were sites where a reproductively active female or juvenile bat was captured in 2004, but could not originally be tracked to a primary roost tree. Three mist net sites were surveyed and two male Indiana bats were captured (these bats were not radio-tagged). Based on the evidence obtained through these mist-netting surveys, there were three maternity colonies identified in Section 4: the Doans Creek, Plummer Creek, and Indian Creek colonies.

Pre-construction mist netting in Section 4 this past summer (August 2010) discovered the presence of a new maternity colony. During the survey, a male Indiana bat was captured at Site 14 and a radio-transmitter was secured to it following USFWS protocol. (A male Indiana bat was found at this same site in 2004 although was not radio-tagged). This male was tracked for seven days, during which investigators tracked it to three different live shagbark hickory roosts (adjacent to but out of the Section 4 right-of-way) and one dead sugar maple snag within the right-of-way. During five nights of exit-count surveys the number of bats seen leaving the dead

snag was: 34, 34, 32, 27, and 30. According to the criteria established in the Tier 1 RPBO, a maternity colony is determined to exist if there is evidence of reproduction in an area including the capture of a reproductive female or juvenile, or if there are high emergence counts at an identified roost tree. Due to the high emergence counts, a primary roost tree and associated maternity colony was identified at this location, and analyzed in the recently issued amendment to the Tier 1 RPBO. The closest known maternity colonies are over 2.5 miles both east and west of this new colony's primary roost tree.

Maternity Colonies within the Section 4 Action Area

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 colonies and other summer habitat in Section 4 is more fully discussed in the Tier 1 BA Addendum and incorporated in the analysis in the Tier 1 Revised PBO. The Tier 1 BA Addendum and RPBO also characterize habitat conditions for the maternity colonies, as does the Tier 2 BA for Section 4 (pages 36-37 and Appendix A).

<u>Doan's Creek Maternity Colony</u>

In the Doan's Creek maternity colony area, two Indiana bats were captured in 2004: a pregnant female and an adult male. The pregnant female was tracked to two secondary roost trees. One was a live shagbark hickory and had an emergence count of nine. This tree is located 1.3 miles from the proposed corridor. It was classified as a secondary roost since the emergence count was below 30. The second roost was a dead shagbark hickory. This tree had an emergence count of 13 and was also classified as a secondary roost. This roost tree is approximately 1.2 miles from the corridor. The male bat was not radio-tagged. During the 2005 mist netting surveys, two adult males were captured but were not radio-tagged. This colony is assumed to consist of 80 reproductively active adult females and their offspring, for a total of 160 individuals once the young become volant. Based on concurrent emergence counts conducted on June 11, 2004, the Doan's Creek Maternity Colony is comprised of a minimum of 16 individuals. Pre-construction sampling efforts at Site 2 within the Doan's Creek Maternity Colony area in 2010 did not capture any Indiana bats.

<u>Plummer Creek Maternity Colony</u>

In the Plummer Creek Maternity Colony area, three Indiana bats were captured in 2004. One was a lactating female and the other two were adult males. The lactating female was tracked to two secondary roosts. One was a live shagbark hickory approximately one mile from the corridor. The maximum emergence count at this tree was five and it was classified as a secondary roost. The second roost tree was a dead tree of an unknown species. It was located approximately 0.6 miles from the corridor. The emergence count was eight bats and it was also classified as a secondary roost. No Indiana bats were captured within this area in 2005. 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 June 19, 2004, the Plummer Creek Maternity Colony is comprised of a minimum of 11 individuals. Pre-construction sampling in August 2010 at Sites 3, 11 and 8 in the Plummer Creek Maternity Colony area did not capture any Indiana bats.

Indian Creek Maternity Colony

In the Indian Creek Maternity Colony area, two adult males were captured in 2004, but only one of them was radio-tagged. The bat was tracked to a secondary roost. The roost was a utility pole in a residential yard approximately 0.5 miles from the proposed corridor. The emergence count was twenty and the pole was classified as a secondary roost. No Indiana bats were captured here in 2005.

As described above, the Indian Creek Maternity Colony was initially identified by tracking a radio-tagged male Indiana bat to a utility pole in a residential yard in 2004. It was initially unclear if the utility pole served as a maternity roost. Because emergence counts do not identify bats to sex or species, it was uncertain if the male Indiana bat was roosting with other male Indiana bats, bats of other species, or female Indiana bats. Due to the uncertainty and uniqueness of this roost, DNA analysis was performed on guano samples collected from the utility pole. The goal of the DNA analysis was to determine the sex and species of bats roosting on the utility pole. The DNA analysis was performed by Dr. Maarten Vonhof from the Department of Biological Sciences at Western Michigan University.

Guano samples were collected from various heights within the plastic covering of the utility pole and DNA analysis was conducted on 20 pellet samples. The results showed all 20 samples to be *Myotis sodalis* (Indiana bat). Of these 20 samples, eight were confirmed as female and eight as male. Four of the samples could not be determined to sex. The DNA analysis showed that both male and female Indiana bats were roosting on the utility pole. The results of the DNA analysis can be found in a report titled, "Molecular Species and Gender Assessment of Bats Utilizing a Roost near an Interstate Expansion Project."

Due to the presence of both male and female Indiana bats roosting at the utility pole, this area was included in the analysis as the Indian Creek Maternity Colony. Pre-construction surveys have not yet occurred in this portion of the Section 4 project area.

Little Clifty Branch Maternity Colony

During pre-construction mist-netting surveys conducted this past summer (August 2010) in the southern portion of Section 4, a male Indiana bat was captured at Site 14 and a radio-transmitter was secured to it following USFWS protocol. This site was outside of any of the previously described maternity colony areas in Section 4. (A male Indiana bat was found at this same site in 2004 although was not radio-tagged). This male was tracked for seven days, during which investigators tracked it to three different live shagbark hickory roosts (adjacent to but out of the Section 4 right-of-way) and one dead sugar maple snag (Roost 297C) within the right-of-way. During five nights of exit-count surveys the number of bats seen leaving the dead snag was: 34, 34, 32, 27, and 30. Guano (pellets) was collected from under the snag and analyzed for species and gender identification. Twenty pellets were analyzed by Maarten Vonhof, Ph.D. at Western Michigan University. Eighteen pellets came from the species *Myotis sodalis* (Indiana bat) and 2 pellets came from the species *Myotis lucifugus* (Little Brown Bat). The gender analysis was inconclusive.

According to the criteria established in the Tier 1 RPBO, a maternity colony is determined to exist if there is evidence of reproduction in an area (including the capture of a reproductive female or juvenile), or high emergence counts at an identified roost tree. Other factors considered in determining whether this colony was a new maternity colony included its proximity to other known colonies, location of other potential roost trees, and genetic analysis. The closest known maternity colonies are over 2.5 miles both east and west of this new colony's primary roost tree. The Plummer Creek colony is approximately 2.6 miles west and the Indian Creek colony is approximately 4.6 miles northeast of this new colony's roost.

Roost Tree Update

Indiana bat roost trees identified during mist net surveys were described in the Tier 1 BA Addendum (dated March 7, 2006). The 2004 roost trees were field-checked in September 2010 to determine their current status. The following is a summary of the findings.

Roost 753R1 – The condition of the utility pole within the Indian Creek Maternity Colony remains unchanged from the previous state observed in 2006 and from the original 2004 state. The plastic cable shield running on the side of the pole continues to exhibit a ½ to ¾ inch gap that allows for bat entry. Bats were physically observed under the shield on September 2, 2010. Communication with the land owner indicates that the bats have been using this pole each year since its discovery in 2004.

Roost 186R1 – The condition of this hickory tree within the Plummer Creek Maternity Colony remains unchanged from the previous state observed in 2006. The surrounding woodland does not appear to have experienced any notable change (*i.e.*, wind/ice damage, timbering, etc.).

Roost 186R2 – This dead snag within the Plummer Creek Maternity Colony has lost upper limbs from both branches of the split trunk since 2006. It currently only contains one small plate of loose bark (1 to 2 square feet). Woodpecker holes and a crevice where the trunk splits are the only potential roost features. The entire tree has dead vines affixed to it. The surrounding woods do not appear to have experienced any notable change.

Roost 554R1 – The condition of this hickory tree within the Doans Creek Maternity Colony remains unchanged from the previous state observed in 2006. The surrounding woodland does not appear to have experienced any notable change (*i.e.,* wind/ice damage, timbering, etc.) and appears to still be used for cattle grazing.

Roost 554R2 – This dead splinter tree within the Doans Creek Maternity Colony has deteriorated from 2006 - some of the splintered sections have become detached. However, the tree appears to still maintain the same height. The general condition of the surrounding woodland does not appear to have experienced any notable change.

Roost 297C – This dead sugar maple snag (new roost discovered in Aug 2010) was found to be down in mid-November 2010 by INDOT consultants during their geotechnical surveys in the area. It is unclear how this tree was downed (no evidence of cutting); however, the surrounding woodland had been recently selectively timbered.

Please see Appendix F of the Section 4 Tier 2 BA for current photos of these 2004 roost trees and Appendix G for additional information on the new roost discovered in 2010.

Adult Males within the Section 4 Action Areas

Nine adult male Indiana bats were captured during mist net surveys within the originally defined (*i.e.* not expanded) Section 4 Action Area in 2004 and 2005. In addition, in 2010, one male Indiana bat was captured at site 14 near This male was radio-tagged and led to the discovery of an additional maternity roost in Section 4. Based on this data and because the Action Area in Section 4 contains 15 known hibernacula, the Service assumes an ample amount of adult male Indiana bats occur in this area. In order to estimate the density of male bats within the Action Area of Section 4 during the summer months, we assumed half of the bats using the hibernacula within the Action Area were male and that half of those male bats would remain close to their hibernacula during the summer [*i.e.* stay within the winter portion of the Action Area, also referred to as Winter Action Area (WAA)]; the other half of the male bats would disperse, presumably to the surrounding Action Area, north and south of the winter portion of the Action Area. In 2009, the population of Indiana bats in hibernacula within the Action Area was approximately 97,688 bats. The density of males was determined by assuming that half of the bats in the hibernacula were males (n = 48,844) and half of those males would remain near the hibernacula during the summer (n = 24,422). This number (n=24,422) is then divided by the number of forested acres in the Winter Action Area (n = 146,275 ac.), to obtain a density of approximately 0.17 males/acre of tree cover. This is a slight increase over the number of males bats estimated during the reinitiated Tier 1 consultation (density = 0.13 male bats/ac.) because the population has increased within some of the hibernacula in the Action Area.

Indiana bats in the Action Area during the Spring, Fall and Winter

During the winter, Indiana bats are dependent on suitable caves for hibernation. During the fall swarming and spring staging periods, Indiana bats are dependent on forested habitat that surrounds the caves, which they use for foraging, mating, and roosting. The INDOT conducted intensive field surveys for Indiana bats at numerous **potential** (*i.e.*, previously undocumented) hibernacula (caves and tunnels) within 5 miles of the 3C corridor during the Tier 2 studies. The detailed results of these surveys are summarized in the Tier 1 BA Addendum and are hereby incorporated by reference. In addition, detailed information on each of the **known** winter hibernacula can also be found in the Tier 1 BA Addendum and the Tier 2 BA for Section 4. The primary findings and general hibernacula information are summarized below.

Of the 60 potential hibernacula surveyed during the <u>winter</u> of 2004/2005, a total of 32 Indiana bats were observed at three different caves. One Indiana bat was observed at Cave, 28 at Cave, and three at Cave. Surveys (using harp-traps and/or mist-nets) performed at these 60 caves during the swarming period in the autumn of 2004 captured 17 Indiana bats (3 female and 14 male) at eight different caves. Indiana bats were captured at Cave, Cave, Cave, Cave (Cave System), Cave, Cave, and Cave. Of the 16 potential hibernacula surveyed in the <u>winter</u> of 2005/2006, one Indiana bat was observed at Of the eight caves surveyed in the <u>spring</u> of 2005, no Indiana bats were captured. Of the 16 caves surveyed during the <u>autumn</u> swarming period in 2005, a total of four Indiana bats (all male) were captured at two caves. Indiana bats were captured at and Cave.

In 2003, only 10 Indiana bat hibernacula were known to occur within the Action Area and were included in the original 2003 Tier 1 BO. As a result of the discovery of three new hibernacula during Tier 2 surveys and the discovery of another hibernaculum by the Service and the IKC, and with the inclusion of Cave, the total number of known Indiana bat hibernacula within the Action Area now stands at 15. The 15 caves forming the basis of the designated WAA include nine caves in western Monroe County: and caves; four caves in eastern Greene County: and and two caves in northwestern County: and caves. These 15 Indiana bat hibernacula located within the Action Area sheltered a combined total hibernating population of 97,688 Indiana bats in 2009 (USFWS, unpublished data, 2011). Therefore, the 2009 Action Area population represented approximately 45% of all the Indiana bats hibernating within the State of Indiana in 2009 (n = 215,277) and 24% of the range-wide population estimated to be 414,031 bats in 2009 (USFWS, unpublished data, 2011). During the Tier 1 consultation, the Service considered the 2005 population data for each hibernaculum individually and collectively (74,042 bats) as the baseline for the Indiana bat population within the Action Area. With this Tier 2 consultation, we have considered the newest population information available which indicates an increase in the Action Area population of about 23,646 bats (note: survey methods in Indiana have been improved upon and may account for some of the observed increase in Indiana bat populations at various hibernacula). Population numbers and trends for individual caves within the WAA through 2005 are available in Table 16 of the Tier 1 BA Addendum. Table 1 below shows the most recent population information as of 2009 (updated March 2011).

Table 1: Updated Indiana bat Populations within Hibernacula in Action Area

Hibernacula	**2009 Indiana bat Population**
Cave	59,250 (-18,437 from 2007))
Cave	18,640 (+4,541 from 2007)
Cave	19,197 (+6,390 from 2007)
Cave	0(-3 from 2005)
	218(0 from 2007)
Cave	61(-29 from 2007)
	48(-35 from 2007)
	188(+106 from 2007)
Cave	10(-39 from 2007)
	9*(-16 from 2005)
Pit	48(+20 from 2005)
Cave	17**(-17 from 2003)
Cave	0**(0 from 2003)
	1 (only surveyed in 2006)
Cave	1**

*Last survey completed in 2007

** Last survey completed in 2005

Note: An independent study of Cave in March 2010 showed approximately 40 Indiana bats.

General Habitat Conditions

INDOT's primary I-69 consultant, BLA, has recently 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 supersede those previously reported in the 2006 Tier 1 RPBO and Tier 1 BA Addendum. Note that the "tree cover" estimates previously reported for each of the 13 maternity colonies and the areas surrounding the hibernacula 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 used for other portions of the Action Area. The 2006 USGS forest cover data, the 2003 tree cover estimates in the Tier 1 BA Addendum, field verification information produced by the Engineering and Environmental Assessment Consultants (EEACs) during Tier 2 studies, and images accessed via Google™ Earth represent the best available data for purposes of this consultation. (The tables previously found in Appendix B of the Tier 1 RPBO have been updated as part of the recent reinitiation of the Tier 1 consultation and also include the most current tree cover and impact estimates for the project area. The revised tables can be found in Appendix A of the 2011 amendment to the 2006 Tier 1 RPBO)

In order to evaluate the anticipated reach of direct and indirect affects, the original Action Area (comprised of the SAA and WAA) has been expanded to include those areas where development induced by the construction and operation of the project is reasonably foreseeable. The WAA and SAA are separate, but overlapping areas; therefore, impacts within the two areas may not be added or subtracted to produce information for impact analysis. Estimated forest cover within the maternity colony areas and the Section 4 Expanded SAA and WAA is summarized below in Table 2. For the Expanded SAA, information is based on satellite images of Section 4 taken in 2001 (land use coverage made available by USGS in late 2006) as well as field data verified by the EEACs who prepared the Section 4 DEIS. The maternity colony areas and the original Tier 1 WAA were evaluated using the more refined tree cover data; however, for areas within the expanded portion of the WAA, the 2001 USGS information was used.

I-69 Project Section 4 area	Total Acres	Total Forest/Tree Cover Acreage	Percent of the area that is Forested
Doans Creek MCA*	12,566	8,099	65%
Plummer Creek MCA*	12,566	8,550	68%
Little Clifty Branch MCA*	12,566	8,825	70%
Indian Creek MCA*	12,566	7,549	60%
Expanded Remaining SAA(excludes maternity colony areas)	68,575	42,400	62%
Expanded WAA	242,723	146,725	60%

*MCA = Maternity Colony Area

Table 2. Estimated amount of forest within Maternity Colony Areas and Expanded Section 4 Summer and Winter Action Areas.

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 tree cover data (2003 higher resolution aerial photographs), USGS 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: Doans Creek - approximately 65%; Plummer Creek - approximately 68%; Little Clifty Branch - approximately 70%; and Indian Creek - approximately 60%. There is an overlap of 552 acres (of which 348 are forested) between the Doans Creek and Plummer Creek colonies. The remaining Expanded Remaining SAA (excluding the maternity colony area) is approximately 62% forested and the Expanded WAA is approximately 60% forested.

Habitat Fragmentation and Core Forests

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 9 patches in the Little Clifty Branch (Section 4) to 421 patches in the Pigeon Creek Colony (Section 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 4 maternity colonies are found in Appendix A of the Tier 1 BA Addendum (and Appendix TT of the Section 4 Tier 2 BA for the Little Clifty Branch colony) and are hereby incorporated by reference.

Analysis of tree cover data, where available, and USGS/EEAC data in the remaining areas found 11,138 acres of core forest within the Expanded Remaining SAA (area not including maternity colony use areas) and 9,443 acres within the colony areas in Section 4. This is an increase from the 9,889 acres of core forest reported available in the Tier 1 BA Addendum using the Tier 1 Remaining SAA and 1990 USGS data. This difference is due to an expansion of the SAA to include the induced TAZs (Traffic Analysis Zones). There will be approximately 986.3 acres of core forests impacted by the Preferred Alternative right-of-way. Of these 986.3 acres, 242.7 acres are located within the Expanded Remaining SAA, 22.5 acres are located within the Doans Creek Maternity Colony, 264.2 acres are located within the Plummer Creek Maternity Colony, 261.8 acres are located within the Little Clifty Branch Maternity Colony, and 211.2 acres are located within the Indian Creek Maternity Colony. The colony overlap contains 16.1 acre of core forest impacts. This impact is a decrease from the finding in the analysis of the representative alignment (RA) in the Tier 1 BA Addendum that found 1,056 acres of impact to core forests.

The Service will use the forest data summarized in Table 2 as an approximate baseline of currently existing forest habitat available within the Section 4 maternity colony areas and the Expanded SAA and WAA. Based on the amount and distribution of core and edge forest and degree of connectivity among forest patches (see BA Addendum and Appendix TT in the Tier 2 BA), the majority of the forest habitat within the Expanded Action Area 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 summer and winter 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).

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 4 alignment of I-69, BLA staff conducted surveys along 84 linear transects along the project corridor. These 84 transects were approximately 60 feet wide and ranged from 400 feet to 5,800 feet in length. Forty-two of the transects were within the preferred alternative impact area and accounted for a total of 10.7% (116.7 acres) of the 1,087 acres of forest habitat that will be directly impacted. For comparison, the other 42 transects were within the same woodlots, but outside of the proposed alignment. These samples totaled 115.3 acres. The total linear distance sampled within the alignment was 15.5 miles, which is approximately 58% of the total length of highway in Section 4. The transects are assumed to be representative of the existing forest habitat conditions within the 1,087 acres of impacted forest. The resulting snag characteristics and projected snag estimates for Section 4 are presented below in Table 3.

Snag Characteristics Snags evaluated starting at ≥9" dbh	**Transects Within Alignment**	**Transects Outside Alignment**
Total number of snags (≥9" dbh) within transect (approx. 60' wide x variable length)	216	174
Average diameter of snags (inches)	13.9	13.6
Range of snag diameters (inches)	9 – 40	9 – 43
Total area sampled within transects (acres)	116.7	115.3
Density of snags in transect area (snags/acre)	2.04 ± 1.73	1.65 ± 1.75
Average Density for all transects (snags/acre)	1.84 ± 1.74	
Estimated total number of snags (≥9" dbh) that will be cleared within footprint of Preferred Alternative Alignment for Section 4 of I-69 (using an average of 1.84 snags/acre x 1,087 impacted acres)	2,000	
Very rough estimate of total number of snags (≥9" dbh) that may be present in forested areas of the Section 4 Expanded SAA, including maternity colony areas (75,075 acres) (an average of 1.84 snags/acre was used)	Section 4 Expanded SAA = 138,138 snags	
% of estimated number of snags in Section 4Expanded SAA that would be directly impacted by I-69 (using an average of 1.84 snags/acre)	1.4%	
% of estimated number of snags in Section 4 Expanded WAA that would be directly impacted by I-69 (using an average of 1.84 snags/acre)*	0.8%	
% of estimated number of snags in Cave WAA that would be directly impacted by I-69 (using an average of 1.84 snags/acre)*	<0.1%	

* These impacts significantly overlap with the Expanded SAA and are not additive.

Table 3. Snag sizes, densities, and estimated totals based upon line transect surveys conducted within and adjacent to woodlots that will be directly impacted by Section 4 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 51% small, 39% medium, and 10% large trees. For transects surveyed outside the alignment, there were 52% small, 38% medium, and 10% 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 forest that will be directly impacted by I-69 in Section 4 is relatively young, second-growth stands that have been previously harvested.

In regards to their quality as foraging habitat, 60 of the 84 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 24 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 1,087 acres that will be permanently lost to construction of I-69 in Section 4 is currently of moderate quality for roosting and foraging Indiana bats.

Wetland Habitat

According to Appendix F of the Section 4 DEIS, and the Draft Wetland Technical Report, the Section 4 “corridor” has 27.01 acres of emergent wetlands, 3.06 acres of scrub-shrub wetlands, 11.45 acres of forested wetlands, and 25.02 acres of unconsolidated bottom wetlands.

Factors Affecting the Species in the Action Area

The following State, local, and private actions within the Action Area 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, foraging, swarming and staging habitat, 2) commercial and private timber harvesting, 3) cutting of snags, 4) degradation of water quality, 5) roadkill along existing roadways, and 6) repeated human disturbance of hibernating bats. The baseline acreages (*e.g.*, % tree cover), habitat conditions, and general ongoing stressors of the maternity colonies and winter habitat are discussed on pages 73-75 and 79 of the Tier 1 RPBO and also within the Tier 2 BA (pgs. 133-138) and are hereby incorporated by reference. (Note: some of the forest data presented in the Tier 1 RPBO has been revised in the Tier 2 BA). No legal drains are maintained within the Section 4 Action Area.

Other stressors specific to the Section 4 Action Area include limestone quarrying and residential development associated with the City of Bloomington. Approximately 250 acres of land within the corridor in the northern portion of Section 4 has been zoned for mineral extraction. Although the mines have indicated that this acreage would be considered in their long-range planning, no formal plans currently exist and they have indicated that no limestone quarrying is likely to occur in the foreseeable future.

With respect to development, a field review completed by BLA in August 2010 of development occurring within the Cave Winter Use Area and Indian Creek Maternity Colony area, as well as of subdivisions in Monroe County, showed that a limited amount of development is

occurring at this time. This development is accounted for in the indirect and cumulative impacts analysis. In the Cave Winter Use Area and Indian Creek Maternity Colony area approximately 35-45 acres of tree clearing for residential development is anticipated. Approximately 10-15 acres have been cleared since the Tier 1 BA Addendum, and 25-30 acres may be cleared in the near future. The Deer Creek Phase II Subdivision accounts for a majority of this tree clearing. It is estimated that approximately 15-20 acres of forest may be cleared to build out this subdivision. The review of Monroe County subdivisions identified approximately 85-120 acres of anticipated tree clearing, 20-35 acres which has occurred since the Tier 1 BA Addendum and 65-85 that may occur in the near future. These areas consist of the following subdivisions: Cedar Chase Phase III (12 acres of potential tree clearing), Foggy Morning Glen (15-30 acres), McHaffey Woods (15-20 acres), Far View Hills Subdivision (15-20 acres), and Iron Gate Farms (30-35 acres). Photographs taken during the field review as well as descriptions of the photos can be found in Appendix E of the Tier 2 BA for Section 4.

In general, 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. In the fall of 2010 the USFWS became aware of private timbering occurring in the future I-69 right-of-way in Section 4. In one instance, two landowners selectively cut approximately 110 acres in and around the planned right-of-way near the proposed SR 45 interchange in Section 4. In March, 2011, INDOT sent out a letter to local logging companies to curtail any distribution of misinformation. These letters indicated that seasonal tree-clearing guidelines had been adopted by INDOT for the entire project area in order to protect the Indiana bat and encouraged all logging companies and local landowners to adhere to these guidelines and to contact the USFWS for more information. Subsequently, the USFWS has issued a letter to all local landowners in Section 4 advising them of the presence of the Indiana bat in the area and ways to avoid potentially taking the species (See Appendix C).

IV. EFFECTS OF THE ACTION

Based on our analysis of information provided in the November 2010 Tier 2 BA for Section 4 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 and recent amendment (dated May 25, 2011). Therefore, the previous discussion of adverse effects and incidental take analyses on pages 81-91 and Appendix A of the Tier 1 RPBO, and discussions contained in the recent amendment to the Tier 1 RPBO (including updated tables B1-B5 now included as Appendix A of the 2011 amendment) remain valid and are hereby incorporated by reference. No additional adverse effects beyond those discussed in the Tier 1 RPBO and the recent amendment 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.

General Habitat Impacts

Forest

The total forest loss anticipated due to construction of the preferred alignment is estimated to be 1,087 acres (approximately 1,083 acres upland forest plus four acres forested wetland), which is approximately 4% less than estimated in the Tier 1 RPBO. The selected corridor for I-69 in

Section 4 has approximately 4,420 acres of forest (including upland and wetland forest) on 140 separate tracts. The 1,087 acres of impact will occur within forest areas ranging in size from approximately 0.1 acre to 275 acres. Along the corridor, 25 of the tracts crossed are greater than 50 acres. Many of the forest areas are large tracts that occupy the entire width of the corridor. The largest tract (275 acres) within the corridor is located west of the Greene/Monroe County line north of Carter Road. See the Section 4 Tier 2 BA, Appendix B for an atlas of the preferred alternative. Up to an **additional** 20 acres of forest may be impacted in several areas due to utility tower relocations (this would make the total loss about 2% less than previously estimated); these activities are being closely coordinated in order to minimize impacts. Approximately 1.4% of the available forest within the entire Section 4 Expanded SAA will be impacted. There will be approximately 986.3 acres of core forest impacted by the Preferred Alternative alignment.

In September and October of 2007, BLA staff surveyed trees along 84 transects within forested areas that would be impacted by Section 4 of I-69 (See Environmental Baseline Section of this document for details). Based upon their findings, it is estimated that approximately 2,000 currently existing snags (*i.e.*, dead trees >9"in diameter with exfoliating bark that may serve as potential roost sites for Indiana bats) may be destroyed within the 1,087 acres that will be permanently cleared for construction of I-69 (Table 3). In the maternity colony areas, the percent of snags being impacted ranged from 0.9% to 3.8% and in the expanded remaining SAA impacts included approximately 0.7% of available snags. If evaluated in terms of snags impacted within the WAA, and more specifically Cave WUA, the percentage of snags impacted by the project is 0.8% and approximately <0.1%, respectively. Based on this level of impact, the construction of I-69 is anticipated to have an insignificant and discountable effect on snag availability for Indiana bats within the Expanded Action Area. 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.

Wetlands

The Preferred Alternative will potentially impact 13.06 acres of wetlands. The project will impact 0.45 acre of one scrub-shrub wetland and 0.49 acre of one unconsolidated bottom wetland in the Doans Creek colony area. Within the Plummer Creek colony, impacts to six emergent wetlands are anticipated, ranging from 0.01 to 1.81 acres and totaling 5.11 acres, and to two forested wetlands totaling 3.13 acres. Within the Little Clifty Branch colony area, impacts to 0.17 acre of one emergent wetland, two forested wetland, one of which will be impacted 0.06 acre and the other impacted 0.25 acre. Also, three unconsolidated bottom wetlands will be affected with impacts ranging from 0.14 to 0.82 acre. Finally, for the Indian Creek Colony, the project will impact two forested wetlands, one of which will be impacted 0.06 acre and the other which will be impacted 0.09 acre. In addition, four unconsolidated bottom wetlands will be affected with impacts ranging from 0.14 to 0.48 acre, for a total of 1.07 acres.

Twelve open water wetlands will be affected by the project totaling 3.48 acres of impact and the Preferred Alternative will cross 112,801 linear feet of stream. A commitment has been made to bridge floodplains and oxbows where reasonable and appropriate. The majority of the currently mapped FEMA floodplains of Black Ankle Creek, Dry Branch, Plummer Creek, Indian Creek, and May Creek will be bridged.

Most of the project right-of-way falls within one of the four maternity colony areas and almost the entire section is within the winter portion of the Action Area (*i.e.* WAA). Depending on the

location and quality of current roosting and foraging areas within Section 4 (and given the relatively high percentage of forest and the numerous stream crossings), the Service anticipates that Indiana bats may attempt to use/cross over the proposed 26.7 mile interstate at various locations including stretches where more heavily wooded areas exist along the proposed alignment and/or where the alignment crosses riparian corridors such as Dowden Branch, Black Ankle Creek, Plummer Creek, Dry Branch, Little Clifty Branch, Mitchell Branch, Indian Creek, Happy Creek (Clear Creek Tributary), and May Creek (Clear Creek Tributary). Based on the forest transect information, some of the forest areas have younger growth with moderate to dense understories and may not be suitable Indiana bat habitat; therefore, not all of the 1,087 acres that will be removed for construction of the preferred alignment is likely to serve as Indiana bat habitat.

Effects and Risks to Local Bat Populations

Indiana bats within the Section 4 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/foraging/swarming/staging habitat and loss of habitat connectivity/travel corridors among forested patches in Section 4
- Harass/wound/kill/harm from disturbance and habitat loss associated w/demolition and subsequent relocation of 66 homes and five businesses in Section 4 (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)
- Harass/wound/kill/harm from indirect/induced loss of roosting, swarming, staging and/or foraging habitat (assuming no restrictions/bats present)
- Harm from permanent habitat loss from I-69 related utility relocations (timing restrictions will prevent direct mortality). Several electric transmission crossings may result in a potential conflict that could result in towers being relocated into wooded areas in Section 4 although less than 20 acres of impact is anticipated; these are being closely coordinated with INDOT and FWS
- Death/kill from 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 45)
- Harassment of bats roosting near construction activities and/or from noises/vibrations/disturbance levels due to operation of I-69 causing roost-site abandonment and atypical exposure to day-time predators while fleeing and seeking new shelter during the day-time
- Increased human disturbance/vandalism of bats in vulnerable hibernacula

Although incidental take may occur in various forms, the total amount of incidental take anticipated of individual bats is fairly small. Based on habitat impacts discussed in the Tier 2 BA, the Service anticipates the incidental take during the summer months to be consistent with or less than that which was determined in the Tier 1 RPBO and recent amendment (May 25, 2011): No more than 47 Indiana bats from the four maternity colonies in Section 4 (Doans Creek – 5; Plummer Creek – 8; Little Clifty Branch – 14; Indian Creek – 20) will be taken as a result of all project-related *habitat modifications* (direct and indirect) through 2030 (see Table

B1 in 2011 Tier 1 RPBO amendment) 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.

Based on the high concentration of males within Section 4 in the summer (due to close proximity to numerous hibernacula), we estimate that up to 33 male bats may be taken in this section during the summer months. Most of this take will be in the form of roadkill from increased high-speed traffic within the WAA. (Roadkill estimates in general may be overestimated as the potential for some currently occurring roadkill to be off-set once the new road is operational was not considered during the 2006 Tier 1 consultation. Furthermore, some recent research has indicated that bats may avoid larger roadways if their roosting and foraging habitat is not divided or if over- or underpasses are available; one study by Zurcher *et. al.* (2010) indicated that bats may avoid on-coming traffic.)

Within the WAA during the fall, winter and spring, we estimate 883 bats may be taken through 2030, primarily as a result of increased disturbance/vandalism at local, unprotected hibernacula and roadkill during the fall swarming period. These worst case scenarios are not likely to significantly impact the local, regional, or range-wide population and would not be expected to jeopardize the species. For example, even in the extreme situation in which all 883 Indiana bats were taken in a single year, this would amount to less than 1% of the WAA's most recent winter population estimate of nearly 100,000 bats. Currently, all of the major hibernacula have some monitoring to determine unauthorized visitation. In recent years, the trend appears to be a decrease in these types of visits. This information will continue to be collected once the highway is operational and will be useful in evaluating the influence the highway may have on increased visitation and disturbance at hibernacula.

Maternity Colony Impacts in the Section 4 Action Area

Based on our assumptions as described in the Tier 1 RPBO, each maternity colony is comprised of 80 adult females and their single offspring. This results in a maximum of 160 bats per colony by mid-June after the young are born and become volant (*i.e.*, capable of flight) around mid-July. Therefore, given the documented presence of 4 maternity colonies in the Section 4 Action Area (which includes the new Little Clifty Branch colony) and an approximate total of 160 females and their pups per colony, we can assume that there are a combined total of approximately 640 (4 x 160 = 640) adult females (n=320) and juveniles (n=320) within or adjacent to the Action Area during the summer active period and that varying proportions of the bats in these colonies are likely to be exposed to direct and/or indirect effects from I-69.

Estimates of the number of bats exposed and adversely affected *(i.e.* disturbed, injured, or killed, henceforth referred to as take) during the summer maternity season as a result of the various project stressors are shown in Appendix A, Table B4 of the recent amendment to the 2006 Tier 1 RPBO (2011). These numbers have been updated to include the newly identified maternity colony.

The impact WNS may have on the ability of the Indiana bat to persist and recover is presently unknown. We currently do not have estimates of adult survivorship, juvenile survivorship, or fecundity for Indiana bat populations affected by WNS. Based on a small amount of New York survey data from 2007 to 2010, Indiana bat hibernating populations in New York appear to have declined by 61% overall with affected individual hibernacula having population growth rates ranging from –99% to 14% during this time period. The impact the anticipated project take will

have in light of the presence of WNS is discussed in more detail in the 2011 amendment to the Tier 1 RPBO (pages 10-16) and is hereby incorporated by reference.

Most project impacts to the maternity colonies will be as a result of direct and indirect loss of roosting and/or foraging habitat, and impacts from construction noise and/or vibrations. These impacts will be temporary in nature and occur at different times over a period of years. Almost all direct impacts related to tree clearing and its associated construction noise in Section 4 will occur this upcoming fall and winter. These impacts (namely forest loss) will most likely be realized by the maternity colonies in Section 4 the maternity season following tree clearing (2012), presumably before any significant impacts from WNS occur in Indiana. We are optimistic that these affected colonies will recover from most project-related direct habitat impacts prior to any substantial WNS-related population reductions. (Pre- and post-construction monitoring is being conducted in all sections to help evaluate the on-going status of the maternity colonies in the Action Area.) If WNS effects manifest earlier than anticipated, we believe the effect of the project impacts could be greater. However, we anticipate that with declining numbers of bats, the number of bats exposed to the project impacts will be fewer as well, and hence, so too will the number of Indiana bats taken (See Appendix A, Table B4). In addition, with declining numbers of bats in an area, the colonies' foraging and roosting requirements would be less as well and we would anticipate that the loss of habitat would not cause the level of effects previously identified.

No mortality due to direct impacts during the construction period (first 1-3 years of the project) is anticipated (due to seasonal tree clearing restrictions) and therefore direct mortality of individual adult females (which are considered the most sensitive individuals) from highway construction activities is not anticipated.

Roadkill

Roadkill may also result in direct death of maternity colony members; as with take from induced development, the full effect of the take is not anticipated to occur until the entire interstate is constructed and fully operational (*i.e.* free flowing traffic on all six sections). Until such time we expect only localized changes in traffic. In addition, some direct mortality from roadkill may be compensatory rather than additive as the number of roadkills currently occurring on local roads will decrease as traffic shifts to completed segments of the new I-69 roadway.

Although Indiana bats generally avoid crossing over open areas (Brack 1983; Menzel *et. al.* 2001), they have been documented flying over busy interstate highways such as I-70 near the Indianapolis Airport (USFWS 2002) and U.S. Route 22 near the Canoe Creek Church in Pennsylvania (Butchkoski 2003). In both of these circumstances, however, the road lies between known roosting and foraging areas for members of the colonies (Butchkoski 2003; D. Sparks, ESI, Inc., pers. comm. 2005). While it has been shown that Indiana bats will cross over busy highways when they divide foraging from roosting areas, it should also be noted that through a radio telemetry study by Indiana State University, Sparks (pers. comm.) observed that individuals of the Indianapolis Airport colony avoided flying over I-70 where a bridge provided a 35-ft high corridor beneath the road. The results of this particular study indicate that bats may avoid flying over highways when an alternative corridor is present. Recent research published by Zurcher *et. al*. 2010 indicates that bats may actually avoid traffic. In this study, bats were more than twice as likely to reverse their flight course crossing a road when vehicles were present. They found that when automobiles were present, 60% of bats exhibited avoidance behavior and reversed course at an average of 10 m from the vehicle. Conversely, when no automobiles were present, only 32% of bats reversed their course and 68% crossed the road.

Therefore, although it is logical to assume that some roadkill may occur, the amount of roadkill attributable to I-69 is somewhat speculative and will be difficult to detect. As the Service does not have a standard means for estimating the likelihood of roadkill, in Tier 1 we estimated roadkill for each colony by starting with the assumption that all exposed bats (160/colony) had a 5% risk of being hit and killed over the course of a 17 year period (this assumes a fully operational interstate). The roadkill estimates used for this project represent what we believe to be a reasonable worst-case scenario and could be reevaluated during subsequent consultations if more detailed information or data becomes available.

Doans Creek Maternity Colony

Of the 1,087 acres of forest (including forested wetlands) that will be cleared for I-69, approximately 76 acres fall within the 2.5-mile radius area of the Doans Creek Maternity Colony area (including portions within the Doans Creek/Plummer Creek Colony overlap area). Most of the alignment within the Doans Creek Maternity Colony area traverses the least forested portion of the colony. The preferred corridor for Section 4 will not directly affect the forest habitat within the center of the assumed maternity colony use area and will not separate any of the known roost trees, capture locations, or proposed mitigation sites from each other.

Within the Doans Creek maternity colony, connectivity to I-69 from the roost trees and capture points occurs along various tree lines and unnamed tributaries. The shortest connectivity route distance to I-69 from the 2 Indiana bat capture points were approximately 1.7 miles (Site 2) and 2.2 miles (Site 4-02-2). The shortest connectivity route distance to I-69 from the 2 roost trees were approximately 2.3 miles (554R1) and 2.2 miles (554R2). Connectivity to the proposed mitigation sites was also calculated. There are four mitigation sites proposed within the maternity colony area including over 240 acres of forest for preservation and 146 acres of land that will be reforested. Another 500 acres will be preserved and/or reforested just west of the maternity colony area. See Figure 3 and Table 13 of the Tier 2 BA for additional information.

Because sufficient roosting and foraging habitat will remain within this area, we believe that the amount of proposed tree clearing (76 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. However, 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.

Figure has been removed for confidentiality reasons related to the federally endangered Indiana bat (*Myotis sodalis*)

Figure 3. Doans Creek Maternity Colony Connectivity to the Nearest I-69 Alignment and Mitigation Sites.

In order to compare to Tier 1 impact estimates within maternity colony areas, tree cover impacts have been evaluated. Approximately 84 acres of tree cover (1% of existing tree cover) will be impacted. This is a reduction from the 95 acres of tree cover reported in the analysis of the representative alignment in the Tier 1 BA Addendum due to further alignment shifts.

Some impacts could occur as a result of the roadway creating a barrier to Indiana bat movement within their maternity area. 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. Another recent publication by Zurcher et. al also supports this conclusion (see roadkill discussion above). Consequently, high-traffic volume roads could be acting as barriers and restricting access to traditional foraging areas. Following this logic, some of the Doans Creek 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 4 will be); however, fortunately for this colony, the majority of its habitat

(including the known roost trees) is southeast 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. In addition, there are four proposed mitigation sites within this colony's use area, totaling over 240 acres of forest preservation and 146 acres of forest restoration. All of the mitigation is planned southeast of the proposed alignment as well.

Two alternate roost trees were identified in 2004, although no primary roosts were found. 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 (outside of the maternity season), additional roosting and foraging habitat will be available within the area. No impact to the identified roost trees is anticipated; however, it is possible one or more alternate roost trees may be affected.

The preferred I-69 alignment cuts across the northwest quarter of the Doans Creek Maternity Colony area (Figures 1 and 3). Although this will not likely create much of a barrier for the bats, once Section 4 of I-69 is operational, fast-moving vehicles may strike bats if they attempt to fly across the interstate at night during the summer maternity season. We are uncertain how or whether colony members currently travel in this portion of the colony area. Assuming that some individual bats from the colony do and will continue to use this area, we anticipate a small number of these bats will be struck by vehicles and killed. As stated above, some recent research suggests that bats may attempt to avoid large mulit-lane roads, as well as approaching vehicles; however, based on some limited reporting of roadkill of Indiana bats at a site in Pennsylvania (Butchkoski 2002), there still exists some potential for roadkill.

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 (although most likely overestimated) and anticipate no more than 8 bats will be killed by vehicle collision through 2030 or approximately 1 bat every two years. The loss of one bat every two years 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 Doans Creek Maternity Colony.

Based on the location of the alignment within the colony area, we have conservatively estimated some take in the form of harassment due to construction noise/vibration (including blasting) 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 noise/vibration impacts are anticipated to occur during nighttime foraging activities. These construction activities will be short term and no long term affects are anticipated.

With regard to indirect impacts within the Doans Creek Maternity Colony area, based on Traffic Analysis Zones (TAZs), minimal induced growth (3 acres forest) is anticipated along this portion of the Section 4 alignment. Most of the induced growth is associated with the proposed U.S. 231 Interchange and was addressed in the Section 3 BO. Further discussion related to indirect impacts can be found starting on page 121 of the Tier 2 BA for Section 4, as well as the Tier 2 Section 4 DEIS.

Plummer Creek Maternity Colony

Approximately 199 acres of forest (including three acres of forested wetland) will be impacted within the Plummer Maternity Colony area. These impacts include about 15 acres of forest that overlap with the Doans Creek Maternity Colony. The project corridor crosses the southern third of the colony area (Figures 1 and 4). Suitable habitat is present on both sides of the alignment and both the female Indiana bats and the two secondary roost trees were found in the area north of the alignment. The two bats captured south of the alignment were males and were not radio-tracked. Although the highway could potentially act as a barrier once constructed, there is ample habitat on either side of the alignment.

While two alternate roost trees were identified, no primary roosts were found. No impacts to the identified roost trees are anticipated; however, it is possible one or more other roost trees (including a primary roost) may be affected. In the event that a primary roost or other alternate roost is felled by construction activities, additional roosting and foraging habitat will be available within the area.

Connectivity to I-69 from the Indiana bat capture points occurs primarily along tree lines, Black Ankle Creek, and unnamed tributaries. The shortest connectivity route to I-69 from the Indiana bat capture points is approximately 1.1 miles (Site 3), while the longest is approximately 1.9 miles (Site 11). The shortest connectivity route to I-69 from the roost trees is 1.6 miles (186R1) and 0.7 miles (186 R2).Connectivity routes were also calculated for both the roost tree sites and the bat capture sites to the mitigation sites. Site 3 is 0.1 mile away from the proposed mitigation site. The longest distance between an Indiana bat capture site (Site 11) and a proposed mitigation site (mitigation site) is approximately 1.4 miles. There is one roost tree (186R1) that is located within the Mitigation site and the other roost tree (186R2) is located 0.5 miles away from the proposed Mitigation Site. The bridge over Black Ankle Creek will provide at least 25 feet of clearance and should maintain the flyway along Black Ankle Creek and connectivity to habitat either side of the highway. See Figure 4 below and Table 13 in the Tier 2 BA for additional information.

The Plummer Creek Maternity Colony contains 8,550 acres of tree cover. Within the Preferred Alternative right-of-way, 206.6 acres of tree cover will be impacted which represents about 2% of existing tree cover. This impact has increased slightly from the 193 acres reported in the analysis of the representative alignment in the Tier 1BA Addendum due to further alignment shifts. Approximately one acre of tree cover impact is anticipated due to indirect/induced development (Tier 1 BA Addendum).

Nine proposed mitigation projects are located within the colony area and include nearly 300 acres of forest restoration and over 700 acres of forest preservation. To date, two properties have been secured with conservation easements and one by fee simple purchase, including one property that contains one of the known colony roost trees. Both of the Indiana bat capture locations are within 500 feet of a mitigation site.

Figure has been removed for confidentiality reasons related to the federally endangered Indiana bat (*Myotis sodalis*)

Figure 4. Plummer Creek Maternity Colony Connectivity to the Nearest I-69 Alignment and Mitigation Sites.

Based on the location of the alignment throughout the colony area and the locations of the known roosts and capture points, some take in the form of harassment due to construction noise/vibration (including blasting) 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 noise/vibration impacts are anticipated to occur to nighttime foraging activities. These activities will be short term and no long term affects are anticipated.

As previously discussed for the Doans Creek Colony, once Section 4 of I-69 is operational, fast-moving vehicles may strike bats if they attempt to cross the interstate at night during the summer maternity season. Given the positioning of forest habitat relative to the proposed interstate alignment, we believe the Tier 1 estimate for road-kill for the Plummer Creek Maternity Colony 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 1 individual every two years 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 Plummer Creek Maternity Colony. Partial bridging of the floodplain of Black Ankle Creek will provide an area for the bats to cross under the roadway therefore reducing the likelihood of road-killed bats at that location.

Little Clifty Branch Colony

Approximately 245 acres of forest impacts will occur within the Little Clifty Branch Maternity Colony area. Less than half an acre of forested wetland impacts are estimated to occur within this colony area. Impacts along this portion of the project corridor were originally described and included within the Remaining SAA totals until the recent discovery of a maternity colony at this location; therefore, there are no Tier 1 colony impacts to compare to. The estimated tree cover impact for this colony is 252 acres which accounts for about 3% of the available colony tree cover.

One Indiana bat capture point and four roost trees are located within the Little Clifty Branch maternity colony. Connectivity to I-69 from the Indiana bat capture point occurs primarily along unnamed tributaries. One roost tree, 297C (now down), was within the construction footprint of the Section 4 Preferred Alternative. The shortest connectivity route to I-69 from the Indiana bat capture point is 0.5 miles (Site 14). The shortest connectivity route to I-69 from the remaining roost trees is <0.1 miles (297A and 297B) and 0.1 miles (297D). The shortest straight-line distance from an Indiana bat capture point to the nearest tree cover impact is 0.3 miles (Site 14). The shortest straight-line distance from the remaining roost trees to the nearest tree cover impact is <0.1 miles (297A and 297B) and 0.1 miles (297D). See Figure 5 below and Table 13 in the Tier 2 BA for additional information.

Two mitigation sites (the and properties) consisting of 189 acres of upland forest preservation are proposed within and adjacent to the Little Clifty Branch Maternity Colony area. In addition, 105 acres of reforestation is proposed at these sites. Connectivity routes were calculated for both the remaining roost tree sites and the bat capture site to the mitigation site. Bat capture site 14 is 0.7 mile away from the closest proposed mitigation site (Two roost trees (297A and 297 B) are located 0.9 mile away from the proposed mitigation site and roost 297D is located 0.8 mile away from the proposed mitigation site. The property is approximately 2.5 miles from the roost and capture locations.

The proposed alignment passes through the center of the Little Clifty Branch Maternity Colony area and includes the parcel known to contain the recently discovered primary roost tree. This is the first instance in which a primary roost tree has been found to be within the project right of way. Recently this primary roost has fallen down. No cause was found, however private timbering in the immediate vicinity of the roost may have played a part. There was no evidence the tree had been blown down (no other visible storm damage) or cut down (the root ball was still intact). The two alternate roosts that were also identified are just outside the right of way limits. It is possible that when the Indiana bats return this spring they may select a new tree that is also within the right-of-way since clearing for this portion will not likely occur until after the 2011 maternity season.

Due to strong site fidelity to their summer maternity habitat, we presume that pregnant Indiana bats will return to this area and attempt to locate this particular roost tree this summer. We fully anticipate some level of take to this colony (once they return and discover the roost is gone) due to stress from searching for a new roost tree and potentially having their colonial roosting behavior *(e.g.* thermoregulatory needs) temporarily disrupted (Kurta and Murray 2002). This particular roost was a dead sugar maple with ten percent or less of the bark still remaining in a single patch on the upper portion of the tree; this snag was probably limited in its continued value as a primary roost. Because of the ephemeral nature of snags such as this, it is likely that Indiana bats have evolved to be able to relocate replacement roosts, if available, when their

previously-used roost trees become unsuitable; however, some level of stress is anticipated, primarily in the form of delayed parturition, or in a worst case scenario, loss of an unborn pup. In general we believe the latter situation to be rare (less than 1%) and, based on the abundance of surrounding habitat, that most females should be able to reestablish a new roost and meet their energy and thermoregulatory needs and give birth to their pups in a timely manner.

Based on forest transect surveys, the area characterized within the right-of-way and outside the right-of-way in the vicinity of the primary roost tree showed no significant difference in number of snags and shagbark hickories. There also was no statistically significant difference in size of live and dead trees (snags). Forest composition was similar throughout the area where the transects were located and shagbark hickories were very abundant. Seven snags were found within the right-of-way, while six snags were found adjacent to the right-of-way. The largest snag within the right-of-way showed a diameter at breast height (DBH) of 24 inches, while the largest snag outside the right-of-way showed a DBH of 26 inches.

Figure has been removed for confidentiality reasons related to the federally endangered Indiana bat (*Myotis sodalis*)

Figure 5. Little Clifty Branch Maternity Colony Connectivity to the Nearest I-69 Alignment and Mitigation Sites.

Although there was a loss of a primary roost within the colony area, the FWS believes that the disruption to the colony will be temporary. Given the fairly narrow linear design of the project, the abundance of surrounding suitable habitat, and the Indiana bat's ability to adapt to the ephemeral nature of roost trees, it is probable that the colony will be able to reestablish a new primary roost tree within a short period of time, minimizing the impacts to individual bats.

Based on the amount of surrounding forest habitat and stream crossings, there are several locations where bats may attempt to cross the interstate. We believe the Tier 1 method for estimating roadkill is reasonable and anticipate that no more than 8 bats will be killed by vehicle collision between 2013 and 2030 within the Little Clifty Branch Maternity Colony, 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 Little Clifty Branch Maternity Colony. Furthermore, the design of several of the bridges within the colony area should be adequate (minimum clearance of 25 feet) to allow bats to fly under the roadway and connect to other habitat areas (Tier 2 BA, pg. 40).

Due to 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 (including blasting) 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.

Results of the indirect and cumulative impact analysis for the Little Clifty Branch Maternity Colony indicate several induced growth areas are expected, including the area near the proposed SR 45 interchange. The analysis includes impacts as generated by the REMI model and assigned to the Traffic Analysis Zones (TAZs) for the I-69 project. A total of eight (8) acres of tree cover and eleven (11) acres of agricultural land are estimated to be indirectly impacted (*i.e.* developed) as a result of the I-69 project in this colony area.

<u>Indian Creek Maternity Colony</u>

The Indian Creek Maternity Colony has the least amount of forested habitat (approximately 60% forested) among the four colonies in this section, although it will incur the largest number of forest impacts. Approximately 291 acres of forest will be impacted in this maternity colony area, including 0.15 acres of forested wetland. Estimated tree cover impacts within the colony area are 315 acres, which is about 4% of the available tree coverage within the entire maternity colony. The alignment essentially bisects the colony, from south to north, and then makes a 90 degree turn, impacting additional forests and further fragmenting the colony. In addition, a mile-long connector road associated with the County Line Interchange, further divides the colony (Figure 1 and 6). Both of the Indiana bat capture locations and the roost tree are located on the east side of the alignment. Most of the known hibernacula in this area are found west of the alignment. Several bridges within the Indian Creek Maternity Colony area are designed to have 25 feet or greater clearance over the waterways, including the bridges over Indian Creek (including the connector road bridge). This will help maintain any existing flyways along Indian Creek.

Connectivity to I-69 from the Indiana bat capture points occurs along tree lines and unnamed tributaries. The connectivity route from Site 21 to I-69 is approximately 2.8 miles long, while the connectivity route to I-69 from Site 23 is 0.5 miles long. The connectivity route for the known roost tree (753R1) is approximately 0.7 mile. The shortest straight-line distance from the bat capture points is 0.4 miles (Site 21). The shortest straight-line distance from the roost tree I-69-related tree cover impacts is 0.6 miles. See Figure 6 below and Table 13 in the Tier 2 BA for additional information.

There are six proposed mitigation sites within the Indian Creek Maternity Colony area, for a total of 388 acres of upland forest preservation and 112 acres of reforestation. An additional two properties (and are a couple of miles northeast of the colony for another 79 acres of preservation and 106 acres of reforestation. Connectivity routes were calculated for both the roost tree sites and the bat capture sites to the mitigation sites. Capture site 21 is located 0.5 miles away from the proposed mitigation property, while site 23 is located 0.4 miles away from the proposed mitigation property. The roost tree (753R1) is located 0.7 miles away from the proposed property. Connectivity is along various tributaries and tree lines.

While one alternate roost tree was identified, no primary roosts were found. No impact to the identified roost tree is anticipated; however, it is possible one or more other roost trees (including a primary roost) may be affected. In the event that a primary roost or other alternate roost is felled by construction activities, additional roosting and foraging habitat will be available within the area.

We believe the Tier 1 estimate for roadkill within the Indian 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 Indian Creek Maternity Colony.

Based on the location of the alignment throughout the colony area, some take in the form of harassment from construction noise/vibration (including blasting) 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 noise/vibration impacts are anticipated to nighttime foraging activities. These construction activities will be short term and no long term affects are anticipated.

Figure has been removed for confidentiality reasons related to the federally endangered Indiana bat (*Myotis sodalis*)

Figure 6. Indian Creek Maternity Colony Connectivity to the Nearest I-69 Alignment and Mitigation Sites.

Some induced growth is expected in the Indian Creek Maternity Colony area as a result of the new interstate. The growth is projected to occur in the western portion of the colony area (Greene County) in conjunction with the County Line Interchange and southern connector road. A total of nine acres of tree cover is anticipated to be impacted within the maternity colony area. Some incidental take is expected as a result of the indirect impacts.

Because the projected direct, indirect and cumulative impacts are highest for this particular colony compared to the other Indiana bat colonies in Section 4 (due in part to its proximity to Bloomington and fewer development restrictions in eastern Greene County), it is particularly important that mitigation for this colony's forest and wetland impacts be completed within the maternity colony area, if possible. Currently, four mitigation sites within this maternity colony area have been purchased (, and) totaling 208 acres, and another 477 acres of mitigation are planned (Figure 6).

Adult Males during the Summer

Seven adult male Indiana bats were captured within the Action Area of Section 4 in 2004, two adult males were captured in 2005, and in 2010 an adult male was captured near the proposed SR 45 interchange location. In 2004, a radio-tagged male led to the discovery of a secondary roost in a utility pole and in 2010 a radio-tagged male led to the discovery of a primary roost tree located within the construction footprint of the project. This section of the project falls almost

entirely within the WAA (*i.e.* within 5 miles of various known hibernacula) and therefore is likely to have a higher concentration of males compared to other project sections.

The preferred alignment will impact potential roosting and foraging habitat and disrupt numerous travel corridors throughout Section 4. Once this section is operational, fast-moving vehicles may strike bats as they fly across the interstate at night. 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 4 during the summer months.

In the Tier 1 RPBO (2006), we estimated that a maximum of 50 adult males may be taken (during the summer months) by the year 2030 as a result of the entire I-69 Proposed Action, with the majority of take (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, and 31 within the WAA, during the summer. Another 5 individuals were estimated to be taken due to disturbance and habitat loss associated with demolition and relocation of homes throughout the entire project area. Although some slight adjustments have been made to the number of male bats exposed to the various stressors (based on the most recent population data available), the take estimated during the Tier 1 process remains valid. Based upon project impacts within Section 4, we estimate 35- 40 male bats may be taken in Section 4 as a result of various stressors during the summer months through 2030. Twenty-one of these individuals are estimated to be taken as a result of roadkill. The potential loss of this very small number of male 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. See Table B4 in the Tier 1 RPBO Amendment for more information.

Hibernating and Swarming Indiana Bat Populations during the Fall, Winter and Spring

In addition to the four maternity colonies present within the action area, almost the entire Section 4 project area is within the WAA that was establish for the Indiana bat as part of the project's Tier 1 consultation. (A small part of the WAA also falls within Section 5 of the I-69 project). The "Winter Action Area" (WAA) is the total area that falls within a 5-mile radius centered on each of the known Indiana bat hibernacula that have entrances located within 5 miles of the proposed 3C corridor. There are 15 hibernacula within 5 miles of the corridor (including the County Line Interchange connector road) that were analyzed within the Tier 2 Action Area as part of the Tier 2 BA Addendum. These hibernacula include Cave, Cave, Cave, Cave, Cave, Cave, Cave, Cave System (includes and Cave), Cave, Cave, Cave, Cave, Cave, Cave, and Cave.

No direct adverse impacts are anticipated to any of the 15 physical cave structures in the Action Area that are known to serve as Indiana bat hibernacula. The only hibernaculum that appears to have hydrological connectivity (*i.e.*, groundwater connections) with the proposed I-69 corridor is Cave. This cave is not currently, nor has it been in the past, an important hibernaculum for Indiana bats (*i.e.*, it is a Priority 4 hibernaculum). Cave is prone to flooding and contained no hibernating Indiana bats when it was last surveyed in 2005.

One significant hibernaculum in Section 4 is Cave. Cave is a Priority 1A cave and has been designated as "critical habitat" for the Indiana bat. There were 59,250 Indiana bats identified within Cave during its last hibernacula survey in 2009. USFWS requested that impacts within the Cave Winter Use Area (WUA) be analyzed and presented individually, as well as within the impact numbers for the entire Expanded WAA, since this information has changed slightly subsequent to the Tier 1 BA Addendum. Impact information related to each hibernaculum along with cave and surrounding habitat descriptions can be found in the Tier 1 BA Addendum.

The Expanded WAA (expanded to include any areas where induced growth is anticipated to occur) contains 146,725 acres of tree cover. Within the WAA, the Preferred Alternative right-of-way, will impact 1,234 acres of tree cover (1,159 acres within Section 4 and 75 acres within Section 5, expressed as "tree cover" acreage). The total tree cover acreage should not be directly compared to the Tier 1 BA Addendum totals since the Cave WUA was subsequently added. The Cave WUA was not included in the Tier 1 BA Addendum because originally only the hibernacula within 5 miles of the main corridor (not the connector road) were considered.

The Cave WUA contains 32,607 acres of tree cover. The Preferred Alternative right-of-way will impact 16.2 acres of tree cover (0.05% of the available tree cover). The impacts within the Cave WUA result from the county-line interchange southern connector road; the mainline does not impact the Cave WUA. Direct impacts for the southern county-line interchange connector road for Cave WUA were originally analyzed as part of the Representative Alignment during Tier 1 Biological Assessment; however, prior to the completion of the Tier 1 Revised BO, the northern connector road was identified as the preferred alternative, and therefore impacts to Cave WUA were not anticipated;

Upland forest impacts associated with each of the 15 hibernacula have also been analyzed. Forest impacts within a 5-miles radius area surrounding the various hibernacula range from 0 acres at to just over 600 acres at A summary of these impacts, including the Tier 1 threshold that was established is presented below. Please note that the Tier 1 BO threshold amount presented below (Table 4) includes a 10% buffer allowance. Some of the anticipated impacts are in Section 5 and are based on the Tier 1 Section 5 Representative Alignment and may change slightly.

In addition to analyzing forest impacts for each hibernaculum, connectivity was analyzed for all known hibernacula and caves where Indiana bats were harp-trapped within five (5) miles of the Section 4 Preferred Alternative. The Winter Use Area (WUA) (five mile radius area surrounding each hibernacula) associated with these hibernacula, like the maternity colony areas and Remaining SAA, has extensive connectivity due to the large amount of forest in this section and the numerous tributaries and tree lines. See the Tier 2 BA for additional information and descriptions of connectivity for each hibernaculum, as well as connectivity information for six caves not considered hibernacula but where Indiana bats were harp-trapped in the spring and/or fall of 2004 and 2005. Connectivity distances to the alignment impacts and mitigation sites are shown below in Table 5.

Within the Expanded WAA there are a total of 273 acres of emergent wetlands, 1,290 acres of forested wetlands, 29 acres of scrub-shrub wetlands, and 1,236 acres of unconsolidated bottom/lacustrine wetlands available. The Preferred Alternative will have no impact to scrub-shrub wetlands in this area. Impacts include nine emergent wetlands ranging from 0.01 to 1.81

Table 4. Hibernacula Winter Action Area Upland Forest Impacts				
Cave	Tier 1 BO*	Section 4 Impacts	Section 5 Impacts**	Total Impacts
	474.1	458.18	0	458.18
	316.8	249.44	40.97	290.41
	106.7	92.86	5.32	98.18
	107.8	58.18	39.06	97.24
	261.8	238.18	20.92	259.10
	385	301.05	42.66	343.71
	694.1	605.37	0	605.37
	611.6	528.58	0	528.58
	0	11.80	0	11.80
	509.3	364.03	42.66	406.69
	93.5	42.25	42.44	84.69
	359.7	265.01	47.09	312.10
	574.2	468.98	0	468.98
	0	0.00	0	0.00
	56.1	54.74	0	54.74
*The Tier 1 BO threshold presented here includes the 10% allowance.				
**The Section 5 forest impacts were calculated using the Tier 1 Representative Alignment. It is thought that this would be the conservative approach. The final Section 5 impacts may change slightly, but are not expected to increase materially.				

acres each and totaling 5.32 acres; eight forested wetland impacts ranging from 0.04 to 1.62 acres each and totaling 3.67 acres; and ten unconsolidated bottom wetlands with impacts ranging from 0.03 to 0.82 acre and totaling 2.73 acres. Approximately 1.9% of the available emergent wetlands, 0.3% of the available forested wetlands, and 0.2% of the available unconsolidated bottom wetlands will be impacted. No wetland impacts are expected within the Cave WUA.

Table 5. Connectivity and Distance to Impacts from hibernacula within 5 miles from the Preferred Alternative			
Hibernacula	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites
	1.3	0.9	0.2
	4.0	2.5	3.5
	1.2	0.7	3.0
	1.9	1.5	0.5
	6.3	4.5	3.8
	2.2	1.0	2.5
	2.0	1.8	2.6
	4.4	2.9	1.2
	5.1	3.5	1.0
	5.6	3.5	0.9
	5.6	3.2	0.6
	6.4	4.5	0.0
	7.2	4.7	0.0
	7.4	4.8	0.0
	8.1	3.2	0.2
	5.9	4.2	6.3

Table 6. Hibernacula Recharge Area Estimates		
Cave Hibernacula Estimated Recharge Area	Total Acres	Acres Inside Preferred Alternative
Cave (Fig 1*)	80	0
Cave (Fig 1)	116	0
Cave (Proximal) (Fig 1)	61	0
Cave (Distal 1) (Fig 1)	738	0
Cave (Distal 2) (Fig 1)	53	0
Cave (Fig 1)	738	0
Cave (Fig 1)	560	0
System ((Fig 1)	2036	0
Cave (Fig 2)	65	0
Cave (Fig 2)	249	0
Cave (Proximal) (Fig 3)	128	0
Cave (Distal #1434) (Fig 4)	24	0
Cave (Distal #1432) (Fig 4)	30	14
Cave (Distal #1240) (Fig 4)	66	17
Cave (Distal #1525) (Fig 4)	98	0
Cave (Distal #1524) (Fig 4)	24	0
Cave (Fig 5)	506	0
Cave (Fig 5)	901	0
Cave (Fig 6)	1174	0
Cave (Fig 7)	80	0
Cave (Fig 8)	192	0
Cave (Fig 9)	2159	0
*Refer to Figures in Appendix H of the Section 4 Tier 2 BA		

Although no direct impacts to the physical structure of any of the hibernacula are anticipated, based on the high density of karst topography within the action area, impacts to hibernacula recharge basins and karst conduits is a possibility. To better comprehend the potential for these types of impacts, the FWS requested that INDOT delineate the recharge area for each of the 15 hibernacula within the I-69 project area. Surface recharge areas estimated from previous dye-tracing efforts and as part of this exercise have been depicted on topographical maps for each hibernaculum in Section 4 (Tier 2 BA Appendix H). With the exception of Cave, none of the hibernacula are known to be hydrologically connected to the project corridor and direct impacts to their recharge areas are not anticipated. Furthermore, the FWS consulted with Mr. Sam Frushour, a retired researcher (and karst expert) for the Indiana Geological Survey who is familiar with the project and project area, regarding this information. Although in several instances he did not agree with the exact delineated boundary lines for the recharge areas, his comments did not result in any additional areas of concerns (with respect to endangered species) beyond those discussed in the Tier 2 BA. See pages 81-107 of the Section 4 Tier 2 BA for a full discussion of the hibernacula recharge areas. Table 6 shows estimated recharge acreages for each of the hibernacula.

Increased Risk of Disturbance/Vandalism to Bats in Vulnerable Hibernacula

Because I-69 is anticipated to induce indirect development and thereby increase the human population within the Action Area and provide improved, convenient accessibility to people that

live outside the Action Area (*e.g.*, via the proposed Greene/Monroe county line interchange), we believe it is reasonable to assume that a small proportion of these "new" people will want to explore the caves in the area and thereby increase the inherent risk of disturbing hibernating Indiana bats within caves that are currently unprotected (*i.e.*, ungated and/or unfenced). Therefore, we have estimated that this increased risk is equivalent to a taking of 1% of the 2009 winter population of each **unprotected** hibernaculum within the Action Area at some point(s) after I-69 becomes operational through the year 2030 (see Appendix B, Table B5). This scenario also assumes that the owners of vulnerable hibernacula will not allow their cave(s) to be gated (this is a reasonable assumption in itself given previous failed attempts at at least one important cave). In a reasonable worst-case scenario an unauthorized visitor(s) or vandal(s) would enter a hibernaculum and directly or indirectly kill/take (*e.g.,* direct, physical contact with bats is not required for arousal to occur and essential fat reserves to be depleted, subsequently leading to starvation) hundreds of Indiana bats. While this scenario could still occur with or without I-69, we believe that it is more likely to happen with the proposed interstate and interchanges in place (*i.e.*, overall improved accessibility). However, the Service believes it is extremely unlikely (*i.e.*, discountable) that I-69 would cause an increased risk of someone physically altering or vandalizing unprotected caves to the degree that they would no longer remain suitable habitat. Typically, the worst physical alterations to the caves themselves are likely to be an increased prevalence of spray-painted graffiti and trash.

Habitat impacts appear fairly insignificant within the WAA and the bulk of anticipated take of bats residing here during the fall, winter and spring is likely to be caused by unauthorized human disturbances of hibernating bats in vulnerable hibernacula and roadkill of foraging bats (primarily occurring during the annual swarming period in late summer and fall). Under the reasonable worst scenarios (all roadkill and vandalism occurring in the same year), the combined anticipated levels of take for these two threats are not likely to significantly impact the recovery unit populations and would not be expected to jeopardize the continued existence of the species. Please see bottom of page 15 of the recent Tier 1 amendment (May 2011) for a discussion of impacts at hibernacula in light of WNS.

Cave Critical Habitat

The revised preferred alignment for the County Line Interchange connector road will consist of approximately 26 acres of right-of-way that falls within the Indiana bat swarming habitat surrounding Cave (*i.e*. winter use area; an important conservation feature of the critical habitat) and will result in approximately 16.2 acres of direct tree cover loss. The 5-mile radius of swarming habitat contiguous with Cave contains 32,607 acres of tree cover therefore a loss of 16.2 acres represents about 0.05% of the existing available habitat. The selection of the southern connector option does not increase the other stressors considered in the Tier 1 evaluation including the amount of induced impacts anticipated within the area surrounding Cave and the overall potential for increased vandalism of the cave. The slight impact to the swarming habitat surrounding Cave will not significantly reduce the quality or quantity of the habitat and this area will likely still support the number and overall fitness of Indiana bats occupying this site as they prepare for hibernation in the fall and when they emerge from hibernation and prepare to migrate in the spring. These impacts will not affect Cave itself, or measurably adversely affect any of the important conservation features of Cave.

Noise

Most noise generated from project-related construction activities will likely occur during daylight hours when Indiana bats are roosting in trees. Unfamiliar noises from the operation of chainsaws, bulldozers, skidders, trucks, etc. may occur in relatively close proximity to occupied primary and alternate roost trees during the summer reproductive season. The novelty of these noises and their relative volume levels will likely dictate the range of responses from individuals or colonies of bats. At low noise levels (or farther distances), bats initially may be startled and have increased respiration/heart rates, but they would likely habituate to the low background noise levels. At closer range and louder noise levels (particularly if accompanied by physical vibrations from heavy machinery and the crashing of falling trees) many bats would probably be startled to the point of fleeing from their day-time roosts and in a few cases may experience increased predation risk. Because the noise levels in construction areas will likely continue for more than a single day the bats roosting within or close to these areas are likely to shift their focal roosting areas further away or may temporarily abandon these roosting areas completely.

As required by NEPA, noise studies were conducted for Section 4. Approximately 44 sites were analyzed for current and future noise levels. (Section 4 Tier 2 DEIS discusses noise studies on page 5-266). Once the road is operational, it is anticipated that noise levels will exceed the applicable noise abatement criteria or exceed the existing noise level substantially at over half of the sites evaluated. It is unclear exactly how bats may react once the highway becomes operational. Some studies indicated very low bat usage close to interstates and others indicate that some bats will roost and forage near large roadways. The latter may be a factor of surrounding available habitat and habituation over time to the noise. The Tier 1 estimate of approximately 9 bats (male and female) taken as a result of construction noise and vibration, remains reasonable.

Some blasting will occur in Section 4. While the effects of blasting are unknown, a commitment has been made to limit the effects blasting will have on the Indiana bat. Blasting will be avoided between September 15 and April 15 in areas within half of a mile of known Indiana bat hibernacula. All blasting in the WAA will follow the specifications developed in consultation with the USFWS and will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of nearby caves serving as Indiana bat hibernacula.

Indirect/Induced Impacts

A total of 160 acres of induced development is predicted to occur within the Section 4 Expanded Action Area. The expert land use panel identified a total of 55 TAZs (traffic analysis zone) near the proposed interchanges at U.S. 231, SR 45, SR 54, and SR 37 in Bloomington as the probable locations of that induced development (see Figure 25, Table 22, and Appendix E of the Tier 2 BA for detailed information about individual TAZs). Unlike Sections 1, 2, and 3, the majority of land in Section 4 is forested. Regarding the potential for I-69 to spur induced development in Section 4, the Section 4 DEIS states:

> Upon review of both existing data, mapping and local coordination, in general, the farmland, streams, and wetlands account for significantly smaller acreage than the forests in any given induced growth traffic analysis zone (TAZ). I-69 Section 4 is much more heavily forested than Sections 1 through 3 of the Tier 2 I-69 Corridor where it was determined that forested land would likely not be impacted by indirect development. Therefore, an estimate of 40% of the induced growth occurring on forested land was

> established based on an analysis of development of specific land uses within the Section 4 project Study Area (See Appendix CC). This 40% estimate does not include the 12 TAZs in the vicinity of the US 231 interchange as those TAZs were determined to primarily consist of agricultural land. Indirect impacts in those 12 TAZs were previously analyzed and considered in the Section 3 Tier 2 FEIS…
>
> Assuming 40% of the anticipated 135 acres of induced growth caused by Section 4 (in those TAZs outside of the US 231 vicinity) will occur on forested lands, the predicted impact is **54 acres** (32 acres in Greene County and 22 acres in Monroe County), and the predicted impact to agricultural/other land use is 81 acres (49 acres in Greene County and 32 acres in Monroe County). Indirect impacts in those TAZs in the vicinity of US 231 are estimated to be 25 acres; therefore, the total estimated induced growth impacts for the Section 4 project are 160 acres of which 106 acres are agricultural land and 54 acres are forest land.[1]**…** Land cover categorized as Agricultural/Other (in and out of a floodplain) represents 26% of the total acres in the TAZs compared with 71% forest, 3% developed, and less than 0.1% unusable (*i.e.*, wetlands).

Originally, the Greene County Expert Land Use Panel provided their forecasts for indirect land use based on an interchange located at SR 54 in southeastern Greene County. That interchange location has since been replaced by a new location along the Monroe-Greene County Line, approximately 3.5 miles northeast of the old location. FWS requested that the induced growth analysis be re-evaluated based on the new interchange location.

According to INDOT, the change from the SR 54 interchange location to the County Line Interchange location will not result in a net increase in overall indirect impacts in Section 4; however, the distribution of indirect impacts could shift. There are approximately 17,000 acres of forest in the 12 TAZs associated with the County Line Interchange area. Even before the introduction of the County Line Interchange, the Expert Land Use Panel assigned 63% (51 out of a total of 81 acres) of all induced growth in the eastern townships of Greene County to these 12 TAZs. However, in order to present a conservative estimate of possible impacts to Indiana bat habitat, INDOT recently analyzed an additional two scenarios. These scenarios assumed half of the remaining 30 acres of induced growth or all of the remaining 30 acres of induced growth would occur within the 12 County Line Interchange TAZs. That growth then would not occur within the other TAZs within eastern Greene County not associated with the County Line Interchange. INDOT also evaluated the potential for up to half of the "no build" growth anticipated in southeastern Monroe County to "leap" to Greene County if the County Line interchange is built due to lower land costs and travel-time savings. Based on a combination of these worst-case scenarios, INDOT has determined only an additional 18 acres of forest is expected to be impacted (0.1% of the total forest area in these TAZs). Please refer to Appendix E of the Tier 2 BA for a full discussion of the indirect land use analysis.

The Service gives deference to the "expert land use panel" on the issue of where induced development is most likely to occur in Section 4. Thus, we anticipate a small amount of incidental take of Indiana bats in Section 4 as a result of induced development (54 acres) in forested areas. The amount of induced/indirect development predicted to occur within each maternity colony area was described in the maternity colony impact section of this document.

[1] The geographic scopes of the cumulative impact analyses in adjacent sections of I-69 of necessity overlap. As a result, some actions will be counted as cumulative impacts in more than one Tier 2 EIS; thus, the cumulative impacts of the I-69 project as a whole cannot be calculated by "adding up" the cumulative impacts totals that are given in each Tier 2 EIS.

Indirect Impacts to Hibernacula Recharge Areas

In addition to evaluating the impacts of indirect development within the individual maternity colonies and the Summer and Winter Action Areas, INDOT evaluated the anticipated indirect growth within each of the 15 Indiana bat hibernaculum's recharge areas. Induced growth is only anticipated to occur within the Cave, Cave, and recharge areas. The amount of development that would occur within the recharge area of each specific TAZ was analyzed on a percentage basis. The Section 4 DEIS stated that in Greene County, residential development would occur at 3.96 housing units/acre. This was used in the analysis to determine how many houses would potentially be constructed in each recharge area. It is anticipated that sixteen (16) residential homes will be induced by I-69 within all the recharge areas combined. No induced employment is anticipated in these areas. Table 7 summarizes these impacts.

All known development occurring at this time was overlaid on the recharge areas to determine if those areas may cause any indirect impacts to the recharge areas. None of the known development sites fell directly within any of the recharge areas. The Iron Gate Subdivision is located approximately 150 feet from the Cave recharge area. Also, there was a "for sale" sign in a farm field that could possibly lead to residential development approximately 250 feet to 300 feet away from the Cave Recharge Area. See Appendix E of the Section 4 Tier 2 BA for a discussion and map of recent and future home development within portions of the action area.

Possible indirect impacts to the karst recharge area due to induced growth could include septic tank failure. An estimated 10-20% of septic tanks fail[2]. This may lead to raw sewage seepage into karst features which would increase the presence of fecal coli-forms and fecal streptococcus.

For the indirect analysis, the Cave distal impacts were combined into one analysis. This is because the impact of all the Distal Recharge Areas fell within one TAZ (2801502). Approximately 20% of the TAZ was located within the distal recharge area. Both induced employment and housing were considered. In this area no induced employment is anticipated. It is anticipated that the construction of one (1) residential home will be induced by I-69.

For the indirect analysis of the Cave proximal impacts, approximately 5% of TAZ ID 2801504 was located within the recharge area. Both induced employment and housing were considered. There is no induced employment anticipated within the recharge area. It is anticipated that the construction of one (1) residential home within this recharge area will be induced by I-69.

The Cave recharge area fell within one induced TAZ (2800802). Approximately 28% of the TAZ fell within the recharge area. It is anticipated that the indirect impacts to this

[2] Indiana Department of Environmental Management, Office of Water Quality. "Total Maximum Daily Load for *Escherichia coli* (*E. coli*) For the Middle West Fork White River Watershed, Morgan, Owen, and Greene Counties. Pg 5. May 2005.

recharge area will include the construction of one residential home. Employment was considered in the area, however none is anticipated.

The recharge area fell within one induced growth TAZ (2801506). Approximately 5% of the TAZ fell within the recharge area. It is anticipated that the indirect impacts to this recharge area will include the construction of one residential home. Employment was analyzed as well, and no induced employment is anticipated to occur within the recharge area.

The Cave recharge area fell within three TAZs (2800906, 2801505, and 2803002). Approximately 11% of TAZ ID 2800906 fell within the Cave recharge area. It is anticipated that the indirect impacts to this recharge area will include the construction of four residential homes in this TAZ. Employment was analyzed as well, and no induced employment is anticipated to occur within this TAZ within the recharge area. Approximately 17% of TAZ ID 2801505 fell within the Cave recharge area. The construction of four residential homes will be induced by I-69. There is no induced employment anticipated within this TAZ within the portion of the Cave recharge area. Approximately 33% of TAZ ID 2803002 fell within the Cave recharge area. It is anticipated that the construction of four residential homes will be induced by I-69 in this TAZ in the Cave recharge area. No induced employment is anticipated in this area. Overall, it is anticipated that the construction of twelve residential homes will be induced by I-69 within the Cave recharge area.

Table 7. Induced Growth within the Hibernacula Recharge Areas

I69TAZ	County	Recharge Area Within	Acres of TAZ within Recharge Area	% of TAZ within Recharge Area	Induced Employment Acreage	Induced Housing Acreage	Approximate Number of Households*
2801502	Greene	Cave Distal	234.03	20%	0.00	0.20	1
2801504	Greene	Cave Proximal	128.25	5%	0.00	0.03	1
2800802	Greene	Cave	137.36	28%	0.00	0.07	1
2801506	Greene		192.00	5%	0.00	0.19	1
2800906	Greene	Cave	371.41	11%	0.00	0.86	4
2801505	Greene	Cave	501.22	17%	0.00	0.90	4
2803002	Greene	Cave	847.92	33%	0.00	0.92	4

In summary, the following effects on Indiana bats in Section 4 are anticipated:

- Direct habitat modification/loss will occur, but will be minimal with a loss of tree cover ranging from approximately 1% to 4% within the four maternity colony areas. Therefore, 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, based on the amount and quality of remaining forest habitat.

- 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 fairly small and minimal impacts are expected.
- One primary roost tree was recently discovered within the project right-of-way. Although this tree is no longer standing, to be conservative, the FWS assumes that upon return to the summer maternity area, the displaced bats will relocate to a new roost in the general vicinity, and potentially within the right-of-way. Loss of a primary roost tree during the winter could result in stress (and take) to pregnant females in the spring as they search for a new roost and try to meet thermoregulatory needs. A few individuals may have delayed parturition or abort their pups. Although no primary roosts were identified for the other colonies, alternate roost trees were located for all maternity colonies within Section 4. None of the known alternate roosts are anticipated to be lost. Loss of other unidentified alternate roost trees may occur.
- Due to the significant amount of forest and stream crossings in Section 4, numerous travel corridors may be disrupted by the proposed interstate alignment. Considering the amount of available foraging habitat, we anticipate that this potential adverse effect would impinge on a relatively small proportion of colony members and not be a significant source of take. Indian Creek is expected to be disrupted the most within Section 4 due to the configuration of the alignment through the colony area. (There will be ten separate bridge crossing locations in Section 4 that will have bridges with 25 feet or greater clearance. These bridge locations would include but are not limited to I-69 over CR 600 E and Black Ankle Creek, I-69 over CR 360 S and Plummer Creek, I-69 over Mitchell Branch, I-69 over SR 54 and Tributary of Mitchell Branch, I-69 over all three crossings of Indian Creek, the county line connector road over Indian Creek, and I-69 over Branch of Clear Creek in two separate locations. The bridge structures 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 through 2030. In addition up to 21 males during the summer and 244 bats in the fall swarming and spring staging periods may be taken through the year 2030. Some roadkill may be offset as traffic on local roads decreases and shifts to the new interstate.
- 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 induce some amount of residential/commercial development in currently forested areas and may also speed up the rate of development that otherwise would have occurred within the action area at a slower rate, particularly in the immediate vicinity of and within easy commuting distance of Section 4 interchanges (e.g., SR 45). We anticipate approximately 10 Indiana bats will be taken due to indirect development.

- 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 and hibernacula areas will ensure that at least 2,878 acres, and up to 3,583 acres of suitable roosting and foraging habitat persists in perpetuity. In addition, several Indiana bat hibernacula, including two Priority 1A caves, will be protected in perpetuity.
- A potential for increased disturbance/vandalism of bats in vulnerable hibernacula due to more accessibility to that part of the state
- Long term reproduction and viability are not expected to be impacted by the project and all maternity colonies and hibernacula 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 Action Area 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, permanent protection of two Priority 1A hibernacula, and other proposed mitigation and conservation measures, we anticipate that long-term habitat conditions for these colonies will be suitable and sustainable for the long-term survival and recovery of the species.

Table B1 (updated in Appendix A of the recent 2011 amendment to the 2006 Tier 1 RPBO), deconstructs the Proposed Action and summarizes the anticipated direct and indirect environmental consequences and likely responses of exposed Indiana bats. After reviewing the Section 4 BA and conducting the formal consultation for Section 4, the Service has concluded that applicable information within Table B1 remains valid for Section 4 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 4: 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 4, no currently present billboards will need to be relocated. Furthermore, because open agricultural land is available in Section 4, the Service does not anticipate that any new cell towers or billboards will be sited/constructed in currently forested areas in Section 4 and therefore no additional forest loss is anticipated related to these types 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 4 (*e.g.*, nightly traffic on SR 45) should fall once I-69 becomes operational, the overall or net effect of I-69 on roadkill of Indiana bats in the action area may be neutral.

Effects on Habitat Quality

In addition to direct and indirect habitat loss, 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; impacts to karst habitat as a result of changes to infiltration and surface water runoff patterns, including introducing contaminants to karst resources; and decreased water quality in the Action Area (short-term and long-term), as a result of construction activities, 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 action area 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 4 of I-69.

During construction, water quality may be temporarily adversely affected in Section 4 streams (e.g., increased siltation) where Indiana bats drink and presumably obtain a small portion of their insect prey. Once operational, Section 4 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 effects to local water quality are not likely to rise to a level where incidental take of Indiana bats is reasonably certain to occur.

Karst habitat is a non-renewable resource that is biologically important because it provides habitat for a number of rare, threatened, and endangered species that depend of caves to different degrees. Many species of bats, including the federally endangered Indiana bat, use caves in karst areas within the WAA of I-69.

According to the Section 4 Tier 2 DEIS on page 5-677/8:

> Highway construction and operation related impacts to identified karst features are unavoidable. Potential karst feature impact totals associated with the four alternatives are presented in Section 5.21 *Karst Impacts*. Preferred Alternative 2 would impact the second-fewest karst features (between 87 and 106), which factored favorably toward its selection as the Preferred Alternative…
>
> Unavoidable impacts upon karst features will be mitigated through implementation of alternative drainage, where feasible. If alternative drainage is not possible, impacts will be mitigated through implementation of water quality treatment measures, and appropriate operation and maintenance measures.
>
> Potential karst feature impacts can occur where highway runoff enters the karst system and/or where the construction of the highway and related drainage features alters the amount of water entering the karst system. The adverse impacts resulting from highway

> construction can be difficult to manage because of the potential for changes in water quality, changes in flow volumes within the karst system if karst conduits are plugged or severed, and, the potential for associated effects upon karst (primarily cave) biota.
>
> The federally endangered Indiana bat (*Myotis sodalis*) and 11 state-listed species (three State-Endangered (SE), one State-Endangered Candidate (SEC), one State-Threatened (ST), one State-Rare (SR), and five Watch List (WL)) were identified during surveys of caves within and near the Section 4 corridor. An assessment was made of the project's potential to cause direct or indirect impacts to state-listed cave biota from changes in drainage areas contributing recharge to the cave springs as well as karst groundwater quantity and quality. It was concluded that the project will not result in such changes of a sufficient magnitude to adversely affect the identified [state-] listed species. Analysis which shows that these species will not be adversely affected is provided in Section 5.17, *Threatened and Endangered Species*.
>
> Direct impacts to known cave openings and passageways were avoided in the development of the four alternatives. … [W]hile caves were avoided in the development of the four alternatives, it should be noted that unidentified subterranean karst features are undoubtedly present, and an unknown number of such unidentified features will be encountered and impacted during highway construction. Features within the construction limits may be bridged, capped or filled. There is also the potential for changes in drainage patterns if the project were to sever a conduit and reduce flows, or by adding drainage, thereby increasing flows.

The INDOT has committed to include measures for spill prevention and containment in the roadway design, incorporate herbicide use plans and low salt zones in sensitive areas (including karst), and to design bridges with no or minimal in-span drains and to direct bridge runoff away from streams and rivers.

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 4 are described in the Section 4 Tier 2 BA starting on page 138 (see also Appendices F-RR), 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.

Forest 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 or reforestation) 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.

To minimize and mitigate impacts to bats due to habitat loss in Section 4, existing high quality forested habitat suitable for Indiana bat foraging and roosting, as well as areas suitable for restoration, were identified within the Action Area. In identifying mitigation properties, INDOT and FHWA used the following criteria for Section 4:

- Recorded Indiana bat hibernacula
- Roost tree(s) and flyways connected to a Roost (including bridge)
- Areas within a Maternity Colony or Winter Focus Area
- Visible or known karst features (e.g., caves, sinkholes, springs)
- Part of a larger contiguous block of forest/property
- Preservation of especially older growth forests with snags/shaggy barked trees
- Reforestation and restoration practices (e.g., wetlands and streams)
- Biologically attractive areas with streams, springs, wetlands, forests, karst and endangered species
- Potential for Human Development

Currently, INDOT has identified 36 property owners as "willing sellers"; their properties total approximately 4,000 acres. Of this total, INDOT has secured a total of 18 properties. Two properties (and equaling 143 acres are in the Veale Creek Maternity Colony area which is in Section 2. The USFWS approved of INDOT receiving credit in Section 4 for these properties because of the importance of obtaining and protecting property in this marginally forested maternity colony area. Other properties within Section 4 that have been secured include:
and and which total over 1,716 acres of mitigation credit (and include two Priority 1A Indiana bat hibernacula). Two other property owners (and have signed a letter of intent to sell their property to INDOT; these properties will also be permanently protected. This will bring the total of secured, protected habitat to over 2,100 acres. Thus, of the 3,583 acres potentially required for upland forest mitigation for the Indiana bat, approximately 1,480 acres remain to fulfill the mitigation commitment based on the Initial Design Criteria. Eighteen properties are currently in the earlier stages of the acquisition process. It is expected that offers on these properties will be accepted by the property owners.

The following properties are currently being pursued by INDOT. Acreage for each parcel is provided in parentheses. An asterisk (*) indicates an offer has been made to the property owner, while two asterisks (**) indicate acceptance of an offer (including the signed letters of intent to sell). Verbal acceptance only is not indicated. An underline indicates the property contains an Indiana bat hibernaculum(a).

- **SR 57 Focus Area**
  - (30 acres)
  - *(168 acres)
  - (296 acres)
- **Doan's Creek Maternity Colony**
  - (13 acres)
  - (114 acres)
  - (12 acres)
  - (250 acres)

- **Plummer Creek Maternity Colony**
    - (236 acres)
    - **(116 acres)
    - (113 acres)
    - **(60 acres)
    - (84 acres)
    - (111 acres)
    - (245 acres)
    - *(57 acres)
    - **(45 acres)
- **Little Clifty Branch Maternity Colony**
    - **(167 acres)
    - (152 acres)
- **Indian Creek Maternity Colony**
    - (30 acres)
    - (58 acres)
    - 40 acres)
    - (159 acres)
    - (133 acres)
    - (80 acres)
    - (22 acres)
    - (163 acres)
- **Cave Focus Area**
    - (73 acres)
    - (70 acres)
- **Garrison Chapel Valley Focus Area**
    - (134 acres)
    - (12 acres)
    - (289 acres)
    - (17 acres)
    - (64 acres)
    - (88 acres)

INDOT will continue to pursue the above properties and intends to make offers to each property owner, as needed. INDOT will provide written documentation to USFWS for each property for which Conservation Easements or Fee Simple purchases are made. As each property is acquired, the Transfer Title signed by the property owner will be provided to USFWS, along with a running total of mitigation acres purchased in Section 4. Updates will be provided on a regular basis and continue until all mitigation commitments have been satisfied.

Some amount of reforestation will occur within each of the maternity colony areas, along with preservation of existing forest. For the Doans Creek and Plummer Creek maternity colonies, a significant net gain of forest is anticipated, which will greatly benefit the colonies. The Indian Creek colony will have a net loss of approximately 51 acres of upland forest, assuming all mitigation is secured. Because the Little Clifty Branch maternity colony was only recently identified, targeted efforts to secure mitigation in this particular area had not previously occurred. This colony will lose approximately 290 acres of forest. One 160-acre parcel has been proposed for preservation near the Indiana bat capture site within this colony area. Just recently, a new property has been proposed that is within and adjacent to the colony area. This property

could provide an additional 37 acres of preservation and 105 acres of reforestation along Indian Creek. Based on the high percentage of surrounding forest, this minor net loss of forest is not expected to significantly affect the colony. Despite the minor net shortfall of upland forest development within two of the maternity colony areas, 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 4 Action Area, and individual bats within the area, will be sufficient and sustainable.

Copies of deeds and/or transfer documents for sites that have been secured by INDOT have been provided to the FWS. Site descriptions, maps, photographs, conceptual mitigation plans, etc. are included in the site specific appendices of the Section 4 Tier 2 BA. and have been added since the BA as shown in Table B. Figure 7 shows a map of all the proposed mitigation sites in Section 4. Table 8 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.

Landlocked properties may also be available for sale or for possible mitigation. The exact acres are unknown at this time and will not be fully identified until final design; however, INDOT currently estimates about 1,500 such acres may occur, with the majority forested. If necessary, once these acres have been identified, the FWS will evaluate the potential suitability of these acres as upland forest mitigation for the Indiana bat. The focus area for these parcels should include areas that will be most beneficial to the Indiana bat, such as maternity colony areas.

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 deed restriction or conservation easement will be recorded for the properties and will provide permanent protection (e.g., no mowing, timber harvest, timber stand improvement, etc.). Most of the property owners have agreed to have conservation easements recorded on their property; several have opted for a fee simple purchase.

Figure has been removed for confidentiality reasons related to the federally endangered Indiana bat (*Myotis sodalis*)

Figure 7. Potential Mitigation Sites in Section 4 of the I-69 Interstate Project.

Table 8. Section 4 Mitigation Site Anticipated Acres Summary

Mitigation Site	Forest Preservation (acres)	Reforestation (acres)	Total Forest Mitigation (acres)	Emergent Wetlands (acres)	Forested Wetlands (acres)	Scrub-Shrub Wetlands (acres)	Wetland Mitigation (acres)
SR 57 Bridge Focus Area							
	6	24	**30**	0	0	0	**0**
	18	150	**168**	0	0	0	**0**
	169	124	**293**	0	3.0	0	**3.0**
Doan's Creek Maternity Colony							
	13	0	**13**	0	0	0	**0**
	47	67	**114**	0	0	0	**0**
	12	0	**12**	0	0	0	**0**
	171	79	**250**	0	0	0	**0**
Plummer Creek Maternity Colony							
	136	100	**236**	0	0	0	**0**
	102	10.6	**112.6**	0	3.0	0.4	**3.4**
	0	113	**113**	0	0	0	**0**
	22	38	**60**	0	0	0	**0**
	67	12	**79**	0	0	0	**0**
	64	14	**78**	8.2	0	0	**8.2**
	245	0	**245**	0	0	0	**0**
	57	0	**57**	0	0	0	**0**
	45	0	**45**	0	0	0	**0**
Little Clifty Branch Maternity Colony							
	37	105	**142**	0	0	0	**0**
	152	0	**152**	0	0	0	**0**
Indian Creek Maternity Colony							
	28	2	**30**	0	0	0	**0**
	58	0	**58**	0	0	0	**0**

Table 8. Section 4 Mitigation Site Anticipated Acres Summary

Mitigation Site	Forest Preservation (acres)	Reforestation (acres)	Total Forest Mitigation (acres)	Emergent Wetlands (acres)	Forested Wetlands (acres)	Scrub-Shrub Wetlands (acres)	Wetland Mitigation (acres)
	40	0	**40**	0	0	0	**0**
	127	32	**159**	0	0	0	**0**
	63	70	**133**	0	0	0	**0**
	72	8	**80**	0	0	0	**0**
	22	0	**22**	0	0	0	**0**
	57	106	**163**	0	0	0	**0**
Cave Winter Focus Area							
	73	0	**73**	0	0	0	**0**
	33	37	**70**	0	0	0	**0**
Garrison Chapel Valley Area							
	134	0	**134**	0	0	0	**0**
	12	0	**12**	0	0	0	**0**
	289	0	**289**	0	0	0	**0**
	17	0	**17**	0	0	0	**0**
	51	13	**64**	0	0	0	**0**
	21	66.5	**87.5**	0.5	0	0	**0.5**
Veale Creek Maternity Colony (Section 2)							
/	32.5	87.55	**120.05**	4.21	7.36	1.63	**13.2**
Totals	*2,492.5*	*1,258.65*	***3,751.15***	*12.91*	*13.36*	*2.03*	***28.3***

* Additional credit in the form of acreage will be given for the property for a total of 440 credit acres for the property and a total of 3,902.15 acres of forest mitigation credit.

Before any construction of Section 4 in I-69 commences within the maternity colony areas, the FHWA, in consultation with the Service will develop detailed, site-specific, final mitigation plans. The mitigation plans will include design plans with 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 4 final mitigation plans will address and/or establish the following: 1) quantifiable criteria and methods for assessing success of all mitigation plantings and functionality of constructed wetlands and streams, 2) approved lists of tree/plant species to be planted (and their relative abundance/%), 3) approved lists of herbicides for weed control, 4) proposed construction schedules, 5) annual post-construction monitoring schedules, and 6) a long-term, ongoing management/stewardship strategy. FHWA will begin construction and/or reforestation within the Section 4 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 4. This will be applicable to all mitigation properties. Once initiated, all Service-approved construction and tree plantings within the Section 4 Mitigation Areas must be completed within 3 calendar years.

Winter Habitat Preservation/Protection

Several opportunities are being pursued to purchase known Indiana bat hibernacula for permanent protection. The owner of two Priority 1A hibernacula has recently signed a permanent conservation easement on 289 acres which includes and Caves and the surrounding habitat. This habitat is especially important during the fall swarming and spring staging periods for the Indiana bat. Over 37,000 Indiana bats hibernated in these two caves in 2009. Permanent protection and management of these two caves will significantly reduce the estimated take associated with unauthorized disturbance and vandalism at Cave. The 2006 Tier 1 RPBO estimated the take of over 180 bats at Cave through the year 2030 due to increased human disturbance; this will now be eliminated. A conservation easement on at least one other small Indiana bat hibernacula is also expected to be purchased in the near future. Gating, fencing, or other techniques to protect known hibernacula will be pursued where warranted. Any gating erected as mitigation will be closely monitored. Management and protection of these important hibernacula will be critical for the protection, survival, and recovery of the species.

Wetland Mitigation

Mitigation plans to offset unavoidable wetland impacts will comply with INDOT's MOU (1991) as noted during Tier 1. The overall I-69 project proposes wetland replacement at a ratio of 3:1 or 4:1 depending on quality for forested wetland impacts. A ratio of 2:1 or 3:1 for Scrub/Shrub wetland impacts and emergent wetland impacts will be replaced, depending upon their quality. Impacts to open water are proposed to be mitigated at a ratio of 1:1 and may be mitigated using borrow pits.

Native Vegetation Planting

Proposed areas for native vegetation planting may include crossings of Black Ankle Creek, Indian Creek Crossings, Clear Creek crossing, and May Creek crossing. Other areas that may be considered include the interchange locations.

Wildlife Crossings

The Section 4 Tier 2 DEIS discusses wildlife crossings on page 5-409. Mitigation measures include potential wildlife crossings in the areas of Doans Creek, Dowden Branch, Bogard Creek, Flyblow Branch, Black Ankle Creek, Plummer Creek, Clifty Branch, Mitchell Creek, Indian Creek, Clear Creek, Happy Creek (Clear Creek Tributary), and May Creek (Clear Creek Tributary). Additional potential wildlife crossings may be provided at overpass locations over Carter Road, Breeden Road, Rockport Road, Lodge Road, Tramway Road and Bolin Lane.

Indiana bat monitoring

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 construction beginning, during construction, and at least five summers post-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.

Education and Outreach

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.

All conservation measures presented in the Tier 1 RPBO dated August 24, 2006 (pgs. 16-23) will be carried out as written or as updated in consultation with the Service. The 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 4. This annual report will be provided throughout the 5-year post-construction monitoring period. The annual report for Section 4 will be included with other sections of I-69 as allowed under the 2006 Tier 1 RPBO, Terms and Conditions Number 2 (pp. 103).

In summary, construction of Section 4 of I-69 will cause direct loss of 1,096 acres [1,087 acres of forest and 9 acres non-forested wetlands] of suitable Indiana bat summer habitat (*i.e.*, roosting and foraging habitat and forested travel corridors); additional habitat loss from indirect development is expected to be minor. Up to an additional 20 acres of forest may be lost due to utility relocations. Although short-term reductions in habitat quality may occur, overall long-term habitat restoration and protection efforts 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 recently updated ITS (part of the 2011 amendment to the Tier 1 RBPO): No more than 47 Indiana bats from the four maternity colonies in Section 4 (Doans Creek – 5; Plummer Creek – 8; Little Clifty Branch – 14; Indian Creek – 20) will be taken during the summer maternity season as a result of all project-related *habitat modifications* (direct and indirect) through 2030 (see Table B1 in 2011 Tier 1 RPBO amendment) and no more than 8 bats per colony (or approximately 1 bat every 2 years) are anticipated to be taken as a result of

roadkill from 2013 to 2030. Approximately 33 male Indiana bats are expected to be taken during that same time period (primarily as a result of roadkill). During the winter, fall and spring we estimate 883 Indiana bats (out of an estimated 100,000) could be taken as a result of direct and indirect impacts in the WAA through the year 2030. Most of these impacts are related to roadkill of Indiana bats during the fall swarming period (244 bats) and based on a potential for increased vandalism once the interstate is completed (599 bats). Therefore, we anticipate the Action Area for Section 4 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 2010 Tier 2 BA for Section 4 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. Limestone quarrying was not originally discussed in the Tier 1 consultation and is addressed below. Overall, as a result of the expansion of the WAA and an increase in the local hibernating bat population, the currently anticipated levels of adverse cumulative effects have slightly increased since the Tier 1 evaluation (most impacts were based on a percentage of the known Indiana bat population in the area at that time). Some impacts attributed to human disturbance at Cave will now be eliminated based on INDOT's purchase of a permanent conservation easement for the property. 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 the incidental take analyses on pages 94-97 and Appendices A of the Tier 1 RPBO and Appendix A of the Tier 1 RPBO amendment remain valid and are hereby incorporated by reference.

Reasonably foreseeable non-federal activities that are anticipated to occur include planned development for residential subdivisions and timber harvest (and other land conversion trends). Other impacts considered include limestone quarrying and legal drain maintenance. The Section 4 Tier 2 DEIS discussed limestone quarrying on page 5-654:

> The only other potential major action identified as being independent of the I-69 Section 4 project is limestone quarrying, which has been a prominent industry in the Section 4 project area since the early 19th century. There are several active limestone quarries in the project area, albeit outside the Section 4 corridor. There has been relatively little change in quarry land use in Greene or Monroe counties over the past 50 years. The current trend is for limestone companies to reopen former mines rather than starting work at a new site. Approximately 250 acres of agricultural and forested land within the corridor around Tramway Road are zoned for mineral extraction. The mines have indicated that they would consider these 250 acres a part of their long range (100-year) plan; however, they have no formal published mine plan to verify this. Indiana requires no mining permit, plan or mitigation for limestone operations.

Based on conversations with the limestone quarries, the conversion of the 250 acres of mineral extraction zoned land to limestone quarry in the foreseeable future is not likely.

No-build growth/Residential development

According to the Tier 2 BA for Section 4, GIS analysis was conducted to determine the approximate amount of no-build growth that is projected to occur in the action areas. This analysis made a conservative estimate of impacts. The percentage of the TAZ within the Action Area was calculated and the no-build growth by land-use type within the Action Area was determined on a percentage basis. The total acreage of no-build was then multiplied by 40% to calculate the amount of forest that would be impacted by the no-build growth.[3] (The 40% was also applied to the 120 acres of no-build growth in Lawrence, Martin, and Owen Counties that fall within the expanded Winter Action Area since these areas have similar land use to areas analyzed in Greene and Monroe counties.) These calculations showed that approximately 154 acres of no-build growth would occur in forested areas in the Expanded Remaining SAA. This is approximately 0.4% of the available forest in the Expanded Remaining SAA. The calculations showed that approximately 39 acres of no-build growth would occur in forested areas within the maternity colonies. Approximately 3 acres of no-build growth would occur in forested areas in Doans Creek Maternity Colony (<0.01% of available forest), 3 acres in Plummer Creek Maternity Colony (<0.01% of available forest), 16 acres in Little Clifty Branch Maternity Colony (0.2% of available forest), and 17 acres in Indian Creek Maternity Colony (0.2% of available forest). This would equate to approximately 0.1% of the available forest within the maternity colony areas. The calculations showed that approximately 920 acres of no-build growth would occur in forested areas in the Expanded WAA. This equates to approximately 0.6% of the available forest within the Expanded WAA. Calculations showed that within the Cave WUA there would be an approximate 42 acres of no-build growth that would occur in forested areas. This equates to approximately 0.1% of the available forest in the Cave WUA. Please refer to the Indirect Impacts section (page 121) and Appendix E of the Tier 2 BA for more information on land-use and development factors in the Section 4 Action Area.

Consultants for INDOT conducted a recent field review of development occurring within the Cave WUA and Indian Creek Maternity Colony area, as well as within various subdivisions in Monroe County, and showed that a limited amount of development is occurring at this time (this was completed by BLA in August 2010). This development is accounted for in the indirect and cumulative impacts analysis. In the Cave WUA and Indian Creek Maternity Colony area approximately 35-45 acres of tree clearing for residential development is anticipated; approximately 10-15 acres have been cleared since the Tier 1 BA Addendum and 25-30 acres may be cleared in the near future. The Deer Creek Phase II Subdivision accounts for a majority of this tree clearing. It is estimated that approximately 15-20 acres of forest may be cleared to build out this subdivision. The review of Monroe County subdivisions identified approximately 85-120 acres of anticipated tree clearing, 20-35 acres which has occurred since the Tier 1 BA Addendum and 65-85 that may occur in the near future. These areas consist of the following subdivisions: Cedar Chase Phase III (12 acres of total potential tree clearing), Foggy Morning Glen (15-30 acres), McHaffey Woods (15-20 acres), and Far View Hills Subdivision (15-20 acres), and Iron Gate Farms (30-35 acres). Photographs taken during the field review as well as descriptions of the photos can be found in Appendix E of the Tier 2 BA for Section 4.

[3] See DEIS Appendix CC for documentation of this 40% factor.

Other Land Conversion Trends

We typically cannot accurately quantify how much forest land on private lands will be converted to other habitat types, the extent of future timber harvests on private lands, nor the amount of privately owned habitat that will be developed for other purposes. However, we can look at the trends state-wide and extrapolate assumptions as to how the private lands within the Action Areas will likely be managed in the foreseeable future.

The following Indiana forest trends were highlighted within the North Central Research Station's 2005 report, "Indiana Forests: 1999-2003, Part A". Trends that we believe may be of a net benefit to Indiana bats have been *italicized* below:

- *There are no major tree die-offs anywhere in the state; natural tree mortality appears evenly across the state.*
- *The ratio of harvested tree volume to tree volume growth indicates sustainable management*.
- *Diverse and abundant forest habitat (snags, coarse woody debris, forest cover and edges) support healthy wildlife populations across the state.*
- *Indiana possesses a diversity of standing dead tree wildlife habitat with an abundance of recently acquired snags to replenish fully decayed snags as Indiana's forests mature***.**
- Indiana's oak species continue to grow slower than other hardwood species.
- The average private forest landholding dropped from 22-acres in 1993 to 16-acres in 2003, indicating a continued "parcelization" of Indiana forests.
- Introduced or invasive plant species inhabit a majority of inventories plots.
- The amount of forest edge doubled from 1992 to 2001, indicating smaller forest plots.
- Due to land use history and natural factors, the forest soils of southern Indiana are generally below-average in quality.
- Although Indiana's overall forested land mass is increasing, the rate of increase has slowed over the past decade.
- *Indiana's forests continue to mature in terms of the number and size of trees within forest stands.*
- Increases in total volumes of oak species are less than those for most other hardwood species.
- The advanced ages and inadequate regeneration of Indiana's oak forests may signal a successional shift from an oak/hickory-dominated landscape to one where other hardwood species, such as maples, occupy more forested areas.
- Indiana's hardwood saw-timber resource continues to be at risk due to maturing of hardwood stands, loss of timberland to development and new pests (gypsy moth, emerald ash-borer, sudden oak death, beech-bark disease, and more).
- Ownerships of Indiana forests have changed in the past decade, resulting in more parcelization and fragmentation.

While the data shows there has been loss of continuous forest, resulting in smaller, fragmented stands, there is also an overall increase in quantity and quality/maturation of forested land across the state.

According to the Tier 2 Section 4 BA, based on direct observation and corroborated by Division of Forestry staff, timber harvesting is a regular activity in Action Area. In Section 4, a majority of the forest is large, continuous tracts. Observations within the Action Area throughout many

years indicate that cutting is for the most part selective harvest, and that clear cutting is limited and sporadic. Some who own property within and outside the right-of-way may harvest timber on a portion of their property. The likelihood and amount of occurrence of such activity is unknown at this time; however, there is evidence that some local landowners are moving ahead with timber harvests prior to selling their properties to INDOT for right-of-way. In one instance, two landowners selectively cut approximately 110 acres in and around the proposed right-of-way near the planned SR 45 interchange in Section 4. Although forest harvested within the right-of-way is already included in the forest impacts, lack of timing restrictions for private harvest could have impacts to Indiana bats. In an effort to eliminate this issue, INDOT and FHWA have made information available to all local timber consultants and landowners indicating the restrictions INDOT is required to follow to avoid take of endangered species and encouraging landowners and timber companies to coordinate with the USFWS' Bloomington, Indiana Field Office (BFO). Furthermore, the USFWS BFO has recently provided information to landowners in the Section 4 project area informing them of the presence of the Indiana bat within the Action Area and their responsibilities under the Endangered Species Act (see Appendix C for copies of information disseminated by the INDOT, FHWA, and USFWS to local timber consultants and landowners).

Legal Drains

For the evaluation in 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. Personal communication between BLA and the Monroe County Surveyor verified there are no legal drains within the county. Personal communication between BLA and the Greene County Surveyor indicated there are no legal drains that are maintained within the Section 4 SAA, WAA, or Indiana bat maternity colonies. An email from the Monroe County Surveyor as well as a letter signed by the Greene County Surveyor is found in Appendix C of the Section 4 Tier 2 BA.

We anticipate a slight decline in bat habitat in some portions of the Action Area in the future, although we are not aware of specific development plans (beyond those already discussed) in known Indiana bat habitat in Section 4 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 4 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:

- The scope, impacts and effects associated with the project in Section 4 are consistent with those evaluated in the Tier 1 RPBO and recent 2011 amendment to the Tier 1 RPBO.
- 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 during the summer maternity season as a result of roadkill (no more than 1 bat every 2 years per colony and no more than 21 males over a 17 year period).
- An increase in the number of swarming habitat acres affected (16.2 acres of tree cover out of 32,607 acres) surrounding Cave will not reduce the value of the habitat and this area will continue to support the survival and fitness of Indiana bats as they prepare for hibernation in the fall and when they emerge from hibernation and prepare to migrate in the spring. Any impacts from this loss are considered immeasurable, and thus, will not reduce the likelihood of conserving the Indiana bat in the Midwest RU.
- Based on an abundance of surrounding forested habitat, we do not anticipate that any of the four maternity colonies will be permanently displaced by direct or indirect effects associated with the construction, operation, and maintenance of Section 4 of the I-69 project.
- The currently proposed 3,600 acres of forest and wetland mitigation in Section 4 has been strategically located to improve upon the existing high-quality habitat within and near the various maternity colony areas and hibernacula; therefore, 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 2,150 acres of existing forest habitat will be protected and over 1,000 acres of forest and wetland habitat will be developed and/or enhanced based on the initial alternative, the maternity colonies within Section 4 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.
- In the event a 60% population decline over a period of several years does occur within the Midwest RU due to WNS, we believe the small amount of estimated project-related take over the next 17 years is not measurable and therefore will not result in any appreciable reduction in the survival or recovery potential for the species within the Midwest RU. Furthermore, we believe that the amount of estimated take would be

proportionally reduced in a WNS-affected population (*i.e.* take could be reduced by up to 60% over a 17-year period) since the number of bats exposed to the various stressors would also decrease. In a reduced population, the anticipate habitat impacts would most likely not cause the level of effects previously identified.

- We do not anticipate any long-term, significant impacts to the local population of Indiana bats, the proposed Midwest Recovery Unit population, nor the species within its entire range due to the proposed project.
- A permanent conservation easement has recently been placed on the third and fourth largest hibernacula in the state (and Caves); protection of these hibernacula will be very important for the long term protection and recovery of the species. Specifically, permanent protection at Cave will eliminate the estimated take due to vandalism and human disturbance. Furthermore, permanent protection of both caves and their surrounding forests will provide long-lasting protection for essential fall swarming habitat for the 37,000 Indiana bats that use these caves and eliminate future possibilities for this property to be developed.

Based on 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 4 (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 4 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 4,
- Harass/wound/kill/harm from disturbance and habitat loss associated w/demolition and subsequent relocation of homes and businesses in Section 4,
- Harass/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,
- 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 of I-69 related incidental take for all four maternity colonies combined from all sources within the Action Area to be no more than 79 individuals (32 from roadkill and an additional 47 adult females/juveniles habitat loss/modification and/or disturbance) during the first 17 years of operation (approximately 2013-2030). (Some small, unknown number of bats in Section 4 may be taken as a result of demolition and relocation activities). Additionally, no more than 33 male bats are anticipated to be taken during the summer months, primarily as a result of roadkill. On an annual basis, this equates to approximately 7 bats (male and female) being taken per year. No significant, long-term adverse effects are anticipated to accrue to any of the maternity colonies, nor to any local populations of adult males.

During the fall, winter, and spring, the Service anticipates up to 883 bats may be taken primarily as a result of roadkill during the fall swarming and spring staging period (n=244) and also as a result of increased vandalism and disturbance at vulnerable (*i.e.* unprotected) hibernacula (n=599). None of these impacts are anticipated to occur until the highway is fully constructed and operational. These estimates are assumed to be a worst-case scenario and may actually be significantly less than predicted.

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 1,087 forested acres (and potentially another 20 acres of forest as a result of utility relocations) in Section 4 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 1,107 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 4 are lower than what previously had been considered in the Tier 1 RPBO. The Tier 1 incidental take estimate of 1,132 acres of forest habitat had been anticipated based upon a worst-case-scenario representative alignment. In Tier 2, the Preferred Alternative Alignment is anticipated to impact 1,107 forested acres (this includes 20 acres of potential utility impacts not previously included); this is a 2% reduction from the Tier 1 estimates. This amount is still well below the anticipated project-wide total of 2,148 acres of direct forest loss (Table 1). This anticipated level brings the cumulative total of Tier 2 estimated forest habitat loss for the entire I-69 Evansville to Indianapolis project to 1,440.4 acres (27.4 acres in Section 1, 69 acres in Section 3, 237 acres in Section 2, and 1,107 acres in Section 4). For a running summary of habitat impacts per Section, see Appendix D of the Tier 2 Section 4 BA.

Section	Loss of Forest Anticipated in Tier 1 RPBO/BA Addendum for Section 4	Loss of Forest Anticipated in Tier 2 BA & Tier 2 BO for Section 4
4	1,132 acres	1, 087 acres (plus potentially an add'l 20 acres for utility relocations)

Table 1. Estimated direct loss of Tier 2 Forest within the I-69 Section 4 Action Area.

Additionally, we anticipate that the Proposed Action will result in the loss of 5.8 acres of non-forested wetlands (palustrine emergent and scrub-shrub) in Section 4 of I-69 (Table 2). 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 17.3 acres. This impact level is still 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 4	Loss of Non-forested Wetlands in Tier 2 BA & Tier 2 BO for Section 4
2	1 acres	5.8 acres*

*Does not include open water ponds

Table 2. Estimated direct loss of non-forested wetlands within the I-69 Section 4 Action Area

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 (and subsequently updated in the May 25, 2011 amendment) the Service believes the following Tier 2 RPMs are necessary, appropriate, and reasonable for further minimizing incidental take of Indiana bats in Section 4 of I-69:

1. In the Section 4 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. The FHWA, in consultation with the Service, must develop detailed, site-specific final mitigation plans for each secured mitigation site within six (6) months of securing the site or within six (6) months of the issuance of this BO, whichever is later. All mitigation sites must be identified and secured within 3 years of the issuance of this biological opinion, including the development of final mitigation plans. 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 4 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 <u>begin</u> construction and/or reforestation within the Section 4 Mitigation Areas either <u>before</u> (the most preferable option) <u>or during the first summer reproductive season</u> (1 April – 30 September) <u>immediately after any I-69 related tree clearing or construction begins</u> in Section 4 anywhere within each 2.5-mile radius maternity area (see Figure 7). Once initiated, all Service-approved construction and tree plantings within the Section 4 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 4. This annual report will be completed throughout the 5-year post-construction monitoring period. The annual report for Section 4 may be a stand-alone document or included as part of the annual report required under the Tier 1 Term and Condition Number 2 (amended May 25, 2011).

In conclusion, the Service believes that no more than 379 individuals will be incidentally taken between the years 2013 and 2030 as the result of roadkill. Direct habitat loss and/or modification will be limited to approximately 1,107 acres of forest habitat and 5.8 acres of non-forested wetland habitat (excluding open-water ponds) within the Section 4 Expanded Action Area. 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 4 Expanded Action Area's forested acreage. 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 and April 1 through November 15 in the WAA), 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 4 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.

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

#	Tier 1 Conservation Measures	Status (as of 06/2011)
	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	Removed
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.

November 10, 2010 meeting regarding the Section 4, Tier 2 Biological Assessment

MEETING MINUTES

I-69 Section 4 BA Meeting

United States Fish and Wildlife Service – Bloomington Field Office (BFO)
Wednesday, November 10, 2010 at 9:00 a.m. to 12:00 p.m. EDT

Attendees	Organization
Scott Pruitt	United States Fish and Wildlife Service (USFWS)
Robin McWilliams	USFWS
Michelle Allen	Federal Highway Administration (FHWA)
Janelle Lemon	INDOT
Jason DuPont	Bernardin, Lochmueller & Associates (BLA/PMC)
Jeremy Kieffner	BLA
Tom Cervone	BLA

Representatives from INDOT, FHWA, USFWS and BLA met on November 10, 2010 at the USFWS (Bloomington Field Office). The purpose of the meeting was to discuss the Biological Assessment for Section 4; provide an update on Mitigation Offers; discuss Conservation Easement language; review Monetary Commitments; and discuss other topics, as appropriate. The following summarizes the meeting.

Biological Assessment

FHWA submitted a Tier 2 Section 4 Biological Assessment (BA) to USFWS on November 1, 2010. That BA included the Southern Connector as the preferred SR 45 connector. In the Tier 1 Revised Biological Opinion (RBO) in 2006, the northern connector was included as the preferred SR 45 connector. The Southern Connector in the Section 4 BA would require 11.8 acres of direct forest loss. No other exceedances from the Tier 1 RBO in 2006 are known, but the 2010 BA does include an analysis of the Little Clifty Branch Maternity Colony and Cave WAA.

A preliminary review of the Section 4 BA by USFWS showed their general thoughts and asked for more specific clarification on the County Line Interchange. They also identified the following language missing in the BA on page 53 that they would like included, "…also concerned with increased accessibility to the Cave area and increased traffic due to the County Line interchange" and on page 55, they requested the removal of the word "relative" on the top of the page. On page 133, they note the number 42 had been 104 and would like an explanation.

INDOT and FHWA will make such changes to the document and forward to USFWS for review.

Mitigation Offers

Two properties have been bought to date as credited in Section 4. In addition, 8 offers are presently pending, and 2 additional offers will be coming out this week. Three appraisals are being completed now.

For the property with and caves, USFWS offered considerations related to bat conservation. INDOT and FHWA will respond to this property owner with a reasonable counter offer. USFWS considers the property valuable from a conservation viewpoint and would be willing to provide additional credit for this property at a reasonable level above the actual acreage based on the bat conservation value.

INDOT, FHWA and USFWS discussed food plots, existing wetlands and other non-forested habitats on mitigation properties related to preservation credits. It was decided that preservation credits would be approved on a case-by-case basis depending on the mix of such habitats and their bat habitat value. Final approval would require a concept map showing such a mix of habitats.

Conservation Easement Contract

Much effort has been invested in finding and working to purchase properties by many people and agencies that have Indiana bat core habitat, i.e., summer and winter habitat. For winter habitat, caves are most important and a commitment to purchase and to install gates is reported in the Tier 1 RBO. These commitments will be completed in consultation between USFWS, INDOT and FHWA.

The meeting identified Cave and Cave as the two caves that warrant further evaluation for potential cave gates. For the existing gate could be removed and replaced with a less air restrictive type, while for Cave, the existing rock(s) could be moved and the opening be gated. The size and shape of such a gate for cave is unknown at this time.

In addition for properties with caves, it was suggested that we ought to have a meeting with an IKC representative(s) to discuss the Conservation Easement language, and concurrently, discuss cave gates and access issues.

A discussion of the Conservation Easement language showed the following:

- Existing trails and existing small areas that are maintained today around structures and open water areas may be maintained as they are today (e.g., mowing, grading and removal of downed timber lying on the trails is allowed)
- Non-intrusive activities as camping and wildlife observations are allowed
- ATV's and horses are allowed at low-volume levels on existing trails for access to the property for inspections, hunting, and ecological management.
- Use of herbicides will be allowed to control State listed exotic and/or invasive plants following expressed application specifications
- Cutting or collection of firewood other than the removal of downed timber on existing trails is not allowed

Monetary Commitments

Six monetary commitments are listed below:

- Indiana bat Educational Pamphlet or Poster ($25,000)
- Autumn/Spring Habitat Research ($125,000)
- Biennial Census ($50,000)
- Bald Eagle Educational Pamphlet ($25,000)
- Fanshell Mussel Educational Pamphlet ($25,000)
- Fanshell Mussel Captive Rearing Research ($20,000)

USFWS will continue to work with INDOT and FHWA to complete all efforts to transfer such money from INDOT to USFWS. Such activities are not required to be completed by issuing of a Biological Opinion for Section 4.

Other Topics

The remaining topic for discussion was bat friendly bridges as a commitment from the Tier 1 BA. Such bridges have not been recommended in Sections 1, 2 and 3 on the grounds of specific conflicts in attracting endangered species to interstate bridges with high volume traffic. Such a commitment is presently being evaluated by USFWS for its use or not in the project.

APPENDIX C.

Information disseminated by FHWA, INDOT, and USFWS pertaining to private logging within the Section 4 Action Area

March 22, 2011

Important Message to All Timber Buyers and Agents Concerning the I-69 Project

Dear Sir or Madam,

The Indiana Department of Transportation (INDOT) has received numerous reports from landowners and others regarding the sale of timber in the construction path of I-69. Some landowners report that they have been contacted by timber buyers and agents verbally claiming to "work with INDOT" or to be under contract with INDOT, stating that the property will be needed for the I-69 project, and offering to harvest timber on the property. These individuals are also reported to have made a number of statements concerning INDOT's land acquisition policies and procedures that are completely false and misleading. INDOT demands that timber buyers and their agents immediately cease and desist from such conduct.

All licensed timber buyers and agents should be aware that INDOT is not "working with" or under contract with any timber buyer to clear land not yet owned by INDOT. Further, INDOT does not sanction or endorse any individual or company engaged in the timber buying business. Subsurface investigation is being conducted in some areas and limited tree removal may occur in conjunction with these investigations. In those instances INDOT's contractor is working directly with the affected property owners.

You should also know that final design of the corridor is not yet complete in some areas. For such areas, it is virtually impossible for any private logging or timber company to identify what land will need to be cleared for construction of I-69, and it is fraudulent for any timber buyer or agent to make statements to prospective clients claiming that INDOT will buy such property.

INDOT has also received reports that written material containing false and misleading information is being distributed to land owners along the I-69 corridor. For example, the material falsely states that INDOT does not consider the value of crops when purchasing property. The material also falsely implies that an owner must harvest crops before selling to the State in order to receive compensation for crops. Further, the material implies that top soil must also be removed from property before sale. In reality, INDOT's appraisal of the property includes the contributing value of the top soil. If the top soil has been removed from the property, then the appraisal and INDOT offer would reflect this removal and any loss in value of the property.

Under I.C. § 25-36.5-1-4, it is a violation of Indiana law for any timber buyer or agent to "commit any fraudulent act in connection with the purchase or cutting of timber." Consequences of such violations can include revocation of timber buying registration, civil penalties and forfeiture of bond or security. INDOT urges all licensed timber buyers and agents to use caution in marketing their services and warns against claiming or implying any sort of relationship or endorsement by the State. Marketing materials must also be completely accurate. INDOT will promptly refer any suspected instance of violation of I.C. 25-36.5-1 or 312 I.A.C. 14 to the Department of Natural Resources Forestry Division and, if applicable, to the Office of the Attorney General for investigation and prosecution.

Further, INDOT is complying with the requirements of the Endangered Species Act (16 U.S.C. §1531 et seq.) and other state and federal laws in undertaking the I-69 project. In accordance with the Revised Tier 1 Biological Opinion, and the Tier 2 Biological Opinions for Sections 1, 2, 3 of the I-69 Project, and by agreement with the United States Fish and Wildlife Service ("USFWS"), INDOT is cutting or harvesting trees in conformity with the following restrictions:

- For Sections 1, 2 and 3 of the I-69 project, no cutting or harvesting between April 1 and September 30 of each calendar year.

- For Section 4 of the I-69 Project, no cutting or harvesting between April 1 and November 15 of each calendar year.

These cutting restrictions are designed to avoid possible harm to the endangered Indiana Bat. INDOT reminds all timber buyers and agents that they, like all citizens, must comply with the Endangered Species Act and all other applicable state and federal laws. Timber buyers and agents are cautioned that INDOT personnel will not hesitate to report any suspected violations of the Endangered Species Act or any other law to the appropriate state and/or federal authorities.

For additional information about the I-69 Project please refer to the I-69 Project website at http://www.i69indyevn.org/. For additional up-to-date information about INDOT's land acquisition policies and procedures, please refer to the INDOT Office of Real Estate website at http://www.in.gov/indot/3018.htm. Timber buyers and agents should contact the USFWS Bloomington Ecological Services Field Office at 812-334-4261 with any questions or concerns about compliance with the Endangered Species Act or about the Indiana Bat.

Sincerely,

Cc: Duane McCoy, Timber Buyer Licensing Forester, IDNR Division of Forestry

INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

I-69 Project Office
P.O. Box 759
Washington, IN 47501

PHONE: (812) 254-2831
FAX: (812) 254-9911

Mitchell E. Daniels, Jr., Governor
Michael B. Cline, Commissioner

April 11, 2011

Important Message to All Property Owners Concerning the I-69 Project

Dear Sir or Madam,

INDOT has recently received reports of landowners being contacted by logging companies or timber buyers and agents claiming to "work with INDOT" or to be under contract with INDOT. Some of these logging companies or timber buyers have told landowners that their property will be needed for the I-69 project, have made other false and misleading statements concerning INDOT's land acquisition policies and procedures, and have offered to harvest timber on their property.

All landowners should be aware that:

- INDOT is not "working with" or under contract with any timber buyer to clear land not yet owned by INDOT.
- INDOT does not sanction or endorse any individual or company engaged in the timber buying business.
- The final design of I-69 is not yet complete in some areas. For such areas, it is virtually impossible for any private logging or timber company to have such information about which land will be cleared, and it is fraudulent for any timber buyer or agent to make statements to prospective clients claiming that INDOT will buy such property.
- Written material containing false and misleading information is being distributed to land owners along the I-69 corridor. For example, the material falsely states that INDOT does not consider the value of crops when purchasing property. The material also falsely implies that an owner must harvest and remove crops from his property before selling to the State in order to receive compensation for crops. Further, the material implies that top soil must also be removed from property before sale. In reality, INDOT's appraisal of the property includes the contributing value of the top soil. If the top soil has been removed from the property, then the appraisal and INDOT offer would reflect this removal and any loss in value of the property.
- Indiana Code Section 25-36.5-1 and 312 I.A.C. 14 governs the conduct of all timber buyers and the rights of timber growers and landowners. Timber buyers and agents must be licensed under Indiana law, and must pay owners for timber harvested. Landowners may verify that a timber buyer or logging company is properly licensed by searching the Indiana Online Licensing website at https://mylicense.in.gov/EVerification/Search.aspx.

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- INDOT is complying with the requirements of the Endangered Species Act (16 U.S.C. §1531 et seq.) and other state and federal laws in undertaking the I-69 project. In accordance with the Revised Tier 1 Biological Opinion, and the Tier 2 Biological Opinions for Sections 1, 2, 3 of the I-69 Project, and by agreement with the United States Fish and Wildlife Service ("USFWS"), INDOT is cutting or harvesting trees in conformity with the following restrictions:

    - For Sections 1, 2 and 3 of the I-69 project, no cutting or harvesting between April 1 and September 30 of each calendar year.

    - For Section 4 of the I-69 Project, no cutting or harvesting between April 1 and November 15 of each calendar year.

  These cutting restrictions are designed to avoid possible harm to the endangered Indiana bat. Landowners should be aware that any person or entity offering to harvest trees within these restricted time frames is not working for or on behalf of INDOT.

- INDOT encourages all landowners and loggers to act in accordance with the cutting restriction to avoid harm to the Indiana bat, and to contact USFWS with any questions or concerns about compliance with the Endangered Species Act or about the Indiana bat.

INDOT urges landowners to use caution in screening information from timber buyers, and to contact INDOT or the Indiana Department of Natural Resources (IDNR) Forestry Division if a timber buyer or agent claims or implies any sort of relationship or endorsement by the State, or disseminates information that may be fraudulent. INDOT will promptly refer any suspected instance of violation of state or federal law to the IDNR Forestry Division and, if applicable, to the Office of the Attorney General for investigation and prosecution.

For additional information about the licensed timber buying program and other forestry issues, please refer to the IDNR Forestry Division website at http://www.in.gov/dnr/forestry/2846.htm.

For additional information about the I-69 Project, including accurate and up-to-date information about tree clearing within the I-69 corridor, please visit the I-69 Project website at http://www.i69indyevn.org/. For additional up-to-date information about INDOT's land acquisition policies and procedures, please refer to the INDOT Office of Real Estate website at http://www.in.gov/indot/3018.htm.

Sincerely,

Samuel Sarvis
Deputy Commissioner of Major Program Management
Indiana Department of Transportation

United States Department of the Interior
Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax (812) 334-4273

June 14, 2011

Dear Landowner:

As part of the new I-69 highway planning process, the Indiana Department of Transportation (INDOT) and Federal Highway Administration (FHWA) were required to do extensive surveys for threatened and endangered species, including the Indiana bat (*Myotis sodalis*), throughout the I-69 project corridor. As a result of these surveys, important summering and wintering areas for the Indiana bat were delineated. Based on this information, we have determined that most of the properties occurring within the preferred project right-of-way in Section 4 are within known Indiana bat maternity colony areas (where young are born and raised during the summer) as well as fall swarming habitat (forested areas near hibernacula where bats roost, mate, and forage prior to hibernation). Indiana bats roost in trees and due to the potential for direct mortality if an occupied roost tree is felled during the summer and fall months, we recommend that you evaluate your exposure to the prohibitions of the Endangered Species Act (ESA) prior to any tree-clearing activities on your parcel.

The ESA makes it unlawful for a person to take a listed animal without a permit. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct". Options to address potential exposure to the ESA include the following:

1. To avoid direct take of Indiana bats, cut and harvest trees outside of the summer maternity and fall swarming periods. This extends from April 1 through November 15 of each calendar year. These are the same tree-clearing restriction dates that the INDOT and FHWA have already committed to for the project in this area of the state.

2. Obtain an incidental take permit from the FWS, either through a federal agency pursuant to Section 7 of the ESA (*e.g.* FHWA), or through development of a Habitat Conservation Plan, pursuant to Section 10 of the ESA.

If you have any questions or need further assistance, please contact Robin McWilliams Munson of my staff (ext. 207).

Sincerely,

Scott Pruitt
Field Supervisor