

**Amendment 2 to the Tier 1 Revised Programmatic Biological Opinion (dated August 24, 2006, previously amended May 25, 2011) for the I-69, Evansville to Indianapolis, Indiana highway.**

**July 24, 2013**

This document has been prepared for the I-69 Evansville to Indianapolis Project. The Federal Highway Administration (FHWA) has used a tiered environmental review process for this project. The U.S. Fish and Wildlife Service (USFWS) issued a Tier 1 Biological Opinion (BO) in December of 2003, and shortly afterward FHWA issued the Tier 1 Final Environmental Impact Statement (FEIS). FHWA issued a Tier 1 Record of Decision (ROD) on March 24, 2004, and then initiated Tier 2 EISs for each of the six sections of the approved corridor (known as I-69 Sections 1 through 6).

The USFWS issued a revised Tier 1 BO in August of 2006 for the entire corridor. The revised Tier 1 BO requires a separate BO for each of the six sections of the project. Tier 2 BOs have been issued for Section 1 (August 29, 2007), Section 2 (February 17, 2010), Section 3 (October 21, 2009), and Section 4 (July 6, 2011). INDOT submitted a Tier 2 Biological Assessment (BA) on December 19, 2012 for Section 5 of the Project. Consultation on the entire corridor was reinitiated in 2011 in order to update baseline information (including new maternity colony data and White Nose Syndrome information), as well as, the impact analysis for Ray's Cave, which is designated Critical Habitat for the Indiana bat. Consultation on the entire corridor has once again been reinitiated for the reasons discussed below. The USFWS has prepared this new Amendment (to be referred to as Amendment 2) to the August 2006 Revised Programmatic Tier 1 BO (RPBO).

**New Information/Need for Reinitiation**

*New Indiana bat maternity colonies discovered*

As stated in the Section 5 Tier 2 BA, Indiana bat presence surveys done in 2012 captured a pregnant female Indiana bat in the Section 5 project area. Radio-telemetry showed this bat roosting in two snags. Roost tree emergence counts indicated that these snags were primary maternity roosts. As recommended by the USFWS, FHWA and INDOT established the Lambs Creek Maternity Colony at this location which is west of Martinsville. In addition to the bat surveys that were completed for I-69, the USFWS conducted a bat survey for the Sycamore Land Trust at the Beanblossom Bottoms Nature Preserve just north of Bloomington, Indiana. Three Indiana bats were captured and tracked to three different roosts, including a primary roost. The USFWS has also recommended this colony be included as the Beanblossom Bottoms Nature Preserve Maternity Colony in the Section 5 BA. The addition of these two new maternity colonies in Section 5 brings the entire I-69 total to 16 Indiana bat maternity colonies along the project corridor.

*Additional forest and wetland impacts anticipated*

Exempted levels of take in the form of forest and wetlands were developed in Tier 1 based on right-of-way impact estimates at that time. These exempted levels of take were included in the

Tier 1 Revised BO and the recent Amendment to the Tier 1 Revised BO. Based on more up-to-date information on project impacts and resources, some of these exempted levels are being approached or exceeded. Tier 1 exempted level of take for total forest in Section 5 is 303 acres. It is estimated that an additional 75 acres of forest impacts may occur because of utility relocations in Section 5, and another 15 acres of forest impacts due to billboard relocations. While these types of activities were expected to occur in each section, most of the relocation activity up through Section 4 was minimal and fell within the estimated forest impacts for each section. Because Section 5 involves the upgrade of an existing four-lane facility where numerous billboards and utilities are already present in the right-of-way, the relocation impacts in this section are more significant and have resulted in the original forest impact estimates for that section being exceeded. The FHWA and INDOT have requested an increase in the exempted level of take for Section 5. The new estimated take is 350 acres of total forest impacts (this includes forested wetlands) in order to account for the uncertainty related to future utility impacts.

Furthermore, there are five hibernacula whose surrounding forest habitat may be impacted by the roadway and/or relocations in Section 5 beyond what was estimated during the Tier 1 consultation, and one that falls within Section 4. Even though a 10% overage was allowed per the reinitiation criteria, this may also be exceeded for these five caves. For this reason, the INDOT and FHWA have requested an increase in the exempted level of habitat impacts for the following hibernacula: Buckner Cave, Coon Cave, Grotto Cave, King Blair Cave, Sullivan Cave, and Salamander Cave. Note there is significant overlap in the WAA of these five hibernacula and the impacted acreage is not additive.

Hibernaculum WAA	Tier 1 RPBO Impacts (not including 10% buffer)	Tier 1 RPBO Impacts (including 10% buffer)	Current Estimated Impacts	New Requested Level of Take
Buckner	288 ac	316.8	293.87 ac	305 ac
Coon	97 ac	106.7	111.5 ac	125 ac
Grotto	98 ac	107.8	99.26	110 ac
King Blair	238 ac	261.8	262.01 ac	275 ac
Sullivan*	51 ac	56.1	57.03 ac	70 ac
Salamander	85 ac	93.5	84.26 ac	95 ac

\* Sullivan Cave is located in the Section 4 Action Area

Table 1. Comparison of Tier 1 exempted habitat impact estimates, current habitat impact estimates, and new requested levels of impact for hibernacula in the WAA. Shading indicates that current estimated impacts will exceed the Tier 1 estimate + 10% overage allowance.

In addition to forest impacts, some unanticipated non-forested wetland impacts have occurred over the span of the project, pushing the projected estimate beyond that which was established in the Revised Tier 1 BO (2006). Additional impacts are primarily the result of better wetland delineation and identification in the project area during the more refined Tier 2 studies and surveys, and not a result of a changed or enlarged project footprint. Originally, the project was expected to impact no more than 20 acres non-forested wetlands. The total impacts to non-forested wetlands in Sections 1-4 is 17.1 acres. Section 5 is currently estimated to impact 4.6 acres and Section 6 another 6 acres, bringing the total to just over 27 acres. The FHWA and

INDOT have requested the exempted level of take of non-forested wetlands be increased to 30 acres for the project as a whole.

### *Private Landowner Clearing along Right of Way*

Finally, additional forest impacts within and adjacent to the ROW have occurred as a result of private landowners cutting and selling their timber prior to the INDOT purchasing the properties for construction of the highway. This action was presumably fostered by an economic incentive to gain the most value out of their property based on perceived INDOT appraisal and compensation procedures.

While this unintended activity has already occurred, part of the new jeopardy analysis for this reinitiation of consultation on Tier 1 of the project will consider the impacts this activity has had on the Indiana bat. The following impacts are only estimates and believed to be a worst-case scenario. It is important to note that these numbers were not verified in the field due to private property access limitations. Approximately 360 acres of habitat was selectively timbered by private landowners whose property fell within the project right of way, prior to INDOT purchasing the land. Another 35 acres was clear-cut. Furthermore, nearly 1,200 acres were selectively cut, and 95 acres clear-cut, adjacent to the right of way. From the information we have, most of this timbering occurred during the time period when Indiana bats are known to be present in the area.

As a result of this activity, FHWA and INDOT have developed a new conservation measure (item 16 under Context Sensitive Solutions in Appendix D) which will be part of their official Proposed Action for the I-69 project. The goal of the measure is to avoid and minimize impacts from private landowner harvests by working with property owners within the right of way who plan to harvest their property. FHWA and INDOT propose to develop a voluntary agreement with the interested landowners, such as a “right of entry” agreement or other type of covenant, to pay the landowner to limit the time of year in which they harvest their property; this time period would be limited to the late fall and winter when Indiana bats are not present in the forested areas. Since conservation measures are part of the Proposed Action, their implementation is required under the terms of the consultation (Tier 1 RPBO, page 16).

No additional impacts to the bald eagle (*Haliaeetus leucocephalus*), eastern fanshell mussel (*Cyprogenia stegaria*), or Ray’s Cave (Critical Habitat for the Indiana bat) have occurred as a result of these additional forest habitat impacts. Our previous conclusions of “not likely to adversely affect” for the eastern fanshell mussel, “no jeopardy” for the bald eagle, and “not likely to adversely modify” for Ray’s Cave, are still valid.

## **Status of the Species**

### **Rangewide Update**

Since the completion of the first amendment to the Tier 1 RPBO in 2011, new species information and population data are available. Although this type of information continues to be

updated via the Tier 2 consultation process for each project section, following is a brief summary of the most recent information available and the current status of the species.

The USFWS BFO has collated the most recent population data gathered during 2013 biennial winter hibernacula surveys throughout the range. This draft information represents the best available data at this time and includes population information for a newly discovered hibernacula which has resulted in the addition of over 120,000 Indiana bats to the population estimate. Based on these surveys, it was determined that the Indiana bat's 2013 range-wide population stands at approximately 541,211 bats, which is a slight decrease over the 2011 range-wide population estimate of 542,470 [and a decrease from the 2009 estimate of 537,841 bats (USFWS, unpublished data, 2013)]. Prior to 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, especially for decreased population estimates in the Northeast. In 2013, just over 40% of the 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 2013 range-wide Indiana bat population estimate of 541,211, we assume that there are approximately 3,382 to 4,510 maternity colonies throughout the species' entire range [assuming a 50:50 sex ratio (Humphrey et al. 1977) with an average maternity colony size of 60 to 80 adult females (Whitaker and Brack 2002)]. As of publication of the Indiana Bat Draft Recovery Plan (Service 2007), we have records of 269 maternity colonies in 16 states that are considered locally extant. Based on the assumptions above, these colonies represent only 6% to 8% of the assumed number of maternity colonies in existence.

### **Recovery Unit Population Update**

The Service's proposed delineation of Recovery Units (RUs) relied on a combination of preliminary evidence of population discreteness and genetic differentiation, differences in population trends, and broad-level differences in macro-habitats and land use (USFWS 2007). The Indiana Bat Draft Recovery Plan proposes four RUs for the species: Ozark-Central, Midwest, Appalachian Mountains, and Northeast (USFWS 2007). The proposed project lies entirely within the Midwest RU. The 2013 Indiana bat population estimate for the Midwest RU was 309,040. This was an increase from the 2011 estimate (308,324), as well as an increase from 2009 (281,977). Over the last 10 years the Midwest Recovery Unit has seen an overall increase in the Indiana bat population although the onset of WNS in the Midwest Recovery Unit is expected to slow or reverse that trend.

### **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 238,068 bats. In 2011, the state-wide population was estimated to be approximately 225,477. In 2009, survey

data indicated 213,244 bats hibernated in the state; both years represent a decrease based on 2007. The most recent survey data for Indiana indicates approximately 226,365 bats are hibernating in the state. In 2013, Indiana's 37 hibernacula harbored approximately 41% of the range-wide population of Indiana bats and approximately 73% of the Midwest Recovery Unit population. The State's two most populous Indiana bat hibernacula are Jughole Cave (n=58,886 bats in 2013) and Wyandotte Cave (n=56,803 bats in 2013), which are both located in southern Indiana approximately 70 miles from the I-69 project corridor. Rays Cave is a close third with 49,617 hibernating bats reported this season. Rays Cave is located in the WAA for the I-69 project. The status of Indiana bats in Indiana greatly influences the status of the species within the Midwest RU and rangewide.

### **New Threats: Update on WNS and Wind Turbines**

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, sites in 22 states (New York, Massachusetts, Delaware, Vermont, New Hampshire, Maine, Connecticut, Virginia, West Virginia, Pennsylvania, New Jersey, Maryland, Missouri, Tennessee, North Carolina, Indiana, Ohio, Alabama, Georgia, Illinois, South Carolina, and Kentucky) and five Canadian provinces (Ontario, Quebec, Prince Edward Island, Nova Scotia, and New Brunswick) have been documented with WNS, including over 50 known Indiana bat hibernacula (Figure 1). The fungus that causes WNS, *Geomyces destructans*, has also been confirmed in Oklahoma and Iowa. 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 5.7 million hibernating bats. The Northeast Recovery Unit population of Indiana bats suffered an approximate 70% decline (loss of at least 37,703 bats, primarily in New York) between 2007 and 2011 (USFWS unpublished data 2012) much of which is attributed to WNS.

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. destructans* fungus has also been detected on two additional bat species: gray bats and cave myotis.

WNS has been documented in all four recovery units (RUs). The Midwest RU is comprised of the states of Indiana, Kentucky, Ohio and portions of Alabama, Georgia, Michigan and Tennessee. To date, Michigan is the only state in the Midwest RU that has not been found to have WNS. Although WNS has been present in the state of Indiana for the past three winters, Indiana's hibernating population of Indiana bats has remained fairly steady between 2009 and 2013.

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. We believe the disease will continue to spread throughout the regions within the next several winters, with some level of mortality continuing to occur. For more information on WNS see: <http://whitenoosesyndrome.org/>.

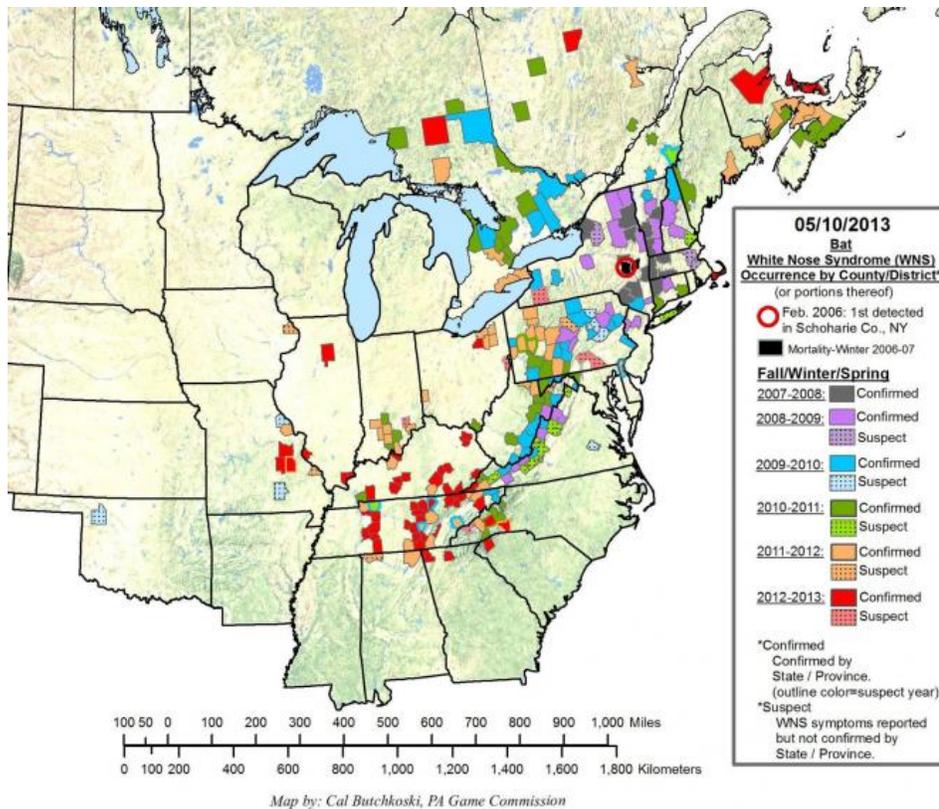


Figure 1. Geographic Distribution of White Nose Syndrome as of May 10, 2013 ([www.whitenosesyndrome.org](http://www.whitenosesyndrome.org) website accessed 07-09-2013).

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. Since that time, one additional Indiana bat mortality has been documented. 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/habitatconservation/wind.html>.

### Action Area

The proposed project involves the construction, operation, and maintenance of an Interstate highway, I-69, from Indianapolis to Evansville, through southwestern Indiana. The "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 proposed action on listed species. For Tier 1, the FHWA, INDOT, and the Service's BFO agreed to break the Action Area down into two seasonally based "sub-" action areas for the purpose of analyzing impacts to the

Indiana bat. These areas include a summer impact area, referred to as the Summer Action Area, and a winter impact area, referred to as the Winter Action Area (WAA). The Tier 1 RPBO (pg. 32) specifically defines these areas and is hereby incorporated by reference. These two impact areas combined comprise the project's Action Area. Due to the more detailed analysis recently completed on Section 5 indirect impacts, the WAA has been expanded by an additional 2,761 acres to include induced growth TAZs (traffic analysis zones) that now touch the boundaries of the WAA (see Figures 18 and 27 in Section 5 BA). This additional acreage will be addressed in the Tier 2 BA and BO for Section 5 and is not a reflection of a change in the amount of indirect impacts, but rather the distribution of the indirect impacts within the Action Area.

## **Environmental Baseline**

### **Status of the Species in the Action Area**

#### **Maternity Colonies**

##### *New Colonies*

As mentioned above, two new Indiana bat maternity colonies were discovered this past summer. A new Indiana bat presence survey was completed May - June 2012 in Section 5. This survey effort was conducted to update the Indiana bat presence status within the Section 5 action area due to the amount of time elapsed since the original surveys which were completed in 2004/2005. A total of twelve Indiana bats were captured, five of which were radio-tagged. All of these bats were tracked successfully to a roost tree. Three of the trees were determined to be primary roosts based on the emergence counts. One roost (927-1) was within the previously identified West Fork (Bryant Creek) Maternity Colony and showed a maximum emergence count of 74 bats; the remaining two (768-1 and 768-2) were outside of any existing known colony. Tree 768-1 was a dead eastern cottonwood and had an emergence count between 29 and 80 bats. This tree was located 1.1 miles from the proposed corridor. It was classified as a primary roost since the emergence count was above 30. The second roost tree was a dead American elm (768-2). This tree had an emergence count between 1 and 43 and was 2.6 miles from the corridor. Based on the discovery of these primary roost trees, it has been determined that an additional maternity colony is present within the Section 5 action area. This new colony is called the Lambs Creek Colony.

In addition to the bat surveys that were completed by INDOT for I-69, the USFWS Bloomington, Indiana Field Office conducted a bat survey for the Sycamore Land Trust at the Beanblossom Bottoms Nature Preserve in Monroe County. We caught three Indiana bats that were tracked to one primary roost and two secondary roosts. Based on the location of this new maternity colony in the project Action Area, we requested that this colony (Beanblossom Bottoms Nature Preserve Colony) be considered in the Section 7 consultation process for this project. This brings the total to 16 known Indiana bat maternity colonies within the I-69 Action Area.

##### *Survey Updates*

Since the first amendment to the Tier 1 RPBO was completed in May 2011, additional bat surveys have been conducted in several of the other project sections as part of the pre- and post-

construction survey requirements. The third year of construction monitoring for Section 1 was conducted from 19 May to 11 June 2011. A total of four sites yielded forty-five bats belonging to 6 species: 11 evening bats, 10 eastern red bats, 10 big brown bats, 9 eastern pipistrelles, 3 northern bats (*Myotis septentrionalis*), and 2 little brown bats (*Myotis lucifugus*); no Indiana bats were caught. In 2012 surveys were again conducted and three Indiana bats were captured and radio-tracked in Section 1. An adult male was tracked to several secondary roosts, and one female was tracked to a primary roost containing over 130 bats. Both roosts were west of the new alignment, on the eastern edge of the existing Pigeon Creek Colony.

The first year of construction monitoring for Section 2 was conducted from 24 May to 2 August 2011. A total of 10 sites yielded one hundred and twenty-seven bats belonging to 7 species: 49 eastern pipistrelles, 46 eastern red bats, 10 little brown bats, 8 big brown bats, 7 northern bats, 4 evening bats, and 3 pregnant Indiana bats. Radio-transmitters were placed on all three Indiana bats. Only two of these bats were tracked to specific roost trees, one within the existing Patoka River Colony and the other in the known Flat Creek Colony; no signal was detected for the remaining Indiana bat. In 2012, two pregnant Indiana bats were netted at site 11 in Section 2. Both females were found to be roosting in various trees within the existing Patoka River Maternity Colony area, including roosting together in a primary roost. These roosts were in the same wetland complex as one of the 2011 roosts.

The first year of construction monitoring for Section 3 was conducted from 21 July to 9 August 2011. A total of eight sites yielded two hundred fifty-four bats belonging to 8 species: 101 little brown bats, 47 big brown bats, 30 eastern pipistrelles, 24 eastern red bats, 25 evening bats, 21 northern bats, 5 Indiana bats and a single hoary bat. All captured Indiana bats received a radio-transmitter. No signal was detected for three of the five radio-tagged bats. One Indiana bat (juvenile female) was detected in an area where biologists did not have permission to access, although it appears the bat was roosting within the known Elnora Colony area. The remaining Indiana bat (adult male) was located at four roost trees which were all large, dead cottonwood trees about  $\frac{3}{4}$  mile east of the Elnora colony area. No Indiana bats were captured in Section 3 during the 2012 survey.

In 2011, one site (18) was netted in the Section 4 project area. Although 24 bats were collected, no Indiana bats were found at this site. In 2012, all 11 sites previously surveyed in 2004-2005 in Section 4 were surveyed again. Three Indiana bats were caught (one lactating female at site 11 and two males at site 23). The female was radio-tracked to a primary roost tree within the known Plummer Creek maternity colony area. The newly discovered roost tree was a dead shagbark hickory and was approximately 1.7 miles from the 2004 roost tree. The radio-tagged male bat was tracked to a dead black walnut tree and was found to be roosting with 3-4 other bats. This secondary roost tree was located in the existing Indian Creek maternity colony area.

### **Hibernacula Populations and Adult Males**

During the 2011 reinitiation process, the most recent population estimates for local hibernacula were derived from the 2009 winter hibernacula surveys. Currently, the most up-to-date population information for the Action Area includes data from 2013 surveys. In 2009, the estimated number of Indiana bats in all the hibernacula within the Action Area was 97,688. In 2013, the estimate was 88,487 bats. Table 1 lists the most recent population information for

each hibernaculum within the I-69 Action Area. This information is also used to estimate the density of male bats within the Action Area during the summer months. Male bats continue to be netted throughout the project area during the ongoing yearly survey efforts.

<b>Hibernacula</b>	<b>2013 (or most recent) Indiana bat Population</b>
Coon Cave	30,496 (+8,667 from 2011)^
Grotto Cave	7,849 (-17,507 from 2011)^
King Blair/Brinegar	218 (2009)
Salt peter	48 (2009)
Leonard Springs	31 (-156 from 2009)
Buckner Cave	58 (+48 from 2009)
Reeves Cave	17* (-17 from 2003)
Salamander Cave	0** (same as 2003)
Ray's Cave	49,617 (+1,214 from 2011)^
Ashcraft Cave	0*** (-3 from 1999)
Sexton Spring Cave	86 (+25 from 2009)
Sullivan	18 (+9 from 2009)
Storm Pit	48 (2009)
Ozzy's Hole	1 (only surveyed in 2006)
Primitive Baptist Spring Cave	1***
*Last survey completed in 2007	
**Last survey completed in 2005; an independent visit of Salamander Cave in March 2010 showed approximately 40 Indiana bats	
***Last survey completed in 2005	
^ 2013 data	

Table 2: Updated Indiana bat Populations within Hibernacula in I-69 Action Area

## **Effects of the Action**

### *Additional Forest Impacts*

Although the project activities and footprint are essentially unchanged, several additional forest impacts are anticipated. Impacts associated with the need for utility and billboard relocations were not independently analyzed in the Revised Tier 1 BO (2006). While these activities were expected to occur in each section, most of the relocation activity to date (Sections 1- 4) has been minimal and has fallen within the acreage of forest impacts estimated as a result of construction in each section. Because Section 5 involves the upgrade of an existing four-lane facility with numerous billboards and utilities already present in the right-of-way, the relocation impacts in this section are more significant than originally anticipated and have resulted in the original forest impact estimates for that section being exceeded. It is estimated that an additional 75 acres of forest impacts may occur because of utility relocations in Section 5, and another 15 acres due to billboard relocations.

An analysis by the INDOT has determined that only a small amount of these forest impacts will occur within the known maternity colony areas in Section 5 and the WAA. For the utility impacts in the colonies, we anticipate 1.5 acres of forest impact (0.03% of available tree cover) in the Lambs Creek Maternity Colony area, 11.5 acres (0.2% of available tree cover) in the West Fork Bryant Creek Colony area, and no impacts in the Beanblossom Bottoms Nature Preserve Maternity Colony area. These impacts will likely occur on the very edge of these colony areas, away from known roosting sites, and will follow the seasonal tree-clearing restrictions, avoiding any tree removal during the maternity season. Furthermore, no billboards are anticipated to be relocated within forested areas within any of the maternity colonies. All 15 acres of potential forest impacts due to billboard relocation will be outside of the colony areas (Michelle Allen, pers. comm., 5/8/2013).

In addition to the Tier 1 exempted forest impact amount being exceeded for Section 5 overall, some of the hibernacula present in the Section 5 Action Area may have their individual WAA habitat impacted by these same utility and billboard relocations, as well as some minor right of way adjustments. An exempted amount of forest impact was developed for each hibernaculum in the WAA during the Tier 1 consultation. There are six hibernacula whose surrounding habitat may be impacted by the relocations and right of way in Section 5 beyond what was estimated during the Tier 1 consultation. Based on this, the INDOT and FHWA have requested an increase in these anticipated impact levels (see Table 1). Increases to the amount of forest habitat potentially impacted range from 12 to 37 additional acres within a hibernacula's 50,240-acre WAA, and many of these impacts overlap. Although we do not have the exact amount of forest within each hibernacula's WAA, the loss of an additional 12 to 37 acres per WAA will not adversely impact the Indiana bat. Furthermore, only two of the hibernacula with slight increases have significant use by Indiana bats (Coon and Grotto Caves). Both of these caves and their immediate surrounding habitat have been permanently protected via a conservation easement.

#### *Additional Wetland Impacts*

In addition to forest impacts, some unanticipated non-forested wetland impacts have occurred over the span of the project, pushing the projected project-wide estimate beyond that which was established in the Revised Tier 1 BO (2006). Originally, the project was expected to impact no more than 20 acres of non-forested wetlands. To date, the total impacts to non-forested wetlands in Sections 1-4 totals 17.1 acres. Section 5 is currently estimated to impact 4.6 acres, and Section 6 another 6 acres, bringing the project total to just over 27 acres. The additional 7 acres of impact has been spread throughout the various sections. These non-forested wetland impact amounts have increased since the Tier 1 estimate as the accuracy of the wetland determination data has improved. During Tier 1, National Wetland Inventory (NWI) wetland data was the most accurate wetland data available for the study area. The NWI data was based upon aerial imagery and not on actual field work. The Tier 2 data consists of field verified wetlands that are identified using the U.S. Army Corp of Engineers wetland criteria (hydrology, vegetation, and soils). Since the NWI data relies solely on aerial imagery it can sometimes under- or over-estimate, or misidentify, wetland areas. This difference in the resource data is the primary cause of the increase in the non-forested wetland impact acreage between Tier 1 and Tier 2. It should be noted that the **forested** wetland impacts have been substantially reduced from the Tier 1 estimates (Michelle Allen, FHWA, pers. comm., 2013). Overall, approximately 0.6% of the

existing non-forested wetlands (*i.e.* emergent/scrub-shrub wetlands) will be impacted in the entire project Action Area.

We anticipate that utility and billboard relocations will likely be in the more urban areas near the existing roadway. Neither the additional forest impacts (including those in the various WAAs) nor the additional wetland impacts are likely to adversely affect any of the known maternity colonies, hibernacula, male Indiana bats, or the local hibernating/swarming populations. These impacts will result in minimal loss of habitat with no direct take anticipated due to tree-clearing restrictions. No impacts to roost trees or any displacement of Indiana bats are anticipated. Habitat impacts will be short term and habitat loss will be temporary due to established conservation measures and reforestation and restoration commitments.

### ***Updated Maternity Colony Impacts and Analysis***

As a result of an increase in the number of maternity colonies now known to occur in the action area, estimates on the number of Indiana bats exposed and adversely impacted by the project overall have been updated (see Table B4). Specific impacts to the two new colonies are analyzed individually below.

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 16 maternity colonies in the Action Area (which includes the new Beanblossom Bottoms Nature Preserve and Lambs Creek colonies) and an approximate total of 160 females and their pups per colony, we can assume that there are a combined total of approximately 2,560 ( $16 \times 160 = 2,560$ ) adult females ( $n=1,280$ ) and juveniles ( $n=1,280$ ) 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.

A discussion of the anticipated stressors and effects of the action on maternity colonies in the project area can be found in the Tier 1 RPBO and the 2011 Amendment and are hereby incorporated by reference. The anticipated project stressors and associated effects have not changed.

In order to determine the amount of take anticipated for the newly discovered Beanblossom Creek Nature Preserve and Lambs Creek colonies, the likelihood of take for each stressor was analyzed for the new colony, as was done in the Tier 1 consultation (and 2011 amendment) for the other 14 colonies. The stressors with the most potential to affect these newly discovered maternity colonies include direct loss of roosting and foraging habitat and roadkill.

### **Beanblossom Bottoms Nature Preserve Maternity Colony Analysis**

Of the 255 acres of forest (including forested wetlands) that will be cleared for I-69, none fall within the 2.5-mile radius area of the Beanblossom Bottoms Nature Preserve Maternity Colony area. Impacts along this part 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 alignment passes through a

very small, unforested portion of the colony (although there are some scattered landscape trees present). In addition, no tree cover impacts are anticipated.

In the Beanblossom Bottoms Nature Preserve maternity colony, 8,371 acres of tree cover<sup>1</sup> are available. Using the estimated amount of 2.3 snags per forested acre in Section 5, it is assumed that 19,253 snags are available within the colony area. Based on EEAC forest data<sup>2</sup>, no forests will be impacted within the maternity colony by the Preferred Alternative (PA), resulting in no snags impacted within the alignment.

Connectivity to the alignment was also analyzed within the Beanblossom Bottoms Nature Preserve Maternity Colony. Connectivity to I-69 from the roost trees and capture points occurs along various tree lines as well as Beanblossom Creek and its various unnamed tributaries. The shortest connectivity routes to I-69 from the two Indiana bat capture points were approximately 4.4 miles (Site 1-B) and 4.9 miles (Site 2-B). The shortest connectivity route distances to I-69 from the two known roost trees were approximately 1.1 mile (782-1) and 4.8 miles (R-1). The shortest straight-line distance from an Indiana bat capture point to the nearest tree cover impact was 2.5 miles (Site 1-B), while the longest was approximately 2.7 miles (Site 2-B). The shortest straight-line distance from any roost tree to the nearest tree cover impact was approximately 1.0 mile (782-1), while the longest straight-line distance was approximately 2.5 miles (R-1).

Connectivity to the proposed mitigation sites was also calculated. There are five mitigation sites proposed within and adjacent to the maternity colony area which includes 168 acres of forest for preservation and 26 acres of land that will be reforested. Another 240-plus acres will be preserved and/or reforested within a mile and a half southeast of the maternity colony area. There is a roost tree (R-1) located 3.6 miles away from the proposed Modesto mitigation site and the other roost tree (782-1) is located 1.7 miles away from the proposed Chambers Pike mitigation site. Capture Site 1-B is located 3.1 miles away from the proposed Modesto mitigation site. Capture Site 2-B is located the farthest from any mitigation site at approximately 3.7 miles from the Modesto mitigation site. See Figure 2 below and Table 12 of the Section 5 Tier 2 BA for additional information.

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1 Tree Cover – defined as all trees, including individual, fragmented groups of trees. Delineated from 2003 aerial photography.

2 Forest included groups of trees >1 acre and wider than 120 feet as verified by the EEAC within the corridor. This includes forested wetlands as well as upland forest.

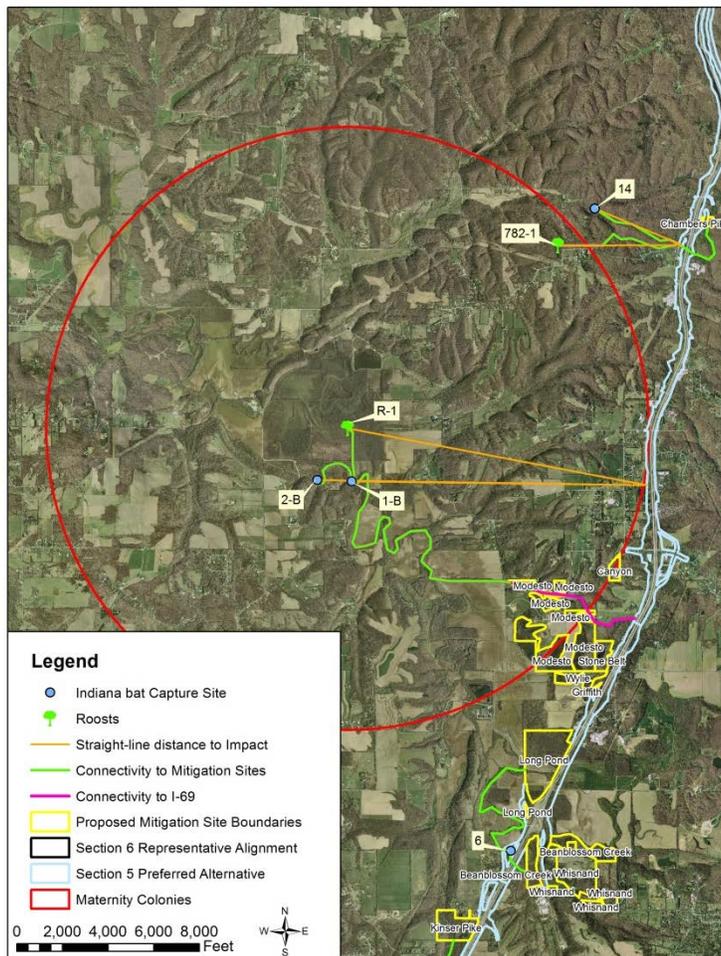


Figure 2. Beanblossom Bottoms Nature Preserve Maternity Colony Connectivity to the Nearest I-69 Alignment and Mitigation Sites.

The preferred I-69 alignment runs just outside the eastern edge of the Beanblossom Bottoms Nature Preserve Maternity Colony area (Figures 1 and 3). Once Section 5 of I-69 is operational, the increase in the number of fast-moving vehicles could increase the number of bats struck as they attempt to fly across the interstate at night during the summer maternity season.

Considering the distance of the proposed alignment to the center of the maternity colony’s use area, the lack of likely travel corridors providing connectivity to the proposed alignment (Figure 2), and juxtaposition of potential roosting and foraging habitat, capture locations, and known roost sites, it is unlikely colony members would be very susceptible to increased roadkill along the upgraded Section 5 roadway.

Because the project consists of upgrading an existing 4-lane roadway and the alignment barely falls within the maternity colony area (and has no tree cover impacts), we believe that no take will occur as a result of any construction activities, nor do we anticipate that the upgraded roadway will be a factor in how individual colony members are able to move throughout the

colony area. It is doubtful that any unknown roost trees (including secondary roosts) will be affected by project construction. In the unlikely event that a roost is felled by construction activities, additional roosting and foraging habitat is available within the area.

No impacts due to construction noise/vibration are expected, as the construction activities will be short term and far removed from suitable foraging and roosting habitat.

With regard to indirect/induced impacts within the Beanblossom Bottoms Nature Preserve Maternity Colony area, minimal to no indirect growth is expected based on Traffic Analysis Zones (TAZs) along this portion of the Section 5 alignment. Further discussion related to indirect impacts can be found starting on page 94 of the Tier 2 BA for Section 5, as well as the Tier 2 Section 5 DEIS.

Overall, impacts to the Beanblossom Bottoms Nature Preserve Colony will be insignificant and discountable.

### Lambs Creek Colony

The proposed alignment passes through the southeastern corner of the Lambs Creek Maternity Colony area and only about one-third (0.3) of a mile of roadway comprises the Section 5 Preferred Alignment (Figure 3). Although the Section 5 alignment ends just inside the maternity colony area, all impacts to the colony associated with the I-69 roadway are being addressed in the Section 5 BA and BO using the Section 5 Preferred Alignment and the Representative Alignment for the Section 6 portion.

The Lambs Creek Maternity colony contains approximately 5,000 acres of forest. Approximately 6 acres of forest impacts will occur within the maternity colony area (4.5 acres are within the Section 6 project 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.

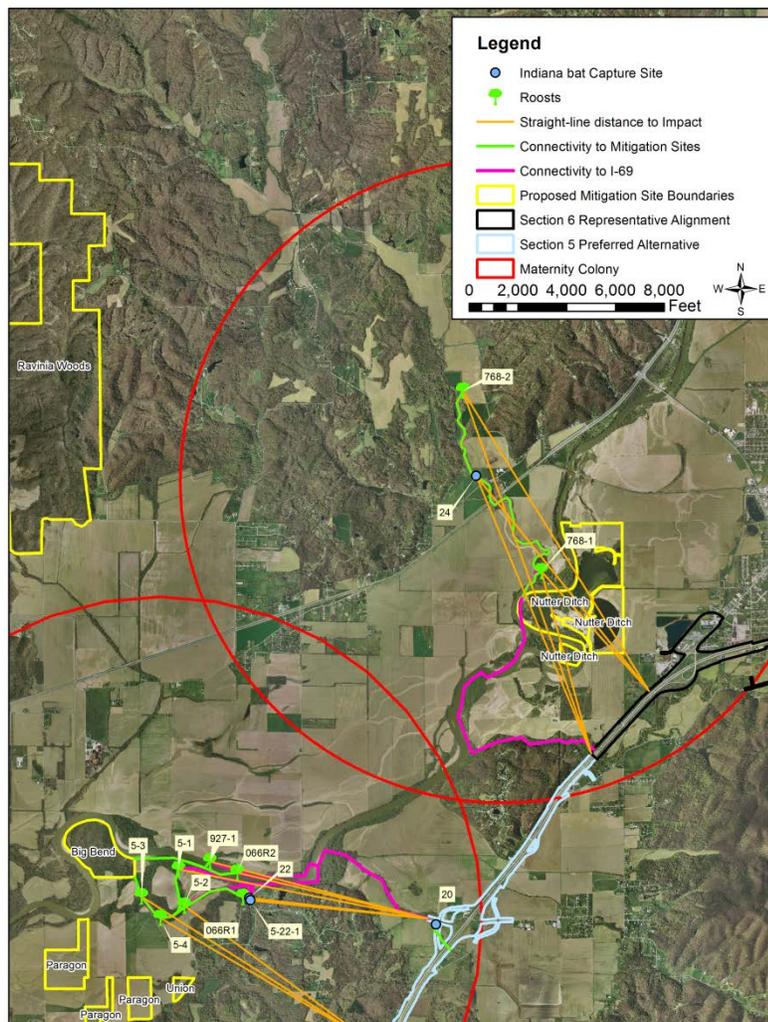
In the Lambs Creek maternity colony, 5,058 acres of tree cover are available. This equates to 11,633 available snags in the colony area (calculated at 2.3 snags/acre density). Based on EEAC forest data, 5.6 acres of the tree cover will be impacted within the maternity colony by the roadway. This equates to potentially 13 snags being impacted within the alignment or approximately 0.1% of all available snags in the maternity colony area.

One Indiana bat capture point and two primary roost trees have been identified within the Lambs Creek Maternity Colony. Connectivity to I-69 from the Indiana bat capture point occurs primarily along the West Fork of the White River and Indian Creek. The shortest connectivity route to I-69 from the Indiana bat capture point is 4.1 miles (Site 24). The shortest connectivity route to I-69 from the roost trees is 2.8 miles (768-1) and 4.9 miles (768-2). The shortest straight-line distance from an Indiana bat capture point to the nearest Section 5 tree cover impact is 2.3 miles (Site 24). The shortest straight-line distance from the roost trees to the nearest Section 5 tree cover impact is 1.5 miles (768-1) and 3.0 miles (768-2). The Indiana bat capture site and the two roost trees are closer to the impacts calculated from the Section 6 Representative

Alignment. The shortest distance from a tree cover impact to the Section 6 Representative Alignment is: 1.2 miles (roost 768-1); 2.7 miles (roost 768-2); and 2.1 miles (Site 24).

No impacts to the identified roost trees are anticipated. Since a four-lane interstate already occupies the preferred alignment right-of-way, it is doubtful that any unknown roost trees (including secondary roosts) will be affected by project construction. In the unlikely event that a roost is felled by construction activities, additional roosting and foraging habitat is available within the area.

Two mitigation sites (Nutter Ditch and Principal) consisting of 288 acres of upland forest preservation and 55 acres of reforestation are proposed within the Lambs Creek Maternity Colony area. Connectivity routes were calculated for both the roost tree sites, and the bat capture site, to the Nutter Ditch mitigation site. Site 24 is 1.6 miles away from the Nutter Ditch mitigation site. Roost 768-1 is approximately 0.3 miles away from the Nutter Ditch mitigation site. Roost 768-2 is approximately 2.4 miles



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

away from the outside boundary of the Nutter Ditch mitigation site. Because the Principal site is relatively new, we do not have connectivity information, nor is it depicted on the maps. See Figure 3 above and Table 13 in the Tier 2 BA for additional information.

Based on the amount of surrounding forest habitat and stream crossing locations, bats from the Lambs Creek Colony may attempt to cross the interstate along the Indian Creek corridor. We anticipate that the I-69 span over Indian Creek will remain the same as it currently is (Michelle Allen, FHWA, pers. comm., 2013) and continue to allow bats to fly under the roadway and connect to other habitat areas east of the alignment if, in fact, they are currently using the stream corridor for that purpose.

Another potential effect of the upgraded interstate in Section 5 is the potential for increased mortality due to vehicle strikes. We believe the Tier 1 estimate for roadkill is reasonable (and very conservative) and anticipate that no more than 8 bats will be killed by vehicle collision between 2013 and 2030 within the Lambs Creek Maternity Colony, or approximately 1 bat every two years (see road-kill discussion in Tier 1 RPBO). An increase in take due to increased traffic may be negligible in this more urban area of the colony circle. Recent research suggests that bats may avoid crossing larger highways and interstates (Zurcher *et. al.*, 2010; Bennett & Zurcher, 2012; and Bennett *et. al.*, 2013). 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 Lambs Creek Maternity Colony.

Some take in the form of harassment due to construction noise/vibration may be possible (although unlikely based on the distance from the known roosts). Loud noises during the day may cause increased heart rates/respiratory rates and disturbance from the roost. This could lead to roost abandonment and/or atypical exposure to daytime predation. No impacts are anticipated to nighttime foraging activities. These construction activities will be short term and no long term affects are anticipated.

Because the Lambs Creek Maternity Colony has been only recently identified, indirect and cumulative impact analyses specific to the colony were not prepared during the Tier 1 evaluation. Recent analysis indicates minimal growth may occur in the colony area, primarily as a result of construction of the Liberty Church Road interchange. A total of 0.1 acres of forest are estimated to be indirectly impacted (*i.e.* developed) as a result of the I-69 project in this colony area.

Overall, we do not anticipate any appreciable long-term changes in reproductive success or the viability of the Lambs Creek Maternity Colony due to construction of the I-69 upgrade along existing SR 37.

### Summary

The number of animals per colony exposed and affected by all of the various stressors is estimated based on a variety of variables including: the location of the right-of-way within the maternity colony area, amount and location of tree cover before and after construction, location

of known roost trees, connectivity of remaining habitat, anticipated indirect and cumulative impacts, etc. Many of these factors are specifically discussed within the Tier 1 Biological Assessment (BA) Addendum, Tier 1 RPBO and the subsequent Tier 2 BAs. The Tier 2 BA and BO for Section 5 will address these colonies in more detail. Please refer to Table B4 in Appendix A for additional information regarding the amount of take anticipated for these colonies (note that these estimates are through the year 2030). Based on the impacts discussed above (as well as the proposed mitigation efforts) and the amount and location of existing foraging and roosting habitat, we do not anticipate the effects of the action to reduce the long-term survival or reproductive potential of these newly identified maternity colonies.

#### ***Adult Males Update (summer impacts)***

Estimates of male bat density within the Action Area have been slightly adjusted since the 2011 Amendment to the Tier 1 RPBO. We estimate that half of the 88,487 bats (2013 estimate) using the hibernacula within the Action Area are males (44,244) and half of those would remain near their hibernacula during the summer reproductive season (22,122). The expanded WAA (portion of the Action Area where bats swarm and hibernate in fall and winter) consists of approximately 148,182 acres of tree cover which results in a density of male bats of 0.15 bats/acre (22,122 bats/148,182 ac. = 0.15 bats/ac). For the portion of the Action Area that extends north and south of the hibernacula area (WAA), we assume the density of adult males is 0.075 adult males per acre of forested habitat (half of the density near their hibernacula). Using these density estimates and the number of acres impacted by the project (excluding the maternity colony areas), we estimated the number of bats exposed and impacted by the project and its various stressors (see Table B4). Because the number of male bats exposed to the project impacts during the summer has slightly decreased since the 2011 Amendment, the take estimates have proportionally decreased resulting in a very small decline in estimated take of males during the summer. Note the amount is still slightly higher than the 2006 Tier 1 RPBO estimate due to increased populations since that time.

With the exception of loss due to roadkill, direct loss of males **during the summer months** due to habitat loss (direct and indirect), noise, and disturbance of summer roosting in ungated hibernacula, is expected to be minimal; only 20 male bats throughout the life of the project are estimated to be taken. The number of road-killed male bats during the summer is also low, with 26 male bats anticipated to be killed over a 17-year period once the highway is fully operational. With a portion of the take already occurring, and some occurring in small increments over a long period of time in the future, these impacts to male bats during the summer, will have no measureable impact on the Indiana bat populations to which these individuals belong.

#### ***Update on Indiana Bats within the Wintering Portion of the Action Area (WAA) during the Fall, Winter and Spring***

No direct adverse impacts are anticipated to any of the 15 Indiana bat hibernacula in the Action Area, although a small amount of take (23 bats through the year 2030) is anticipated due to loss of fall roosting and swarming habitat surrounding several of the hibernacula.

Take associated with roadkill and human disturbance is based on a percentage of exposed bats (estimated in Tier 1 RPBO to be 0.25% and 1%, respectively). Based on the latest population estimates for each of the hibernaculum within the Action Area, the number of Indiana bats taken

by the various stressors during the fall swarming, winter hibernation, and spring staging periods has decreased (n = 761 bats) due to an overall decrease in the local population using those hibernacula (a decrease from 97,688 in 2009 to 88,487 bats in 2013). Take associated with unauthorized visits (which is the bulk of the projected winter take) is not anticipated to occur until a significant amount of the highway is constructed and operational, facilitating access to the general area. The small amount of additional forest impacts surrounding several hibernacula in Section 5 is addressed above in the forest impact section.

To date, mitigation efforts have resulted in the permanent protection of over 3,400 acres within the winter portion of the Action Area (*i.e.* area surrounding all of the hibernacula; defined as WAA in the Tier 1 RPBO), including over 800 acres of reforestation. This area is within and near one of the core hibernacula areas in the Midwest RU. Most importantly, a permanent conservation easement has been placed on two Priority 1A Indiana bat hibernacula. This easement permanently protects Coon and Grotto Caves and nearly 300 acres of surrounding swarming habitat. Over 38,000 Indiana bats hibernated in these two caves in 2013. Permanent protection and management of these two caves has significantly reduced the potential take associated with unauthorized disturbance and vandalism. Conservation easements have also been placed on two other small Indiana bat hibernacula in the WAA. In addition, a conservation easement has been placed on a large cave in the Action Area which underwent work last spring to remove some large boulders and debris from opening in order to restore the cave's airflow. Monitoring will determine the cave's suitability for hibernating bats, including Indiana bats. Reforestation has also occurred on the surrounding land to improve roosting and foraging habitat. Management and protection of these important hibernacula is critical for the protection, survival, and recovery of the species.

#### *Section 4 Private Landowner Tree Clearing*

Beginning in early 2011, the USFWS Bloomington Field Office (BFO) began receiving reports of private landowners cutting timber in and adjacent to the right of way in Section 4 of the I-69 project. Over time, the BFO received notification of at least 10 different parcels being logged along the preferred alignment. The INDOT eventually determined that over 35 parcels (close to 1,700 acres of forest) along the right of way had some degree of timber harvest prior to INDOT securing them for road construction. While INDOT did not condone the private landowner harvest, it appears that many property owners began contracting for timber services once project development began in the area.

In 2010, early in the Tier 2 consultation process for Section 4, the FWS discussed with INDOT whether landowners would be compensated for timber on their property. INDOT indicated that the landowners would be compensated; FWS interpreted this to mean that the landowners would be paid for their marketable timber value based on a timber appraisal. However, INDOT's approach is to pay a landowner an amount comparable to other local, forested properties in the same market. This method of appraisal and valuation is known as the comparable sales approach, and is described in INDOT's 2011 Appraisal Manual.

During the appraisal time period (primarily in 2011), we were informed that several landowners were advised to have their properties harvested prior to selling to INDOT in order to improve their financial gains. Based on this, INDOT sent letters to landowners and local timber companies informing them of the potential ESA violations and advised them to adhere to

seasonal tree-clearing restrictions for the Indiana bat. Additionally, we issued, in June 2011, a letter to all property owners along the I-69 right of way informing them of the presence of the endangered Indiana bat in the project area and providing suggestions of how to avoid taking the species. For a copy of the above-reference letters, please see Appendix C of the Section 4 Tier 2 BO. Despite these efforts, some logging in the area continued.

In order to determine the extent of the private tree clearing activities along the Section 4 alignment, the FHWA, INDOT and their consultants gathered information on the location and potential amount of forest that was timbered on various properties. To do this, information was collected from aerial photography, conversations with property owners, and observations of harvesting activities and logging trucks, etc. by technical field staff working along the alignment. (In addition, biologists and law enforcement officials from local FWS field offices investigated active logging at several properties along the right of way during the summer, fall, and spring of 2011-2012). Tables 3 and 4 provide information based on the FHWA’s information gathering effort. The acreage amounts listed are a maximum amount estimate, assuming that all of the forest on a particular parcel had some harvest occur. For example, if logging activity was noted on a property that was 100 acres in size, and 50 acres of that parcel was forested, it was assumed that all 50 acres of forest had some logging occur. It is important to note that these numbers were not verified in the field due to private property access limitations. The Tables show the amount of potential harvest both along the entire ROW in Section 4, and specifically within the four maternity colonies in Section 4.

Table 3. Potential Harvest Amounts on Private Property along the I-69 Right of Way.

	Number of parcels with Some Harvesting	Number of Forested Acres on Parcels with Some Harvesting	Number of Harvested Forest Acres within ROW	Number of Forested Acres Outside of ROW (Potentially Harvested)
Selective Cut	35	1,530	360	1,170
Clear-cut	3	130	35	95
Total	38	1,660	395	1,265
<p>Note: The information on this type of harvest activity has been developed through the following methods: reviews and before/after comparisons of aerial photography dated 2005, 2008, 2010, and 2011 (via Google Earth and Bing Maps) to estimate the extent of forested acreage on the parcels, conversations with property owners, and observations of tree harvesting and logging trucks on proposed and publicly-owned right-of-way by technical field staff. In the before/after comparisons in the majority of the parcels identified as selectively harvested, there is not a significant difference between the 2005 and 2011 aerial photography. These acres were not confirmed in the field as the property is privately held.</p>				

Table 4. Potential Harvest Amounts on Private Property within the Four Maternity Colony Areas.

Maternity Colony	Maximum Forest Acreage Potentially Cut <sup>^</sup>	Forest Acreage Cut Within ROW	Potential Forest Acreage Cut Outside of ROW
Doans Creek Selective	80	20	60
Doans Clear-cut	0	0	0
Plummer Selective	230	55	175
Plummer Clear-cut	0	0	0
Little Clifty Selective	610	125	485
Little Clifty Clear-cut	55	15	40
Indian Creek Selective	230	80	150
Indian Creek Clear-cut	65	25	40
<b>TOTAL</b>	<b>1270</b>	<b>320</b>	<b>950</b>
<sup>^</sup> The maximum forest potentially cut is a tally of all available forest in the parcels that had some amount of harvesting done. This is a worst case amount, assuming the landowner had the entire forested portion of their parcel harvested to some extent.			
Note: The information on this type of harvest activity has been developed through the following methods: reviews and before/after comparisons of aerial photography dated 2005, 2008, 2010, and 2011 (via Google Earth and Bing Maps) to estimate the extent of forested acreage on the parcels, conversations with property owners, and observations of tree harvesting and logging trucks on proposed and publicly-owned right-of-way by technical field staff. In the before/after comparisons in the majority of the parcels identified as selectively harvested, there is not a significant difference between the 2005 and 2011 aerial photography. These acres were not confirmed in the field as the property is privately held.			

### Effects of the Activity

Most of the stressors associated with tree cutting and clearing (*e.g.* loss of roosting/foraging habitat, decreased habitat connectivity, degraded water quality, noise, etc.) have been previously discussed and analyzed in the Tier 1 RPBO (pg. 81) and the previous biological assessments and biological opinions for this project, and are hereby incorporated by reference. However, while tree-clearing activities completed by the INDOT were not expected to result in direct death of individual bats due to seasonal clearing restrictions, the private landowner tree-clearing activities appear to have primarily occurred during the summer maternity season and the fall swarming

period. This timing significantly increases the likelihood of direct mortality due to the felling of occupied roost trees.

During the summer, most reproductive females occupy roost sites under the exfoliating bark of dead trees. Indiana bats sometimes are found under bark on large dead branches within a living tree or on a dead trunk of a living tree with multiple trunks. Living trees typically are used as alternates only when suitable dead trees are not available. Maternity colonies typically use 10 to 20 trees each year, but only one to three of these are primary roosts used by the majority of bats for some or all of the summer (USFWS 2007). Roost trees, although ephemeral in nature, may be occupied by a colony for a number of years until they are no longer available or suitable (USFWS 2007).

The probability of an occupied roost tree being felled during timber harvest activities is difficult to predict. Snag density is typically less in harvested forests, presumably as a result of harvest methods and activities (Wisdom, L.J. and Bate 2008; Ohmann, 2002). It is not uncommon for logging companies to remove snags for safety and access purposes, or for snags to be knocked over by equipment or falling trees (Garber et. al., 2005). This was likely the cause of a roost tree found on the ground in the project right of way in early 2011. In the summer of 2010 a primary roost tree was identified within the right of way in what is now known as the Little Clifty Branch colony. (This roost, along with a few secondary roosts, was the basis for the establishment of a colony in this location.) The following January (2011), geotechnical field crews working in the area, discovered that the roost tree was on the ground. There was no evidence that the tree had been cut down (although the top had been cut away from an access path), nor any evidence of storm damage in the area (other downed trees/branches) (pers. comm. J. Dupont, Bernardin Lochmueller and Associates, 2011). Further investigation determined that the property owner had selectively harvested the area that previous October/November (2010). While it is unlikely that the maternity colony was still using the tree in October/November, it does provide further evidence that there is a non-discountable likelihood that snags present in areas being harvested could be felled, whether intentionally or not. Depending on the timing of the harvest, it is reasonable to expect, in a worst case scenario, that an occupied roost tree could be felled in areas with known maternity colonies.

The amount of tree harvest that occurred within each known 2.5 mi.<sup>2</sup> colony home range area ranged considerably. The Doans Creek Colony and Plummer Creek Colony had up to 80 acres and 230 acres selectively cut along the preferred alignment for I-69 in their respective colony areas. However, no clear-cutting occurred in these two colonies, and due to the juxtaposition of the colonies along the alignment, no harvest occurred within a ½ mile radius of the colonies' centers, near the identified roosts. Both of these colonies contain over 60% tree cover (over 8,000 acres of forest) and presumably ample roosting and foraging habitat continues to be available in the area. Nearly 40% of the Doans Creek Maternity Colony falls within the boundary of the Crane Naval Surface Warfare Center. This facility routinely consults with the USFWS, Bloomington, Indiana Field Office (BFO) and manages its forests according to the

BFO's *Forest Management Guidelines for Informal Section 7 Consultations on Indiana Bats (Myotis sodalis) within the State of Indiana*. By following these guidelines, direct impacts to roosting bats are avoided, and suitable roosting habitat is maintained into the future.

In addition to federal land, approximately 400 acres of I-69 reforestation and preservation activities are located within the Doan's Creek colony area (including a parcel that falls within both the Doans Creek and Plummer Creek Colonies). Along this line, within the Plummer Creek Colony, acquisition of nearly 1,000 acres for forest preservation (primarily near the center of the colony) has already occurred and reforestation efforts are ongoing on over 300 additional acres. Based on the location and probable amount of selective harvest in these two colony areas, it is unlikely that an occupied roost tree was felled during the subject private landowner timber harvest activities in these colonies. Also, considering the mitigation and management activities occurring within these colony areas, we believe suitable roosting and foraging habitat will continue to be available and persist into the future.

Up to 230 acres was selectively harvested within the Indian Creek Maternity Colony and another 65 acres were clear-cut (near the western edge of the colony). Within a ½ mile of the colony center, up to 30 acres (9%) was selectively harvested from just over 330 acres of available tree cover. The two known roosts (alternate roosts) are not located on parcels with known harvesting. The nearest timbered parcel to a known roost tree is approximately 0.13 miles away. This parcel was selectively cut in late August, 2011. The late summer clearing date reduces the probability of non-volant pups being present. Furthermore, it is likely the colony had already begun to disperse by this time, which would greatly reduce the likelihood of bats being impacted (USFWS 2007).

We anticipate overall habitat impacts will be insignificant as a result of this activity. The Indian Creek Colony area is 60% forested and numerous snags and roosting habitat is present. The 65 acres that was clear-cut represents only about 0.9% of the entire forested habitat present in the colony area. Selective cutting in central Indiana is estimated by the local state forester to remove an average of 20 trees per acre. It is likely that the removal of larger, high quality timber trees will result in decreased snag availability in the future within the 230 acres where cutting occurred; however, the harvested acreage was spread throughout the colony area (a majority of the harvest was over ½ mile from the colony center) and over half of the acreage fell within the right of way, which was already accounted for during the initial consultation. Reforestation efforts are underway on nearly 180 acres within the colony area and almost 500 acres will be permanently protected and managed for the Indiana bat. Long term impacts to the colony as a result of the habitat modification are unlikely due to the presence of other existing suitable habitat and mitigation efforts.

The Little Clifty Branch Colony had up to 610 acres selectively harvested and 55 acres clear-cut within the 2.5 mi<sup>2</sup> colony area. Of this, just over 215 acres of potential selective harvest occurred within a ½ mile radius of the colony center (the clear-cut was approximately a mile

from the colony center). The total tree cover in this portion of the colony is approximately 411 acre, indicating that just over half of all the forest in the colony center potentially had some selective harvest occur. All of the identified roosts occurred on properties where harvesting was known to occur. The primary roost was found down the winter following its discovery. We assume, based on the fact that timber harvest occurred that fall in the area the roost tree was located, that the snag was felled as a result of the activity occurring in its vicinity. As previously stated, there was no indication the tree had been cut down or felled by storms. It is important to note that the tree was in the proposed right of way and would have been removed during the winter of 2011-2012. The inevitable loss of this primary roost is evaluated in detail in the Section 4, Tier 2 Biological Opinion. Of the four colonies, the Little Clifty Colony is most likely to be adversely affected by the landowner clearing.

As previously suggested, a serious consequence of summer tree clearing is the potential felling of an occupied roost tree, resulting in direct mortality of individual bats. The USFWS's 2007 Indiana Bat (*Myotis sodalis*) Draft Recovery Plan reports on page 76:

“We are aware of three documented accounts of occupied Indiana bat roost trees being felled. In all cases it was not known that the tree contained a bat roost when it was cut, and in all cases some of the bats in the tree were killed or injured. Cope et al. (1974) reported on the first known Indiana bat maternity roost tree, a dead elm in Wayne County, Indiana. The tree was located near a hedgerow that was being removed, and when the tree was destroyed during bulldozing, bats were observed exiting. The original account stated that eight bats were “captured and identified as Indiana bats,” and that about 50 bats flew from the tree. Although the original account did not specify how the eight bats were captured, J. Whitaker (Indiana State University, pers. comm., 2005) recounted that those bats were killed or disabled, retrieved by the landowner, and subsequently identified by James B. Cope (a biologist). In another case, Belwood (2002) reported on the felling of a dead maple in a residential lawn in Ohio. One dead adult female and 33 nonvolant young were retrieved by the researcher. Three of the young bats were already dead when they were picked up, and two more died subsequently. The rest were apparently retrieved by adult bats that had survived. In a third case, 11 dead adult female Indiana bats were retrieved (by people) when their roost was felled in Knox County, Indiana (J. Whitaker, pers. comm., 2005).”

In order to evaluate the one-time impact the private landowner harvest may have had on the Indiana bat within the action area, we analyzed a reasonable worst case scenario which involved the felling of an occupied maternity roost in the Little Clifty Branch Colony area (this colony was the most likely to potentially be exposed to the harvest activities based on the amount and location of the activities). Using information from the Belwood (2002) and Cope (1974) papers, we estimated that if an occupied roost tree was felled, approximately 4% of the adult females would be killed and 15% of the pups. We then assessed the potential effects of this amount of take to the colony by using a demographic model (Thogmartin et al. 2013), assuming the tree-

clearing activities would impact approximately 3 adults and 12 pups in a typical maternity colony of 80 adults and 80 pups (Tier 1 estimate).

For our scenario, we evaluated model outputs that compared population tendencies over time with and without the estimated take from the landowner tree-clearing activities. These outputs allowed us to evaluate whether take from the action would influence the population levels differently than how the populations would otherwise trend over time. Because WNS was factored in to all the model runs, the Indiana bat population declined quickly over time for the take and no take scenarios. The goal of the analysis was to determine whether take from the proposed action changed the nature of that decline or potential recovery of the species. The demographic model assumed that WNS was present in the area beginning in 2011. However, since no population impacts have been noted to date in Indiana, the model parameters were adjusted to incorporate population impacts due to WNS beginning in 2014. Although there is no way to know for sure when or how WNS may fully impact Indiana bats in Indiana or the Midwest, the WNS impacts were based on observations of WNS-caused declines in the northeast, specifically in the state of New York, which is the best available information at this time.

The model projections (using the Indiana bat specific assumptions for WNS) predict a 79% chance of extirpation by year 50 with the private landowner clearing occurring, and a 76% chance without the landowner logging activity (Appendix B). In addition, the estimated mean time to extinction with the tree-clearing activities is 24 years with the logging compared to 23.5 years without; maximum time to extinction is the same for both scenarios. The median population growth for both scenarios is zero (0) when WNS is factored into the model. If the model is run without WNS as a factor, there are no differences in the population projections with or without the harvest impacts. Considering that WNS was only recently confirmed in the state of Indiana in the winter of 2010-2011 and that the Indiana bat population still remains stable in the state, we believe it is unlikely that the tree-clearing activities that occurred prior to the state taking ownership of the project right of way will reduce the long-term fitness of the colony. While the population models enable us to evaluate the effects of the take on the local populations, we recognize that any model prediction on the response of bat populations to WNS are speculative to some extent, and models using different assumptions on how populations respond to WNS will have different outcomes. That being said, we believe our analysis is logical and comports with existing information.

In addition to direct mortality, harvested areas typically exhibit fewer snags than unharvested areas. Low numbers of suitable snags can result in decreased quality of forested habitat for Indiana bat roosting. Tree clearing activities could have also impacted bats during fall swarming/spring staging activities, a critical fat building time period. Disturbance during this period could have reduced the fitness of bats entering hibernation or stressed bats just emerging from hibernation and preparing to give birth. Although the harvesting likely resulted in a decrease of habitat quality, based on the amount of available remaining habitat and mitigation

efforts to protect and restore several hibernacula and forested habitat in the maternity colony areas (including 153 acres of preservation and 103 acres of reforestation within and adjacent to the Little Clifty Maternity Colony), we believe these impacts are short term in nature and do not affect the survivability or recovery potential of the species.

Given that the take associated with the landowner harvest activities did not likely impact the fitness or viability of Indiana bats at the local population scale (the Little Clifty Creek Maternity Colony), we do not anticipate a reduction in the likelihood of survival and recovery of the species at the Midwest Recovery Unit or rangewide scale as well.

In order to eliminate potential impacts to the Indiana bat from future private landowner tree-clearing activities associated with the development of I-69, the INDOT and FHWA have prepared a letter for property owners along Sections 5 and 6 of the preferred alignment that emphasizes the risks of killing or harming/harassing federally listed animals by timbering in Indiana bat maternity colony areas during the maternity season (Appendix C). These letters were sent out on July 9, 2013 for Section 5, prior to the start of the appraisal process in this section. In these letters, FHWA, through INDOT, encourages private landowners and loggers to act in accordance with the cutting restriction timeframe of November 16-March 31 as described in the Revised Tier 1 Biological Opinion. The letters also ask that private landowners contact the I-69 Section 5 Project office if they are considering a tree-harvesting activity between April 1 and November 15. Please note the tree clearing restrictions in Section 5 are in place from April 1-November 15 in the WAA (from the I-69 Section 4 interchange north to Arlington Road) and April 1-September 30 in the SAA (Arlington Road north to the northern project terminus).

Furthermore, INDOT and FHWA have agreed to a new conservation measure that includes paying a willing landowner for an early “right of entry” or other type of agreement or covenant on their parcel; FHWA, through INDOT, will contact landowners of property within areas of concern within the right-of-way to discuss options for deferring tree clearing activities to the approved tree-clearing timeframe of November 15-March 31 within the WAA and October 1-March 31 in the SAA. This will voluntarily limit the timing of private timber harvest to a period outside of the maternity season. These offers will be made on a case by case basis in coordination with the USFWS’s Bloomington, Indiana Field Office (for a list of Conservation Measures see Appendix D).

## **Conclusion**

(Our non-jeopardy conclusion regarding impacts to the bald eagle still stands as stated in the original December 3, 2003 Tier 1 BO.)

After reviewing the current status of the Indiana bat, updated information regarding the environmental baseline for the action area, and new information regarding the two new colonies, additional forest and wetland impacts, and impacts from private landowner tree-clearing activities along the preferred alignment in Section 4, the USFWS has concluded that appreciable

reductions in the likelihood of survival and recovery of Indiana bats due to the construction, operation, and maintenance of I-69 from Evansville to Indianapolis, Indiana are unlikely to occur, and hence, the FHWA has ensured that their proposed action is not likely to jeopardize the continued existence of the Indiana bat or destroy or adversely modify designated critical habitat.

Our basis for this conclusion follows:

- Neither the additional forest impacts due to utility/billboard relocations (including those in the various individual hibernacula WAAs) nor the additional acres of wetland impacts are likely to adversely affect any of the known maternity colonies, hibernacula, male Indiana bats, or the local hibernating/swarming populations. The impacts will result in minimal, short-term loss of habitat with no direct take anticipated due to tree-clearing restrictions.
- Private landowner timber harvests that took place primarily in 2011, within and adjacent to the I-69 project right-of-way, were primarily a concern for the Little Clifty Maternity Colony. Based on model predictions, we do not believe that this activity has resulted in a long-term reduction of fitness (reproductive potential or survival) for this maternity colony.
- Although the selective harvesting activities may have reduced the number of snags present in an area, based on the existing amount of forested habitat in Section 4 and the average number of snags present, numerous snags will still be available in the area. Furthermore, in most instances, the harvested areas were strung throughout the colony area, and not concentrated in the colony's core.
- FHWA and INDOT have developed additional landowner correspondence and an additional conservation measure to specifically address the issue of private landowner tree clearing in the Action Area.
- In general, areas with less than 5% forest cover are not capable of sustaining an Indiana bat maternity colony. Currently, forest coverage (*i.e.* tree cover) in the maternity colonies ranges from 10.5% to 70% (estimates for tree cover loss at the colony with 10.5% tree cover is only 1 acre total); see Table B2 for tree cover estimates per colony. The construction of I-69 (and associated utility/billboard relocations) will directly reduce the total amount of forest habitat/tree cover available around each of the 16 known colonies and in some cases will cause small additional amounts to be indirectly lost by induced development. When combined, the percentages of existing tree cover that will be directly and/or indirectly impacted at each maternity colony is very small. Twelve of the 16 colonies will lose less than 1% of their tree cover, and the other four will lose 1.4%, 1.7%, 2.1%, and 2.6%; therefore, the total amount of forest loss is, we believe, insignificant for each colony. We do not anticipate any long-term reductions in maternity colony reproductive success or survival as a result of this loss.
- We do not believe that any of the 16 maternity colonies will be permanently displaced by the interstate; that is, sufficient quality and quantity of habitat will remain throughout the life of the project. In addition, the proposed 3:1 mitigation commitment for upland forest losses will largely be focused on improving forest habitats within these affected maternity colony areas, and thus, any adverse impacts from habitat loss will be temporary.

- We estimate the incidental take of Indiana bats **during the summer**, as a result of the proposed action, will be no more than 307 bats (261 females/juveniles and 46 males) spread over a 17-year long period. On an annual basis, this equates to about 18 bats being taken (largely as a result of harm or harassment, not mortality) per year, during the summer, throughout the entire project corridor. Table B4 in Appendix A breaks down the anticipated take by colony and males. This total take equates to less than 1% of the Indiana bat population that occupies these areas each summer.
- We estimate the proposed action will only directly or indirectly take a relatively small number of bats **during fall, winter and spring** (estimated total = 761 bats over a 17-year long period or about 44 bats/year; see Table B5) and will only have minimal, short-term effects on these bats' respective maternity colonies and hibernating populations. The estimated amount of yearly take represents only 0.05% of the *annual* winter population within the Action Area. Loss of these individuals will have no measurable effects on the viability of other maternity colonies in the region or the species' range or to hibernating populations to which these individuals belong. Again, the proposed action in combination with relatively small amounts of cumulative impacts/take is not reasonably expected, directly or indirectly, to cause an appreciable reduction in the reproduction, numbers or distribution of the Indiana bat at local, regional, range-wide scales.
- Mitigation and conservation efforts associated with the project will include over 2,200 acres of reforestation (with permanent protection) and the permanent conservation of an additional 4,000-plus forested acres, managed for the Indiana bat and other wildlife species. Reforestation and restoration efforts will more than offset the anticipated direct forest and wetland loss (including the acreage clear-cut by private landowners) and the additional acreage of forest preservation will ensure suitable bat habitat remains in the area in perpetuity.
- Permanent conservation easements have been placed on the fourth and sixth largest hibernacula in the state (Coon and Grotto Caves); protection of these Priority 1A hibernacula is very important for the long term protection and recovery of the species. Specifically, permanent protection at Coon Cave will eliminate the estimated take due to vandalism and human disturbance. Furthermore, permanent protection of both caves and their surrounding forests provides long-lasting protection of essential fall swarming habitat for the 38,000 Indiana bats that use these caves and eliminates future possibilities for this property to be developed.

# 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)].

**Since the Tier 1 Consultation, Tier 1 Revised PBO dated August 24, 2006, and the May 25<sup>th</sup>, 2011 Amendment to the Tier 1 RPBO, there have been additional refinements to the alignment for Sections 1, 2, 3, 4, and 5 and more accurate habitat impact calculations, as well as updated Indiana bat population estimates. Those numbers have been updated in this amended Incidental Take Statement (ITS);**

## **INDIANA BAT**

### **AMOUNT OR EXTENT OF TAKE**

The Service believes it is reasonably certain to anticipate that incidental take of Indiana bats will occur as a direct or indirect result of the Proposed Action in the following forms:

- death/kill and/or injury/wound from direct felling of occupied trees (during indirect/induced development),
- death/kill and/or injury/wound from direct collision with vehicles traveling on I-69 once it is operational (*i.e.*, roadkill),

- death/kill/wound/harassment of hibernating Indiana bats in unprotected Indiana bat hibernacula as an indirect result of project-induced population growth and increased vehicular accessibility to hibernacula areas,
- harassment of roosting bats 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, and
- harm through loss of roosting habitat such as primary and/or alternate roost trees, and loss of foraging habitat.

Based on our knowledge of the ecology of Indiana bats, and the distribution of Indiana bats within the Action Area of I-69, we assume that the habitat that will be lost will adversely affect the roosting and foraging habitat of Indiana bats.

Based on our analysis of the environmental baseline and effects of the proposed action, the Service anticipates that 16 Indiana bat maternity colonies occupy the Action Area and therefore may be impacted as a result of the proposed activities. The effect of the loss of foraging habitat is expected to result in the harm of some bats (*e.g.*, as the result of exposure to predation or overwinter mortality of bats that failed to store adequate fat reserves). Loss of roosting habitat and degradation of remaining habitat may also result in harm of individual bats. While some adverse effects are not expected to directly result in the death of bats, they may exacerbate the effects of other ongoing stressors on the bats. Collectively, the effects of the action are expected to result in behavioral or physiological effects which impair reproduction and recruitment, or other essential behavioral patterns. We anticipate take/death of individuals, decreased fitness of individuals, reduced reproductive potential, and reduced overwinter survival of a maximum of 307 Indiana bats within the Action Area during the summer and 761 Indiana bats during the fall, winter, and spring as detailed in Tables B4 and B5 in Appendix A, respectively. The effects on the 16 known maternity colonies may be lost reproductive capacity and potentially a short-term decline in their colony sizes. No significant, long-term adverse effects to affected maternity colonies are anticipated.

Construction of I-69 along the proposed 3C alignment and its associated actions is expected to result in the permanent loss of just over 2,000 acres of suitable summer foraging and roosting habitat (forest and wetlands) for Indiana bats, a decrease of approximately 165 acres from the 2006 Tier 1 RPBO estimate. Degradation of remaining habitat is also likely to occur from increased fragmentation and increased disturbance.

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. Therefore, the anticipated levels of take primarily are being expressed below as the permanent, direct loss of currently suitable summer roosting and foraging habitat and fall swarming and staging habitat in the Action Area for Indiana bats that will result from project implementation as estimated in the Tier 1 BA Addendum and subsequent Tier 2 BAs for Sections 1, 2, 3 and 4. Human vandalism and disturbance at the various hibernacula will be tracked via routine surveys and existing data loggers at most sites. Finally, the FHWA will

record and track any known Indiana bat roadkills to ensure that the anticipated amount of incidental take is not exceeded.

**Summer Action Area:**

Permanent direct loss of up to 1,973 acres of forest habitat and 30 acres of non-forested wetlands is anticipated. Approximate direct loss and exempted levels of take of Tier 2 forest within each project section is summarized in Table 1 below. New estimates were based on refinements detailed in Tier 2 Biological Assessments for Sections 1, 2, 3, 4 and 5; data from Table 3 of the Tier 1 BA Addendum was used for Section 6. The exempted level of take for forest habitat in Section 5 was increased from 303 acres in the Tier 1 RPBO ITS to 350 acres; expected loss of non-forested wetlands has been increased from 20 acres to 30 acres.

**Table 1.** Tier 1BA Addendum Estimated Direct Loss of Forest within the I-69 Summer Action Area and Revised Estimates for Forest Loss based on Tier 2 numbers.

<b>Project Section</b>	<b>Tier 1 BA Addendum Estimated Direct Loss of Tier 2 Forest (acres)</b>	<b>Revised Tier 2 Estimated Direct Forest Loss (acres) including utility-related forest impacts*</b>
1	55	28
2	280	212
3	112	67
4	1,132	1,050
5	303	350**
6	266	266***
<b>Total</b>	<b>2,148</b>	<b>1,973</b>
*Sections 1-4 have been updated with the most current design information. The impacts in Sections 1-3 show the acreage of upland forest that was removed within the construction limits plus wetland forest and utility impacted forest. The impacts in Section 4 show the acreage of upland forest within the right-of-way plus wetland forest and utility impacted forest. Please note for the utilities in Section 4, an additional 2.5 acres was added in to provide a buffer since the data has not been field verified. The impacts in Section 5 include upland forest within right-of-way, the forested wetlands impacted, as well as the estimated utility and billboard impacts at that time. Section 6 reflects the same number that was estimated in the Tier 1 BA Addendum.		
** This is the revised requested amount of habitat impact; actual impact amount is currently estimated at 345		
***From Tier 2 Representative Alignment as described in the Tier 1 BA Addendum.		

**Winter Action Area (overlaps with Summer Action Area):**

Permanent direct loss of **up to** 1,248 acres of forest habitat surrounding the 15 known hibernacula (and expanded in areas where induced growth is likely) is anticipated (from the Tier 2 Section 5 BA and includes utility and billboard impacts). Approximate direct loss of Tier 2 forest within a 5-mile radius of each hibernaculum is summarized in Table 2 below. The sum of the individual acreages is greater than 1,248 acres because of a high degree of overlap among the impacted acres surrounding the hibernacula. Increases in exempted levels of take have been

made for Buckner Cave, Coon Cave, Grotto Cave, King Blair Cave, Sullivan Cave, and Salamander Cave.

<b>Hibernaculum Name</b>	<b>Current Estimated Direct Loss of Tier 2 Forest (acres)</b>	<b>2006 Tier 1 RPBO and Newly Revised (shaded) Levels of Take*</b>
Ozzy's Hole Cave:	556.98	694.10
Primitive Baptist Spring Cave:	498.49	611.60
Sexton Springs Cave:	431.72	574.20
Reeves Cave:	404.56	509.30
Ashcraft Cave :	452.52	474.10
Saltpeter Cave:	320.65	359.70
Leonard Springs Cave:	346.13	385.00
Buckner's Cave:	293.87	305
King Blair Cave System:	262.01	275
Grotto Cave:	99.26	110
Coon's Cave:	111.5	125
Salamander Cave:	84.26	95
Sullivan Cave:	57.03	70
Storm's Pit Cave:	0	0
Ray's Cave:	12.76	12.98**
<p>*Shading indicates the six hibernacula where estimated levels of take of forest habitat were amended per this 2013 Tier 1 Reinitiation Consultation. These amended impact amounts would have an additional 10% exceedance allowance added to them for reinitiaion requirement per the ITS. The remaining 2006 Tier 1 levels (non-shaded) include the 10% exceedance allowance.</p> <p>**Established during the 2011 Tier 1 Reinitiation</p>		

**Table 2.** Updated Estimated Direct Loss of Tier 2 Forest within a 5-mile radius of each Hibernaculum within the I-69 Winter Action Area Compared with Re-initiation threshold levels.

## **Roadkill:**

The Service anticipates that all bats that are struck by vehicles likely will be killed. The Service assumes that the annual number of deaths by vehicle collisions is not likely to exceed 21 Indiana bats per calendar year through the year 2030. The anticipated 5% mortality rate is not expected to commence until the highway is completely constructed and fully operational; some smaller percentage of bats may be impacted as significant portions are completed. It is likely that the anticipated amount of roadkill will be somewhat off-set when local traffic begins to divert to the interstate, therefore lowering roadkill along existing highways and local roads. Furthermore, it is likely that the impacts associated with Sections 5 and 6 will be significantly lower than the estimated 5% because the project involves an upgrade of an existing four-lane state highway as opposed to new construction, such as has occurred in Sections 1-4. Based on the best available scientific data, the actual number of Indiana bats that may be struck and killed from vehicles traveling on I-69 between Evansville and Indianapolis cannot be precisely quantified and dead bats will be difficult to locate once I-69 is operational. If more specific information becomes available, then this issue will be reexamined during the Tier 2 consultations and prudent adjustments will be made at that time.

## **EFFECT OF THE TAKE**

In the accompanying amendment to the Tier 1 RPBO, the Service determined that the aggregate level of anticipated take is not likely to result in jeopardy to Indiana bats or destruction or adverse modification of designated Critical Habitat (*i.e.*, Ray's Cave).

## **REASONABLE AND PRUDENT MEASURES**

The Service believes the following reasonable and prudent measures are necessary and appropriate to further minimize take of Indiana bats:

1. In the Tier 1 BA Addendum (also listed in the Tier 1 RPBO, pg. 16), the FHWA proposed to investigate and/or 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. The Service will take the necessary steps to ensure that the FHWA successfully implements all the conservation measures to the fullest extent practicable.
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.
3. All I-69 construction personnel and INDOT maintenance staff need to be made aware of potential issues concerning Indiana bats and construction and maintenance of I-69.

4. The FHWA needs to ensure that the impacts of take associated with future Tier 2 section-specific actions are appropriately minimized and that the exemption of incidental take is appropriately documented and anticipated levels of incidental take will not be exceeded nor will any new forms of take occur that were not anticipated in Tier 1 RPBO or the recent amendments (2011 and 2013) to the Tier 1 RPBO.

The Service believes that the measures above are necessary, appropriate, and reasonable for minimizing take of Indiana bats.

## **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 terms and conditions, which implement the reasonable and prudent measures. These terms and conditions are non-discretionary.

1. The FHWA must implement all proposed mitigation and conservation measures, as detailed in the revised “Tier 1 Forest and Wetland Mitigation and Enhancement Plan” and “Conservation Measures for Impacts to Threatened and Endangered Species” sections of the Tier 1 BA Addendum and Appendix B of the Tier 1 BA or alternative measures that are of equal or greater benefit to Indiana bats as developed in consultation with the Service during Tier 2 consultations.
2. FHWA will prepare an annual report detailing all conservation measures, mitigation efforts, and monitoring that have been initiated, are ongoing, or completed during the previous calendar year and the current status of those yet to be completed. The report will be submitted to the Service’s BFO by 31 January each year and reporting will continue for at least 5 years post-construction or until otherwise agreed to with the Service.

If proposed conservation measures or mitigation goals cannot be realized (e.g., lack of willing-sellers), then FHWA will investigate and propose alternative solutions that can be realized and are of equal or greater benefit to Indiana bats within the Summer and Winter Action Areas.

3. All I-69 engineering supervisors, equipment operators, and other construction personnel and INDOT (and/or concessionaire) maintenance staff will attend a mandatory environmental awareness training that discloses where known sensitive Indiana bat sites are located in the project area, addresses any other concerns regarding Indiana bats, and presents a protocol for reporting the presence of any live, injured, or dead bats observed or found within or near the construction limits or right-of-way during construction, operation, and maintenance of I-69.
4. To ensure that the impacts of take associated with future Tier 2 project-section specific action are appropriately minimized and that the exemption of incidental take is appropriately documented, the U.S. Fish and Wildlife Service has or will prepare an individual Tier 2 BO for each of the six Tier 2 Sections for which we conclude will be

likely to adversely affect the Indiana bat (*Myotis sodalis*) and/or bald eagle (*Haliaeetus leucocephalus*). The Tier 2 BO for a Section will be a stand-alone document that “tiers” back to the Tier 1 Revised Programmatic BO (as amended), rather than being physically appended to it as previously described.

While conducting each of the Section-specific “second tier” consultations, the Service has or will ensure that each action proposed under I-69’s programmatic-level design standards (1) are consistent with the previously evaluated standards and conservation commitments (2) will have the effects anticipated during the landscape/programmatic-level analysis, that is, that there is nothing unusual about the proposed Section-specific project that will result in unanticipated impacts, and (3) that the environmental baseline will be appropriately updated.

As previously proposed, the Service has or will review the information provided by FHWA and INDOT within each of the Tier 2 Biological Assessments (BAs) for each I-69 Section. We will (1) confirm the species that may be affected, (2) assess how the action may affect the species, including ensuring that the level of effect is commensurate with the effects contemplated in the Tier 1 programmatic-level BO (as amended), and (3) verify the current tally of the cumulative total of incidental take that has occurred to date is below the levels anticipated in the 2006 programmatic incidental take statement (ITS) as amended (2011 and 2013). During this review, if it is determined that an individual Section of I-69 is not likely to adversely affect listed species, the Service has or will complete its documentation with a standard concurrence letter stating that the Service concurs that the proposed project Section is not likely to adversely affect listed species or designated critical habitat. The concurrence letter will refer to the Tier 1 Revised Programmatic BO (*i.e.*, it “tiers” to it), and specify that the Tier 2 BA is consistent with the analysis underlying the Tier 1 Revised Programmatic BO (as amended). However, if information presented in a Tier 2 BA establishes that the proposed Section-specific actions are likely to adversely affect listed species or designated critical habitat, then the Service will complete a Tier 2 BO along with a Section-specific ITS. No incidental take shall be exempted until after a Tier 2 BA has been reviewed and has been found to be consistent with Tier 1 in a Section-specific concurrence letter, or until a Section-specific Tier 2 BO and ITS have been completed by the Service.

Because acreages of lost Indiana bat habitat are being used as a surrogate to monitor levels of incidental take within the entire Action Area as well as within each Tier 2 Project Section and 5-mile radius around each known hibernaculum, the FHWA will provide the Service's Bloomington Field Office with a detailed description of each project section’s contribution to habitat loss by preparing a Tier 2 Biological Assessment for each project section. The Tier 2 Biological Assessments must include: maps of the preferred final alignment and all associated development; methods and results of Tier 2 mist net surveys, radio-tracking studies, roost tree emergence counts, and hibernacula surveys; exact locations of all known and newly discovered Indiana bat roost trees and hibernacula (hibernacula location maps must identify known hydrologically connected surface streams and sinkholes and their drainage basins and delineate approximate boundaries of potential recharge areas for each hibernaculum within the Action Area in relation to I-69’s direct and indirect impacts as identified during Tier 2 and previous

studies); the total acreages and relative quality of forest (e.g., maturity of forest/estimated dbh of live canopy trees and estimated suitability for roosting/estimated number and dbh of snags) and wetland habitats that will be directly impacted and permanently cleared/filled; and all other anticipated project section-specific impacts. Tier 2 BAs must also describe any additional direct or indirect effects that were not considered during the Tier 1 programmatic-level consultation. To reduce redundancy, Tier 2 BAs should summarize or simply reference sections of the Tier 1 BA and BA Addendum that would otherwise be repetitive.

Each Tier 2 BA must quantify how the individual Tier 2 project section's direct impact acres contribute to the estimated project section-specific and hibernacula-specific acres (see Tables 1 and 2 above) as well as to the project-wide forest acres (currently estimated to be 1,973 ac.) and non-forested wetland acres (30 ac.) as specified in the AMOUNT OR EXTENT OF TAKE section above. The Tier 2 BAs should also report how much total acreage remains for the overall I-69 project and within each project section in the SAA and hibernacula in the WAA (*i.e.*, provide the running totals and the remaining balances for these exempted levels of take).

FHWA's cover letters requesting project-section specific ESA Section 7 reviews must include a determination of whether or not the proposed project is consistent with the Tier 1 Programmatic Biological Opinion and Incidental Take Statement (as amended) and request a Section-specific concurrence letter or initiation of Formal Consultation resulting in a Section-specific Tier 2 BO and ITS. The cover letter, and one bound hard copy and an electronic copy of the Tier 2 BA should be submitted to the BFO when requesting a project section review.

5. Any dead bats located within the construction limits, right-of-way, rest stops, or mitigation areas of I-69, regardless of species, should be immediately reported to BFO [(812) 334-4261], and subsequently transported (frozen or on ice) to BFO. No attempt should be made to handle any live bat, regardless of its condition; report bats that appear to be sick or injured to BFO. BFO will make a species determination on any dead or moribund bats. If an Indiana bat is identified, BFO will contact the appropriate Service Law Enforcement office as required.

The FHWA will keep track of all known Indiana bats killed from vehicle collisions to ensure that the anticipated amount of incidental take, 21 killed per calendar year, is not exceeded.

**ATTENTION:** If at any point in time during this project, the exempted project-wide or section-specific, or hibernacula-specific habitat acreages or annual number of roadkilled bats quantified in the AMOUNT OR EXTENT OF TAKE section of this ITS are exceeded by more than 10%, then the Service will assume that the exempted level of take for this project may have been exceeded and the FHWA should immediately reinstate formal consultation.

In conclusion, the Service believes that the permanent loss of currently suitable summer roosting and foraging habitat for Indiana bats will be limited to a maximum of 1,973 acres of forest habitat and 30 acres of non-forested wetlands within the Summer Action Area (the portion of the Action Area used by the Indiana bat in the summer) and including 1,248 acres of forest habitat (including utility and billboard impacts) that also falls within the Winter Action Area (portion of the Action Area used by the Indiana bat during the fall, winter, and spring). These acreages represent approximately a 1% loss of the SAA's forested acreage and a 1% loss of the WAA's forested acreage and will occur over a period of at least several years. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded (or tree clearing occurs during the period April 1-September 30 in the SAA or April 1-November 15 within the WAA any given year) 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**

1. Working with the Service, develop national guidelines or best management practices for addressing Indiana bat issues associated with FHWA projects within the range of the Indiana bat, including measures to avoid and minimize private landowner impacts to the species prior to state and/or federal acquisition.
2. Provide funding to expand on scientific research and educational outreach efforts on Indiana bats in coordination with the Service's BFO.
3. In coordination with the BFO, purchase or otherwise protect additional Indiana bat hibernacula and forested swarming habitat in Indiana.

4. Provide funding to staff a full-time Indiana bat Conservation Coordinator position within the BFO, which has the Service's national lead for this wide-ranging species.
5. Provide funding for research to address White Nose Syndrome in bats.

### BALD EAGLE

1. Working with the Service, develop guidelines for addressing Bald Eagle issues associated with FHWA projects in the Midwest.
2. Provide funding to implement a bald eagle post-delisting monitoring plan in Indiana or throughout the Midwest.
3. Expand on educational and outreach efforts on bald eagles in Indiana.

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 the reinitiation of formal programmatic consultation with FHWA on the construction, operation, and maintenance 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











## Appendix B

### Population Model Runs using the Thogmartin et al. 2013 model.

The scenario was run 10,000 times with and without the project. We assume WNS is present in the area in 2011 and population impacts begin in 2014 (model uses the Indiana bat specific assumptions). We assessed whether or not the take of 3 adult females and 12 pups from an occupied roost tree during private landowner harvests in the maternity colony area resulted in long-term fitness reductions for that colony.

	<b>WITHOUT project (Scen2)</b>	<b>WITH project (Scen1)</b>	<b>% Difference</b>
Median population size at year 50	0	0	<b>0</b>
Probability of extirpation by year 50	0.76	0.79	4.0
Probability of extirpation by year 25	0.46	0.51	9.0
Mean years to extirpation	23.5	24.0	2.0
Median years to extirpation	21	22	5.0
Median growth rate at year 50	0	0	0

**Conclusion:** Model projections of a maternity colony that begins with 80 females and 80 pups and loses 3 adult females and 12 pups in 1 year are similar with or without these losses. These model projections (using the Indiana bat assumptions for WNS) predict a 76 percent chance of extirpation by year 50 with the project and 79 percent chance without the project; the percent difference between the two scenarios at 25 years is higher, indicating that over time the project impacts are lessened. The years to extirpation with or without the project are very similar, and 0 growth rate is expected at year 50, with or without the project. WNS essentially drives the population to extirpation with the project having minimal impacts on the probability or time to extirpation.

# Appendix C



## INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

100 North Senate Avenue  
Room N758  
Indianapolis, Indiana 46204

PHONE: (317) 234-7248

Michael R. Pence, Governor  
Brandye Hendrickson, Interim  
Commissioner

July 9, 2013

### Important Message to Property Owners Regarding the Endangered Species Act

Dear Landowner:

The Indiana Department of Transportation (INDOT) is in the process of completing the environmental studies for Section 5 of the I-69 Evansville to Indianapolis Project and has begun survey work in the area near State Road 37. This letter is intended to help update property owners within the I-69 Section 5 study area (from Bloomington to Martinsville) of important information pertaining to the Endangered Species Act (ESA). You are receiving this letter because your property is in the study area that may be directly or indirectly impacted by the Project.

INDOT, in consultation with the U.S. Fish and Wildlife Service, continues to survey and identify sensitive habitat for the endangered Indiana bat (*Myotis sodalis*). Many of the properties in the vicinity of SR 37, the general alignment of Section 5 of the I-69 project, contain forests that are or can be habitat for the endangered Indiana bat.

Although the alignment for Section 5 is not finalized, some property owners may be considering tree harvesting activities on their property. INDOT recommends that property owners become aware of potential restrictions on timing and other regulatory requirements such as federal penalties prior to commencing such activities.

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 and 4 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. (The northern portion of I-69 Section 5 shares this restriction.)
- For Sections 4 and 5 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.

[www.in.gov/dot/](http://www.in.gov/dot/)  
An Equal Opportunity Employer

INDOT encourages all landowners and loggers to act in accordance with the cutting restriction above to avoid harm to the Indiana bat. Please contact the Bloomington field office USFWS at 812-334-4261 with any questions or concerns about compliance with the Endangered Species Act or the Indiana bat.

Please contact the I-69 Section 5 Project office to discuss the Project location or if you are considering a tree-harvesting activity between April 1 and November 15 if your property is within the I-69 Section 5 Project area. The Project office is staffed Monday-Friday or by appointment and can be reached at 812-334-8869.

Sincerely,

A handwritten signature in cursive script that reads "Sandra A. Flum". The signature is written in black ink and is positioned above the printed name and title.

Sandra A. Flum  
Project Manager

## Appendix D

### Conservation Measures

The following conservation measures were jointly developed by the FHWA, INDOT, and the Service during informal consultation and were subsequently incorporated into the Tier 1 BA and the Tier 1 BA Addendum as part of the official Proposed Action for the I-69 project. Since conservation measures are part of the Proposed Action, their implementation is required under the terms of the consultation. These measures were specifically designed to avoid and minimize impacts of the proposed action on Indiana bats and bald eagles and to further their recovery. **The Service has analyzed the effects of the Proposed Action based on the assumption that all conservation measures will be implemented or equivalent measures developed in consultation with the Service during or following Tier 2.** The beneficial effects of the following measures were taken into consideration for both our jeopardy and incidental take analyses.

#### INDIANA BAT (*Myotis sodalis*)

##### A. CONTEXT SENSITIVE SOLUTIONS

###### *WINTER HABITAT*

- 1. Alignment Planning** - Efforts will be made to locate Interstate alignments beyond 0.5 miles from known Indiana bat hibernacula.
- 2. Blasting** - Blasting will be avoided between September 15 and April 15 in areas within 0.5 miles of known Indiana bat hibernacula. All blasting in the Winter Action Area (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.
- 3. Hibernacula Surveys** – A plan for hibernacula surveys (caves and/or mines) will be developed and conducted in consultation with and approved by USFWS during Tier 2 studies.
- 4. Karst Hydrology** – To avoid and minimize the potential for flooding, dewatering, and/or microclimate (i.e., temperature and humidity) changes within hibernacula, site-specific efforts will be made to minimize changes in the amount, frequency, and rate of flow of roadway drainage that enters karst systems that are determined to be hydrologically connected to Indiana bat hibernacula.

###### *AUTUMN/SPRING HABITAT*

- 5. Tree Removal** – To minimize adverse effects on bat habitat, tree (three or more inches in diameter) cutting will be avoided within five miles of a known hibernaculum. If unavoidable, cutting will only occur between November 15 and March 31.

## *SUMMER HABITAT*

**6. Alignment Planning** - Efforts will be made to locate Interstate alignments so they avoid transecting forested areas and fragmenting core forest where reasonable.

**7. Tree Removal** - Tree and snag removal will be avoided or minimized as follows:

**a. Tree Cutting** - To avoid any direct take of Indiana bats, no trees with a diameter of 3 or more inches will be removed between April 15 and September 15. Tree clearing and snag removal will be kept to a minimum and limited to within the construction limits. In the median, outside the clear zone, tree clearing will be kept to a minimum with woods kept in as much a natural state as reasonable. Forested medians will be managed following IDNR State Forest timber management plan.

**b. Mist Netting** - In areas with suitable summer habitat for the Indiana bat, mist net surveys will be conducted between May 15 and August 15 at locations determined in consultation with the USFWS as part of Tier 2 studies. If Indiana bats are captured, some will be fitted with radio transmitters and tracked to their diurnal roosts for at least 5 days unless otherwise determined by USFWS.

**8. Bridges** – Bridges will include the following design features:

**a. Surveys** – The undersides of existing bridges that must be removed for construction of I-69 will be visually surveyed and/or netted to determine their use as night roosts by Indiana bats during the summer.

**b. Bat-friendly bridges** – Where feasible and appropriate, Interstate and frontage road bridges will be designed to provide suitable night roosts for Indiana bats and other bat species in consultation with the USFWS.

**c. Floodplains** – Where reasonable and appropriate, floodplains and oxbows will be bridged to protect environmentally sensitive areas. The Patoka River floodplain will be bridged in its entirety, thus minimizing impacts to many different habitats.

**9. Stream Relocations** – Site-specific plans for stream relocations will be developed in design considering the needs of sensitive species and environmental concerns. Plans will include the planting of woody and herbaceous vegetation to stabilize the banks. Such plantings will provide foraging cover for many species. Stream Mitigation and Monitoring plans will be developed for stream relocations, as appropriate.

## *ALL HABITATS*

**10. Medians and Alignments** – Variable-width medians and Independent alignments will be used where appropriate to minimize impacts to sensitive and/or significant habitats. Context sensitive solutions will be used, where possible. This may involve vertical and horizontal shifts in the Interstate.

**11. Minimize Interchanges** - Efforts have been made to limit interchanges in karst areas, thereby limiting access and discouraging secondary growth and impacts. In Tier 2, further consideration will be given to limiting the location and number of interchanges in karst areas.

**12. Memoranda of Understandings (MOUs)** - Construction will adhere to the Wetland MOU (dated January 28, 1991) and Karst MOU (dated October 13, 1993). The Wetland MOU minimizes impacts to the Indiana bat by mitigating for wetland losses, and creating bat foraging areas at greater ratios than that lost to the project. The Karst MOU avoids and minimizes impacts to the Indiana bat by numerous measures which protect sensitive karst features including hibernacula.

**13. Water Quality** - Water contamination will be avoided/minimized by the following:

**a. Equipment Service** - Equipment servicing and maintenance areas will be designated to areas away from streambeds, sinkholes, or areas draining into sinkholes.

**b. Roadside Drainage** - Where appropriate in karst areas, roadside ditches will be constructed that are grass-lined and connected to filter strips and containment basins. U.S. Fish and Wildlife Service 18

**c. Equipment Maintenance** - Construction equipment will be maintained in proper mechanical condition.

**d. Spill Prevention/Containment** – The design for the roadway will include appropriate measures for spill prevention/containment.

**e. Herbicide Use Plan** - The use of herbicides will be minimized in environmentally sensitive areas, such as karst areas that are protective of Indiana bats and their prey. Environmentally sensitive areas will be determined in coordination with INDOT and, as appropriate, INDOT consultants. Appropriate signage will be posted along the interstate to alert maintenance staff.

**f. Revegetation** - Revegetation of disturbed areas will occur in accordance with INDOT standard specifications. Woody vegetation will only be utilized beyond the clear zone. Revegetation of disturbed soils in the right-of-way and medians will utilize native grasses and wildflowers, as appropriate, similar to the native seed mixes of other nearby states.

**g. Low Salt Zones** – A low salt and no spray strategy will be developed in karst areas for this project. A signing strategy for these items will also be developed. The low salt zones will be determined in coordination with INDOT.

**h. Bridge Design** – Where feasible and appropriate, bridges will be designed with none or a minimum number of in-span drains. To the extent possible, the water flow will be directed towards the ends of the bridge and to the riprap drainage turnouts.

**14. Erosion Control** - Temporary erosion control devices will be used to minimize sediment and debris. Timely revegetation after soil disturbance will be implemented and monitored. Revegetation will consider site specific needs for water and karst. Erosion control measures will be put in place as a first step in construction and maintained throughout construction.

**15. Parking and Turning Areas** – Parking and turning areas for heavy equipment will be confined to sites that will minimize soil erosion and tree clearing, and will avoid

environmentally sensitive areas, such as karst.

**16. Avoid and minimize impacts from private landowner harvests within the right of way** - The goal of the measure is to avoid and minimize impacts from private landowner harvests by working with property owners within the right of way who plan to harvest their property. FHWA and INDOT propose to develop an voluntary agreement with the interested landowners, such as a “right of entry” agreement or other type of covenant, to pay the landowner to limit the time of year in which they harvest their property; this time period would be limited to the late fall and winter when Indiana bats are not present in the forested areas.

## **B. RESTORATION / REPLACEMENT**

### *SUMMER HABITAT*

**1. Summer Habitat Creation / Enhancement** - Indiana bat summer habitat will be created and enhanced in the Action Area through wetland and forest mitigation focused on riparian corridors and existing forest blocks to provide habitat connectivity. The following areas and possibly others will be investigated for wetland and forest mitigation to create and enhance summer habitat for the Indiana bat: Pigeon Creek, Patoka River bottoms, East Fork of the White River, Thousand Acre Woods, White River (Elnora), First Creek, American Bottoms, Garrison Chapel Valley, Beanblossom Bottoms, White River (Gosport), White River (Blue Bluff), and Bradford Woods. In selecting sites for summer habitat creation and enhancement, priority will be given to sites located within a 2.5 mile radius from a recorded capture site or roost tree. If willing sellers cannot be found within these areas, other areas may be used as second choice areas as long as they are within the Action Area and close enough to benefit these maternity colonies, or are outside the Action Area but still deemed acceptable to the USFWS. Where appropriate, 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.

**2. Wetland MOU** - Wetlands will be mitigated at ratios agreed upon in the Wetland MOU (dated January 28, 1991). Wetland replacement ratios are as follows:

- a. Farmed 1 to 1
- b. scrub / shrub and palustrine / lacustrine emergent 2 - 3 to 1 depending upon quality
- c. bottomland hardwood forest 3 – 4 to 1 depending upon quality
- d. exceptional, unique, critical (i.e. cypress swamps) 4 and above to 1 depending upon quality.

**3. Forest Mitigation** - The Tier 1 Forest and Wetland Mitigation and Enhancement Plan identifies the general location of potential mitigation sites for upland and bottomland forests. Preference will be given to areas contiguous to large forested tracts that have recorded federal and state listed species. The actual mitigation sites implemented will be determined in or following Tier 2 in consultation with the Service and other environmental review agencies. Coordination with the environmental review agencies will assure that these forest mitigation sites are strategically situated in biologically attractive ecosystems. Forest impacts will be mitigated at a ratio of 3 to 1. All forest mitigation lands will be protected in perpetuity via conservation easements. The 3:1

forest mitigation may not be located entirely within the Action Area. 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.

## **C. CONSERVATION / PRESERVATION**

### *WINTER HABITAT*

**1. Hibernacula Purchase** - Opportunities will be investigated to purchase at fair market value from “willing sellers,” an Indiana bat hibernaculum(a) including associated autumn swarming/spring staging habitat. After purchase and implementation of all management efforts, the hibernaculum(a) and all buffered areas will be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements.

**2. Hibernacula Protection** – With landowner permission, investigations will be coordinated with the USFWS on acquiring easements to erect bat-friendly angle-iron gates at cave entrances. These gates prevent unauthorized human access and disturbance of hibernacula, while maintaining free airflow within the hibernacula within the Action Area. Gates will be constructed according to designs from the American Cave Conservation Association. Effects of gates on water flow and flash flooding debris will be carefully evaluated before and after gates are installed. Other structures (e.g., perimeter fencing) or techniques (e.g., alarm systems and signs) may also be used.

### *AUTUMN/SPRING HABITAT*

**3. Autumn/Spring Habitat Purchase** - Any hibernaculum(a) purchased as part of conservation for Indiana bat winter habitat will include associated autumn swarming/spring staging habitat to the maximum extent practicable. Any purchase will be from a willing seller at fair market value. In addition, some parcels containing important autumn swarming/spring staging habitat may be acquired near key hibernacula regardless of whether the hibernacula are acquired themselves. Any acquired autumn swarming/spring staging habitat would be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements. The purchase of forest would be included as part of the 3:1 mitigation in Measure B.3.

### *SUMMER HABITAT*

**4. Summer Habitat** - Investigations will be coordinated with the USFWS on purchasing lands at fair market value in the Action Area from “willing sellers” to preserve summer U.S. Fish and Wildlife Service 21 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.

## **D. EDUCATION / RESEARCH / MONITORING**

### *WINTER HABITAT*

**1. Monitor Gated Caves** - All caves that have gates erected as mitigation for this project will have their temperature, humidity, bat activity and populations monitored before and for three years after gate installation. Infra-red video monitoring or other techniques deemed acceptable by USFWS will be conducted for a minimum of two nights in the appropriate season at each newly installed cave gate to ensure the bats are able to freely ingress and egress. Data acquisition will use a number of data loggers minimizing the need for entry into these caves. All precautionary measures will be taken to minimize potential impacts to hibernating Indiana bats.

**2. Cave Warning Signs** - Where deemed appropriate by USFWS, the following may be done: signs will be posted that warn the public and discourage cave entry at hibernacula within/near the Action Area. Signs should be placed so that they do not block air flow into the cave and do not draw attention to the entrance and attract violators (USFWS 1999). Also, light-sensitive data loggers may be placed within the caves to assess the effectiveness of the warning signs at deterring unauthorized entries. Permission from the landowners must be obtained before erecting such signs and installing data loggers.

**3. Biennial Census** – Total funding of \$50,000 will be provided to supplement the biennial winter census of hibernacula within/near the proposed Action Areas. Funding will be made available in consultation with the USFWS.

**Status Report – To be completed.**

### *AUTUMN/SPRING HABITAT*

**4. Autumn/Spring Habitat Research** - Total funding of \$125,000 will be provided 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. Funding will be made available as soon as practical after Notice to Proceed is given to the construction contractor for the applicable Tier 2 Section (or earlier).

### *SUMMER HABITAT*

**5. Mist Netting** - A work plan for surveying, monitoring, and reporting will be developed and conducted in consultation with and approved by USFWS. This mist netting effort will be beyond the Tier 2 sampling requirements. Fifty mist netting sampling sites are anticipated. Monitoring surveys focused at each of the 13 known maternity colonies 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.

### *GENERAL*

**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. Funding would be provided after a Notice to Proceed is issued for construction of the first section of the project.

**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.

**8. Access to Patoka 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.

**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 being made available from a server accessed on the IGS website at IU: <http://igs.indiana.edu/arcims/statewide/index.html>. In addition, detailed GIS forest data (five meter resolution) has been developed for the 13 maternity colony foraging areas (circles with 2.5 mile radius) and WAA. This data was developed in order to better determine habitat impacts to the Indiana bat. This is the most accurate and detailed forest data known to exist for those areas. This data could potentially be used by USFWS, other government agencies, or students to examine effects on the Indiana bat, other species, or ecosystems over time.