



I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES

Section 5—Final Environmental Impact Statement

**APPENDIX LL2
Redacted Section 5 Tier 2 Biological Opinion**



U.S. Department
of Transportation
**Federal Highway
Administration**

Indiana Division

May 20, 2013

575 N. Pennsylvania Street, Room 254
Indianapolis, IN 46204
317-226-7475

In Reply Refer To:
HAD-IN

Mr. Scott Pruitt, Supervisor
U.S. Fish & Wildlife Service
Bloomington Field Office
620 South Walker Street
Bloomington, Indiana 47403-2121

Dear Mr. Pruitt:

The Federal Highway Administration (FHWA) and the project applicant, Indiana Department of Transportation (INDOT) request that the U.S. Fish and Wildlife Service (Service) reinstate formal consultation on the Evansville to Indianapolis I-69 project (Tier 1) for the Indiana bat (*Myotis sodalis*).

FHWA, in cooperation with INDOT, completed a Tier 1 Final Environmental Impact Statement (FEIS) for the proposed Indianapolis to Evansville I-69 Project in December 2003. The FEIS evaluated five alternative routes and their associated variations through the southwestern portion of Indiana. FHWA issued a Record of Decision (ROD) for the project on March 24, 2004, selecting Alternative 3C, which traverses portions of Gibson, Warrick, Pike, Daviess, Greene, Monroe, Morgan, Johnson, and Marion counties in Indiana.

During the Tier 1 study, FHWA engaged in Section 7 consultation with the Service. FHWA submitted a draft Biological Assessment (BA) to the Service on March 26, 2003. The BA analyzed impacts of the I-69 Project on three listed species: the Indiana bat, bald eagle, and eastern fanshell mussel. The Service provided comments on the Draft BA to FHWA and INDOT on May 30, 2003. FHWA revised the BA and submitted the Final BA to the Service on July 18, 2003. On December 3, 2003, the Service issued the Tier 1 Biological Opinion (Tier 1 BO), concluding that the project was not likely to adversely affect the eastern fanshell mussel, and that any effects to the Indiana bat and bald eagle were not likely to jeopardize the continued existence of these species.

In 2004 and 2005, FHWA and INDOT completed field surveys for the Indiana bat along the approved project corridor that identified thirteen (13) maternity colonies and two hibernacula not previously identified in the BA or by the Service. FHWA prepared an Addendum to the Tier 1 BA and submitted it to the Service on March 7, 2006, together with a request to reinstate formal consultation in order to evaluate the new information relating to the Indiana bat. After considering the information in the BA Addendum, the Service issued a Final Tier 1 Revised BO on August 24, 2006. In the Tier 1 Revised BO, the Service affirmed its previous conclusion that the I-69 Project was not likely to jeopardize the continued existence of the species.

In 2010, pre-construction mist netting captured a male Indiana bat in Section 4. Radio-telemetry showed this bat roosting in two live trees and a snag. The snag was located within the proposed right-of-way. Roost tree emergence counts showed this snag to be a primary roost. As recommended by the Service,

FHWA and INDOT established the Little Clifty Branch Maternity Colony at this location which is southwest of SR 45. On April 11, 2011 FHWA requested re-initiation of formal consultation on the Tier 1 Revised BO because of this finding. On May 25, 2011 USFWS issued an Amendment to the Tier 1 Revised BO. This Amendment addressed the additional colony (a total of 14 colonies) as well as new information that was available on white nose syndrome.

FHWA has also completed formal consultation for four Tier 2 Projects. The Service has reviewed Tier 2 BAs on Sections 1, 2, 3 and 4 and has issued Tier 2 BOs for each of those projects, concluding that the potential impacts of each of the four projects to the Indiana bat are consistent with the impacts predicted in the Tier 1 Revised BO (for Sections 1, 2, 3, which were completed prior to the Amendment) and Amendment to the Tier 1 Revised BO (for Section 4, which was completed after the Amendment), and that these Tier 2 Sections were not likely to jeopardize the continued existence of the Indiana bat. The FHWA has issued a ROD for Sections 1, 2, 3 and 4. At this time, most of the forest cover within the right-of-way for these Sections has been removed and Sections 1, 2, and 3 are open to traffic. Currently, construction is still ongoing in Section 4 within portions of Greene and Monroe Counties.

FHWA also has requested formal consultation on the fifth Tier 2 Project, Section 5, with the submittal of the Section 5 Tier 2 BA on December 19, 2012.

Upon the recommendation of the Service, FHWA is requesting the re-initiation of formal Tier 1 Section 7 consultation regarding the Indiana bat (*Myotis sodalis*), followed by issuance of a Tier 2 BO for Section 5. The re-initiation of Tier 1 Section 7 consultation is requested for the following three items:

1. Additional Maternity Colonies
2. Exempted Levels of Take
3. Documentation for Private Property Owner Tree Clearing in Section 4

Additional Maternity Colonies

As stated in the Section 5 Tier 2 BA, Indiana bat presence surveys in 2012 captured a pregnant female Indiana bat in Section 5. Radio-telemetry showed this bat roosting in two snags. Roost tree emergence counts showed these snags to be primary roosts. As recommended by the Service, 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 Service conducted a bat survey for the Sycamore Land Trust at the Beanblossom Bottoms Nature Preserve. Three Indiana bats were captured and tracked to three different roosts. As recommended by the Service, FHWA and INDOT included 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.

Exempted Levels of Take

Exempted levels of take for 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 Amendment to the Tier 1 Revised BO. Based on more up-to-date information on project impacts, some of these exempted levels of take are being approached or exceeded. This is primarily due to estimated impacts due to relocations of utilities and billboards which were not included in the original Tier 1 Revised BO thresholds. The levels of take requested below provide a more refined estimate that takes into

account the additional utility and billboard impacts. FHWA is requesting the following increases in exempted level of take for habitat impacts:

Tier 1 Non-forested Wetlands

In the Tier 1 Revised BO the exempted level of take for non-forested wetlands was 20 acres. Current estimates (including all Sections) show a total of 27.7 acres of non-forested wetland impacts, which exceeds this exempted level of take. FHWA and INDOT would like to request an increase in this exempted level of take to 30 acres of non-forested wetland impacts to account for uncertainty related to future impacts. FHWA and INDOT will continue to minimize and avoid impacts to all wetland types. It is noted that the total wetland impacts including all types have been reduced from the total Tier 1 BA Addendum estimate of 120 acres to a current estimate of 63 acres. Current wetland impact estimates are approximately half of the Tier 1 BA estimate, with the reduction primarily to forested wetlands.

Section 5 Total Forest

The Tier 1 exempted level of take for total forest for Section 5 is 303 acres. This did not include utility or billboard impact estimates. Estimates in Section 5 show 254.57 acres of total forest impacted by the Draft Environmental Impact Statement (DEIS) Preferred Alternative right-of-way. An additional 75 acres of forests are estimated to be impacted by utility relocations. Also, an additional 15 acres of forests are estimated to be impacted by billboard relocations and to accommodate access to them. This totals approximately 345 acres, which exceeds the 303 acre exempted level of take. The entire project has been below the estimated total impacts assumed in the Tier 1 Revised BO. In Sections 1 – 4, project right-of-way and utility impacts are approximately 146 acres below the Tier 1 Revised BO thresholds which only included right-of-way estimates. Adding the additional 42 acres over the limit assumed in the Tier 1 Revised BO for Section 5, then overall the Project has affected 105 fewer acres than assumed in the Revised Tier 1 BO. FHWA and INDOT would like to request an increase in this exempted level of take to 350 acres of total forest impacts for Section 5 to account for uncertainty related to future utility impacts.

Tier 1 Hibernacula Forest

Individual hibernacula Winter Action Area (WAA) circles have their own Tier 1 exempted levels of take. Additionally, FHWA and INDOT are concerned that right-of-way and future utility impacts could cause these exempted levels of take to be exceeded for some of the hibernacula in Section 5. FHWA and INDOT would like to request the hibernacula exempted levels of take increases listed below to account for uncertainty related to future utility impacts. Please see Table 1 (attached) showing the current hibernacula impacts including DEIS Preferred Alternative 8 right-of-way, utility, and billboard estimates. The following hibernacula WAA circle impacts approach or exceed the take presented in the Tier 1 Revised BO. The requested level of take listed below was determined by adding 10 acres to the estimated impacts and rounding up to the nearest 5 acres. Please note the impact acreages noted below are not additive because there is significant overlap of the hibernacula WAA circles.

Hibernaculum WAA	Estimated Impacts	Requested Level of Take
	293.87 ac	305 ac
	111.5 ac	125 ac
	99.26	110 ac

	262.01 ac	275 ac
	57.03 ac	70 ac
	84.26 ac	95 ac

Private Property Owner Tree Harvesting Activities in Section 4

Prior to INDOT's land acquisition activities for the Section 4 project, some private landowners chose to harvest trees on their land. This harvest activity occurred both within the area to be acquired by INDOT as part of the right-of-way for the project and some activity occurred outside of the planned right-of-way. Neither FHWA nor INDOT approved, consented to or condoned harvesting activities on the private land involved. The project does not have access to the private property where harvesting activity reportedly occurred to document the extent of private enterprise. In March 2011, INDOT sent out a letter to all registered logging companies to curtail any distribution of misinformation regarding tree harvesting. These letters indicated that seasonal tree-clearing guidelines had been adopted by INDOT for the entire project area in order to protect the Indiana bat and encouraged all logging companies and local landowners to adhere to these guidelines and to contact the USFWS for more information. In April 2011 INDOT posted an open letter to land owners on the I-69 project website. The letter discouraged tree clearing outside of the dates in INDOT's environmental commitment. Subsequently in June 2011, the USFWS issued a letter to all local landowners in Section 4 advising them of the presence of the Indiana bat in the area and ways to avoid potentially taking the species (Please note these letters are included in Appendix C of the Section 4 Tier 2 BO). In addition, the Section 5 Tier 2 BA includes the following commitment, "Should USFWS so desire, INDOT and FHWA will assist USFWS in distributing letters to the property owners in the Section 5 corridor designed to increase awareness of the impact of tree harvesting on Indiana bats. INDOT will also send a letter to each property owner in the right-of-way, stating that INDOT is not working with any logging companies in the development of I-69. It is anticipated that these letters would be distributed in early 2013 to assure owners are informed early in the process. This information should prevent any confusion on the part of the landowners that INDOT advocates, condones or permits logging on the property prior to the time when INDOT purchases the property for the Project. INDOT and FHWA will also work with USFWS to identify logging activities within the project area, and INDOT will notify USFWS of any logging activity discovered. This notice will allow USFWS to take appropriate action under the ESA as warranted."

The USFWS, during ongoing consultation and meetings with FHWA, has stated that USFWS has determined that it must consider the impact of harvest activities conducted by private property owners on their property prior to acquisition of the property by INDOT as part of the Tier 1 baseline and jeopardy analysis. FHWA has attempted to gather information relating to this pre-acquisition harvest activity as requested by USFWS. 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.

Tables 2 and 3 (attached) contain the results of this information gathering exercise. The number of acres estimated to be harvested have not been confirmed in the field. Without access to the private land, information in the tables is based on an assumption that the entire deeded parcels were treated uniformly by the private owners, so if logging occurred on a portion of the parcel, the entire forested portion of the parcel is included in the table regardless of the amount of harvesting present. The numbers in the table

should be considered the maximum-estimate of acres affected by timber harvest reported in the area. Table 2 shows the estimated acres within the proposed right-of-way and outside of the proposed right-of-way for the parcels with forest acreage reportedly harvested. Table 3 shows the estimated forest acreage potentially harvested by Indiana bat maternity colony. Tables 2 and 3 include estimated impacts by selective cut and clear cut. For the purposes of this attempt to estimate harvest activities, the term selective cut indicates that individual trees were harvested from the property. Coordination with Jeremiah Lemmon, the Greene County IDNR District Forester, estimates that for the selective harvesting in the vicinity of the project, an average of 20 trees per acre were harvested or approximately 4.5% of the trees per affected acre (an average 444 growing stock trees per acre as estimated based on US Forest Service's "Indiana Forests in 1998"). It is important to note the data in Tables 2 and 3 are only estimates.

Upon the recommendation of the Service, FHWA is requesting the Re-Initiation of formal Tier 1 Section 7 consultation regarding the Indiana bat (*Myotis sodalis*). Because the new information triggering this request for re-initiation does not relate to either the eastern fanshell mussel (*Cyprogenia stegaria*) or the bald eagle (*Haliaeetus leucocephalus*), we also request that you confirm that the findings in the Revised Tier 1 BO relating to those species remain unchanged. Due to this request for re-initiation of formal consultation on the Tier 1 Revised BO and Amendment, FHWA and INDOT acknowledge that the schedule for the Tier 2 formal consultation for Section 5 that is currently underway will need to be extended. Based on our recent coordination, FHWA and INDOT agree that the completion date for the Section 5 formal consultation should be extended to June 14, 2013. Timeframes can be discussed further with USFWS during the consultation process.

Please send your response to the undersigned with a copy to Tom Cervone, Ph.D., Bernardin, Lochmueller & Associates, Inc., 6200 Vogel Rd., Evansville, IN 47715. Thank you for your time and consultation.

Sincerely,



Karen A. Bobo
Acting Division Administrator
Federal Highway Administration-Indiana Division

cc: Ms. Laura Hilden (INDOT)
Mr. Tim Miller (BLA, Indianapolis)

Table 1. Hibernacula Impacts as of February 2, 2013

Cave	Section 5 ROW Impacts	Section 5 Utility Forest (75 acres)	Section 5 Billboard Forest	Section 5 Total Forest	Total Forest Acres	TIRPBO	TIRPBO with 10% threshold	TIRPBO Remaining Acreage	TIRPBO with 10% threshold Remaining Acreage
	0	0	0	0	452.52	431	474.10	-21.52	21.58
	28.47	11.16	2.94	42.57	293.87	288	316.80	-5.87	22.93
	11.24	5.33	0.42	16.99	111.5	97	106.70	-14.5	-4.80
	27.19	10.25	2.94	40.38	99.26	98	107.80	-1.26	8.54
	14.13	5.26	0.42	19.81	262.01	238	261.80	-24.01	-0.21
	28.47	11.21	2.94	42.62	346.13	350	385.00	3.87	38.87
	0	0	0	0	556.98	631	694.10	74.02	137.12
	0	0	0	0	498.49	556	611.60	57.51	113.11
	0	0	0	0	12.76	11.8	12.98	-0.96	0.22
	27.91	10.4	0.42	38.73	404.56	463	509.30	58.44	104.74
	32.47	11.42	0	43.89	84.26	85	93.50	0.74	9.24
	39.13	13.91	0	53.04	320.65	327	359.70	6.35	39.05
	0	0	0	0	431.72	522	574.20	90.28	142.48
	0	0	0	0	0	0	0.00	0	0.00
	0	0	0	0	57.03	51	56.10	-6.03	-0.93

Table 2. Private Land Potentially Harvested (Based on Forested Acreage on Total Parcel)				
	Number of Parcels with Some Harvesting	Number of Forested Acres on Parcels with Some Harvesting	Number of Harvested Forest Acres within R/W	Number of Forested Acres Outside of R/W (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 3. Private Land Potentially Harvested within the Maternity Colonies
(Based on Forested Acreage on Total Parcel)**

Maternity Colony and Logging Type	Total of Forested Acres	Total of Forested Acres outside of ROW
Doan's Selective Cut	80	60
Doan's Clear Cut	0	0
Plummer Selective Cut	230	175
Plummer Clear Cut	0	0
Little Clifty Selective Cut	610	485
Little Clifty Clear Cut	55	40
Indian Creek Selective Cut	230	150
Indian Creek Clear Cut	65	40
Total	1,270	950

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.

Table 4. Comparison of Revised Tier 1 BO and Tier 2 Forest Impacts

Section	Forest Impacts in ROW (acres) (Revised Tier 1 BO, Table 3)	Forest Impacts* (acres)	Difference
1	55	34	21
2	280	243	37
3	112	73	39
4	1132	1037	95
5	303	229	74
6	266	266	0
TOTAL	2148	1882	266

Note: While there has been some logging of private lands on parcels adjacent to the I-69 ROW, the reduction in forest impacts resulting from the refined alternatives chosen for each of the 5 Sections for which an FEIS has been prepared off-sets acreage impact that may have occurred as a result of the private owners clear cutting their forest. Thus, it would appear that the impacts of private logging are consistent with the level of impact assumed in the Revised Tier 1 BO.

* Sections 1-4 have been updated with the most current design information, and include upland forest within the ROW plus forested wetland impacts. Section 5 includes total forest impacted in the ROW in the FEIS. Section 6 reflects the same number that was estimated in the Tier 1 BA Addendum.



United States Department of the Interior

Fish and Wildlife Service



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

June 11, 2013

Ms. Karen A. Bobo
Acting Division Administrator
U.S. Department of Transportation
575 North Pennsylvania Street, Room 254
Indianapolis, Indiana 46204

Dear Ms. Bobo:

The U.S. Fish and Wildlife Service (FWS) has reviewed the Federal Highway Administration's (FHWA) May 20, 2013 request for reinitiation of consultation for the Evansville to Indianapolis I-69 project (Tier 1) for the Indiana bat (*Myotis sodalis*). 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.

Pursuant to information provided in your Tier 2 Biological Assessment (BA) for Section 5 of the I-69 Indianapolis to Evansville highway extension project and new information regarding potential increases in habitat impacts, the U.S. Fish and Wildlife Service (FWS), Bloomington, Indiana Field Office will reevaluate the Tier 1 Revised Programmatic Biological Opinion (RPBO) dated August 24, 2006 and the 2011 Amendment to the RPBO and provide a second amendment to the document. The decision to amend the current Tier 1 opinion (including the 2011 Amendment) is primarily based on: 1) new impact information related to utility and billboard relocations in Section 5 which stretches from SR 37 on the south side of Bloomington in Monroe County to just south of SR 39, south of Martinsville in Morgan County; 2) the discovery of two new Indiana bat maternity colonies within the right of way of Section 5; 3) more accurate wetland delineation data which has revealed additional non-forested wetland impacts not realized using the Tier 1 data; and 4) information related to private landowner tree-

TIER 2 BIOLOGICAL OPINION

for

SECTION 5

of the

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

for the

FEDERALLY ENDANGERED INDIANA BAT

traversing portions of

MONROE and MORGAN COUNTIES, INDIANA

Submitted to the Federal Highway Administration

July 25, 2013

Prepared by:

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EXECUTIVE SUMMARY

This document contains a Tier 2 Biological Opinion for Section 5 of I-69 and tiers back to the Tier 1 Revised Programmatic Biological Opinion dated August 24, 2006 and its recent amendments (May 25, 2011 and July 2013) for the proposed extension of I-69 from Evansville to Indianapolis, Indiana. The Federal Highway Administration originally reinitiated formal consultation on Tier 1 of the proposed I-69 extension on March 7, 2006 and submitted an addendum to the original Biological Assessment that detailed significant new information regarding potential impacts to the Federally endangered Indiana bat (*Myotis sodalis*) that were not known or available for analysis during the original formal consultation period in 2003. Subsequently, on April 11, 2011, the Federal Highway Administration again reinitiated Tier 1 consultation based on new maternity colony information, as well as documentation of the newly discovered disease White Nose Syndrome within the action area. On May 25, 2011, the U.S. Fish and Wildlife Service issued an amendment to the August 24, 2006 Tier 1 RPBO, including a revised Incidental Take Statement. Most recently, based on new impact and colony information, the Federal Highway Administration re-initiated consultation on Tier 1 of the project. The USFWS issued a second amendment to the Tier 1 RPBO on July 24, 2013.

The effects associated with the proposed construction, operation, and maintenance of Section 5 of I-69 are within the scope of effects contemplated in the recently amended Tier 1 Revised Programmatic Biological Opinion (2013). Upon evaluation of the proposed project, we believe incidental take of Indiana bats in the Section 5 Action Area is likely, but the impact of such taking is not likely to jeopardize the continued existence of the Indiana bat and is not likely to adversely modify the bat's designated Critical Habitat. A Tier 2 Incidental Take Statement for Section 5 has been included at the end of this Biological Opinion with its non-discretionary Reasonable and Prudent Measures and associated Terms and Conditions to further minimize the incidental take of Indiana bats in Section 5.

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service or USFWS) Tier 2 Biological Opinion (BO) for Section 5 of the proposed Interstate 69 (I-69) project. The Service's Bloomington, Indiana Field Office (BFO) received the Federal Highway Administration's (FHWA) Tier 2 Biological Assessment (BA) for Section 5 on December 20, 2012 along with a letter requesting the Service to initiate formal consultation on the proposed construction, operation, and maintenance of Section 5 of I-69 from Indianapolis to Evansville, Indiana and its effects on the federally endangered Indiana bat (*Myotis sodalis*).

The original formal consultation for Tier 1 of I-69 was concluded with the issuance of the Service's Programmatic BO (PBO) on December 3, 2003. On March 7, 2006, the FHWA requested to reinitiate formal consultation for the Indiana bat and submitted a very thorough and updated Tier 1 BA Addendum that detailed additional impacts to Indiana bats stemming from significant new information regarding this species' presence and abundance within the project's action areas, as revealed during Tier 2 field studies. The Service's August 24, 2006 Revised Tier 1 Programmatic BO (RPBO) replaced the December 3, 2003 PBO. On April 11, 2011 the FHWA again requested to reinitiate formal consultation for Tier 1 based on new maternity colony information and documented presence of the devastating disease White Nose Syndrome (WNS). The USFWS issued an amendment to the 2006 Tier 1 RPBO on May 25, 2011, which included an updated Incidental Take Statement. On July 24, 2013, another amendment (#2) to the Tier 1 RPBO, along with an updated Incidental Take Statement, was issued.

This Tier 2 BO for Section 5 of I-69 is prepared in accordance with Section 7 of the Endangered Species Act (ESA or the Act) of 1973, as amended (16 U.S.C. 1531 et seq.) and is the culmination of formal Section 7 consultation under the Act. The purpose of formal Section 7 consultation is to insure that any action authorized, funded, or carried out by the Federal government is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of any officially designated critical habitat of such species. This Tier 2 BO covers the proposed actions of the FHWA, as this agency will partially fund the road construction associated with this project. To reduce redundancy between the Tier 1 RPBO (dated August 24, 2006 and amended May 25, 2011 and July 24, 2013) and this section-specific Tier 2 BO, the Service has incorporated portions of the Tier 1 RPBO and its recent amendments by reference in this Tier 2 BO. Similarly, portions of the Tier 2 Biological Assessment (Tier 2 BA) for Section 5 have been incorporated by reference in this Tier 2 BO.

The Section 5 Tier 2 BO is primarily based on information provided from the following sources:

- 1) Tier 1 BA [dated July 18, 2003, revised October 27, 2003; prepared by Bernardin-Lochmueller and Associates, Inc.(BLA)],
- 2) Tier 1 BA Addendum (dated March 7, 2006; prepared by BLA),
- 3) Tier 1 Revised Programmatic BO (RPBO) dated August 24, 2006),
- 4) Tier 2 Draft Environmental Impact Statement (DEIS) for Section 5 (dated October, 2012),
- 5) Tier 2 BA for Section 5 (dated December 19, 2012),
- 6) Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision (dated April 2007),
- 7) Reports and scientific literature on Indiana bat research conducted in the action area and elsewhere,
- 8) Meetings, phone calls, e-mails, other written correspondence with FHWA, INDOT, and their consultants. A limited number of field visits and site investigations were also conducted by personnel from the Service's BFO, and
- 9) Tier 1 RPBO amendment (dated May 25, 2011)
- 10) Tier 1 RPBO amendment #2 (dated July 24, 2013)

In conducting our Tier 2 evaluation, we determined whether (1) this Section of the proposed project falls within the scope of the I-69 amended Tier 1 RPBO, (2) the effects of this proposed action are consistent with those anticipated in the amended Tier 1 RPBO, and (3) the appropriate Terms and Conditions associated with the Reasonable and Prudent Measures identified in the amended Tier 1 Incidental Take Statement (ITS) are being adhered to (See Appendix A of this document and page 176 of the Section 5 Tier 2 BA for the list of conservation measures). This

document serves as the Tier 2 BO for Section 5 of the I-69 Project. As such, it also provides the anticipated level of incidental take and a cumulative tally of incidental take that has been exempted under the amended Tier 1 RPBO.

Road construction that will occur as part of this proposed project will also require a federal permit(s) from the U.S. Army Corps of Engineers (COE). However, issuance of the COE permit will not result in any impacts to Indiana bats beyond those addressed in this consultation with the FHWA. Therefore, the Service intends to provide a copy of this BO to the COE (and EPA, IDEM and IDNR) to demonstrate that the FHWA has fulfilled its obligations under Section 7 of the Act to consult with the Service for Section 5 of the project.

CONSULTATION HISTORY

The proposed action has a background that encompasses several decades of planning and environmental studies by INDOT and is outlined in Chapter 1 of the Tier 1 Final Environmental Impact Statement (FEIS) and the Tier 2 DEIS for Section 5 of the I-69 Project. A chronological summary of important consultation events and actions associated with this project is presented in the Section 5 Tier 2 BA (pg. 4) and is hereby incorporated by reference. In addition to this summary, on May 20, 2013 the FWHA requested a reinitiation of the Tier 1 consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action (*e.g.*, highway construction and associated development) is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. The Service issued an amendment to the Tier 1 RPBO on July 24, 2013, including a revised ITS.

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

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

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

This Tier 2 BO for Section 5 of I-69 considers impacts associated with FHWA's and INDOT's preferred alternative to construct, operate, and maintain a new interstate facility within the Alternative 3C corridor in Monroe and Morgan Counties, Indiana (Figure 1). The Proposed Action for Section 5 of I-69 includes the following:

- Alternative 8 (as defined in the DEIS) is the preferred alternative. The Service has been informed the preferred alternative will be further refined in the FEIS to reduce impacts.
- Upgrading approximately 21 miles of an existing, multi-lane, divided transportation facility (SR 37) just south of Bloomington in Monroe County to SR 39 south of Martinsville in Morgan County (see Section 5 BA or DEIS for specifications and typical cross-sections).
- Construction of turn-arounds and new access roads along the length of the project. Approximately 15 miles of new access roads will be developed. (See Section 5 DEIS for details)
- Use of 1,346 acres of right-of-way (ROW) of which 973 acres is existing ROW;
- Mechanical clearing/grubbing/demolition of existing forest/vegetation and man-made structures from right-of-way. Some construction-related debris may be burned on-site.
- INDOT contractors following safeguards established in INDOT's Standard Specifications (Section 203.08 Borrow or Disposal) that include obtaining required permits, and identifying and avoiding or mitigating impacts at borrow/disposal sites that contain wetlands or archaeological resources. Special Provisions will also include prohibiting tree clearing from April 1 to September 30 within the Summer Action Area (SAA) for the Indiana bats and from April 1 to November 15 within the Winter Action Area (WAA), as identified in the Tier 2

DEIS for Section 5 and prohibiting the filling of wetlands outside the construction limits.

- Clearing of approximately **255** acres of forest and other trees (>3” diameter-at-breast height/DBH) from the right-of-way (ROW) while Indiana bats are not present [*i.e.*, between 1 October and 31 March (SAA) or 16 November and 31 March (WAA)]
- Relocating numerous utilities and billboards that are situated within the right-of-way for the Preferred Alternative. Based on the estimated location of these anticipated relocations, and the adjacent land uses, forest impacts from utility relocations are expected to be **75** acres and billboards, 15 acres. It is estimated that 1.5 acres of utility impacts will fall within the Lambs Creek maternity colony area and 11.5 acres within the West Fork (Bryant Creek) colony. Exact locations are not yet known. No billboard relocations are expected in the colony areas.
- Filling/converting of approximately 13 acres of wetlands, including emergent (3.5 ac.), forested (5.3 ac.), scrub-shrub (1.1 ac.), and open water ponds (2.5 ac.)
- Impacting approximately 85,000 linear feet of stream habitat
- Impacting approximately 110 known karst features; the Karst MOU (1993) will be implemented throughout the project area
- Constructing/upgrading seven interchanges: Fullerton Pike, SR45/2nd Street and Tapp Road, SR48/3rd Street, SR 46, Walnut Street, Sample Road, and Liberty Church Road.
- Rehabilitating or reconstructing numerous stream crossings including bridges, 3-sided structures, culverts, etc. Some new structures will be required for interchange ramps and access roads. Detailed design information is not available until the final design phase, after the Final EIS and Record of Decision (ROD).
- Constructing approximately 8 overpasses/grade separations (see list in Tier 2 BA)
- Relocating 147 residential dwellings, 32 commercial businesses, 4 apartment complexes, and 1 church
- Incorporating and maintaining wildlife crossings. Griffy Creek, Bean Blossom Creek, Bean Blossom Creek overflow, Bryant Creek, Little Indian Creek, and Jordan Creek will provide wildlife crossings for all but the largest mammals. Other bridges and larger culverts will also provide additional crossing opportunities for smaller wildlife. Natural bottoms for box culverts will be used for crossings where feasible. Additional wildlife crossings may be enhanced at 15 other locations.
- Installation of lighting at least 40 feet above the highway in order to avoid collisions between bats and vehicles. Lighting locations will be identified during final design. The locations could include the SR 37, Fullerton Pike, Tapp Road, SR45/2nd Street, SR 48/3rd Street, and SR 39 interchanges.
- Revegetating disturbed areas in accordance with INDOT standard specifications. Woody vegetation will only be used at a reasonable distance beyond the clear zone to ensure a safe facility. Revegetation of disturbed soils in the right-of-way, interchange areas, and medians will utilize native grasses and native wildflowers, where practical.

- Implementing all mitigation and “Conservation Measures” detailed in the Tier 1 RPBO and Appendix D of the Tier 1 BA Addendum. A summary table of the I-69 Conservation Measures is provided in Appendix A.
- Proposed mitigation for impacts to forests and wetlands in Section 5 are as follows:

<u>Required Mitigation (ac.)*</u>	<u>Description</u>	<u>Theme</u>
379.17**	Upland forest	Replacement
758.34**	Upland forest	Preservation
17.40	Forested wetland	Replacement
7.60	Emergent wetland	Replacement
3.54	Scrub-Shrub wetland	Replacement
85,017 linear feet	Stream Channel	Replacement

Total: 1166.05* acres

* Required mitigation acreage includes a 10% buffer over projected impacts. Impact amounts and required mitigation amounts will continue to be refined in the FEIS and design phase and are expected to further decrease.

**Forest mitigation commitment 3:1 with a minimum of 1:1 replacement and the remaining in preservation; currently approximately 363 ac. of forest replacement and 1,702 ac. of forest preservation are currently being pursued. Final mitigation acreages will be based on final impacts.

- INDOT will monitor and oversee maintenance of Section 5 mitigation lands while they are being established. INDOT will monitor forest mitigation lands for a minimum of 10 years.
- Operation of the interstate will occur in phases as construction of sections and subsections are completed. Local access and traffic volumes and patterns will change over time as portions of I-69 become operational. Assuming all sections of I-69 are completed by the year 2030 as non-toll facilities, then traffic on some local roadways will appreciably decrease and in some instances increase (see DEIS chapter 5.6).
- Section 5 of I-69 will be operated as a non-toll facility and thus no toll readers or other toll-collecting infrastructure will be installed along the interstate.
- Maintenance of the interstate will include the removal and disposal of road-killed animals and trash, snow plowing, application of road salt and/or sand, and maintenance and mowing of right-of-ways.
- Over time, all sections of I-69 will need to be resurfaced/repaved and bridges will need to be repaired or replaced.

Project Schedule

Construction for Section 5 has been scheduled to begin in 2013.

Mitigation

Upland forests impacted by the I-69 Evansville-to-Indianapolis project will be mitigated at

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

Currently, INDOT has identified 21 willing property owners and four landlocked sites (totaling 2,065 acres of upland forest) for upland forest preservation or reforestation. As of July 17, 2013, 2 properties have been secured for a total of 376 acres. The remaining 19 properties and four landlocked sites are in various stages of the acquisition process.

INDOT will be responsible for monitoring and maintaining the mitigation areas while they are being established, as well as addressing long-term management for sites currently without an identified steward. Table 6 provides a list of the properties being pursued as well as the breakdown of anticipated mitigation acreage for each site. See the Section 5 Tier 2 BA for detailed descriptions, photos, maps and other information for each mitigation site. Landlocked sites and the Richland Creek site are more recent additions and are not included in the Section 5 BA.

Action Area

“Action area” is defined by regulation as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area is not limited to the “footprint” of the action nor is it limited by the Federal agency’s authority. Rather, it is a biological determination of the reach of the biological, chemical and physical impacts associated with the proposed action. In the Tier 1 Section 7 consultation process, the FHWA, INDOT and the USFWS Bloomington Field Office (BFO) jointly developed two seasonally based action areas for the Indiana bat, the summer impact area is referred to as the Summer Action Area (SAA) and the winter impact area is referred to as the Winter Action Area (WAA). The SAA for the Indiana bat has been generally defined as a 5-mile band, 2.5 miles either side of the centerline of Alternative 3C (including the maternity colony areas), that runs the entire length of the proposed project. The WAA for Indiana bats is the total area that falls within a 5-mile radius centered on each of the known Indiana bat hibernacula that have entrances located within 5 miles of the proposed 3C corridor because indirect effects to swarming bats could reach that distance. These two impact areas combined comprise the project’s Action Area.

In the Tier 1 RPBO, the Service stated that the Action Areas may need to be expanded or otherwise refined in subsequent Tier 2 BAs as the anticipated reach of direct and indirect effects of each section of I-69 are more clearly recognized and understood. Because INDOT’s Tier 2 analyses for Section 5 (see the Section 5 Tier 2 DEIS, Section 5.24.3 “Analysis”) indicated that I-69 would likely cause/induce some indirect development in Traffic Analysis Zones (TAZs) beyond the 2.5-mile buffer/boundary of the Indiana bat SAA defined in Tier 1, INDOT and FHWA expanded the SAA for Section 5 to include these additional areas (*i.e.*, the “Expanded SAA”; Figure 1). The same rationale was used to develop the Expanded WAA as well. See page 32 of the Tier 1 RPBO for a detailed discussion of the I-69 Action Area and pages 30-33 of the Section 5 Tier 2 BA for additional rationale behind the expanded Action Areas for Section 5.

To preserve clarity and avoid duplicating impact results, the entire WAA was addressed in the Section 4 Tier 2 BA. The Section 5 representative alignment was used for the analysis because a more refined design had not become available for the Section 5 portion of I-69. The term representative alignment was developed as part of the Tier 1 BA Addendum. In the Tier 1 BA Addendum, the representative alignment was defined as “the footprint for the alternative with the largest Tier 2 forest impacts, among those alternatives that are still under study” In this Section 5 Tier 2 BO only the impacts that were affected or changed with the new preferred Section 5 alignment will be updated.

The Tier 2 Section 5 Expanded WAA begins just to the northeast of where Greene County Road 215 E crosses the Section 4 preferred alternative and ends in Section 5 just north of Bloomington. Please note due to the more detailed analysis completed on Section 5 indirect impacts since the development of the Section 4 BA, the WAA has been expanded an additional 2,761 acres to include additional areas of induced growth that now touch the boundaries of the WAA. This addition will not impact those hibernacula areas that are only impacted by the Section 4 ROW due to the proximity of this area being greater than five miles from those hibernacula.

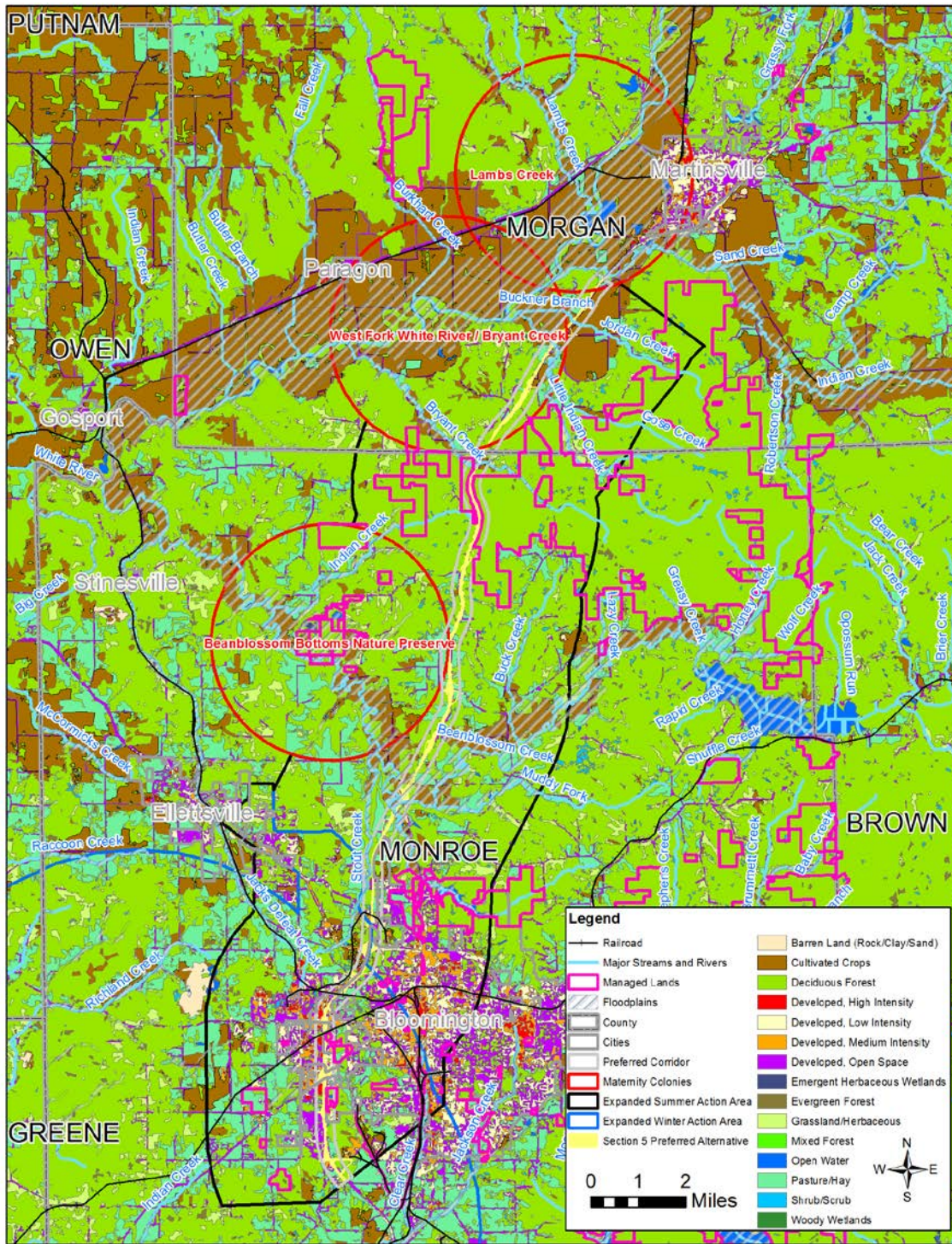


Figure 1. Preferred alignment for Section 5 of I-69, Indiana bat maternity colony areas, the Section 5 Expanded Summer Action Area and Expanded Winter Action Area (which together make up the formal Action Area).

Analytical Framework for Jeopardy Determinations

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

II. STATUS OF THE SPECIES

Indiana Bat Status

Indiana bat species description, life history, population dynamics, status and distribution and threats are fully described on pages 38-54 of the Tier 1 RPBO, and are hereby incorporated by reference. Since the completion of the Tier 1 RPBO in 2006, species information and population data continues to be updated. Most of this more recent information is reflected in the recent amendments to the Tier 1 RPBO (dated May 25, 2011 and July 24, 2013); following is a brief summary of this most recent information and as well as the most current population estimate for the species.

On 15 April 2007, the Service released the *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (USFWS 2007), which contains an excellent summary of the current status of the Indiana bat. In addition, the Bloomington Field Office (BFO) recently completed a 5-Year Review of the Indiana bat (USFWS 2009), which summarizes the current status of the species, progress towards recovery, and remaining threats to the bat. Both the draft recovery plan and 5-Year Review are available on the Service's Indiana bat website at <http://www.fws.gov/midwest/Endangered/mammals/inba/index.html> and are hereby incorporated by reference. The 5-Year Review found that the required recovery criteria for the Indiana bat had not been achieved and thus it should remain at its current 'endangered' status. The Recovery Priority Number for the Indiana bat was changed from "8" to "5", reflecting a species that currently faces a high degree of threat and has a low recovery potential.

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

hibernaculum 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 (which has been adjusted to include the new colony) of 542,470 [and an increase 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 Efforts

The existing recovery program for the Indiana bat focuses on protection of hibernacula (USFWS 1983). The proposed recovery program has four broad components: 1) range-wide population monitoring at the hibernacula with improvements in census techniques; 2) conservation and management of habitat (hibernacula, swarming, and to a degree, summer); 3) further research into the requirements of and threats to the species; and 4) public education and outreach (USFWS 2007). This recovery program continues to have a primary focus on protection of hibernacula but also increases the focus on summer habitat and proposes use of Recovery Units to establish and focus recovery efforts.

Recovery Units

The Service's proposed delineation of Recovery Units (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 a decrease 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.

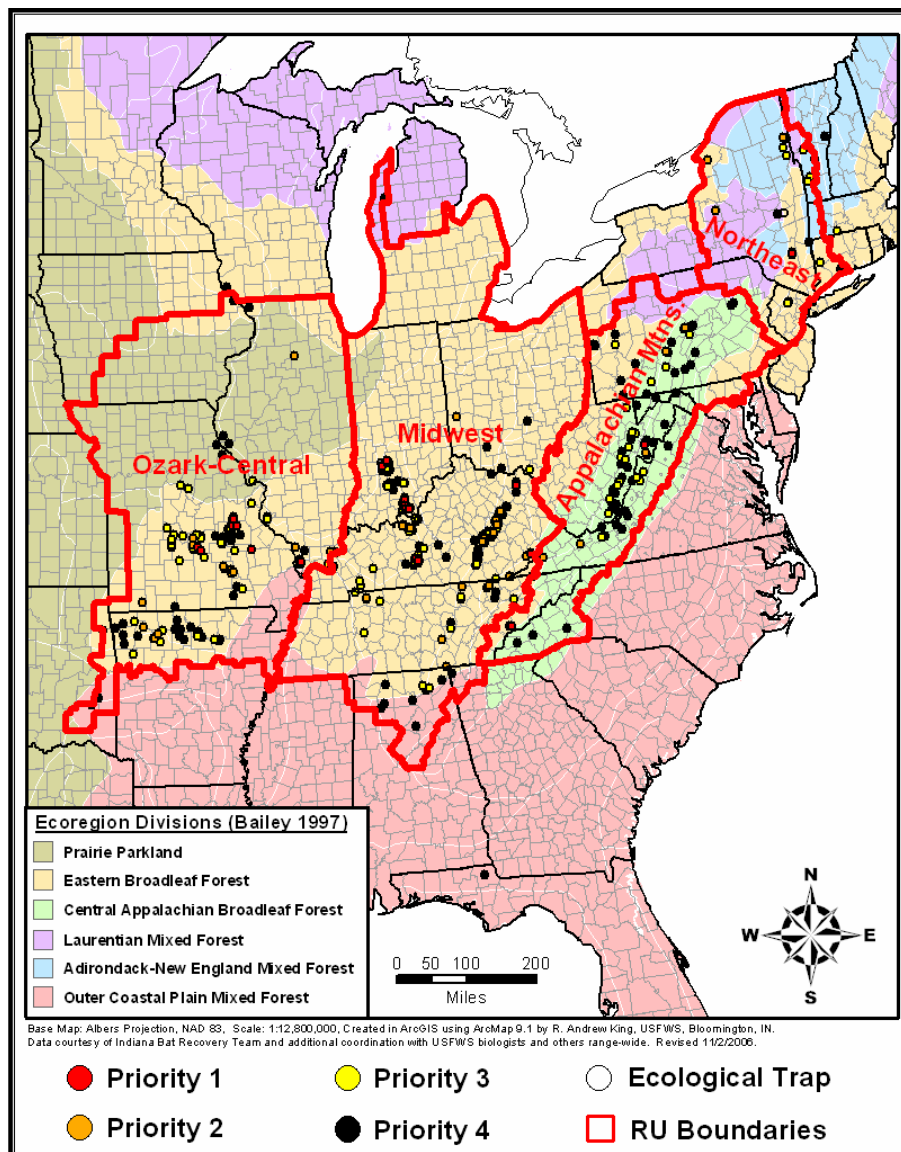


Figure 2. Proposed Indiana bat Recovery Units (Service 2007).

The State's two most populous Indiana bat hibernacula are Cave (n=58,886 bats in 2013) and Cave (n=56,803 bats in 2013), which are both located in southern Indiana approximately 70 miles from the I-69 project corridor. Cave is a close third with 49,617 hibernating bats reported this season. 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

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 2). 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.

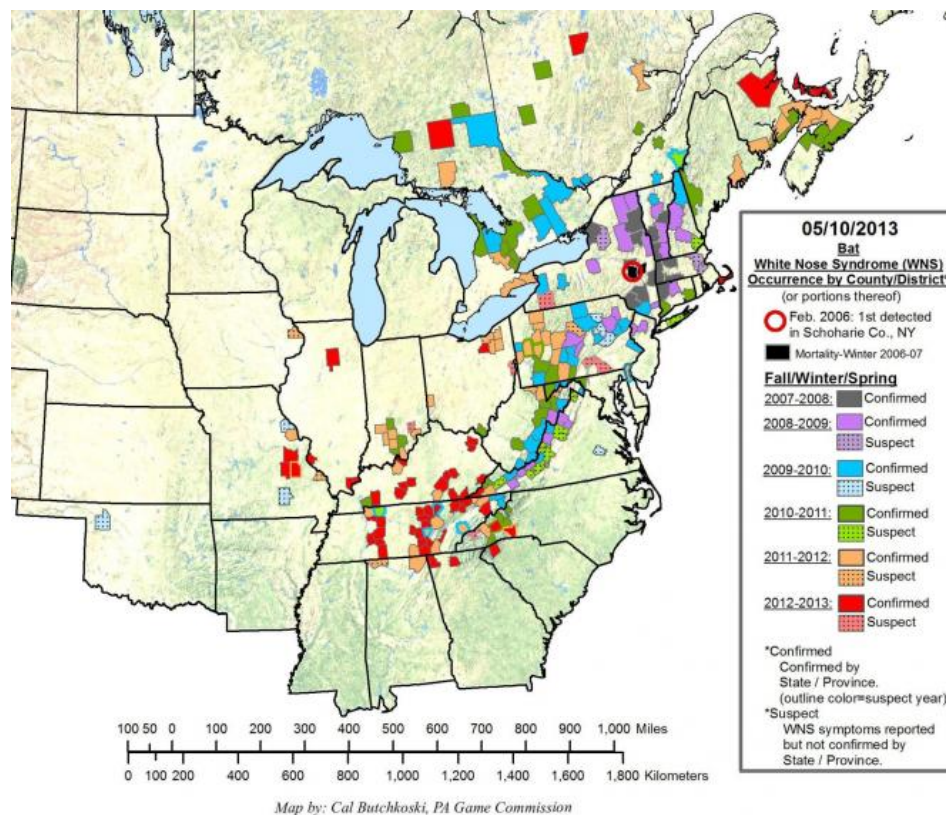


Figure 1. Geographic Distribution of White Nose Syndrome as of May 10, 2013 (www.whitenosesyndrome.org website accessed 07-09-2013).

WNS has been characterized as a condition primarily affecting hibernating bats. Affected bats usually exhibit a white fungus on their muzzles and often on their wings and ears as well (Blehert *et al.* 2009). Some affected bats may display abnormal behavior including flying during the day and in cold weather (before insects are available for foraging) and roosting towards a cave's entrance where temperatures are much colder and less stable. Many of the affected bats appear to have little-to-no remaining fat reserves which are necessary to survive until spring emergence. The fungus associated with WNS has been identified as a previously undescribed species of the genus *Geomyces* (named *G. destructans*; G.d.) (Gargas *et al.*, 2009). The fungus thrives in the cold and humid conditions of bat hibernacula. All of the possible modes of transmission are not currently known, although biologists suspect it is primarily spread by bat-to-bat contact. In addition, people may unknowingly contribute to the spread of WNS by visiting affected caves and subsequently transporting fungal spores to unaffected caves via their clothing and gear. Interestingly, G.d. has been documented growing on hibernating bats in several European countries, but the fungus does not appear to be causing widespread mortality there (Puechmaile *et al.* 2010). Within the U.S., WNS has been confirmed in the Indiana bat, little brown bat, small-footed bat, northern long-eared bat, gray bat, tricolored bat and big brown bat. The G.d. fungus has also been detected on two additional bat species: the southeastern bat 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 go to: <http://whitenosesyndrome.org/>.

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 death 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>.

III. ENVIRONMENTAL BASELINE

The environmental baseline for Indiana bats and their habitat in the I-69 Action Areas, including Section 5, was fully described on pages 59-79 of the Tier 1 RPBO and is hereby incorporated by reference. Additional baseline information is presented in the May 24, 2011 Amendment to the Tier 1 RPBO, Amendment 2 to the Tier 1 RPBO (July 24, 2013), the Tier 2 Section 4 BO, the Tier 2 DEIS for Section 5 (see Chapter 5– Environmental Consequences) and the Tier 2 Section 5 BA. A summary of this information is presented below. The following information also summarizes the effects of past and ongoing environmental factors affecting Indiana bats and reviews and updates the status of the species within the Section 5 Action Area.

No critical habitat for the Indiana bat is present within the Section 5 project area. Cave has been designated as critical habitat for the Indiana bat and is approximately 13 miles west of the I-69 corridor near the southern portion of Section 5. Cave in Crawford County, also designated critical habitat, is approximately 60 miles from the southern end of Section 5 and therefore not within the Section 5 Action Area.

Indiana Bats within the Section 5 Action Area

In 2004, mist netting surveys were conducted at 24 sites in Section 5. A total of five (5) Indiana bats were captured within Section 5 in 2004. This includes one (1) pregnant female and four (4) adult males. All five (5) Indiana bats were radio-tagged and two (2) roost trees were identified. Other bats captured included: big brown bats (*Eptesicus fuscus*), eastern red bats (*Lasiurus borealis*), little brown bats (*Myotis lucifugus*), hoary bats (*Lasiurus cinereus*), northern long-eared bats (*Myotis septentrionalis*), evening bats (*Nycticeius humeralis*), and the tri-colored bat (*Perimyotis subflavus*) [formerly called eastern pipistrelle (*Pipistrellus subflavus*)]. Thirteen (13) bridges in the Section 5 action area were also inspected for bats.

Additional mist netting surveys were completed during the summer of 2005. The 2005 surveys were focused around the locations of Indiana bat captures where no primary roost trees were identified in 2004. Three mist net sites were surveyed. One Indiana bat was captured in 2005; a lactating female. The bat was radio-tagged and was successfully tracked to four new roost trees, one primary (roost #5-4) and three secondary (roost #s 5-1, 5-2, and 5-3). Based on the evidence obtained through the mist netting surveys during this effort, there was one maternity colony identified in Section 5: the West Fork (Bryant Creek) Maternity Colony.

A full discussion of the methods and results of these surveys with maps of the maternity colony and other summer habitat in Section 5 is more fully discussed in the Tier 1 BA Addendum and incorporated in the analysis in the Tier 1 Revised BO as amended.

2012 Indiana Bat Presence Surveys

An Indiana bat presence survey was recently completed in May and June of 2012. This survey effort was conducted to update Indiana bat presence status within the Section 5 action area due to the amount of time elapsed since the previous surveys which were completed in 2004 and 2005. A total of twelve Indiana bats was captured, five of which were radio-tagged. All of these bats were successfully tracked to a roost tree. Three of the trees were determined to be primary roosts based on the emergence counts. One (roost tree #927-1) was within the previously identified

West Fork (Bryant Creek) Maternity Colony and the remaining two (roost tree #768-1 and #768-2) were outside of any existing colony. Based on the discovery of these primary roost trees, USFWS has determined that a second Indiana bat maternity colony is present within the Section 5 Action Area. This colony is referred to as the Lambs Creek Colony. See Table 5 of the Section 5 Tier 2 BA for a summary of all Indiana bats that were captured during mist netting surveys, roost tree information, and emergence counts for those roosts. See Appendix G of the Tier 2 BA for the full 2012 mist-net survey report.

Maternity Colonies within the Section 5 Action Area

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

Each maternity colony's roosting and foraging area was assumed to fall within a circle with a 2.5-mile radius centered on primary roosts, placed between multiple roosts, or centered on mist net sites of Indiana bat captures if no roosts were identified. A full discussion of the methods and results of these surveys with maps of the maternity colonies and other summer habitat in Section 5 is more fully discussed in the Tier 1 BA Addendum and incorporated in the analysis in the Tier 1 RPBO. The Tier 1 BA Addendum and RPBO also characterize habitat conditions for the West Fork Bryant Creek maternity colony, as does the Tier 2 BA for Section 5 (pages 48-49 and Appendices A, H and I).

West Fork (Bryant Creek) Maternity Colony

In 2004 in the West Fork (Bryant Creek) Maternity Colony, three Indiana bats were captured – a post-lactating female and two adult males. One of the males was tracked to two secondary roost trees. One was a live tulip poplar (066R1) and had an emergence count of zero. This tree was located 1.3 miles from the proposed corridor. It was classified as a secondary roost since the emergence count was below 30. The second roost was a dead silver maple (066R2). This tree had an emergence count of zero and was classified as a secondary roost. This roost tree was approximately 1.5 miles from the corridor. The post-lactating female was radio-tagged but her signal was never detected. One lactating female was captured and radio-tagged in 2005. She was successfully tracked to four roost trees, one primary roost and three secondary roosts. The primary roost was a dead unknown tree (5-4) with an emergence count of 128. This tree was located 1.8 miles from the corridor. The three secondary roosts included a dead American elm (5-1) with an emergence count of three, a live silver maple (5-2) with an emergence count of four, and a dead unknown tree (5-3) with an emergence count of 13. These trees were located between 1.7 and 2.0 miles away from the corridor. This colony is assumed to consist of 80 reproductively active adult females and their offspring, with a total of 160 individuals once the young become volant. Based on concurrent emergence counts conducted on July 29, 2005, the West Fork (Bryant Creek) Maternity Colony is comprised of a minimum of 128 individuals.

During the May/June 2012 Indiana bat presence survey a pregnant adult female was capture and radio-tagged. She was successfully tracked to a dead eastern cottonwood (roost #927-1) located along the northern bank of the White River. The tree showed a maximum emergence count of 74 bats and is thus considered to be a primary roost.

Lambs Creek Maternity Colony

During the 2012 survey, a pregnant female was captured at site 24. She was tracked to two primary roosts. These roosts were not already within an existing maternity colony. One was a dead eastern cottonwood (roost #768-1) and had an emergence count between 29 and 80. 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 was a dead American elm (roost #768-2). This tree had an emergence count between one and 43. This roost tree was approximately 2.6 miles from the corridor. Based on this information, the USFWS (Bloomington Field Office) considers the finding of these roosts (with emergence counts over 30) indicative of a new maternity colony. The epicenter of this new maternity colony is located at the midpoint of the two primary roosts. Because this maternity colony was identified subsequent to the Tier 1 BA Addendum, an assessment of the maternity colony area (as has been done for all previous colonies) has been included in Appendix I of the Section 5 Tier 2 BA.

This colony is assumed to consist of 80 reproductively active adult females and their offspring, for a total of 160 individuals once the young become volant. Based on emergence counts, the Lamb's Creek Maternity Colony is comprised of a minimum of 80 individuals.

According to the criteria established in the Tier 1 RPBO, a maternity colony is determined to exist if there is evidence of reproduction in an area (including the capture of a reproductive female or juvenile), or high emergence counts at an identified roost tree. Other factors considered in determining whether a newly identified roost is indicative of a new maternity colony include its proximity to other known colonies, location of other potential roost trees, and potentially genetic analysis.

Beanblossom Bottoms Nature Preserve Maternity Colony

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 this past summer (2012). We captured three Indiana bats that were tracked to one primary roost tree and two secondary roosts. Because this maternity colony was identified subsequent to the Tier 1 BA Addendum, an assessment of the maternity colony area has been included in Appendix H of the Tier 2 BA.

Camp Atterbury Maternity Colonies

There have been several roost and bat captures identified around the Camp Atterbury area in adjacent Johnson County. These surveys were completed separate from the I-69 study. The closest of the three maternity colonies that have been identified is estimated to be over 18 miles from the nearest Preferred Alternative right-of-way. It is not anticipated that any of these maternity colonies will be affected by I-69.

Roost Tree Update

The Section 5 roost trees originally discovered in 2004 and 2005 through mist netting surveys and radio telemetry were revisited in the summer of 2006 and again on July 16, 2012. The following summarizes the current condition of these roost trees. Photo documentation is provided in Appendix F of the Tier 2 BA for Section 5. Roost trees 5-1, 5-2, 5-3 and 5-4 are located along or within the same West Fork White River oxbow feature on the south side of the

river, immediately west of a high power transmission line that crosses the river. Roost tree 066R1 is located adjacent to a residence south of the West Fork White River off of Godsey Road. Roost tree 066R2 is located on an island within the channel of the West Fork White River, immediately north of 066R1.

Roost 5-1 – The dead snag (unknown species) discovered in 2005 along the outer edge of the West Fork White River riparian corridor within the West Fork White River/Bryant Creek maternity colony is no longer standing and is considered to be in Stage 8 decay.

Roost 5-2 – The dead snag (unknown species) discovered in 2005 within the West Fork White River oxbow in the West Fork White River/Bryant Creek maternity colony could not positively be identified in 2006 or 2012 based on the GPS coordinates and 2005 photographs. The general area was searched and no roost tree was noted in the immediate vicinity. The tree is presumed to no longer be standing and is considered to be in Stage 9 decay.

Roost 5-3 – The dead snag (unknown species) discovered in 2005 within the West Fork White River oxbow in the West Fork White River/Bryant Creek maternity colony was observed to be intact in 2006 (Stage 4) and remains so in 2012. The tree still exhibits exfoliating bark and has potential for Indiana bat roost usage. Although it is only about 25 feet tall, the tree is considered to be in Stage 4 decay.

Roost 5-4 – The dead snag (unknown species) discovered in 2005 within the West Fork White River oxbow in the West Fork White River/Bryant Creek maternity colony was a primary roost in 2005 and observed to be intact in 2006 (Stage 4), but in 2012 only the lower four to five feet of the trunk remain. This roost is considered to be in Stage 9 decay and no longer has potential for Indiana bat roost usage.

Roost 066R1 - The tulip poplar tree on a rural residential lot discovered in 2004 within the West Fork White River/Bryant Creek maternity colony was observed to be intact in 2006 (Stage 2) and remains so in 2012 (Stage 2). The tree is still alive, but declining and has a large vertical scar (approximately 10 feet in length) approximately 30 feet above the ground which was the apparent roost location on the tree.

Roost 066R2 - The dead silver maple discovered in 2004 on a West Fork White River island within the West Fork White River/Bryant Creek maternity colony was not visited in 2006 or in 2012 due to inaccessibility to the island at the time of survey. At the time of the 2004 investigation, the tree reportedly only had <5% exfoliating bark and was considered to be in Stage 3 decay. The current state of this former roost is unknown.

Adult Males within the Section 5 Action Areas

Four adult male Indiana bats were captured during mist net surveys within the originally defined (*i.e.* not expanded) Section 5 Action Area in 2004 and 2005. During the 2012 survey, four male Indiana bats were captured at three separate sites. Two of the male bats were radio-tagged which led to the discovery of three secondary roost trees. A third radio-tagged male bat was tracked to a bat box in a residential yard; approximately 15-20 bats were found roosting in the bat box. Based on this data and because part of the Action Area in Section 5 contains known hibernacula, the Service assumes an ample amount of adult male Indiana bats occur in this area. Since a majority of the WAA and all of the 15 hibernacula also fall within the Action Area for Section 4,

all male bats occupying the WAA (including those within the Section 5 Action Area), were addressed in the Section 4 Tier 2 BO.

In order to estimate the density of male bats within the remaining portion of the Action Area of Section 5 (outside of the WAA) during the summer months, we assumed half of the bats using the hibernacula within the Action Area were male and that half of those male bats would remain close to their hibernacula during the summer [*i.e.* stay within the winter portion of the Action Area, also referred to as Winter Action Area (WAA)]; the other half of the male bats would disperse, presumably to the surrounding Action Area, north and south of the winter portion of the Action Area. In 2013, the population of Indiana bats in hibernacula within the Action Area was approximately 88,488 bats. The density of males was determined by assuming that half of the bats in the hibernacula were males (n = 44,244) and half of those males would remain near the hibernacula during the summer (n = 22,122). This number (n=22,122) was then divided by the number of forested acres in the Winter Action Area (n = 148,182 ac.), to obtain a density of approximately 0.15 males/acre of tree cover. This is a slight decrease over the number of male bats estimated during the 2011 Tier 1 reinitiation consultation (density = 0.17 male bats/ac.) because the population has slightly decreased within some of the hibernacula in the Action Area and the Action Area has been expanded based on projected induced growth areas). 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 which is half of the density near their hibernacula.

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

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

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

In 2003, only 10 Indiana bat hibernacula were known to occur within the Action Area and were included in the original 2003 Tier 1 BO. As a result of the discovery of three new hibernacula during Tier 2 surveys and the discovery of another hibernaculum by the Service and the IKC, and with the inclusion of Cave, the total number of known Indiana bat hibernacula within the Action Area now stands at 15. The 15 caves forming the basis of the designated WAA include nine caves in western Monroe County:

and caves; four caves in eastern Greene County: and and two caves in northwestern Lawrence County: and caves. These 15 Indiana bat hibernacula located within the Action Area sheltered a combined total hibernating population of 88,488 Indiana bats in 2009 (USFWS, unpublished data, 2013). Therefore, the 2013 Action Area population represented approximately 39% of all the Indiana bats hibernating within the State of Indiana in 2013 (n = 226,365) and 16% of the range-wide population estimated to be 541,211 bats in 2009 (USFWS, unpublished data, 2013). During the Tier 1 consultation, the Service considered the 2005 population data for each hibernaculum individually and collectively (74,042 bats) as the baseline for the Indiana bat population within the Action Area. With this Tier 2 consultation, we have considered the newest population information available which indicates an increase in the Action Area population of about 14,446 bats (note: survey methods in Indiana have been recently improved upon and may account for some of the observed increase in Indiana bat populations at various hibernacula since 2007).

Hibernacula	2013 (or most recent) Indiana bat Population
Cave	30,496 (+8,667 from 2011)^
Cave	7,849 (-17,507 from 2011)^
	218 (2009)
	48 (2009)
	31 (-156 from 2009)
Cave	58 (+48 from 2009)
Cave	17* (-17 from 2003)
Cave	0** (same as 2003)
Cave	49,617 (+1,214 from 2011)^
Cave	0*** (-3 from 1999)
Cave	86 (+25 from 2009)
	18 (+9 from 2009)
	48 (2009)
	1 (only surveyed in 2006)
	1***
Cave	
*Last survey completed in 2007	
**Last survey completed in 2005; an independent visit of Cave in March 2010 showed approximately 40 Indiana bats	
***Last survey completed in 2005	
^ 2013 data	

Table 1. Updated Indiana bat Populations within Hibernacula in I-69 Action Area

Population numbers and trends for individual caves within the WAA through 2005 are available in Table 16 of the Tier 1 BA Addendum. Table 1 above shows the most recent population information based on recent surveys of hibernacula within the project's WAA. The first eight hibernacula listed have some portion of their fall swarming and spring staging habitat within the Section 5 Action Area.

General Habitat Conditions

INDOT's primary I-69 consultant, BLA, has recently provided the Service with more up-to-date forest coverage data for the Tier 2 analyses and thus the forest acreages reported in this Tier 2 BO supersede those previously reported in the 2006 Tier 1 RPBO and Tier 1 BA Addendum. Note that the "tree cover" estimates previously reported for each of the original 13 maternity colonies and the areas surrounding the hibernacula were based on 2003 aerial photos made available via the National Agricultural Imagery Program (NAIP) which have a much greater resolution (5m) than the USGS data used for other portions of the Action Area. The 2006 USGS forest cover data, the 2003 tree cover estimates in the Tier 1 BA Addendum, field verification information produced by the Engineering and Environmental Assessment Consultants (EEACs) during Tier 2 studies, and images accessed via Google™ Earth represent the best available data for purposes of this consultation. (The tables previously found in Appendix B of the Tier 1 RPBO have been updated as part of the recent reinitiation of the Tier 1 consultation and also include the most current tree cover and impact estimates for the project area. The revised tables can be found in Appendix A of the 2013 amendment to the 2006 Tier 1 RPBO).

In order to evaluate the anticipated reach of direct and indirect affects, the original Action Area (comprised of the SAA and WAA) has been expanded to include those areas where development induced by the construction and operation of the project is reasonably foreseeable. The WAA and SAA are separate, but overlapping areas; therefore, impacts within the two areas may not be added or subtracted to produce information for impact analysis. Estimated forest cover within the maternity colony areas and the Section 5 Expanded SAA and WAA is summarized below in Table 2. For the Expanded SAA, information is based on satellite images of Section 5 taken in 2001 (land use coverage made available by USGS in late 2006) as well as field data verified by the EEACs who prepared the Section 5 DEIS. The original maternity colony areas and the original Tier 1 WAA were evaluated using the more refined tree cover data while the three newer colonies were evaluated using the NLCD and EEAC data; however, for areas within the expanded portion of the WAA, the 2001 USGS information was again used.

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

Based on the GIS analysis conducted by BLA using tree cover data (2003 higher resolution aerial photographs), USGS imagery, and some field verified data (EEAC), the percentage of forest habitat per maternity colony area (2.5-mile radius area = 12,566 acres) is: Beanblossom Bottoms - approximately 67%; West Fork Bryant Creek - approximately 37%; and Lambs Creek - approximately 40% (Table 2). There is an overlap of 743 acres (of which 58 are forested) between the West Fork Bryant Creek and Lambs Creek colonies. The Expanded Remaining

SAA (excluding the maternity colony areas) is approximately 54% forested and the Expanded WAA (which includes both Section 4 and Section 5) is approximately 60% forested. The amount of acreage for the Expanded WAA has slightly increased since the Section 4 BA and BO were developed due to additional TAZs being identified in Section 5. These changes will be discussed later in the document.

I-69 Project Section 5 area	Total Acres	Total Forest/Tree Cover Acreage	Percent of the area that is Forested
Beanblossom Bottoms MCA*	12,566	8,371	67%
West Fork Bryant Creek MCA*	12,566	4,710	37%
Lambs Creek MCA*	12,566	5,058	40%
Expanded Remaining SAA(excludes maternity colony areas)	51,686	27,947	54%
Expanded WAA**	245,484	148,182	60%

* MCA = Maternity Colony Area

** The Expanded WAA includes areas in both Section 4 and Section 5; as previously mentioned, the entire WAA was fully addressed in the Section 4 BO, however summary information will still be described and discussed within this Section 5 BO.

Table 2. Estimated amount of forest within Maternity Colony Areas and Expanded Section 5 Summer and Winter Action Areas.

Habitat Fragmentation and Core Forests

The current number of total tree cover “patches” for each of the maternity colony areas in the Alternative 3C corridor of I-69 ranges from 8 patches in the Beanblossom Bottoms Colony (Section 5) to 421 patches in the Pigeon Creek Colony (Section 1). Generally, a higher number of patches translates to more fragmentation and lower connectivity. Few, large class patches, with no mid-size patches and then a scattering of very small patches suggests a high level of connectivity. GIS-based maps depicting tree cover patches and degree of connectivity within the Section 5 maternity colonies are found in Appendix A of the Tier 1 BA Addendum (and Appendices H and I of the Section 5 Tier 2 BA for the Beanblossom Bottoms and Lamb’s Creek maternity colonies) and are hereby incorporated by reference. (Please note the patches in the Beanblossom Bottoms Colony are mid-sized and therefore connectivity is not as good as the nine large patches in the Little Clifty Creek Colony in Section 4.)

Analysis of tree cover data, where available, and USGS/EEAC data in the remaining areas, found 11,018 acres of core forest within the Expanded Remaining SAA (area not including maternity colony use areas). This is an increase from the 9,196 acres of core forest reported in the Tier 1 BA Addendum using the Tier 1 Remaining SAA and 1990 USGS data. This difference is due to an expansion of the SAA to include the induced TAZs (Traffic Analysis Zones). Within the three Section 5 colony areas there are a total of 6,455 acres of core forest.

The Service will use the forest data summarized in Table 2 as an approximate baseline of currently existing forest habitat available within the Section 5 maternity colony areas and the Expanded SAA and WAA. Based on the amount and distribution of core and edge forest and degree of connectivity among forest patches (see BA Addendum and Appendix TT in the Tier 2

BA), the majority of the forest habitat within the Expanded Action Area represents moderate to high quality roosting and foraging habitat for Indiana bats. We believe this is a reasonable characterization of habitat because the project is within the core of the Indiana bat's summer and winter range and based on GIS-based analyses presented in the BA Addendum, field data derived from forest plots and transects collected by BLA (see below) and review of aerial photographs (*e.g.*, via Google™ Earth).

Existing Forest Habitat Conditions within the Preferred Alternative Alignment

To better characterize the forest maturity (*i.e.*, diameter of tree trunks at breast height - DBH), tree species composition, sub-canopy conditions (*i.e.*, degree of vegetative clutter and presence/absence of invasive plant species), and amount of currently available roosting habitat (*i.e.*, number/size/density of suitable snags with exfoliating bark) within the woodlots that will be directly impacted by the preferred Section 5 alignment of I-69, BLA staff conducted surveys along 62 linear transects along the project corridor. These 62 transects were approximately 60 feet wide and ranged from 224 feet to 7,575 feet in length. Thirty-one of the transects were within the preferred alternative impact area and accounted for a total of 17.0% (42.4 acres) of the 249 acres of upland forest habitat that will be directly impacted. For comparison, the other 31 transects were within the same woodlots, but outside of the proposed alignment. These samples totaled 41.8 acres. The total linear distance sampled within the alignment was 5.8 miles, which is approximately 28% of the total length of highway in Section 5 (21 miles). The transects are assumed to be representative of the existing upland forest habitat conditions within the 249 acres of impacted forest. The resulting snag characteristics and projected snag estimates for Section 5 are presented below in Table 3.

Snag Characteristics Snags evaluated starting at ≥9" dbh	Transects Within Alignment	Transects Outside Alignment
Total number of snags (≥9" dbh) within transect (approx. 60' wide x variable length)	62	78
Average diameter of snags (inches)	15.0	15.2
Range of snag diameters (inches)	9 – 36	9 – 30
Total area sampled within transects (acres)	42.4	41.8
Density of snags in transect area (snags/acre)	2.00 ± 1.86	2.52 ± 2.46
Average Density for all transects (snags/acre)	2.26 ± 2.18	
Estimated total number of snags (≥9" dbh) that will be cleared within footprint of Preferred Alternative Alignment for Section 5 of I-69 (using an average of 2.26 snags/acre x 350 impacted forest acres)	791	
Very rough estimate of total number of snags (≥9" dbh) that may be present in forested areas of the Section 5 Expanded SAA, including maternity colony areas (46,028 acres) (an average of 2.26 snags/acre was used)	Section 5 Expanded SAA = 104,023 snags	
% of estimated number of snags in Section 5 Expanded SAA that would be directly impacted by I-69 (using an average of 2.26 snags/acre)	0.76%	

Table 3. Snag sizes, densities, and estimated totals based upon line transect surveys conducted within and adjacent to woodlots that will be directly impacted by Section 5 of I-69.

BLA estimated the diameters of upper canopy dominant trees along the transects and estimated the percentage of trees that fell into each of three different size classes: small (<9”), medium (9”-18”), and large (>18”) trees. There was a slight difference in the size distribution of trees between transects that were within the alignment and those outside the alignment. On average, transects surveyed **within** the alignment had 53% small, 34% medium, and 14% large trees. For transects surveyed **outside** the alignment, there were 47% small, 35% medium, and 18% large sized trees. The majority of trees both inside and outside the alignment had small to medium-sized diameters (less than or equal to 18” DBH) indicating that most of the forest that will be directly impacted by I-69 in Section 5 is relatively young, second-growth stands that have been previously harvested. The tendency for those transects outside of the right of way to have slightly larger trees could be due to the fact that most of the area within the proposed right of way is already dedicated to transportation purposes and has been more recently altered.

In regard to their quality as foraging habitat, 39 of the 62 transects were categorized as having ‘moderate’, ‘moderate-dense’, or ‘dense’ understory vegetation, a characteristic that can deter foraging Indiana bats, which prefer more open understory conditions. Japanese honeysuckle, bush honeysuckle (*Lonicera* spp.) and/or autumn olive, highly invasive plant species that form dense thickets in the understory of woodlots, were present in 41 of the surveyed transects. Those transects within the proposed right of way had a slightly higher percentage of these invasive species than those transects outside of the right of way (71% v. 61%). These species, if left unchecked, can take over and quickly lead to low quality bat foraging habitat. Based on our review of the best available data, it appears the majority of the 249 acres of upland forest that will be permanently lost to construction of I-69 in Section 5 is currently of low to moderate quality for roosting and foraging Indiana bats.

Wetland Habitat

According to Appendix F of the Section 5 DEIS, the Section 5 “corridor” has 10.45 acres of emergent wetlands, 3.31 acres of scrub-shrub wetlands, 37.52 acres of forested wetlands, 2.23 acres of aquatic bed wetlands, and 29.68 acres of unconsolidated bottom wetlands. The Preferred Alternative will impact 12.46 acres of wetlands, including unconsolidated bottom wetlands. Wetland impacts will continue to be minimized as the project progresses.

Factors Affecting the Species in the Action Area

The following State, local, and private actions within the Action Area are likely adversely affecting Indiana bats to variable degrees, and are likely to continue into the reasonably foreseeable future: 1) loss and degradation of roosting, foraging, swarming and staging habitat, 2) commercial and private timber harvesting, 3) cutting of snags, 4) degradation of water quality, 5) roadkill along existing roadways, and 6) repeated human disturbance of hibernating bats. The baseline acreages (*e.g.*, % tree cover), habitat conditions, and general ongoing stressors of the maternity colonies and winter habitat are discussed on pages 73-75 and 79 of the Tier 1 RPBO and also within the Tier 2 BA and are hereby incorporated by reference. (Note: some of the forest data presented in the Tier 1 RPBO has been revised in the Tier 2 BA).

There are four legal drains that are maintained within the Section 5 Indiana bat maternity colony areas in Morgan County. These legal drains are: Thad Roberts Ditch, Ella McNair Ditch, McNair Lateral, and Mary A. Nutter Ditch. It is estimated that the maintenance of these four drains may include the removal of 40 acres of tree cover. Three of these acres fall within the

Lambs Creek Maternity Colony and the remaining 37 fall within the West Fork Bryant Creek Colony.

Personal communication between BLA and the Monroe County Surveyor verified there are no legal drains within Monroe County.

Other stressors specific to the Section 5 Action Area include limestone quarrying and residential development associated with the City of Bloomington. The Section 5 Tier 2 DEIS discussed the limestone quarrying on page 5.24-18:

There are several active limestone quarries in the project area. There has been relatively little change in quarry land use in Monroe County over the past 50 years. The current trend is for limestone companies to reopen former mines rather than starting work at a new site. Active quarry or milling sites include C&H Stone off of Fullerton Pike, Hoadley (3 facilities – Rockport, Tapp, active mill on Arlington Road), and Reeds off of Prow Road.

With respect to development, GIS analysis was conducted to determine the approximate amount of no-build growth that is projected to occur in the action areas. These calculations showed that approximately 1,325 acres of no-build growth would occur in forested areas in the Expanded Remaining SAA. This is approximately 4.7% of the available forest in the Expanded Remaining SAA. The calculations showed that approximately 104 acres of no-build growth would occur in forested areas within the maternity colonies. Approximately 62 acres of no-build growth would occur in forested areas in Beanblossom Bottoms Nature Preserve Maternity Colony (0.7% of available forest), 6 acres in West Fork (Bryant Creek) Maternity Colony (0.1% of available forest), and 36 acres in Lambs Creek Maternity Colony (0.7% of available forest). This would equate to approximately 0.6% of the available forest within the maternity colony areas. The calculations showed that approximately 1,563 acres of no-build growth would occur in forested areas in the Expanded WAA. This equates to approximately 1.1% of the available forest within the Expanded WAA. This development is accounted for in the indirect and cumulative impacts analysis.

In general, data from the U.S. Forest Service, North Central Research Station's 2005 report "Indiana Forests: 1999-2003, Part A" indicate that while there has been a loss of continuous forests (resulting in smaller, more fragmented stands), there has been an overall increase in forested land across the state. In the fall of 2010 the USFWS became aware of private timbering occurring in the future I-69 right-of-way in Section 4. The private timbering was presumably being conducted to gain additional monetary compensation for the property prior to INDOT acquiring the land. In one instance, two landowners selectively cut approximately 110 acres in and around the planned right-of-way near the proposed SR 45 interchange in Section 4. In March, 2011, INDOT sent out a letter to local logging companies to curtail any distribution of misinformation. These letters indicated that seasonal tree-clearing guidelines had been adopted by INDOT for the entire project area in order to protect the Indiana bat and encouraged all logging companies and local landowners to adhere to these guidelines and to contact the USFWS for more information. Subsequently, the USFWS issued a letter to all local landowners in Section 4 advising them of the presence of the Indiana bat in the area and ways to avoid potentially taking the species. In an effort to be proactive for Section 5, INDOT developed a new letter and sent it out to all landowners in the right-of-way on July 9, 2013. These letters are being sent out prior to the appraisal process to assure owners are informed early in the process.

Furthermore a new Conservation Measure has been developed which includes additional coordination with landowners to avoid and minimize private tree clearing in the Action Area.

IV. EFFECTS OF THE ACTION

Based on our analysis of information provided in the December 19, 2012 Tier 2 BA for Section 5 of I-69, and the subsequent Tier 1 Reinitiation request (May 20, 2013), we have determined that the adverse effects of the proposed action are consistent with those contemplated in the August 24, 2006 Tier 1 RPBO and recent amendments (dated May 25, 2011 and July 24, 2013).

Therefore, the previous discussion of adverse effects and incidental take analyses on pages 81-91 and Appendix A of the Tier 1 RPBO, and discussions contained in the recent amendments to the Tier 1 RPBO (including updated tables B1-B5 now included as Appendix A of the 2013 amendment 2) remain valid and are hereby incorporated by reference. No additional adverse effects beyond those discussed in the Tier 1 RPBO and the recent amendments are anticipated from the Proposed Action. Both the harmful and beneficial effects of the Tier 2 BA estimated impacts and proposed mitigation acreages were taken into consideration for both our incidental take and jeopardy analyses for this Tier 2 BO. Anticipated effects are summarized below.

Direct Habitat Impacts

Forest

The total forest loss anticipated due to construction of the preferred alignment is estimated to be 255 acres (approximately 249 acres upland forest plus six acres forested wetland). Up to an **additional** 75 acres of forest may be impacted in several areas due to utility relocations and another 15 acres for billboard relocation. This would make the total anticipated loss of forest (345 acres) about 14% over what was previously estimated in Tier 1. Due to the expected exceedance of forest impacts, the INDOT and FHWA reinitiated consultation in May, 2013 and requested the amount of take of forest habitat in Section 5 to be increased to 350 acres. The selected corridor for I-69 in Section 5 has approximately 1,904 acres of forest (including upland and wetland forest) on 193 separate tracts. The 350 acres of impact will occur within forest areas ranging in size from approximately 0.01 acre to 181 acres. Along the corridor, 10 of the tracts crossed are greater than 50 acres. The largest tract (181 acres) within the corridor is located east of SR 37 and north of West Burma Road. See the Section 5 Tier 2 BA Appendix B for an atlas of the preferred alternative. Up to 0.7% of the available forest within the entire Section 5 Expanded SAA will be impacted (including utilities and billboards). There will be approximately 44.9 acres of core forest impacted by the Preferred Alternative alignment.

In July of 2012, BLA staff surveyed trees along 62 transects within forested areas that would be impacted by Section 5 of I-69 (See Environmental Baseline Section of this document for details). Based upon their findings, it is estimated that approximately 800 currently existing snags (*i.e.*, dead trees >9" in diameter with exfoliating bark that may serve as potential roost sites for Indiana bats) may be destroyed within the 350 acres that will be permanently cleared for construction of I-69 (Table 3). In the maternity colony areas, the percent of snags impacted ranged from 0.0% (Beanblossom Bottoms) to 1.1% (West Fork Bryant Creek) and in the expanded remaining SAA impacts included approximately 1.0% of available snags. The percentage of snags impacted by the project in the WAA is 0.7% (this has been updated since the WAA was addressed in the Tier 2 BA for Section 4). Based on this level of impact, the construction of I-69 is anticipated to have an insignificant and discountable effect on snag availability for Indiana bats within the Expanded

Action Area. Furthermore, only a fraction of these snags, those with direct solar exposure (along edges or within canopy openings), are likely to be suitable as potential primary maternity roost trees.

Core Forest

There will be approximately 44.9 acres of core forests impacted by the Preferred Alternative right-of-way. Of these 44.9 acres, 35.6 acres are located within the Expanded Remaining SAA, 9.2 acres are located within the Bryant Creek Maternity Colony, and 0.1 acres are located within the Lambs Creek Maternity Colony. There is no core forest impact within the Beanblossom Bottoms Nature Preserve Maternity Colony or in the overlap between Bryant Creek and Lambs Creek Maternity Colonies. This impact is a decrease from the finding in the analysis of the representative alignment (RA) in the Tier 1 BA Addendum that found 67 acres of impact to core forests.

Wetlands

The Preferred Alternative will potentially impact a total of 12.46 acres of wetlands. The project will not impact any wetlands within the Beanblossom Bottoms Maternity Colony. Within the West Fork Bryant Creek Maternity Colony, 0.13 acre of emergent wetlands will be impacted and within the Lambs Creek colony, 0.12 acre of scrub-shrub wetlands will be impacted.

The remaining 12.21 acres of wetland impacts occur within the Expanded Remaining SAA. The Expanded Remaining SAA has a total of 9 acres of aquatic bed wetlands, 41 acres of emergent wetlands, 379 acres forested wetlands, 56 acres of scrub-shrub wetlands, and 200 acres of unconsolidated bottom wetlands available. Impacts include two aquatic bed wetlands one at 0.06 acres and the other at 0.08 acres, totaling 0.14 acres. Seventeen emergent wetlands are impacted ranging from 0.01 acres to 1.17 acres totaling 3.35 acres. Nine forested wetlands are impacted ranging from 0.07 to 2.79 acres, totaling 5.27 acres. There are two scrub-shrub wetlands, one at 0.07 acre and the other at 0.88 acre, totaling 0.95 acre. In addition, two unconsolidated bottom wetlands are impacted one at 2.13 acres and the other at 0.37 acre, totaling 2.5 acres. Approximately 1.6% of the available aquatic bed wetlands, 8.2% of the available emergent wetlands, 1.4% of the available forested wetlands, 1.7% of the available scrub-shrub wetlands, and 1.3% of the available unconsolidated bottom wetlands will be impacted.

In order to determine impacts to the entire Expanded WAA, wetland impact totals include both Sections 4 and 5 and were fully addressed in the Tier 2 Section 4 BA using the representative alignment for Section 5 estimates. Using the most recent Section 4 right of way information and the impact calculation from the preferred alternative for Section 5, wetland impacts within the Expanded WAA have decreased from 11.72 acres to 9.77 acres. The Preferred Alignment will have no impact to scrub-shrub wetlands in the Expanded WAA area. Impacts include ten (10) emergent wetlands ranging from 0.01 to 1.86 acres each and totaling 5.11 acres; nine (9) forested wetland impacts ranging from 0.02 to 1.34 acres each and totaling 2.34 acres. In addition, eight unconsolidated bottom wetlands are affected with impacts ranging from 0.14 to 0.49 acre and totaling 2.32 acres.

Two open water wetlands will be affected by the project totaling 2.50 acres of impact (included as part of the 12.46 acre total listed above) and the Preferred Alternative will cross 85,017 linear feet of stream and ditches.

The Section 5 corridor crosses several 100-year floodplains. These mapped floodplains include: Indian Creek and the eastern edge of the White River floodplain; the confluence of Little Indian Creek, Jordan Creek, and Buckner Branch of Little Indian; Bryant Creek; the confluence of Beanblossom Creek and Griffy Creek; and Stout Creek. Although it is not anticipated that any floodplains in Section 5 will be bridged in their entirety, floodplain encroachments will be minimized, where reasonable, by utilizing existing bridge crossings and through design practices such as longer bridges and perpendicular stream crossings where new crossings are warranted.

Most of the project right-of-way is outside of the known maternity colony areas. Approximately 20% of the forest impacts occur on the outer edge of two maternity colony areas. Based on the location and quality of current roosting and foraging areas within Section 5 (and given the location of the preferred alternative), the Service anticipates that Indiana bats may attempt to use/cross over the proposed interstate at only a few locations including stretches where more heavily wooded areas exist along the proposed alignment and/or where the alignment crosses riparian corridors such as Beanblossom Creek, Griffy Creek, Bryant Creek, and Little Indian Creek. Based on the forest transect information, some of the forest areas have younger growth with moderate to dense understories and may not be suitable Indiana bat habitat; therefore, not all of the 350 acres that will be removed for construction of the preferred alignment is likely to serve as Indiana bat habitat.

Effects and Risks to Local Indiana Bat Populations

Indiana bats within the Section 5 Action Area may be exposed to adverse effects and incidentally taken from several I-69 related activities. The following forms of incidental take are possible:

- Harm from permanent direct loss of roosting/foraging/swarming/staging habitat and loss of habitat connectivity/travel corridors among forested patches in Section 5
- Harass/wound/kill/harm from disturbance and habitat loss associated w/demolition and subsequent relocation of 147 homes, 4 apartment buildings, and 32 businesses in Section 5 (assuming one or more home owner/business owner will choose to construct a new home in a forested area, no seasonal tree-clearing restrictions, and Indiana bats assumed present)
- Harass/wound/kill/harm from disturbance and habitat loss associated w/private landowner clearing and timber salvage prior to INDOT purchasing property (assuming home owner/business owner chooses to not work with INDOT to avoid timbering property during maternity season and assuming Indiana bats are present)
- Harass/wound/kill/harm from indirect/induced loss of roosting, swarming, staging and/or foraging habitat (assuming no restrictions/bats present)
- Harm from permanent habitat loss due to I-69 related utility and billboard relocations (timing restrictions will prevent direct mortality). Several utility crossings and billboard relocations may result in a potential conflict that could result in pipelines, power lines, or billboards being relocated in wooded areas in Section 5. Approximately 75 acres of utility impact is anticipated and 15 acres of billboard impacts; these are being closely coordinated with INDOT and FWS
- Death/kill from collisions with an increased volume of vehicles traveling at high speeds (*i.e.*, roadkill) on I-69 and/or increased traffic volumes on other local roadways and new access roads

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

Although incidental take may occur in various forms, the total amount of incidental take anticipated of individual bats is fairly small. Based on habitat impacts discussed in the Tier 2 BA, the Service anticipates the incidental take during the summer months to be consistent with or less than that which was determined in the Tier 1 RPBO and recent amendments (May 25, 2011 and July 24, 2013): No more than 3 Indiana bats from the three maternity colonies in Section 5 (Beanblossom Bottoms Nature Preserve – 0; West Fork White River Bryant Creek – 3; and Lambs Creek – 0) will be taken as a result of all project-related *habitat modifications* (direct and indirect) through 2030 (see Table B4 in 2013 Amendment to Tier 1 RPBO) and no more than 16 bats total in the West Fork White River Bryant Creek and Lambs Creek colonies (or approximately 1 bat/2 years/colony) are anticipated to be taken as a result of roadkill from 2013 to 2030. (This roadkill estimate is likely an overestimate due to the fact that the project is upgrading an existing four-lane highway in this section; any increase in roadkill would be a result of increased traffic volume (not the new roadway), assuming Indiana bats currently cross existing SR37. Furthermore, some recent research has indicated that bats may avoid larger roadways if their roosting and foraging habitat is not divided or if over- or underpasses are available; one study by Zurcher *et. al.* (2010) indicated that bats may avoid on-coming traffic.)

Maternity Colony Impacts in the Section 5 Action Area

Based on our assumptions as described in the Tier 1 RPBO, each maternity colony is comprised of 80 adult females and their single offspring. This results in a maximum of 160 bats per colony by mid-June after the young are born and become volant (*i.e.*, capable of flight) around mid-July. Therefore, given the documented presence of 3 maternity colonies in the Section 5 Action Area (which includes the two new colonies, 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 480 ($3 \times 160 = 480$) adult females ($n=240$) and juveniles ($n=240$) within or adjacent to the Action Area during the summer active period and that varying proportions of the bats in these colonies are likely to be exposed to direct and/or indirect effects from I-69.

Estimates of the number of bats exposed and adversely affected (*i.e.* disturbed, injured, or killed, henceforth referred to as take) during the summer maternity season as a result of the various project stressors are shown in Appendix A, Table B4 of the 2013 amendment to the 2006 Tier 1 RPBO. These numbers have been updated to include the newly identified maternity colonies.

The impact WNS may have on the ability of the Indiana bat to persist and recover is presently unknown. We currently do not have estimates of adult survivorship, juvenile survivorship, or fecundity for Indiana bat populations affected by WNS. Based on a limited amount of survey data from New York survey (2007 to 2010), Indiana bat hibernating populations in New York appear to have declined by almost 70% overall with affected individual hibernacula having population growth rates ranging from -99% to -21% during this time period. The impact the anticipated project take will have in light of the presence of WNS is discussed in more detail in the 2011 amendment to the Tier 1 RPBO (pages 10-16) and is hereby incorporated by reference. Although WNS was detected in the state of Indiana, and the Action Area, in the winter of 2010-2011, no population impacts in Indiana have been noted to date.

Impacts to the maternity colonies in Section 5 are expected to be fewer compared to most of the previous sections because the project consists primarily of upgrading an existing four lane divided highway. Colonies currently inhabiting the action area are doing so despite the present transportation infrastructure already in place. Project impacts to the maternity colonies will include direct and indirect loss of roosting and/or foraging habitat, and impacts from construction noise and/or vibrations. These impacts will be temporary in nature and occur at different times over a period of years. Pre- and post-construction monitoring is being conducted in all sections to help evaluate the on-going status of the maternity colonies in the Action Area.

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

Roadkill

Roadkill may also result in direct death of maternity colony members (and is likely currently occurring to some extent); as with take from induced development, the full effect of the take is not anticipated to occur until the entire interstate is constructed and fully operational (*i.e.* free flowing traffic on all six sections). Until such time we expect more localized changes in traffic. In addition, some direct mortality from roadkill may be compensatory rather than additive as the number of roadkills currently occurring on other local roads may decrease as traffic shifts to completed segments of the new I-69 roadway. Because the project consists primarily of upgrading an existing 4-lane facility, we do not expect roadkill deaths to rise significantly. Some increase could occur due to overall increased traffic volume and higher speed limits.

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

Therefore, although it is logical to assume that some roadkill may occur, the amount of roadkill attributable to I-69 is somewhat speculative and will be difficult to detect. As the Service does not have a standard means for estimating the likelihood of roadkill, in Tier 1 we estimated roadkill for each colony by starting with the assumption that all bats in a colony would be exposed to I-69 traffic (160/colony) and had a 5% risk of being hit and killed over the course of a 17 year period (this assumes a fully operational, completed interstate). The roadkill estimates

used for this project represent what we believe to be a reasonable worst-case scenario and could be reevaluated during subsequent consultations if more detailed information or data becomes available. The preferred alternative for Section 5 runs along the outer edge of two maternity colonies and likely does not separate large portions of roosting and foraging habitat, therefore further reducing the likelihood that roadkill is a significant form of take of Indiana bats in Section 5.

Private Landowner Clearing in Maternity Colony Areas

One effect of the action that was not originally contemplated during the Tier 1 consultation was the potential for private landowners to conduct timber harvests on their property prior to selling their land to the State for the project construction. INDOT's approach to purchasing right of way involves paying 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. In some cases, it appears, landowners have found it more economically beneficial to conduct some amount of harvest on their properties prior to selling to the State. Unfortunately, most of this cutting often occurs during the time period that the Indiana bat is present.

In an effort to avoid and minimize this issue, INDOT and FHWA, in coordination with the FWS, have developed a new conservation measure which is now included in the official proposed action for the I-69 project (see Appendix D, item A16, of Amendment 2 of the Tier 1 RPBO, 2013). FHWA, through INDOT, plans to mitigate impacts of out-of-season logging by providing private landowners within the approved right-of-way, who express an interest or intent to harvest timber, a mechanism to avoid or limit their harvesting activities to the November 15-March 31 timeframe within the WAA and the October 1-March 31 timeframe in the SAA. Options may include a "right of entry" agreement or other type of covenant or agreement between FHWA/INDOT and the landowner. FHWA, through INDOT, will contact landowners of property within the right-of-way to discuss opportunities for deferring tree clearing activities to the approved tree-clearing timeframes. This will voluntarily limit the timing of private timber harvest to a period Indiana bats are not present in the Action Area. These offers will be made on a case by case basis in coordination with the USFWS's Bloomington, Indiana Field Office.

Furthermore, INDOT/FHWA has recently provided information to landowners in the Section 5 project area informing them of the presence of the Indiana bat within the Action Area and the potential for violations under the Endangered Species Act if timber activities occur during the restricted time period (see Appendix B for copy of July 9, 2013 letter to landowners). Fortunately, these potential impacts are less likely to occur in Section 5 than Section 4 because much of the proposed alignment falls within existing INDOT ROW.

Implementation of the above measures should significantly reduce any impacts to bats as a result of private landowner tree clearing. Furthermore, because the amount of acquisition of private properties will be much less than what occurred in Section 4 and because a fewer number of landlocked parcels is anticipated, forest impacts from private landowners in Section 5 is anticipated to be considerably less than what occurred previously in Section 4. Additional information related to private landowner clearing can be found in Amendment 2 to the Tier 1 RPBO (2013).

Beanblossom Bottoms Nature Preserves Maternity Colony

Of the 350 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 Maternity Colony area. Impacts along this portion of the project corridor were originally described and included within the Remaining SAA totals until the recent discovery of a maternity colony at this location; therefore, there are no Tier 1 colony impacts to compare to. The alignment barely passes through a small, unforested area 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 cover¹ are available. This equates to 19,253 available snags at 2.3 snags/acre density. Based on EEAC forest data², no forests will be impacted within the maternity colony by the Preferred Alternative (PA), resulting in 0 snags impacted within the alignment.

Within the Beanblossom Bottoms maternity colony, connectivity to I-69 from the roost trees and capture points occurs along various tree lines and Beanblossom Creek and its various unnamed tributaries. The shortest connectivity route distance to I-69 from the two (2) Indiana bat capture points were approximately 4.4 miles (Site 1-B) and 4.9 miles (Site 2-B). The shortest connectivity route distance to I-69 from the two (2) 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 away from the Modesto mitigation site. See Figure 3 below and Table 12 of the Tier 2 BA for additional information.

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

Figure 3. 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 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, lack of likely travel corridors providing connectivity to the proposed alignment (Figure 3), and juxtaposition of potential roosting and foraging habitat, capture locations and known roost sites, it is unlikely colony members would be susceptible to increased roadkill along the upgraded Section 5 roadway.

Since the roadway does not pass through any known foraging or roosting habitat for this colony, we believe no take will occur as a result of the construction of the preferred alternative in this portion of the Section 5 Action Area. Furthermore, 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 do not anticipate that the upgraded roadway will be a factor in how individual colony members are able to move throughout the colony area. We also do not

anticipate any take in the form of harassment of the colony due to construction noise/vibration. Construction activities will be short term and far removed.

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.

West Fork (Bryant Creek) Maternity Colony

Approximately 54 acres of forest (or 66 acres of tree cover - including utility impacts) will be impacted within the West Fork (Bryant Creek) Maternity Colony area. The project corridor crosses the southeastern edge of the colony area (Figures 1 and 4). Suitable habitat is present on both sides of the alignment however all of the Indiana bat capture locations and roost trees were in the area north and west of the alignment. Although the upgrade of the highway in this area could theoretically increase any potential barrier effect once constructed, there is ample habitat on either side of the alignment and Indiana bats have been able to persist in the area.

Numerous alternate roost trees have been identified in the colony area, along with one primary roost. No impacts to any identified roost trees are anticipated. All of the roost trees found to date are located along the floodplain of the West Fork White River; the closest impact to any of the roost tree locations is 1.4 miles. In the unlikely event that an unknown primary roost or other alternate roost is felled by construction activities, additional roosting and foraging habitat will be available within the area.

Seven roost trees and three Indiana bat capture sites are located within the West Fork (Bryant Creek) maternity colony. Connectivity to I-69 from the Indiana bat capture points occurs primarily along tree lines, West Fork of the White River, Bryant Creek, and Little Indian Creek. The shortest connectivity route to I-69 from an Indiana bat capture point is less than 0.1 mile (Site 20), while the longest is approximately 2.6 miles (Site 19). The shortest connectivity route to I-69 from the roost trees is 1.8 miles (066R2), while the longest is 2.8 miles (5-3). The shortest straight-line distance from an Indiana bat capture point to the nearest tree cover impact was less than 0.1 mile (Site 20), while the longest was approximately 2.1 miles (Site 19). The shortest straight-line distance from a roost tree to the nearest tree cover impact is 1.4 miles (066R1), while the longest was approximately 2.2 miles (5-3). Connectivity routes were calculated for both the roost tree sites and the bat capture sites to the mitigation sites. Site 19 is located the closest to a mitigation site at approximately 0.1 mile away from the Bryant Creek mitigation site. Site 22 was located the farthest from a mitigation site at approximately 1.1 miles away from the Big Bend mitigation site. All the roost trees in this colony are connected to the Big Bend mitigation site, the closest being roost 5-3 at approximately 0.2 miles away and the farthest being roost 066R1 at approximately 1.1 miles away. The Big Bend mitigation site is located in close proximity to a majority of the bat captures and the roost trees that have been identified in this colony. This site will preserve roosting and foraging habitat for the Indiana bat. See Figure 4 below and Table 12 in the Tier 2 BA for additional information.

In the West Fork (Bryant Creek) maternity colony, 4,710 acres of tree cover are available. This equates to 10,833 available snags at 2.3 snags/acre density. Based on EEAC forest data, 53.7 acres of these forests will be impacted within the maternity colony by the Preferred Alternative. This would equate to 121 snags impacted by the Preferred Alternative which is approximately 1.0% of the available snags in the maternity colony. The tree cover impact has decreased considerably from the 107 acres reported in the analysis of the representative alignment in the Tier 1BA Addendum.

Some impacts could occur as a result of the project increasing the barrier to Indiana bat movement within their maternity area. Indiana bats associated with a maternity colony near the Indianapolis Airport have been observed to readily cross small roads (e.g., dirt, gravel, and paved) while foraging at night, but multilane divided highways were only rarely crossed and most of those crossings occurred when bats followed a stream under Interstate 70 (pers. comm. with Dale W. Sparks, Indiana State University, 2007). Sparks and his colleagues have concluded that if Indiana bats don't cross major interstates and highways often, that the presence of such transportation infrastructure in a landscape could essentially be reducing the amount of possible foraging grounds bats would otherwise be willing to visit, thus reducing the amount of food potentially available to the bats. Another recent publication by Zurcher *et. al* also supports this conclusion (see roadkill discussion above). Consequently, high-traffic volume roads could be acting as barriers and restricting access to traditional foraging areas. Following this logic, with the addition of access roads, an interchange, and larger right of ways, some of the West Fork (Bryant Creek) Maternity Colony members may no longer be willing to cross over I-69 while foraging and may be more susceptible to vehicular collision (Note: I-70 in the vicinity of the Indianapolis airport is significantly wider than what I-69 in Section 5 will be); however, fortunately for this colony, the majority of its habitat (including the known roost trees) is west of the proposed alignment and thus bats would not need to cross the proposed interstate to reach suitable habitat for roosting and foraging; no reduction in access to the majority of their assumed colony area is expected.

In addition, there are four proposed mitigation sites within this colony's use area, totaling 148 acres of forest preservation and 48 acres of forest restoration. All of the mitigation is planned west of the proposed alignment and most is near the center of the colony area.

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

Figure 4. West Fork (Bryant Creek) Maternity Colony Connectivity to the Nearest I-69 Alignment and Mitigation Sites.

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

As previously discussed, once Section 5 of I-69 is operational, an increased volume of fast-moving vehicles may result in additional bat/vehicle collisions. Assuming that some individual bats from the colony do and will continue to use this area, we estimate a small, additional number of these bats may be struck by vehicles and killed. As stated above, some recent research suggests that bats may attempt to avoid large multi-lane roads, as well as approaching vehicles; however, based on one report of road-killed Indiana bats at a site in Pennsylvania (Butchkowski 2002), there still exists some potential for bats to be struck by vehicles along highways. Given the positioning of forested habitat relative to the proposed interstate alignment, we believe the Tier 1 estimate for roadkill for the West Fork (Bryant Creek) Maternity Colony

will not be exceeded and no more than 8 bats will be killed by vehicle collision between 2013 and 2030, or approximately 1 bat every two years, as a result of the upgrade of SR 37 for the Section 5 Preferred Alignment (see road-kill estimate discussion above). The loss of 1 individual every two years from vehicular collision 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 colony. Partial bridging of the floodplain of Little Indian Creek will provide an area for the bats to cross under the roadway therefore reducing the likelihood of road-killed bats at that location; it is unclear if other crossings in that area (access roads and the interchange) will be as easy to navigate, although the western portion of the interchange was recently shifted further north into a more agricultural area, reducing the amount of construction impacts at Little Indian Creek (not shown on Figure 4).

Results of the Tier 1 indirect and cumulative impact analysis for the West Fork (Bryant Creek) Maternity Colony area indicated no induced growth was expected. The analysis included impacts as generated by the REMI model and assigned to the Traffic Analysis Zones (TAZs) for the I-69 project. The indirect impact analysis was updated during the Tier 2 process and currently 0.9 acres of forest are anticipated to be impacted by induced growth as a result of the I-69 project in this colony area.

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 comprises the Section 5 Preferred Alignment. 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 Section 6.

The Lambs Creek Maternity colony contains approximately 5,000 acres of tree cover. Approximately 6 acres of forest impacts will occur within the maternity colony area (4.5 acres are actually 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, 7.1 acres of the tree cover will be impacted (including utility impacts) within the maternity colony by the Preferred Alternative. This equates to 16 snags impacted within the Preferred Alternative which is approximately 0.1% of the available snags in the maternity colony circle.

One Indiana bat capture point and two roost trees are located 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 are: roost 768-1: 1.2 miles; roost 768-2: 2.7 miles; and Site 24: 2.1 miles.

No impact to the identified roost trees is anticipated. Since a four-lane interstate already occupies the proposed alignment right-of-way, it is doubtful that any unknown roost trees (including a primary roost) would be affected by project construction. In the unlikely event that a primary roost or other alternate 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 has been removed for confidentiality reasons related to the federally endangered Indiana bat (*Myotis sodalis*)

Figure 5. 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. See Figure 5 above and Table 13 in the Tier 2 BA for additional information.

Based on the amount of surrounding forest habitat and stream crossings, bats from the Lambs Creek Colony may attempt to cross the interstate along the Indian Creek corridor. We anticipate that the I-69 bridge over Indian Creek will remain at least the same size as it currently is 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 (M. Allen, FHWA, pers. comm.).

We believe the Tier 1 method for estimating road-kill is reasonable (and conservative) and anticipate that no more than 8 bats may be killed by vehicle collision between 2013 and 2030 within Lambs Creek Maternity Colony, or approximately 1 bat every two years (see road-kill estimate discussion above). The loss of a few individuals due to road-kill may cause short-term (*i.e.*, 2 to 3 years) reductions in reproductive success, but we do not anticipate an appreciable long-term change in reproductive success or viability of the Lambs Creek Maternity Colony.

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

Adult Males during the Summer

Four adult male Indiana bats were captured within the Action Area of Section 5 in 2004, none in 2005, and four in 2012. In 2004, a radio-tagged male led to the discovery of two roost trees in the West Fork (Bryant Creek) Maternity Colony area. In 2012, three radio-tagged males led to the discovery of three secondary roost trees (outside of any known maternity colonies in the southern portion of the action area around Bloomington) and a roost in a bat box in a residential yard (just inside of the Beanblossom Bottoms Nature Preserve colony). The southern portion of Section 5 falls within the WAA (*i.e.* within 5 miles of various known hibernacula) and therefore is likely to have a higher concentration of males compared to other parts of the project area.

The preferred alignment will impact potential roosting and foraging habitat and disrupt various travel corridors throughout Section 5. Once this section is operational, fast-moving vehicles may strike bats as they fly across the interstate at night. We are uncertain how or whether male Indiana bats currently travel across or parallel to the proposed interstate alignment. Assuming that some individual bats do and will continue to use this area, we anticipate a small number of male bats could be struck by vehicles and killed; this is the most likely form of incidental take of male Indiana bats in Section 5 during the summer months.

Impacts to male bats in the WAA (including a small portion of Section 5) were previously evaluated in the Section 4 BA and BO. Given the lower density of male Indiana bats in the remaining area of Section 5, and that the project primarily entails upgrading an existing roadway, we anticipate the total number of bats that may be taken as a result of the Proposed Action in the Section 5 SAA to be less than 5 individuals between the years 2013 and 2030, or 1 male bat every three and a half years (primarily as a result of roadkill). The potential loss of this very small number of male bats will have no measurable or significant short or long-term impacts on local or regional Indiana bat populations in the SAA, Midwest Recovery Unit or beyond.

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

Approximately one quarter of the Section 5 project area is within the WAA that was established for the Indiana bat as part of the project's Tier 1 consultation. The "Winter Action Area" (WAA) is the total area that falls within a 5-mile radius centered on each of the known Indiana bat hibernacula that have entrances located within 5 miles of the proposed 3C corridor. Of the 15 hibernacula in the WAA, eight fall within 5 miles of the Section 5 corridor. Because all 15 also fall within 5 miles of the Section 4 corridor, all 15 hibernacula were analyzed in detail as part of the Tier 2 consultation for Section 4. Cave, Cave, Cave, Cave, Cave, Cave, Cave, and Cave System (includes Cave) and Cave have entrances within a five-mile radius of the Section 5 corridor. In this Section 5 Tier 2 BO only the impacts that were affected with the new Preferred Section 5 alignment will be updated.

During the recent Tier 1 Reinitiation consultation, FHWA and INDOT requested an increase in the amount of habitat impacts expected to occur around 5 of the Section 5 hibernacula and one of the Section 4 hibernacula. Increases to the amount of forest habitat potentially impacted range from 12 to 37 additional acres within a hibernaculum's 50,240-acre WAA, and most of these impacts overlap; this 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 in impacts have significant use by Indiana bats (Cave and Caves). Both of these caves and their immediate surrounding habitat have been permanently protected via a conservation easement.

Please note since the development of the Section 4 BA a more detailed analysis has been completed on Section 5 indirect impacts. This has resulted in the WAA being expanded an additional 2,761 acres to include induced growth TAZs that now touch the more northern boundaries of the WAA. This additional TAZ acreage will not impact those hibernacula areas that are only impacted by the Section 4 ROW due to the location of these newly expanded areas being greater than five miles from those Section 4 hibernacula.

WAA Forest Impacts

The Expanded WAA (recently further expanded to include additional areas where induced growth is anticipated to occur in Section 5) contains 148,182 acres of tree cover. Within the WAA, the Preferred Alternative right-of-way will impact 1,228 acres of tree cover and utility and billboard impacts will add another 19.4 acres of impact, for a total of 1,247.8 acres. Based on the acreage of tree cover in the WAA, an estimated 340,819 snags are available (2.26 snags/acre density). Using the more refined EEAC forest data, 1,106.7 acres of these forests (including utility and billboard impacts) will be impacted within the Expanded WAA by both the Section 4 and the Section 5 Preferred Alternative (63.07 acres within Section 5 and 1,042.67 acres in Section 4). This equates to 2,501 snags impacted within the Preferred Alternative for

Section 4 and 5. This is approximately 0.7% of the available snags in the Expanded WAA. Based on this level of impact, the construction of I-69 is anticipated to have an insignificant and discountable effect on snag availability for Indiana bats within the Expanded WAA.

Upland forest impacts associated with each of the 15 hibernacula are shown below. Forest impacts within a 5-miles radius area surrounding the various hibernacula range from 0 acres at to just over 550 acres at A summary of these impacts, including the Tier 1 threshold that was established, the new requested level of take (per the 2013 Tier 1 Reinitiation) is presented below. Please note that the Tier 1 BO threshold amount presented below (Table 4) includes a 10% buffer allowance. The impact acreages reflect the most current design information for Sections 4 and 5. Most impacts have been further reduced from what was reported in the Section 4 Tier 2 BA and BO.

Table 4. Hibernacula Winter Action Area Upland Forest Impacts						
Cave	Tier 1 BO Threshold (ac.)*	Revised Take Estimate 2013 ¹	Total Impacts (ac.)**	Sec. 5 Utility Impacts (ac.)***	Sec. 5 Billboard Impacts (ac.)***	Section 5 ROW Impacts (ac.)
	474.1	-	452.52	0	0	0
	316.8	305	293.87	11.16	2.94	28.47
	106.7	125	111.5	5.33	.42	11.24
	107.8	110	99.26	10.25	2.94	27.19
	261.8	275	262.01	5.26	0.42	14.13
	385	-	346.13	11.21	2.94	28.47
	694.1	-	556.98	0	0	0
	611.6	-	498.49	0	0	0
	12.98 ²	-	12.76	0	0	0
	509.3	-	404.56	10.4	0.42	27.91
	93.5	95	84.26	11.42	0	32.47
	359.7	-	320.65	13.91	0	39.13
	574.2	-	431.72	0	0	0
	0	-	0	0	0	0
	56.1	70	57.03	0	0	0

* The Tier 1 BO Threshold presented here includes a 10% exceedance allowance.
 **This includes the most current design for Section 4 and Section 5.
 ***These impacts are not cumulative; total utility and billboard impacts in the WAA are 16.5 and 2.9, respectively.
¹ A 10% exceedance allowance of this acreage would be allowed before reinitiation is triggered
² The Tier 1 threshold for Cave was revised per the May 25, 2011 Tier 1 RPBO Amendment

WAA Connectivity

In addition to analyzing forest impacts for each hibernaculum, connectivity was analyzed for all known hibernacula and caves where Indiana bats were harp-trapped within five (5) miles of the Section 4 and Section 5 Preferred Alternative in the Section 4 BA and BO. Only those caves that are closer to the Section 5 Preferred Alternative are included in this Section 5 Tier 2 analysis. This includes three hibernacula () and and two caves where Indiana

bats were harp trapped (and Caves). Please refer to the Section 4 Tier 2 BA for information regarding the other hibernacula and harp trapped caves.

Section 5 of the Preferred Alternative falls within the northern portion of the Winter Action Area. Because there is more urban development in this area, and because the project involves upgrading an existing four-lane highway, impacts to the bat’s connectivity to the surrounding habitat should be minimal. See the Section 5 Tier 2 BA for additional information and descriptions of connectivity for the three hibernacula listed above, as well as connectivity information for and caves which are not considered hibernacula but where Indiana bats were harp-trapped in the spring and/or fall of 2004 and 2005. Connectivity distances to the alignment impacts and mitigation sites are shown below in Table 5.

Table 5. Connectivity and Distance to Impacts from known hibernacula and Indiana Bat Harp Trap Locations within 5 miles from the Preferred Alternative			
Location	Connectivity Routes to I-69 (miles)	Straight-line Distance to Impacts (miles)	Connectivity to Mitigation Sites (miles)
	6.0	4.1	0.0
	5.7	3.9	0.0
	3.7	2.6	0.2
Cave	1.1	0.8	1.8
Cave	2.8	2.2	3.7

Updated Expanded WAA Wetland Impacts

The Expanded WAA has a total of 296 acres of emergent wetlands, 1,305 acres of forested wetlands, 40 acres of scrub-shrub wetlands, and 1,171 acres of unconsolidated bottom wetlands available. In order to determine anticipated impacts to the entire Expanded WAA, wetland impact totals include both Sections 4 and 5. The Preferred Alternative will have no impact to scrub-shrub wetlands in this area. Impacts include ten (10) emergent wetlands ranging from 0.01 to 1.86 acres each and totaling 5.11 acres; nine (9) forested wetland impacts ranging from 0.02 to 1.34 acres each and totaling 2.34 acres. In addition, eight unconsolidated bottom wetlands are affected with impacts ranging from 0.14 to 0.49 acre and totaling 2.32 acres. Approximately 1.7% of the available emergent wetlands, 0.2% of the available forested wetlands, and 0.2% of the available unconsolidated bottom wetlands will be impacted. Table 17 of the Tier 2 Section 5 BA summarizes the wetland impacts in the Expanded WAA.

With the exception of Cave (which is not within the Section 5 portion of the WAA), none of the hibernacula are known to be hydrologically connected to the project corridor and direct impacts to their recharge areas are not anticipated. See pages 81-107 of the Section 4 Tier 2 BA for a full discussion of the hibernacula recharge areas for the entire WAA.

No direct adverse impacts are anticipated to any of the 15 physical cave structures in the Action Area that are known to serve as Indiana bat hibernacula. Detailed impact information related to each hibernaculum along with cave and surrounding habitat descriptions can be found in the Tier 1 BA Addendum and also the Tier 2 Section 4 BA and BO.

Habitat impacts appear fairly insignificant within the Section 5 portion of the WAA and the bulk of anticipated take of bats residing here during the fall, winter and spring is likely to be caused

by vehicular collisions (primarily occurring during the annual swarming period in late summer and fall). With that said, because highway traffic already exists on the current four lane facility, additional vehicular take is expected to be minimal.

Noise Impacts

Construction Noise

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

Highway Noise

Highways are linear noise sources in which the tire/pavement contact, engine and exhaust generate sound at various pressures and frequencies. For interstates such as I-69, steady state A-weighted sound pressure levels of 66 dB or greater are anticipated at distances of 250 feet from the roadway and possibly as far as 350 to 400 feet from the roadway depending on the volume of traffic predicted for the design year, and then decrease with distance from the roadway to lower levels. The construction of I-69 in Section 5 will produce new noise levels with the upgrade of the principal arterial road (SR 37).

The Section 5 Tier 2 DEIS discusses noise studies starting on page 5-10. The existing measured L_{eq} noise levels within the project corridor ranged from 42.5 dBA at Site M-34 to 69.6 dBA at Site M-24. Noise Meter Locations are shown in the Tier 2 BA for Section 5 beginning on page 87. Nearly 800 sites were analyzed for current and future noise levels within the three maternity colony areas and the WAA. Of the 18 receptors in the Beanblossom Creek Colony, one exceeds the applicable noise abatement criteria (NAC) for the design year preferred Alternative 8. Of the 53 receptors not displaced by preferred Alternative 8 in the West Fork White River/Bryant Creek Colony, 20 exceed the applicable NAC. Of the 13 receptors not displaced by preferred Alternative 8 in the Lamb's Creek Colony, 9 exceed the applicable NAC. Of the 576 receptors not displaced by preferred Alternative 8 within the WAA, 108 exceed the applicable noise abatement criteria, or substantially exceed the existing noise level.

It is unclear exactly how bats may react once the new highway becomes fully operational. Some studies indicated very low bat usage close to interstates and others indicate that some bats will roost and forage near large roadways. The latter may be a factor of available surrounding habitat and habituation over time to the noise. Since this project involves the upgrade of an existing four-lane facility, we anticipate noise impacts to be minimal.

Blasting

Some blasting may occur in Section 5. While the effects of blasting are unknown, a commitment has been made to limit the effects blasting will have on the Indiana bat. Blasting will be avoided between September 15 and April 15 in areas within half of a mile of known Indiana bat hibernacula. All blasting in the WAA will follow the specifications developed in consultation with the USFWS and will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of nearby caves serving as Indiana bat hibernacula.

Indirect/Induced Impacts

Induced development

A total of 95 acres of induced development is predicted to occur within the Section 5 Expanded Action Area. The expert land use panel identified a total of 31 TAZs (traffic analysis zone) along existing SR 37 in Bloomington and near the various proposed interchanges as the probable locations of that induced development (see Figure 27, Table 18, and Appendix E of the Tier 2 BA for detailed information about individual TAZs). Unlike the previous new-terrain Sections, Section 5 has existing development along the Preferred Alignment; therefore, it is assumed that some of the induced development will result in higher densities of growth on already developed land. Regarding the potential for I-69 to spur induced development in Section 5, the Section 5 DEIS states:

Upon review of existing data, mapping, and local coordination, in general, the streams and wetlands account for significantly smaller acreage than the agricultural land or forests in any given induced growth TAZ. Based on the ratio of available agricultural and forest land within TAZs with induced growth, an estimate of 35% of the induced growth occurring on agricultural land and 65% forest land was established based for Monroe County. An estimate of 55% agricultural land and 45% forest land was established for Morgan County. These percentages are applied where growth is expected to occur on non-developed land.

The Service gives deference to the “expert land use panel” on the issue of where induced development is most likely to occur in Section 5. Thus, we anticipate a small amount of incidental take of Indiana bats in Section 5 as a result of induced development (47 forested acres) in forested areas. The amount of induced/indirect development predicted to occur within each maternity colony area was described in the maternity colony impact section of this document and is considered insignificant.

Effects on Habitat Quality

In addition to direct and indirect habitat loss, proposed actions may result in a decrease in the quality of remaining habitat within the Action Area. Factors that may lead to a loss in the quality of remaining habitat include: increased habitat fragmentation; increased human disturbance (e.g., more lighting associated with road improvements, increased traffic and associated noise levels); foraging habitat over culverted or relocated streams will be relatively poor until the aquatic community becomes re-established; impacts to karst habitat as a result of changes to infiltration and surface water runoff patterns, including introducing contaminants to karst resources; and decreased water quality in the Action Area (short-term and long-term), as a result of construction activities, road salts, motor oil and other road run-off, and various hazardous

materials leaked or spilled during traffic accidents. Over time, it is expected that fragmentation of habitat in some portions of the Action Area will increase as new indirect development occurs particularly near proposed interchanges. However, as the mitigation plantings mature into suitable Indiana bat habitat this will be at least partially off-set.

Lighting/Noise

Increased human presence/disturbance in the project area may affect the quality of summer bat habitat, but these effects are expected to be relatively minor. Because Section 5 entails upgrading an existing four-lane facility, Indiana bats in the action area have likely previously been exposed to artificial lighting, higher noise levels and highway traffic and may not be as affected as those individuals in previously undisturbed portions of the overall project. No incidental take is anticipated from the additional lights and traffic noise levels that will occur with the operation of Section 5 of I-69.

Water Quality

During construction, water quality may be temporarily adversely affected in Section 5 streams (e.g., increased siltation) where Indiana bats drink and presumably obtain a small portion of their insect prey. Due to the addition of numerous new frontage roads, Section 5 streams and legal drains will receive additional roadway runoff containing salts (applied by INDOT maintenance staff) and other vehicular-based contaminants, which may further degrade their current conditions, which in some cases are already of poor quality. Anticipated adverse impacts to water quality will be addressed in erosion control plans that INDOT will be implementing during all construction activities, which will help alleviate short-term sedimentation impacts on aquatic insect communities. Because the bulk of the Indiana bats' prey base is made up of terrestrially based insects (*i.e.*, not aquatic-based, Tuttle *et. al.* 2006), short and/or long-term adverse effects to local water quality are not likely to rise to a level where incidental take of Indiana bats is reasonably certain to occur.

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

Karst

Karst habitat is a non-renewable resource that is biologically important because it provides habitat for a number of rare, threatened, and endangered species that depend on caves to different degrees. Many species of bats, including the federally endangered Indiana bat, use caves in karst areas within the WAA of I-69. Some anticipated karst impacts may include: sediment-laden runoff to sinking streams, cave recharge areas, or sinkholes; filling in sinkholes or reopening buried sinks; collapse and exposure of karst conduits; and blocked spring outlets and recharge pathways. Drainage patterns could be altered either increasing or decreasing typical flow patterns.

According to the Section 5 Tier 2 DEIS on page 5.24-45 and 5.24-46:

Highway construction and operation related impacts to identified karst features are unavoidable. As summarized in **Table 5.24-6**, approximately 672 total karst features are

found within the Section 5 Karst Study Area, including 319 within the corridor and 353 relevant karst features beyond the corridor. Additional right-of-way Existing SR 37 right-of-way accounts for over 50% to 85% of the number of karst features, acres of karst features, and acres of relevant karst impacts included in the five alternatives. New right-of-way required for Alternatives 4 and 5 accounts for 41% and 39% of the total karst impacts (in acres). The majority of karst impacts are in existing SR 37 right-of-way. New right-of-way to be acquired for Alternatives 6 and 7 accounts for only 23% of the total karst impacts (in acres) and 24% of the Preferred Alternative 8 total karst impacts (in acres). Potential karst feature impact totals associated with the five alternatives are presented in **Section 5.21, Karst Impacts (Table 5.21-3)**. Total impacts to karst features range from 144 features (439.7 total acres for Alternative 4), 138 features (430.02 total acres for Alternative 5), 109 features (338.5 total acres for Alternative 6), 113 features (340.3 total acres for Alternative 7), to 110 features (343.7 total acres for Alternative 8). Of these features, 77 (260.7 total acres) are located within the existing SR 37 right-of-way and are already affected by the existing transportation facility.

Cave and Cave were considered biologically significant due to the state-listed species demonstrated to occupy them. Special measures may be required to protect these fauna from potential impacts from road construction, operation, and maintenance. The proposed six-lane I-69 will have similar type of direct impacts to the Cave A and Cave B Systems as the existing four-lane SR 37. In order to maintain the existing base flow levels in the system, surface treatment of runoff water may be required. Karst springs are present within these caves. An assessment was made of the projects potential to cause indirect impacts to state listed cave biota from changes in drainage areas contributing recharge to the cave springs as well as karst groundwater quantity and quality. Findings of this assessment conclude that the project will not result in such changes of a sufficient magnitude to adversely affect the identified state listed species. Analysis which shows that these species will not be adversely affected is provided in **Section 5.17, Threatened and Endangered Species**.

In accordance with the Karst MOU, unavoidable impacts upon karst features will be mitigated through implementation of alternative drainage, where feasible. If alternative drainage is not possible, impacts will be mitigated through implementation of BMPs, including water quality treatment measures, and appropriate operation and maintenance measures.

While avoidance measures were considered for known caves during the development of the five alternatives, it should be noted that unidentified subterranean karst features are undoubtedly present, and an unknown number of such unidentified features will be encountered and may be impacted during highway construction. Features within the construction limits may be bridged, capped or filled. There is also the potential for changes in drainage patterns if the project were to sever a conduit and reduce flows, or by adding drainage, thereby increasing flows.

The Karst MOU requires that investigations of pollutant loadings are performed for the project area's existing drainage as well as the proposed highway drainage. The degree of impact upon each feature is case-specific depending upon the situation of the feature relative to the proposed work. Calculations of estimates of pollutant loads from the highway and drainage within the right-of-way of the Preferred Alternative will be made, including prior to and post construction estimates. Pollutant loads will be calculated based on methodology developed by the FHWA. The calculated pollutant loads for the applicable karst features will be tabulated for use by INDOT and the MOU signatory agencies for the evaluation of avoidance, alternative drainage, treatment, and maintenance alternatives and

in development of the Erosion and Sediment Control plans, in compliance with the Indiana Handbook for Erosion Control in Developing Areas.

Impacts Summary

In summary, the following effects on Indiana bats in Section 5 are anticipated:

- Direct habitat modification/loss will occur, but will be minimal with a loss of tree cover ranging from approximately 0% to 1% within the three maternity colony areas. Therefore, the total amount of forest loss is relatively insignificant. It is also unlikely that these maternity areas would experience a significant long-term decrease in quality of roosting or foraging habitat as a direct result of I-69, based on the amount and quality of remaining forest habitat, the location of the alignment, and the fact that it is an upgrade of an existing four-lane facility.
- Seasonal tree-cutting restrictions will ensure no direct impacts/take occurs from the construction of I-69 during the maternity colony season. INDOT has also extended this restriction to include all borrow areas used by construction contractors.
- Indirect loss of forest or wetland habitat from residential and commercial development is anticipated to be fairly small and minimal impacts are expected, particularly in the maternity colony areas.
- No known primary or alternate roost trees will be impacted within the three known maternity colonies. Given the capture location of the bats, the location of the I-69 alignment, and results of forest transects conducted by BLA, it is unlikely that any primary maternity roosts are within the proposed alignment that will be cleared for I-69. Thus, no take is anticipated from the loss of a primary roost tree. Loss of unidentified alternate roost trees may occur, but this is limited given the location of the proposed alignment.
- Because construction in Section 5 primarily involves the upgrade of an existing four-lane facility, impacts to existing stream crossings and bat travel corridors are expected to be minimal. In most cases, current stream crossings will be maintained or improved upon (longer spans, redirection of road-runoff, etc.). If any of the existing stream crossings are currently used as corridors for bats, the upgraded structures should continue to provide areas for bats to connect to existing habitat and safely cross under the interstate. Some additional structures may be developed for access roads and interchanges but we expect impacts to bat movement to be minimal from such structures.
- Death/kill from collision with vehicles once roadway is fully operational is anticipated on I-69 and other local roadways when traffic volume and speed increases. One bat per colony is projected to be taken every two years through 2030. Some road-kill may be offset as traffic on local roads decreases and shifts to the new interstate. Since Section 5 consists of upgrading an existing four-lane state highway, impacts of this project from vehicular collision are anticipated to be less than the other new terrain sections.
- The maternity colonies and individual adult males have access to ample additional habitat nearby in the unlikely case that some individual bats should become displaced from their traditional foraging/roosting areas.
- I-69 may induce some amount of residential/commercial development in currently forested areas and may also speed up the rate of development that otherwise would have occurred within the action area at a slower rate, particularly in the immediate vicinity of

and within easy commuting distance of Section 5 interchanges (e.g. Liberty Church Interchange).

- Some harassment of bats roosting near construction areas may occur as a result of exposure to novel noises/vibrations/disturbance causing roost-site abandonment and atypical exposure to day-time predators while fleeing and seeking new shelter during the day-time. This will have only short term impacts, if any.
- Proposed forest, wetland, and stream mitigation within and near the maternity and hibernacula areas will ensure that up to 2,000 acres of suitable roosting and foraging habitat persists in perpetuity, in addition to the permanent protection of two Priority 1A hibernacula.
- Long term reproduction and viability are not expected to be impacted by the project and all maternity colonies and hibernacula are likely to persist in the area.

Although there may be some short-term impacts to individuals within the three colonies, these impacts are not likely to affect the colonies' long-term reproduction and viability. Thus, the maternity colonies are likely to persist within the Action Area into the reasonably foreseeable future following construction, operation, and maintenance of the I-69 project. Furthermore, with successful implementation and maturation of the proposed mitigation projects, permanent protection of two Priority 1A hibernacula, and other proposed mitigation and conservation measures, we anticipate that long-term habitat conditions for these colonies will be suitable and sustainable for the long-term survival and recovery of the species.

Table B1 (updated in Appendix A of the recent 2013 amendment to the 2006 Tier 1 RPBO), deconstructs the Proposed Action and summarizes the anticipated direct and indirect environmental consequences and likely responses of exposed Indiana bats. After reviewing the Section 5 BA and conducting the formal consultation for Section 5, the Service has concluded that applicable information within Table B1 remains valid for Section 5 of I-69. In addition to project elements assessed in Table B1, the Service also considered potential adverse effects from the following possible indirect I-69 related actions in Section 5: induced construction/operation of new cell towers. Furthermore, because open agricultural land is available in Section 5, the Service does not anticipate that any new cell towers will be sited/constructed in currently forested areas in Section 5 and therefore no additional forest loss is anticipated related to these types of actions.

Effects of Avoidance, Minimization and Mitigation Measures

The FHWA and INDOT have incorporated measures into the proposed project design to avoid, minimize and mitigate the impacts of the project to the extent practical. Proposed avoidance, minimization and mitigation procedures are discussed in the Revised Tier 1 Forest and Wetland Mitigation and Enhancement Plan (see Appendix D of the Tier 1 BA Addendum). Details of specific mitigation projects in Section 5 are described in the Section 5 Tier 2 BA starting on page 119 (see also Appendices J-DD), and updated Conservation Measures developed for the project can be found in Appendix D of the recent amendment (Amendment 2, July 24, 2013) and are hereby incorporated by reference. A summary of the proposed Conservation Measures and their current implementation status is provided in Appendix A of this BO.

Forest Mitigation

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

To minimize and mitigate impacts to bats due to habitat loss in Section 5, existing high quality forested habitat suitable for Indiana bat foraging and roosting, as well as areas suitable for restoration, were identified within the Action Area. In identifying mitigation properties, INDOT and FHWA used the following criteria for Section 5:

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

Currently, INDOT has identified 21 property owners as “willing sellers”; their properties total approximately 1,850 acres. Of this total, INDOT has secured two properties, Ravinia Woods and Chambers Pike. Thus, INDOT is currently pursuing approximately 1,475 acres to fulfill the mitigation commitment based on the Preferred Alternative design. Of this amount we anticipate approximately 1,166 acres will be required although the final amount is dependent on the final impacts. INDOT and FHWA will fulfill all required mitigation efforts. At this time, INDOT is currently in the early stages of the acquisition process. INDOT is also pursuing 4 landlocked sites that total 249 acres. Offers will be extended on the potential mitigation parcels, as needed, to fulfill the mitigation requirements.

The following properties are currently being pursued by INDOT. Acreage for each parcel is provided in parentheses.

- **Crooked Creek Maternity Colony (Section 6)**
 - Waverly Bog (119 acres)
- **Lamb Creek Maternity Colony**
 - Berean Valley (245 acres)
 - Nutter Ditch (305 acres)
 - Principal (38 acres)
- **Bryant Creek Maternity Colony**
 - Ravinia Woods (373 acres)
 - Union (11 acres)

- Big Bend (99 acres)
- Bryant Creek (27 acres)
- Paragon (64 acres)
- Cooksey (131 acres)
- Creek Road (47 acres)
- **Morgan Monroe State Forest Focus Area**
 - Chambers Pike (3 acres)
- **Beanblossom Bottoms Nature Preserve Maternity Colony**
 - Canyon (10 acres)
 - Stone Belt (19 acres)
 - Wylie (17 acres)
 - Griffith (7 acres)
 - Long Pond (111 acres)
 - Modesto (144 acres)
- **Beanblossom Creek Focus Area**
 - Whisnand (78 acres)
 - Beanblossom Creek (65 acres)
- **Maple Grove Historic District Focus Area**
 - Kinser Pike (43 acres)
 - Stout Creek (16 acres)
 - Stout Valley (33 acres)
- **Other**
 - Victor Pike (47 acres) – Section 4
 - Richland Creek (75 acres) - Section 4

INDOT will continue to pursue the above properties and intends to make offers to each property owner, as needed. INDOT will provide written documentation to USFWS for each property for which Conservation Easements or Fee Simple purchases are made. As each property is acquired, the Transfer Title signed by the property owner will be provided to USFWS, along with a running total of mitigation acres purchased in Section 5. Updates will be provided on a regular basis and continue until all mitigation commitments have been satisfied.

Some amount of reforestation will occur within each of the maternity colony areas, along with preservation of existing forest. For two of the maternity colonies, a net gain of forest is anticipated, which will greatly benefit the colonies. In terms of tree cover change, the Lambs Creek Colony will have a net gain of approximately 48 acres of upland forest, assuming all mitigation is secured. The West Fork White River (Bryant's Creek) Colony is anticipated to have a net loss of 6 acres of upland forest. The Beanblossom Bottoms Nature Preserve Colony will have approximately 26 acres of reforestation performed in and adjacent to the colony area although no direct forest impacts are anticipated within the colony. Finally, 40 acres of reforestation is proposed in the West Fork White River (Crooked Creek) Colony area in Section 6. This reforestation is especially significant for this colony due to the amount of development currently occurring in this area. With successful implementation of the proposed mitigation projects, we anticipate that short- and long-term habitat conditions for the three maternity colonies within the Section 5 Action Area, and individual bats within the area, will be sufficient and sustainable.

Copies of deeds and/or transfer documents for sites that have been secured by INDOT have been provided to the FWS. Site descriptions, maps, photographs, conceptual mitigation plans, etc. are

included in the site specific appendices of the Section 5 Tier 2 BA. Figure 7 shows a map of most of the proposed mitigation sites in Section 5. Landlocked sites are not shown and several recent additions and revisions are not depicted including the loss of the three northern most Paragon parcels due to conflicts with tree planting and historic preservation requirements. Table 6 shows an overall summary of the credits anticipated at each mitigation site. Once the restorations mature, the sites will provide larger contiguous blocks of bottomland and upland forests and increased connectivity among other existing blocks of forested habitat and will thereby provide valuable habitat for Indiana bats foraging and roosting in the area.

Several landlocked properties may be available for sale and possible mitigation use. Currently, four landlocked parcels are being pursued for mitigation potential: Stout Valley (33 acres of forest preservation); Principal (38 acres of forest preservation); Cooksey (70 acres of forest preservation and 61 acres of forest restoration); and Creek Road (33 acres of forest preservation and 9 acres of forest restoration). Cooksey and Creek Road are adjacent to the West Fork Bryant Creek colony area and the Principal site is within the Lambs Creek maternity colony area. Additional acres are unknown at this time and will be identified as the final design progresses. If necessary, once these acres have been identified, the FWS will evaluate the potential suitability of these acres as upland forest mitigation for the Indiana bat. The focus area for these parcels should include areas that will be most beneficial to the Indiana bat, such as maternity colony areas. Please note these are not listed in Table 6.

INDOT will be responsible for monitoring and maintaining the various mitigation areas, where applicable, while they are being established or until a long-term management entity is identified. The environmental benefits of these sites will be significant and will continue to increase as the sites mature. Silvicultural manipulation in these areas will be limited to activities which will enhance the quality of habitat for Indiana bats, as agreed to by the Service's BFO. A deed restriction or conservation easement will be recorded for the properties and will provide permanent protection (e.g., no mowing, timber harvest, timber stand improvement, etc.). About half of the property owners have agreed to have conservation easements recorded on their property and half have opted for a fee simple purchase.

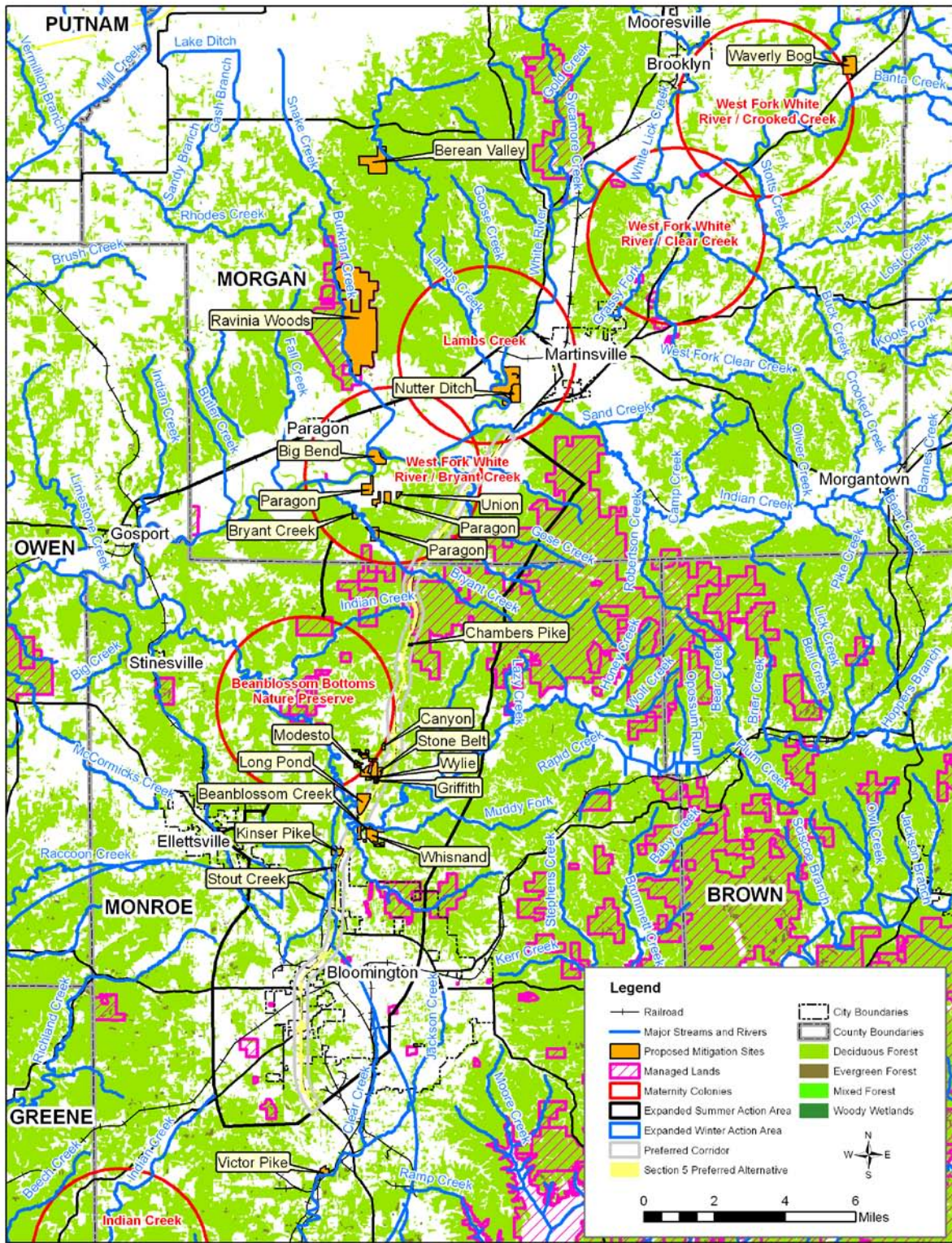


Figure 7. Potential Mitigation Sites in Section 5 of the I-69 Interstate Project.

Table 6. Section 5 Mitigation Site Anticipated Acres Summary							
Mitigation Site	Forest Preservation (acres)	Reforestation (acres)	Total Upland Forest Mitigation (acres)	Emergent Wetlands (acres)	Forested Wetlands (acres)	Scrub-Shrub Wetlands (acres)	Wetland Mitigation (acres)*
Crooked Creek Maternity Colony							
Waverly Bog**	81	38	119	0	0	0	0
Lamb Creek Maternity Colony							
Berean Valley	245	0	245	0	0	0	0
Nutter Ditch	250	55	305	0	0	0	0
Bryant's Creek Maternity Colony							
Ravinia Woods	373	0	373	0	0	0	0
Union	4	2	6	1	1	3	5
Big Bend	99	0	99	0	0	0	0
Bryant Creek	17	10	27	0	0	0	0
Paragon	28	36	64	0	0	0	0
Morgan Monroe State Forest Focus Area							
Chambers Pike	3	0	3	0	0	0	0
Beanblossom Nature Preserve Maternity Colony							
Canyon	10	0	10	0	0	0	0
Stone Belt	19	0	19	0	0	0	0
Wylie	15	2	17	0	0	0	0
Griffith	7	0	7	0	0	0	0
Long Pond	79	8	87	4	19	1	24
Modesto	117	24	141	2	1	0	3
Beanblossom Creek Focus Area							
Whisnand	54	23	77	1	0	0	1
Beanblossom Creek	36	0	36	0	0	0	0
Maple Grove Historic District Focus Area							
Kinser Pike	35	8	43	0	0	0	0
Stout Creek	16	0	16	0	0	0	0
South of Bloomington							
Victor Pike	18	29	47	0	0	0	0
Totals	1,506	235	1,741	8	21	4	33
*Unconsolidated Bottom (PUB) and Aquatic Bed (PAB) Wetlands may be mitigated for using out of kind mitigation (2.90 acres)							

** Credit from this site will be applied in Section 5 with the understanding that when the Section 6 project begins, a similar amount of mitigation will be sought in Section 5 to complete the Section 6 mitigation requirements.

Before any construction of Section 5 in I-69 commences within the maternity colony areas, the FHWA, in consultation with the Service will develop detailed, site-specific, final mitigation plans. The mitigation plans will include design plans with detailed descriptions for each phase of mitigation including 1) initial construction and establishment, 2) 5-year, post-construction monitoring phase, and 3) long-term management. The Section 5 final mitigation plans will address and/or establish the following: 1) quantifiable criteria and methods for assessing success of all mitigation plantings and functionality of constructed wetlands and streams, 2) approved lists of tree/plant species to be planted (and their relative abundance/%), 3) approved lists of herbicides for weed control, 4) proposed construction schedules, 5) annual post-construction monitoring schedules, and 6) a long-term, ongoing management/stewardship strategy. FHWA will begin construction and/or reforestation within the Section 5 Mitigation Areas either before (the most preferable option) or during the first summer reproductive season (1 April – 30 September) immediately after any I-69 related tree clearing or construction begins in Section 5. This will be applicable to all mitigation properties. Once initiated, all Service-approved construction and tree plantings within the Section 5 Mitigation Areas must be completed within 3 calendar years.

Wetland Mitigation

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

Landowner Coordination

In an effort to avoid and minimize impacts to Indiana bats and their habitat as a result of private landowner clearing within and adjacent to the I-69 right of way, INDOT and FHWA, in coordination with the FWS, have developed a new conservation measure which is now included in the official proposed action for the I-69 project (see Appendix D, item A16, of Amendment 2 of the Tier 1 RPBO, 2013). FHWA, through INDOT, plans to mitigate impacts of out-of-season logging by providing private landowners within the approved right-of-way, who express an interest or intent to harvest timber, a mechanism to avoid or limit their harvesting activities to the November 15-March 31 timeframe within the WAA and the October 1-March 31 timeframe in the SAA. Options may include a "right of entry" agreement or other type of covenant or agreement between FHWA/INDOT and the landowner. FHWA, through INDOT, will contact landowners of property within the right-of-way to discuss opportunities for deferring tree clearing activities to the approved tree-clearing timeframes. This will voluntarily limit the timing of private timber harvest to a period Indiana bats are not present in the Action Area. These offers will be made on a case by case basis in coordination with the USFWS's Bloomington, Indiana Field Office.

Furthermore, INDOT/FHWA has recently provided information to landowners in the Section 5 project area informing them of the presence of the Indiana bat within the Action Area and the potential for violations under the Endangered Species Act if timber activities occur during the restricted time period (see Appendix B for copy of July 9, 2013 letter to landowners). Fortunately, these potential impacts are less likely to occur in Section 5 than Section 4 because

much of the proposed alignment falls within existing INDOT ROW. Furthermore, the amount of acquisition of private properties will be much smaller and a fewer number of landlocked parcels is anticipated. Additional information can be found in Amendment 2 to the Tier 1 RPBO (2013).

Native Vegetation Planting

Proposed areas for native vegetation planting may include stream crossing and interchange locations.

Wildlife Crossings

The Section 5 Tier 2 DEIS discusses wildlife crossings on page 5.18-16. Mitigation measures include potential wildlife crossings in the areas of Griffy Creek, Bean Blossom Creek, Bean Blossom Creek overflow, Bryant Creek, Little Indian Creek, and Jordan Creek. Additional potential wildlife crossings may be provided at another 15 sites by way of incorporating a shelf at existing structures. Since the preferred alternative would occur as an upgrade along the existing alignment of SR 37, there would be no net loss of crossings along the alignment as a whole. According to the DEIS, overall permeability is expected to increase based on anticipated improvements at existing structures.

Indiana bat monitoring

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

Education and Outreach

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

All conservation measures presented in the Tier 1 RPBO dated August 24, 2006 (pgs. 16-23), and the new measure developed during the 2013 Tier 1 Reinitiation, will be carried out as written or as updated in consultation with the Service. The FHWA will provide the Service with a written annual report that summarizes the previous year's monitoring, conservation and mitigation accomplishments, remaining efforts, and any problems encountered within Section 5. This annual report will be provided throughout the 5-year post-construction monitoring period. The annual report for Section 5 will be included with other sections of I-69 as allowed under the 2006 Tier 1 RPBO, Terms and Conditions Number 2 (pp. 103).

In summary, **construction** of Section 5 of I-69 will cause direct loss of an estimated 358 acres [approximately 350 acres of forest and 8 acres of non-forested wetlands] of suitable Indiana bat summer habitat (*i.e.*, roosting and foraging habitat and forested travel corridors). Four and a half of the 5.6 acres of upland forest lost in the Lambs Creek maternity colony will be due to the Section 6 representative alignment. The 350 acres includes 75 acres of forest loss due to utility relocations and another 15 acres as a result of billboard relocations. Forested habitat loss from future indirect development is expected to be approximately 47 acres. Although short-term reductions in habitat quality may occur, overall long-term habitat restoration and protection efforts are expected to improve the habitat conditions for Indiana bats. The Service anticipates the incidental take to be consistent with or less than that which was determined in the recently updated ITS (part of the 2013 amendment to the Tier 1 RBPO): No more than 3 Indiana bats from the three maternity colonies in Section 5 (Beanblossom Bottoms Nature Preserve – 0; West Fork White River Bryant Creek – 3; and Lambs Creek – 0) will be taken as a result of all project-related *habitat modifications* (direct and indirect) through 2030 (see Table B4 in 2013 Amendment to Tier 1 RPBO) and no more than 16 bats total in the West Fork Bryant Creek and Lambs Creek colonies (or approximately 1 bat/2 years/colony) are anticipated to be taken as a result of roadkill from 2013 to 2030 and less than 5 males are estimated to be taken between the years 2013 and 2030, or 1 male bat every three and a half years (primarily as a result of roadkill). Impacts to male bats in the WAA in the summer, as well as impacts to all bats during the fall, winter, and spring in the WAA were addressed within the Tier 2 Section 4 BA and BO since the WAA falls primarily within the Section 4 project area. We anticipate the Action Area for Section 5 will continue to support the existing maternity colonies into the foreseeable future.

V. CUMULATIVE EFFECTS

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

Based on information provided in the December 2012 Tier 2 BA for Section 5 of I-69, the currently anticipated sources of cumulative effects are consistent with those contemplated in the August 24, 2006 Tier 1 RPBO. Limestone quarrying was not originally discussed in the Tier 1 consultation and is addressed below. No additional adverse effects beyond those discussed in the Tier 1 RPBO are anticipated as a result of cumulative effects. Therefore, most of the previous discussion of adverse effects and the incidental take analyses on pages 94-97 and Appendices A of the Tier 1 RPBO and Appendix A of the Tier 1 RPBO amendments remain valid and are hereby incorporated by reference.

Reasonably foreseeable non-federal activities that are anticipated to occur include land conversion activities such as development for residential and commercial growth and timber harvesting. Other types of impacts considered include limestone quarrying and legal drain maintenance.

No-build Growth/Residential Development

According to the Tier 2 BA for Section 5:

GIS analysis was conducted to determine the approximate amount of no-build growth that is projected to occur in the action areas. This analysis made a conservative estimate of impacts. The percentage of the TAZ within the action areas was calculated and the no-build growth by land-use type within that particular action area was determined on a percentage basis. The total acreage of no-build that will occur on lands that have not been previously developed was then multiplied by 45% in Morgan County and by 65% in Monroe County to get the amount of forest that would be impacted by the no-build growth. Please see Chapter 5.24 in the Section 5 DEIS for an explanation of how this percentage was chosen. The total acreage of no-build was multiplied by 40% in the TAZs in Greene, Lawrence, Martin, and Owen Counties that fall within the expanded winter action area. These calculations showed that approximately 1,325 acres of no-build growth would occur in forested areas in the Expanded Remaining SAA. This is approximately 4.7% of the available forest in the Expanded Remaining SAA. The calculations showed that approximately 104 acres of no-build growth would occur in forested areas within the maternity colonies. Approximately 62 acres of no-build growth would occur in forested areas in Beanblossom Bottoms Nature Preserve Maternity Colony (0.7% of available forest), 6 acres in West Fork (Bryant Creek) Maternity Colony (0.1% of available forest), and 36 acres in Lambs Creek Maternity Colony (0.7% of available forest). This would equate to approximately 0.6% of the available forest within the maternity colony areas. The calculations showed that approximately 1,563 acres of no-build growth would occur in forested areas in the Expanded WAA. This equates to approximately 1.1% of the available forest within the Expanded WAA.

Please refer to the Indirect Impacts section (page 94) and Appendix E of the Tier 2 BA for more information on land-use and development factors in the Section 5 Action Area.

Timber Harvest/Other Land Conversion Trends

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

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

- *There are no major tree die-offs anywhere in the state; natural tree mortality appears evenly across the state.*
- *The ratio of harvested tree volume to tree volume growth indicates sustainable management.*
- *Diverse and abundant forest habitat (snags, coarse woody debris, forest cover and edges) support healthy wildlife populations across the state.*

- *Indiana possesses a diversity of standing dead tree wildlife habitat with an abundance of recently acquired snags to replenish fully decayed snags as Indiana's forests mature.*
- Indiana's oak species continue to grow slower than other hardwood species.
- The average private forest landholding dropped from 22-acres in 1993 to 16-acres in 2003, indicating a continued "parcelization" of Indiana forests.
- Introduced or invasive plant species inhabit a majority of inventories plots.
- The amount of forest edge doubled from 1992 to 2001, indicating smaller forest plots.
- Due to land use history and natural factors, the forest soils of southern Indiana are generally below-average in quality.
- Although Indiana's overall forested land mass is increasing, the rate of increase has slowed over the past decade.
- *Indiana's forests continue to mature in terms of the number and size of trees within forest stands.*
- Increases in total volumes of oak species are less than those for most other hardwood species.
- The advanced ages and inadequate regeneration of Indiana's oak forests may signal a successional shift from an oak/hickory-dominated landscape to one where other hardwood species, such as maples, occupy more forested areas.
- Indiana's hardwood saw-timber resource continues to be at risk due to maturing of hardwood stands, loss of timberland to development and new pests (gypsy moth, emerald ash-borer, sudden oak death, beech-bark disease, and more).
- Ownerships of Indiana forests have changed in the past decade, resulting in more parcelization and fragmentation.

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

According to the Tier 2 Section 5 BA, based on direct observation and corroborated by Division of Forestry staff, timber harvesting is a regular activity in the Action Area. Observations within the Action Area throughout many years indicate that cutting is for the most part selective harvest, and that clear cutting is limited and sporadic. Some who own property within and adjacent to the right-of-way may be motivated to harvest timber on a portion of their property prior to selling to the State. The likelihood and amount of such activity should be significantly reduced based on INDOT's coordination with landowners and new conservation measure.

Limestone Quarrying

The Section 5 Tier 2 DEIS discussed limestone quarrying on page 5.24-18:

There are several active limestone quarries in the project area. There has been relatively little change in quarry land use in Monroe County over the past 50 years. The current trend is for limestone companies to reopen former mines rather than starting work at a new site. Active quarry or milling sites include C&H Stone off of Fullerton Pike, Hoadley (3 facilities – Rockport, Tapp, active mill on Arlington Road), and Reeds off of Prow Road.

Legal Drains

In addition to "other" impacts projected under the No Build scenario, impacts to tree cover from legal drains and their maintenance were estimated and included in addition to the model based other impacts. These impacts could potentially occur regardless of the I-69 construction. Legal drains were identified through consultation with county officials as those streams legally maintained by the county or maintained through conservancy districts. For the Tier 1 BA Addendum analysis, impacts were assumed to be 75 feet from either side of a legal drain. The legal drain impacts represent a highest impact scenario for tree cover impacts as not all legal drains are likely to be maintained, and maintenance may not result in impacts on both sides of the stream, or the entire 75 feet. Personal communication between BLA and the Monroe County Surveyor verified there are no legal drains within the county. Personal communication between BLA and the Morgan County Surveyor indicated there are four legal drains that are maintained within the Section 5 Indiana bat maternity colonies. These legal drains are Thad Roberts Ditch, Ella McNair Ditch, McNair Lateral, and Mary A. Nutter Ditch. It is estimated that the maintenance of these legal drains may include the removal of 40 acres of tree cover. Three acres of this potential impact falls within the Lambs Creek Maternity Colony and the remaining thirty-seven acres falls within the West Fork (Bryant Creek) Maternity Colony.

Summary

We anticipate a slight decline in bat habitat in some portions of the Action Area in the future, although we are not aware of specific development plans (beyond those already discussed) in known Indiana bat habitat in Section 5 at this time. If INDOT, FHWA or USFWS become aware of specific projects, impacts to Indiana bats will be addressed through the incidental take permit process, if appropriate.

VI. CONCLUSION

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

Our basis for this conclusion follows:

- The scope, impacts and effects associated with the project in Section 5 are consistent with those evaluated in the Tier 1 RPBO and recent 2011 and 2013 amendments to the Tier 1 RPBO.
- Because construction of I-69 consists primarily of upgrading an existing four-lane facility and, impacts to the existing colonies should be minimal. Much of the work performed will be within existing right of way.
- New coordination with landowners along the right of way regarding Indiana bat presence and tree clearing restrictions, in conjunction with a new conservation measure to

encourage landowners to limit the timing clearing, should avoid and minimize impacts to Indiana bats.

- Because I-69 will have a long narrow/linear footprint, the amount of adverse impacts to any one habitat patch or maternity area along its path is minimal when compared to impacts of a similarly sized area that has a non-linear configuration.
- We anticipate very few Indiana bats may be taken during the summer maternity season as a result of road-kill (no more than 1 bat every 2 years per colony and no more than 5 males over a 17 year period).
- Based on an abundance of surrounding forested habitat, we do not anticipate that any of the three maternity colonies will be permanently displaced by direct or indirect effects associated with the construction, operation, and maintenance of Section 5 of the I-69 project.
- The currently proposed 2,098 acres (including landlocked parcels) of forest and wetland mitigation in Section 5 has been strategically located to improve upon the existing high-quality habitat within and near the various maternity colony areas and hibernacula; therefore, we believe adverse impacts to the colonies and any adult males occurring in the immediate area will be further minimized and should not be long lasting. Because up to 1,700 acres of existing forest habitat will be protected and over 396 acres of forest and wetland habitat (363 acres of upland forest and 33 acres of water resources) will be developed and/or enhanced based on the initial alternative, the maternity colonies within Section 5 will experience a net gain in habitat as part of the Proposed Action and receive both short and long-term benefits that will continue in perpetuity. In the unlikely event all of the proposed mitigation areas completely fail, the maternity colonies are still likely to persist within the other available habitat within their traditional summer range.
- We do not anticipate any long-term, significant impacts to the local population of Indiana bats, the proposed Midwest Recovery Unit population, nor the species within its entire range due to the proposed project.
- A permanent conservation easement has recently been placed on the third and fourth largest hibernacula in the state (and Caves); protection of these hibernacula will be very important for the long term protection and recovery of the species. Specifically, permanent protection at Cave will eliminate the estimated take due to vandalism and human disturbance. Furthermore, permanent protection of both caves and their surrounding forests will provide long-lasting protection for essential fall swarming habitat for the 37,000 Indiana bats that use these caves and eliminate future possibilities for this property to be developed.

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

We believe that the proposed roadway construction, operations, and maintenance, while potentially resulting in the incidental take of some individuals, are not a significant threat to the species in the proposed Midwest Recovery Unit nor the species as a whole and, therefore, do not rise to the level of jeopardy. No component of the proposed action is expected to result in harm, harassment, or mortality at a level that would reduce appreciably the reproduction, numbers, or distribution of the Indiana bat.

SECTION 5 (TIER 2)

INCIDENTAL TAKE STATEMENT

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

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

INDIANA BAT

AMOUNT OR EXTENT OF TAKE

The Service believes it is likely that incidental take of Indiana bats in Section 5 of I-69 will occur as a direct or indirect result of the Proposed Action in the following forms:

- Harm through habitat modification/permanent direct loss of roosting habitat/ alternate roost tree(s) and loss of foraging habitat and connectivity/travel corridors among forested patches in Section 5,
- Harass/wound/kill/harm from disturbance and habitat loss associated w/demolition and subsequent relocation of homes and businesses in Section 5,
- Harass/harm from permanent habitat loss from I-69 related utility relocations,
- Death/kill from direct collision with vehicles traveling at high speeds (*i.e.*, road-kill) on I-69 and/or increased traffic volumes on other local roadways,
- Harassment of bats roosting near construction and/or operation of I-69 from noises/vibrations/disturbance levels causing roost-site abandonment and atypical exposure to day-time predators while fleeing and seeking new shelter during the day-time.

Based on our analysis, the Service believes three Indiana bat maternity colonies occur within the Expanded SAA. Adverse effects on the colonies include habitat loss/modification, short term noise/disturbance, and loss of individuals from road-kill. Although very difficult to predict, we estimated the maximum amount of I-69 related incidental take for all three maternity colonies combined from all sources within the Action Area to be no more than 19 individuals (16 from road-kill and an additional 3 adult females/juveniles as a result of habitat loss/modification and/or disturbance) during the first 17 years of operation (approximately 2013-2030). (Some small, unknown number of bats in Section 5 may be taken as a result of habitat modification, demolition and relocation activities). Additionally, no more than 5 male bats are anticipated to be taken during the summer months, primarily as a result of road-kill. In total, on an annual basis, this equates to approximately 1 bat (males and females combined) being taken per year. No significant, long-term adverse effects are anticipated to accrue to any of the maternity colonies, nor to any local populations of adult males.

It is unlikely that direct mortality of small-sized bats from road-kill will be detected, that is, we do not expect that most dead or moribund bats are likely to be found. The same is true for take associated with habitat modification/loss and disturbance; detecting or finding dead individuals is unlikely. However, as outlined in the Tier 1 RPBO, we can track the level of anticipated take by monitoring the amount of habitat modification as a surrogate. The Proposed Action will result in the loss of up to 350 forested acres (including forested wetlands) in Section 5 of I-69. The Service anticipates that reproductive and viability consequences at the maternity colony level are not likely to occur with the proposed amount of habitat modification. If the amount of habitat modification exceeds the specified levels, the trigger for reinitiation has been met. The specified level of habitat modification which triggers reinitiation is defined as exceeding the anticipated 350 acres by more than 10%. Furthermore, the FHWA will keep track of any known Indiana bat road-kills to ensure that the anticipated amount of incidental take is not exceeded.

Although the anticipated levels of adverse impacts to Indiana bat summer habitat/forest in Section 5 were modified during the Tier 1 Reinitiation Consultation (increased from 303 acres to 350 acres), the overall project amount is still well below the anticipated total of 2,148 acres of direct forest loss (Table 1). This anticipated level brings the cumulative total of Tier 2 estimated forest habitat loss for the entire I-69 Evansville to Indianapolis project to 1,973 acres (28 acres in Section 1, 212 acres in Section 2, 67 acres in Section 3, and 1,050 acres in Section 4). For a running summary of habitat impacts per Section, see Appendix D of the Tier 2 Section 5 BA (updated 5-29-2013 via email from S. Flum, INDOT).

Loss of Forest Anticipated in the 2006 Tier 1 RPBO/BA	Loss of Forest Anticipated in 2013 Amendment 2 of the Tier 1RPBO
2,148 acres	1, 973 acres

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

Additionally, we anticipate that the Proposed Action will result in the loss of 4.6 acres of non-forested wetlands (palustrine emergent and scrub-shrub) in Section 5 of I-69 (Table 2). This anticipated level brings the cumulative total of incidental take of Tier 2 estimated non-forested wetlands for the entire I-69 Evansville to Indianapolis project to approximately 27.7 acres. This impact level is above the 20 acres originally anticipated for the entire I-69 Evansville to

Indianapolis project in the Tier 1 RPBO and ITS, however, through the recent Tier 1 Reinitiation (July 24, 2013), this amount was revised to 30 acres and therefore is within the allowable amount.

Section	Loss of Non-forested Wetlands Anticipated in Tier 1 RPBO/BA Addendum for Section 5	Loss of Non-forested Wetlands in Tier 2 BA & Tier 2 BO for Section 5
5	2 acres	4.6 acres*

*Does not include open water ponds; although the amount is above the original estimate for Section 5, the project-wide amount is still within the anticipate limit.

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

EFFECT OF THE TAKE

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

TIER 2 REASONABLE AND PRUDENT MEASURES

In addition to the Tier 1 Reasonable and Prudent Measures (RPMs) contained within the 24 August 2006 Incidental Take Statement for Tier 1 of the I-69 Evansville to Indianapolis project (and subsequently updated in the May 25, 2011 and July 24, 2013 amendments) the Service believes the following Tier 2 RPMs are necessary, appropriate, and reasonable for further minimizing incidental take of Indiana bats in Section 5 of I-69:

1. In the Section 5 Tier 2 BA (page 114), the FHWA proposed to implement numerous conservation measures and mitigation efforts as part of their proposed action and these measures are hereby incorporated by reference (including the recently added measure to work with private landowners to avoid tree clearing during the time period Indiana bats are present). These measures will benefit a variety of wildlife species, including Indiana bats. FHWA should take necessary steps to ensure that successful implementation of all conservation measures is achieved to the fullest extent practicable in a timely manner.
2. The implementation status of all the proposed conservation measures, mitigation efforts, and research and any related problems need to be monitored and clearly communicated to the Service on an annual basis.

TIER 2 TERMS AND CONDITIONS

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

1. The FHWA, in consultation with the Service, must develop detailed, site-specific final mitigation plans for each secured mitigation site within six (6) months of securing the site

or within six (6) months of the issuance of this BO, whichever is later. All mitigation sites must be identified and secured within 3 years of the issuance of this biological opinion, including the development of final mitigation plans. The mitigation plans will not be conceptual, but rather will contain detailed descriptions for each phase of mitigation including 1) initial construction and establishment, 2) 5-year, post-construction monitoring phase, and 3) long-term management. The Section 5 final mitigation plans will address and/or establish the following: quantifiable criteria and methods for assessing success of all mitigation plantings and functionality of constructed wetlands and streams, approved lists of tree/plant species to be planted (and their relative abundance/%), approved lists of herbicides for weed control, proposed construction schedules, annual post-construction monitoring schedules, and a long-term, ongoing management/stewardship strategy.

To ensure timeliness, the FHWA must begin construction and/or reforestation within the Section 5 Mitigation Areas either before (the most preferable option) or during the first summer reproductive season (1 April – 30 September) immediately after any I-69 related tree clearing or construction begins in Section 5 anywhere within each 2.5-mile radius maternity area (see Figure 7). Once initiated, all Service-approved construction and tree plantings within the Section 5 Mitigation Areas must be completed within 3 calendar years.

2. FHWA will provide the Service with a written annual report that summarizes the previous year's monitoring, conservation and mitigation accomplishments, remaining efforts, and any problems encountered within Section 5. This annual report will be completed throughout the 5-year post-construction monitoring period. The annual report for Section 5 may be a stand-alone document or included as part of the annual report required under the Tier 1 Term and Condition Number 2 (amended May 25, 2011 and July 24, 2013).

In conclusion, the Service believes that no more than 21 individuals will be incidentally taken between the years 2013 and 2030 as the result of road-kill. Direct habitat loss and/or modification will be limited to approximately 350 acres of forest habitat and 4.6 acres of non-forested wetland habitat (excluding open-water ponds) within the Section 5 Expanded Action Area. Such take will be monitored by reporting known Indiana bat vehicle collisions and tracking the amount of habitat modification. These acreages represent less than a 1% loss of the Section 5 Expanded Action Area's forested acreage. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the anticipated levels of incidental take (*i.e.*, habitat modification and/or road-kill) are exceeded by more than 10% (or tree clearing occurs during the period April 1-September 30 in the SAA and April 1 through November 15 in the WAA), then such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The FHWA must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

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

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

INDIANA BAT CONSERVATION RECOMMENDATIONS

1. 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.

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

REINITIATION NOTICE

This concludes formal programmatic consultation with FHWA on the construction, operation, and maintenance of the Section 5 portion of the I-69 from Evansville to Indianapolis, Indiana and associated development. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action (e.g., highway construction and associated development) are subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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

#	Tier 1 Conservation Measures	Status (as of 06/2011)
A. Context Sensitive Solutions		
1	Alignment planning - alignments will be located beyond 0.5 miles from known IBat hibernacula	completed
2	Avoid Blasting within 0.5 miles of IBat hibernacula from 15 September to 15 April	to be completed
3	Survey potential hibernacula for IBats	completed
4	Avoid and minimize impacts to karst hydrology connected to IBat hibernacula	to be completed
5	Tree removal - to avoid direct take of IBats, tree cutting within 5 miles of a known hibernaculum will only be allowed from 15 November to 31 March	to be completed
6	Alignment planning - alignments will be located to minimize impacts to forested areas and core forests	ongoing
7a	Tree cutting - to avoid direct take of IBats, no trees >3 inches DBH will be cut down from 1 April to 30 September	ongoing
7b	To locate IBats within the action area, mist net surveys will be conducted as part of Tier 2 studies. If captured, IBats will be radio-tracked to locate roost trees	ongoing
8a	Bridge surveys will be conducted in action area as part of Tier 2 studies	completed
8b	Bat friendly bridges will be designed where feasible and appropriate	Removed
8c	The Patoka River floodplain will be bridged in its entirety to minimize impacts to riparian habitat	completed
9	Stream relocations - site-specific plans will be developed including stream mitigation and monitoring plans	ongoing
10	Medians and Alignments - variable-width medians and independent alignments will be used to minimize impacts	ongoing
11	Minimize Interchanges - efforts will be made to minimize interchanges in karst areas	ongoing
12	INDOT will adhere to the multi-agency Wetland and Karst MOUs	ongoing
13a	Water quality - equipment servicing and maintenance areas will be restricted to designated areas away from streams and sinkholes and their immediate watersheds	ongoing
13b	Water quality - road-side ditches will be constructed with filter strips and containment basins	to be completed
13c	Construction equipment will be maintained in proper mechanical condition	ongoing
13d	Roadways will be designed to contain accidental spills	ongoing
13e	Herbicide use will be minimized in identified environmentally sensitive areas	to be completed
13f	Revegetation - disturbed soil areas will be revegetated with native grasses and wildflowers	ongoing
13g	Low Salt Zones - low salt and no salt spray strategy will be developed in karst areas	to be completed
13h	Bridges will be designed with none or a minimum number of in-span drains and water will be directed toward drainage turnouts at the ends of the bridge	to be completed
14	Erosion control measures will be implemented during construction	ongoing
15	Parking and Turning Areas - for heavy equipment will be outside and away from environmentally sensitive areas.	ongoing
16	Avoid and minimize private landowner clearing - initiating a process to limit clearing to Nov.16-March 31.	ongoing
B. Restoration / Replacement		
1	Summer Habitat Creation/Enhancement - Wetland and forest mitigation will occur within the action area with priority given to sites within 2.5 miles of IBat capture sites or roost trees. Mitigation sites will be planted with a mixture of native trees that is largely comprised of species that have been identified as having relatively high value as potential Indiana bat roost trees. Tree plantings will be monitored for five years after planting to ensure establishment and protected in perpetuity via conservation easements.	ongoing

APPENDIX A. Continued.

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

APPENDIX B.

Information disseminated by FHWA, INDOT, and USFWS pertaining to private logging within the Section 5 Action Area



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

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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.

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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