

# **BIOLOGICAL OPINION**

on the

## **PROPOSED CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE FORT DRUM CONNECTOR PROJECT (NYS DOT PIN 7804.26)**

### **FOR THE FEDERALLY-ENDANGERED INDIANA BAT (*Myotis sodalis*)**

traversing portions of  
**THE TOWNS OF PAMELIA AND LERAY,  
JEFFERSON COUNTY, NEW YORK**

**Submitted to the Federal Highway Administration**

**JUNE 2008**

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APPENDIX B. U.S. Fish and Wildlife Service. 2007. Biological Opinion on the Reconstruction of U.S. 119 from Partridge to Oven Fork in Letcher County, Kentucky, and its effects on the Indiana bat. Kentucky Field Office, Frankfort, KY.

APPENDIX C. Indiana bat biological opinions including amount and form of incidental take authorized.

APPENDIX D. June 25, 2008, letter from the FHWA regarding environmental commitments.

## INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) based on our review of the Federal Highway Administration (FHWA) and New York State Department of Transportation's (NYSDOT) proposed Fort Drum Connector Project (NYSDOT PIN 7804.26) (Project) located in the Towns of Pamela and LeRay, Jefferson County, New York, and its effects on the Indiana bat (*Myotis sodalis*) in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

On November 19, 2007, the Service received the FHWA's request for formal consultation along with the Biological Assessment (BA) of the Fort Drum Connector Route (Northern Alternative #4) (I-81 to Fort Drum North Gate) NYSDOT Region 7, Jefferson County, New York (Gress Engineers, Inc. and FMSM Engineers, Inc. 2007).

Road construction that will occur as part of this proposed project will also require a permit(s) from the U.S. Army Corps of Engineers (Corps). We received an electronic mail from Mr. Christopher Woods, of FHWA, on June 9, 2006, stating that FHWA will be the lead Federal agency for all transportation projects started after August 2005. Pursuant to that agreement under 50 CFR § 402.07, FHWA is taking the lead for this project. The Corps is contributing to a project that will result in adverse effects to a listed species. Any actions the Corps is responsible for will be addressed in the Reasonable and Prudent Measures section. The Service intends to provide a copy of this BO to the Corps to demonstrate that the FHWA has fulfilled its obligations to consult with the Service.

This BO is based on information provided in the BA, the Draft Environmental Impact Statement for PIN 7804.26, Fort Drum Connector Route (I-81 to Fort Drum North Gate) New Construction, Towns of LeRay and Pamela, Jefferson County, New York (DEIS) (U.S. Department of Transportation FHWA and NYSDOT 2007), numerous meetings, telephone conversations, and electronic mail exchanges among the Service, FHWA, NYSDOT, and others. A complete administrative record of this consultation is on file at the Service's Cortland, New York, Field Office.

## CONSULTATION HISTORY

On **April 18, 2005**, the Service received a request from the New York State Department of Transportation (NYSDOT) for National Environmental Policy Act (NEPA) scoping comments for the proposed project.

On **August 5, 2005**, the Service responded to the initial request by informing FHWA and NYSDOT that the Federally-listed endangered Indiana bat may be present within the project action area and recommended the preparation of a biological assessment.

On **November 29, 2005**, the Service received an Indiana Bat Habitat Assessment Form from the NYSDOT.

On **December 19, 2005**, the Service responded to this information and again recommended that the NYSDOT prepare a biological assessment.

On **May 25, 2006**, a Project Information and NEPA Issues Meeting was held in Watertown, New York, to give the regulatory agencies an overview of the project and update them on the project's progress. This meeting provided the agencies an opportunity to review maps and discuss any environmental issue, including ESA compliance, with FHWA, NYSDOT, and their representatives.

On **April 11, 2007**, a Preliminary Environmental Review Meeting was sponsored by FHWA to provide early coordination in the NEPA process. At this meeting the Service provided verbal comments on the Pre-Draft Environmental Impact Statement (PDEIS). The Service recommended conducting a mist-net survey and radio-telemetry study to determine effects of the proposed project on the Indiana bat.

On **May 8, 2007**, the Service received a copy of the DEIS.

In a Department of the Interior letter dated **June 18, 2007**, FHWA, NYSDOT, and their representatives received constructive comments from the Service concerning the DEIS.

During **June and July 2007**, the Service, FHWA, NYSDOT, and New York State Department of Environmental Conservation (NYSDEC) discussed and agreed upon proposed ecological studies, including mist-netting and radio-tracking of Indiana bats.

During the period of **July 2007**, numerous phone calls were made to the Service and NYSDEC by NYSDOT representatives to discuss the on-going Indiana bat survey and radio-telemetry study. These discussions kept both State and Federal agencies updated on Indiana bat capture and roost tree locations.

On **August 8, 2007**, a conference call was initiated by NYSDOT representatives (Lochner Engineering) to provide a summary of the Indiana bat survey and radio-telemetry study to all project partners, including the Corps, Service, NYSDEC, FHWA, NYSDOT, and Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM), representing Gress Engineering. This meeting disclosed the BA preparation schedule, summarized field investigations, provided participants an opportunity to discuss a BA template provided by FHWA, and allowed for discussion regarding a list of considerations provided by the Service for developing Indiana bat BAs. Additionally, potential conservation measures were discussed.

On **September 26, 2007**, the Service received a copy of a Preliminary Draft BA.

On **October 10, 2007**, a meeting was held at the Service office in Cortland, New York. The meeting was attended by the Service, NYSDOT and their Indiana bat consultants, as well as the Corps, FHWA, and NYSDEC via conference call. This meeting was requested by NYSDOT to review the Preliminary Draft BA and discuss potential conservation measures that could be implemented to avoid, minimize, and compensate impacts to the Indiana bat associated from the proposed project.

On **November 21, 2007**, the Service received the final BA (dated November 19, 2007) and a request from the FHWA to expedite consultation.

On **December 7, 2007**, the NYSDOT requested completion of consultation and receipt of the BO by February 29, 2008.

On **December 21, 2008**, the Service sent a letter to FHWA stating that the initiation package was complete and that the Service would attempt to meet the FHWA/NYSDOT requested timeframes.

On **April 2, 2008**, the Service sent sections of the draft BO to the FHWA and NYSDOT for review via electronic mail.

On **April 4, 2008**, a meeting was held at the Service office in Cortland, New York. The meeting was attended by the Service, NYSDOT, FHWA, as well as the Corps and NYSDEC via conference call. A number of important issues, including conservation measures and terms and conditions to minimize adverse effects on the Indiana bat, were discussed.

On **April 30, 2008**, the Service received additional information on proposed conservation measures and terms and conditions from the FHWA.

On **May 22, 2008**, the Service provided the FHWA, NYSDOT, and Corps with a Draft BO on the proposed project.

On **June 19, 2008**, the Service, FHWA, NYSDOT, and Corps held a conference call to discuss comments on the Draft BO.

On **June 25, 2008**, the Service received a letter from the FHWA describing additional environmental commitments for the proposed project.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

As defined in the Service's Section 7 regulations (50 CFR 402.02), "action" means "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." The "action area" is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present Federal, State, or private activities, as well as the cumulative effects of reasonably certain future State or private activities within the action area.

This BO evaluates activities associated with the construction of the Fort Drum Connector Route. In their biological assessment, FHWA and NYSDOT outlined activities that may adversely or beneficially affect the Indiana bat. The following opinion addresses whether implementation of the project is likely or not likely to jeopardize the continued existence of the Indiana bat.

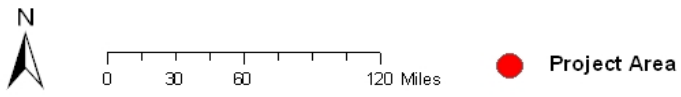
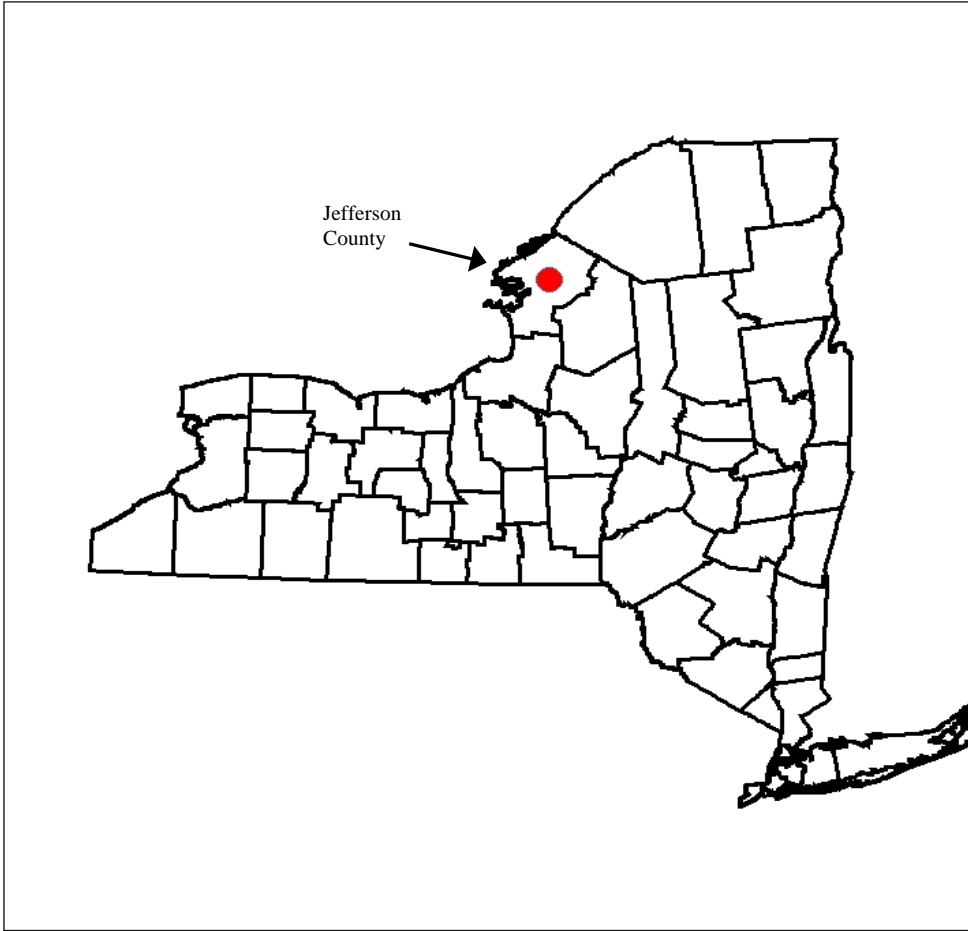
The following project and project area descriptions are summarized from the FHWA and NYSDOT November 19, 2007, BA of the Fort Drum Connector Route (Northern Alternative #4) (I-81 to Fort Drum North Gate), NYSDOT Region 7, Jefferson County, New York (Gress Engineers, Inc. and FMSM Engineers, Inc. 2007).

#### **Project Description**

The project is located in the Towns of LeRay and Pamela, Jefferson County, New York (Figures 1 and 2). The project includes approximately 4.3 miles (6.9 km) of four-lane, interstate-style, divided highway on a new direct alignment between Interstate 81 (I-81) and U.S. Route 11 at the Fort Drum Army Installation (Fort Drum) North Gate. This is the northern alternative as discussed in the DEIS (Figure 2). The project seeks to enhance the strategic viability of Fort Drum and addresses the increased traffic volume and safety concerns associated with the expansion of the 10<sup>th</sup> Mountain Division at Fort Drum (3<sup>rd</sup> Brigade assigned in 2005) (U.S. Department of Transportation FHWA and NYSDOT 2007). The North Gate is the primary entrance to access the base.

Actions associated with the proposed project include construction, operation, and maintenance of the proposed four-lane divided expressway with up to a 98-foot-wide (30 m) median in some sections. The disturbance limits for the proposed road corridor are approximately 328-foot-wide (100 m), but are narrowed in some instances to avoid sensitive environmental areas. The project would begin at I-81 south of the Military Road overpass with a trumpet interchange and then extend eastward on a new alignment which would include a new bridge over State Route 37, a new underpass constructed at Gould Corners Road, a new bridge constructed over U.S. Route 11, and an eastern terminus at Fort Drum's North Gate. Limited use of explosives (blasting) is anticipated to remove bedrock to construct bridge substructures, ditches, underground utilities, and the highway road bed.





**Figure 1. Fort Drum Connector project location, Jefferson County, New York.**

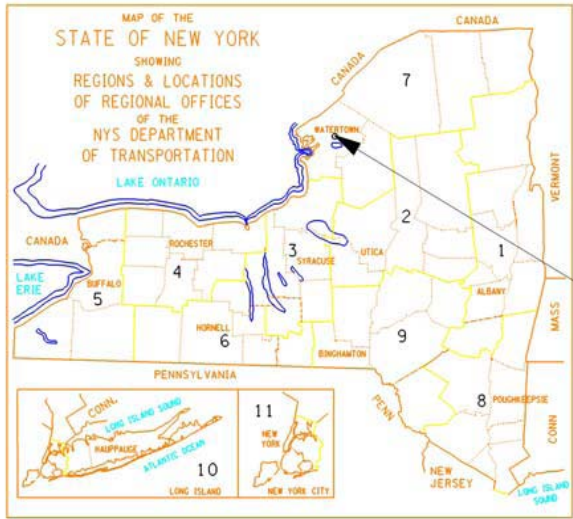


FIGURE II-1  
 REGIONAL MAP  
 FORT DRUM CONNECTOR  
 PIN 780426  
 TOWNS OF PAMELIA AND LE RAY  
 JEFFERSON COUNTY

SITE OF WORK

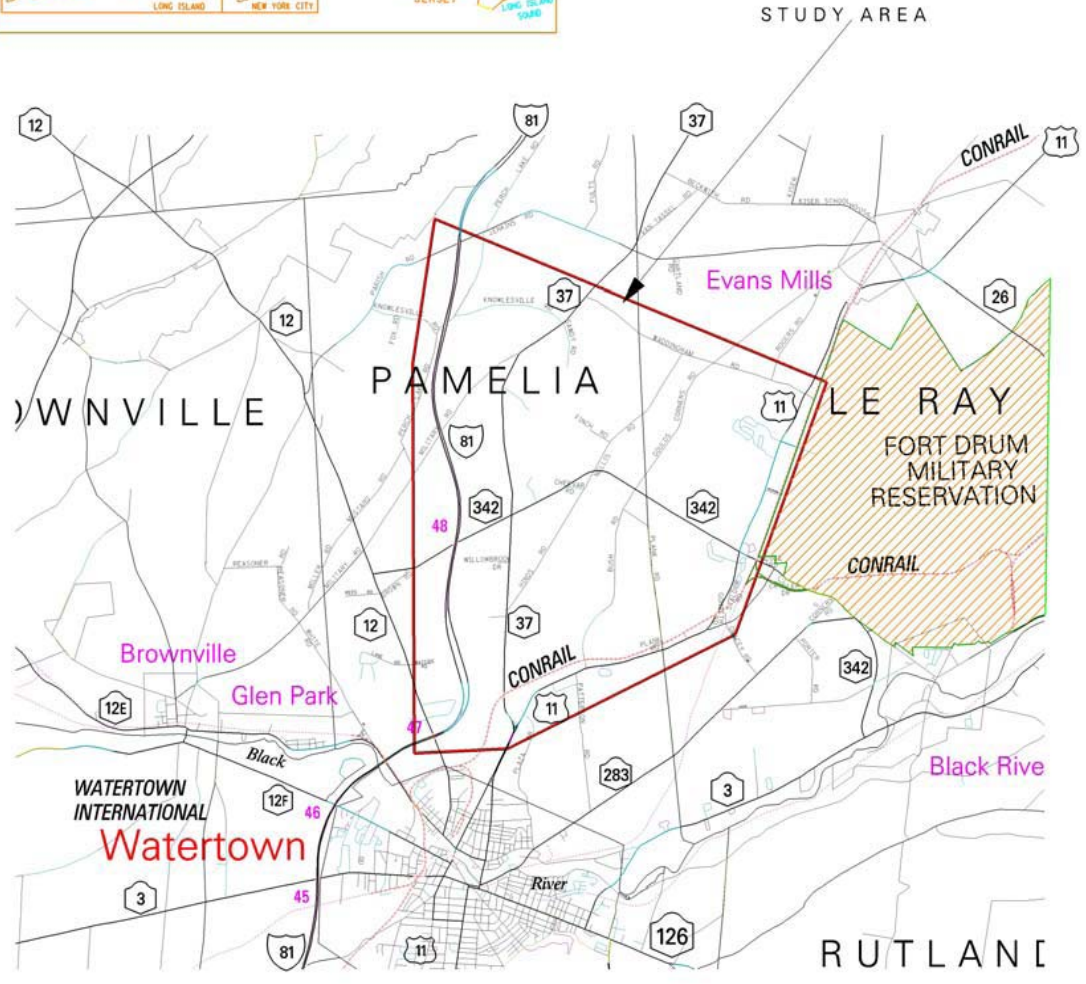


Figure 2. Fort Drum Connector project location (USDOT and NYSDOT 2007).

Construction of the trumpet interchange at I-81 will require the clearing of forested areas; additional forest will be removed between I-81 and State Route 37, north of Highland Meadows Golf Course, and north of Anable Avenue. In addition, the project will include crossing two intermittent streams (Lowell and Philomel Creeks) that possess wetland characteristics. These two intermittent streams will be placed in culverts under the roadway to maintain stream flow. The anticipated linear impact to these streams is estimated to be 436 feet (133 m) and 226 feet (69 m), respectively. Both of the intermittent stream crossings will also impact jurisdictional wetlands.

Under the current plan, the Fort Drum Connector Route would cross West Creek, a perennial stream, at the existing Fort Drum Entrance Road crossing and would only be slightly modified from its current condition. This plan would require widening the roadway shoulders and replacing the culverts which carry West Creek and an unnamed tributary underneath the existing road. This plan would require approximately 297 square meters of fill within the Ordinary High Water Mark of West Creek, and would affect about 56 linear feet (17 m) of perennial stream and riparian vegetation.

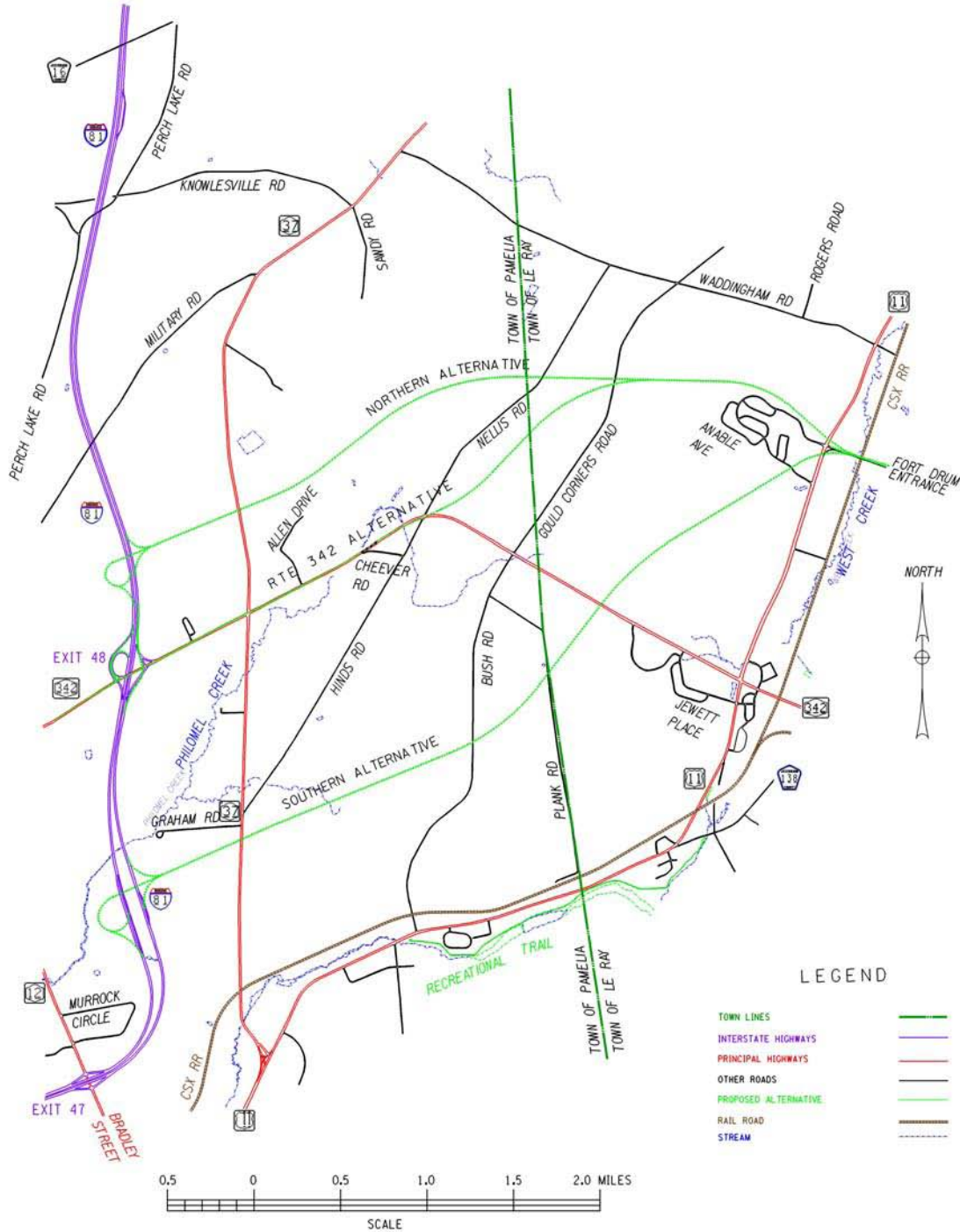
The Fort Drum Connector Route is anticipated to affect 662 feet (202 m) to 875 feet (277 m) of intermittent stream and 56 feet (17 m) to 46 feet (46 m) of perennial streams within the Philomel, Lowell, and West Creek drainages. Construction will result in impacts to 12 wetlands resulting in a loss of 4.7 acres (1.9 hectares).

In order to compensate for cumulative impacts to wetlands from the proposed project, a 7.54-acre (3.05 hectares) wetland mitigation area will be created approximately 1.74 miles (2.8 km) south of the proposed project corridor near the confluence of Willow Brook and an unnamed tributary to Philomel Creek in the Town of Pamela. This site is located 3.6 miles northeast of Glen Park Cave. The proposed wetland mitigation area currently supports agricultural land uses and was utilized for corn production in 2007. Development of the mitigation area does not involve any tree removal and will not adversely affect existing habitat for the Indiana bat; however, once fully established, the site has the potential to provide some additional, permanently protected, forested habitat to support this species.

Any waste areas will be within the construction footprint provided in the BA. Borrow areas have not been determined and will be up to individual contractors. NYSDOT staff have indicated that borrow areas in Jefferson County are primarily old fields with scattered trees and hedgerows and only limited tree removal is anticipated from mining activities. NYSDOT has indicated that it has the authority to ensure that the contractors will not disturb hedgerows or intact forest. Any scattered trees larger than 5 inches d.b.h. will be cut in the winter.

Currently, construction is expected to occur during the 2010 and 2011 construction seasons. Once completed, the highway is designed to have a speed limit of 110 km/hour (68.5 miles/hour) and carry an estimated traffic volume of 11,800 vehicles per day. The access of the Fort Drum Connector Route will be fully controlled and only have interchanges at the intersections of I-81 and U.S. Route 11, so potential future commercial development along this highway will likely only occur at the interchange at U.S. Route 11 where development is currently taking place.

FIGURE II-2  
 LOCATION MAP  
 FORT DRUM CONNECTOR  
 JEFFERSON COUNTY



**Figure 3. Project map (northern alternative) (USDOT and NYSDOT 2007).**

## **Conservation Measures**

Conservation measures represent actions pledged in the project description that the action agency or the applicant will implement to further the species' recovery. Such measures may be tasks recommended in the species' recovery plan, should be closely related to the action, and should be achievable within the authority of the action agency or applicant. The beneficial effects of conservation measures are taken into consideration in the Service's conclusion of jeopardy or non-jeopardy to the listed species, and in the analysis of incidental take. Such measures, however, must minimize adverse effects to listed species within the action area in order to be factored into the Service's analyses.

The following conservation measures include both typical highway design standards and measures specifically designed to avoid, minimize, and compensate for impacts of the proposed project on the Indiana bat. The nonstandard highway design measures were jointly developed by the FHWA, NYSDOT, NYSDEC, and the Service during informal consultation. These measures were specifically designed to avoid and minimize impacts of the proposed project on Indiana bats. The Service has analyzed the effects of the proposed action considering that the project will be implemented as proposed (including all conservation measures).

### Tree Removal

To avoid a direct adverse effect on the Indiana bat, the removal or cutting of trees > 3.0 inches (7.6 cm) d.b.h. during the spring, summer, or fall (when bats may be present) will be avoided. Tree removal will only occur between November 15 and March 31 while bats are in the hibernaculum. In addition, tree and snag removal will be restricted to the construction area and suitable Indiana bat habitat and disturbance limits will be delineated on final construction plans. The FHWA shall ensure that all forest areas intended for clearing will be clearly flagged prior to any tree-removal activities. The FHWA shall ensure that bright fencing delineates the clearing limits within all forested and wetland areas immediately following tree clearing and prior to remaining construction activities (Special Spec #615.xxxx in future contracts). Fencing/flagging shall be redone as needed to ensure easy visibility until all construction activities are completed for the project. These measures will prevent the accidental disturbance of roosting/foraging habitat.

### Minimization of Road Footprint

To reduce indirect effects from habitat loss on the Indiana bat, the road footprint will be minimized within designated forested areas (I-81, Golf Course, and Anable Avenue). This conservation measure will reduce the initial forest impact of 57 acres down to 36 acres. Implementation of this conservation measure will preserve 21 acres of forest within the Fort Drum Connector Route right-of-way and within the median at the I-81 junction and the Golf Course.

## Forest Preservation

In addition to the protection of 21 acres of forest along the project corridor right-of-way, an additional 35 acres of forest off the right-of-way are planned to be preserved. Forest preservation activities will be coordinated with the Service, and once purchased, property representing forest preservation and located outside the fenced Fort Drum Connector Route right-of-way will either be retained by the FHWA/NYS DOT or transferred to an appropriate conservation entity at a future date.

## Hedgerow Replacement

Approximately 4,200 linear feet (1,280 m) of hedgerows will be replaced to offset the loss of hedgerows impacted by the Fort Drum Connector Route. Approximately 1,800 trees will be planted to ensure a minimum survival of 1,260 trees at the end of 5 years. Trees will be planted along the right-of-way in two rows approximately 6 feet apart. Mixed sizes of trees (6 inch seedlings to 12-foot-high trees) will be planted. Hedgerows will be replaced in portions of the right-of-way that provide the necessary space to accommodate traffic safety and the planted trees once they mature. Species planted will include a mixture of native deciduous species (e.g., maple, elm, and hickory) that are commercially available and known to be used by Indiana bats. Trees will be planted during the first construction season in areas where space allows. Planting requirements will be included in project plans as a special note. Any trees that die within the first year after project completion will be replanted.

## Artificial Bat Roosts

To compensate for short-term loss of potential summer, autumn, and spring roost trees within the Fort Drum Connector Route, artificial bat roosts will be erected near the three primary forested areas (I-81, Golf Course, and Anable Avenue). A total of 15 “Rocket” style bat houses will be equally located at the edges of the three forested areas. Bat houses will be located at varying distances (20-50 feet) from the edge of the existing forest where they will receive direct solar radiation. Bat houses will follow plans found at [www.biology.eku.edu/bats/rocketbox.html](http://www.biology.eku.edu/bats/rocketbox.html) with the following alterations:

- 1) metal posts ( $\geq 2$  inch diameter) will be used;
- 2) posts will be sunk into concrete at least 2 feet;
- 3) poplar or pine wood will be used;
- 4)  $\frac{3}{4}$ -inch stock lumber will be used; and
- 5) the outside of the boxes will be painted gray or brown.

All artificial roost structures will be constructed and installed as soon as possible after winter tree cutting, but no later than May 15<sup>th</sup> following cutting.

## Air Quality/Dust Control

To minimize potential affects on air quality, construction contractors will use water trucks and other pro-active measures to prevent discharges of dust into the atmosphere that may

unreasonably interfere with the public and adjacent properties or may be harmful to plants and animals.

### Water Quality

To minimize potential indirect effects on Indiana bats or aquatic insects which may provide forage, adverse effects to aquatic resources will be minimized through strict adherence to the NYSDOT-required Storm Water Pollution Prevention Plan (SWPPP). Under NYSDEC Stormwater General Permit #GP-02-01, a SWPPP must be prepared in accordance with the NYSDOT Environmental Procedures Manual for every proposed construction project. Each SWPPP must consist of erosion and sediment control plans, stormwater infrastructure management plans, and a spill prevention plan. The SWPPP is typically developed during the project design phase; consequently, the SWPPP for the Fort Drum Connector Route has not yet been developed. However, NYSDOT will ensure that any stormwater infrastructure design for the proposed project will be wholly contained within the corridor covered by this BA.

Typical SWPPPs will provide a detailed description of the pollution prevention measures that will be used to control litter, construction chemicals, and construction debris from becoming a pollutant source in the stormwater discharges. In addition, SWPPPs will describe specific actions to be taken during active and post-construction phases of the project that will minimize adverse impacts to water quality from erosion and sedimentation and will include a spill prevention response plan. Typical elements of a NYSDOT-approved SWPPP include the following items:

1. Erosion Control - The project will incorporate temporary erosion control structures to minimize erosion. Erosion control measures, such as silt fence, temporary seeding, rock checks, and erosion control blankets, will be incorporated as a first step in construction and maintained throughout active construction activities. In addition, NYSDOT often requires permanent stormwater quality practices, such as stormwater ponds, wetlands, or detention basins, for projects that require coverage under the SPDES General Permit.
2. Sediment Control - In addition, the SWPPP will describe the temporary and permanent structural and vegetative measures to be used for soil stabilization, runoff control, and sediment control for each stage of the project from initial land clearing and grubbing to project close-out, including a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable.
3. Roadside Drainage - Where feasible, vegetated swales will be used to assist with filtering sediment and other pollutants before it reaches streams and adjacent wetlands.
4. Revegetation - All temporarily disturbed areas created from construction activities will be revegetated following NYSDOT specifications. Permanent revegetation will occur after sections are completed and consist of a variety of grasses and forbs, including legumes, wildflowers, and cereals. Seed mixes used for temporary sediment and erosion control shall consist of quick growing species such as ryegrass, Italian ryegrass, or cereal grasses. The



species used shall be suitable to the area and not compete with the permanently planted grasses. Mulch consisting of hay, straw, wood fiber, or other suitable materials will be placed evenly after the application of the seed mix to temporarily stabilize unprotected earth.

5. Equipment Service/Maintenance - The SWPPP will require that any areas used for servicing and performing maintenance on construction equipment will be designated in locations away from streams, wetlands, and ponds. The contractor will submit a proposed plan designating staging areas and this plan will be reviewed and approved by the engineer prior to construction. Materials that may leach pollutants will be stored under cover and out of the weather. Fuel tanks located on site will have double containment systems and any fuels or other spills will be required to be cleaned up immediately. Concrete or other material wash outs will be located in designated areas away from aquatic resources. All construction equipment will be maintained in proper mechanical condition so fuel, oil, and other pollutants do not get into waterbodies during construction activities.
6. Spill Plan - The SWPPP will require that in the event of a spill, NYSDOT requires the contractor to call the NYSDEC Spill Hotline if the spill meets the criteria noted in the NYSDOT Environment Handbook for Transportation Operations.
7. Construction activities within streams will be conducted during low flow periods.

### **Additional Environmental Commitments**

In the FHWA's June 25, 2008, letter to the Service (Appendix D), additional measures were described that the Service is considering as part of the project. The FHWA has committed to conduct additional mist-netting surveys during the year prior to construction (2009) and 3 years after construction is completed (2014). Current Indiana bat mist-netting protocols shall be followed. The scope of the netting and radio-tracking shall be similar to the study conducted in 2007. For example, all captured Indiana bats shall be banded and radio transmitters shall be attached (if body weights are sufficient). Radio-tracking to day roosts shall occur for a minimum of 1 week (or until transmitter loss or failure). At least 3 exit counts shall occur for each bat. In addition, the FHWA shall monitor the use of artificial roost structures at least once per month between May 15 and August 15 in years 1, 3, and 5 starting in the calendar year after the roosts initial installation.

### **Project Setting**

The identified action area is located within the Great Lakes Section of the Central Lowland Physiographic Province, and lies between the Adirondacks to the east, Lake Ontario to the west, the St. Lawrence River to the north, and the Tug Hill Plateau to the south. The elevation range in the action area is approximately 300-600 feet. The terrain is often steep, producing rock outcrops adjacent to some streams. Within the project area, a thin mantle of soil covers the limestone bedrock, which is occasionally exposed where soil has eroded.



## Action Area

The “action area” is the entire area within which project-associated environmental effects are anticipated to occur (e.g., earth disturbance, noise, traffic-related bat mortality, flight path disruption) and effects will extend beyond the road construction corridor. The Service generally agrees with the action area described in the BA with slight modifications as described below.

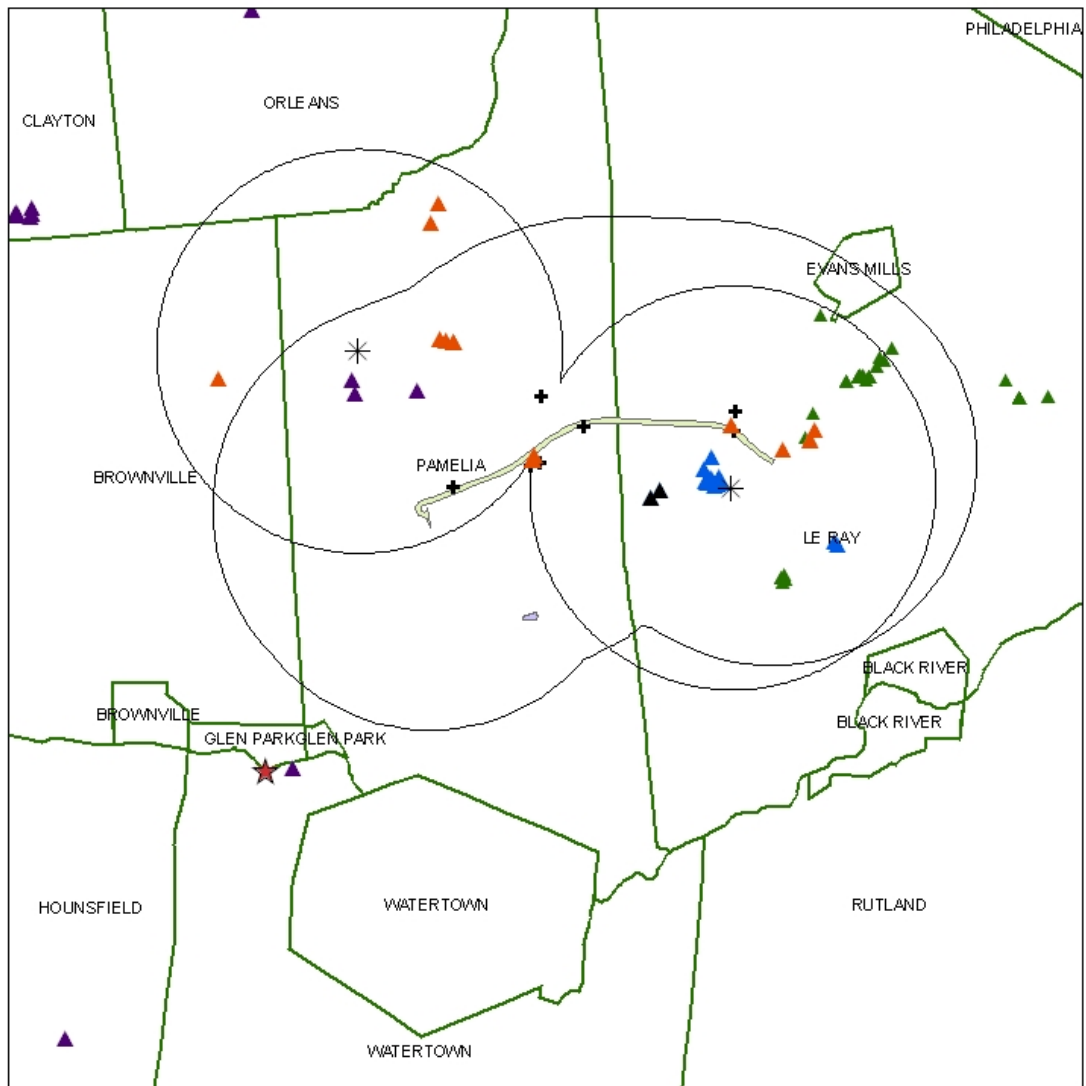
Based on site-specific vegetation surveys, most of the project corridor (83%) consists of grasslands and mixed rangeland (pasture and scrub/shrub). In addition, the project corridor contains forested habitats confined to three primary locations, including the western terminus of the project area near I-81, areas north of Highland Meadows Golf Course, and areas north of Anable Avenue. These forested habitats represent approximately 16% of the corridor and include maple/cottonwood windbreaks, maple-oak-hickory-elm, oak-hickory, and maple-hickory dominated forest communities. The remaining 1% of the corridor contains golf courses, residential and commercial developments.

### *Summer*

Indiana bats are known to occur within and adjacent to the project’s footprint. Surveys conducted for the proposed project resulted in the capture of five reproductive female Indiana bats which were tracked to 12 roost trees associated with three maternity colonies along the project corridor. Previous and subsequent radio telemetry projects also identified Indiana bat activity in these areas (Environmental Solutions and Innovations, Inc. 2006, 2008a, 2008b, Hicks et al. 2006, Stantec Consulting 2007). Two known Indiana bat hibernacula (Glen Park Cave and Glen Park Commercial Cave) are within 5 miles of the proposed project. Glen Park Commercial Cave contains only a handful of Indiana bats (Hicks and Newman 2007), therefore, we will focus the remainder of this BO on the Glen Park Cave wintering population. In 2005, the NYSDEC and Service successfully tracked 26 of 32 radio-tagged Indiana bats from Glen Park Cave to their spring roost sites, all of which remained within 20 miles of their hibernaculum (Hicks et al. 2006). Similar studies on 7 occasions of all other primary hibernacula (Jamesville, Barton Hill, Williams Lake complex) in New York State have shown Indiana bats traveling no more than 40-50 miles from their hibernacula to spring/summer roost sites. The next closest hibernaculum to the project area is Jamesville Quarry Cave, located approximately 69 miles away. Therefore, we anticipate that all Indiana bats captured during the Fort Drum Connector mist-netting activities winter at Glen Park Cave. Additional information can be found in the **Environmental Baseline** section.

Sparks et al. (2005a) summarized results of previous studies and reported linear distances between roosts and foraging areas for females from 0.5 to 8.4 km (0.3 to 5.2 mi), although most distances were less than half the maximum distance. Butchkoski and Hassinger (2002) reported maximum distances between Indiana bat roosts and foraging areas of 4.5 km (2.8 mi). Distances between capture sites and roosts sites during studies associated with the proposed project ranged from 0.8-4 miles (0.13-6.44 km) with a mean of  $2.09 \pm 1.39$  miles. The Service routinely considers Indiana bats using roost trees within 2.5 miles from each other as part of the same colony, unless there is sufficient information to demonstrate otherwise.

To determine the potential summer action area for the 3 maternity colonies in the vicinity of the proposed project, we considered the distances between all documented roosts associated with the Fort Drum Connector study and roosts from other studies, any documented foraging information, distances between capture sites and roost trees, and distances previously documented in the literature. Instead of buffering each of the documented roost trees from the various studies that have taken place near the project corridor, we estimated centers of bat activity areas for the eastern and western sections of the project and buffered those points by 2.5 miles. In addition, we buffered the project corridor by 2.5 miles. This captured all of the roost trees associated with Indiana bats captured along the project corridor and the majority of foraging data collected to date (Figure 4). There is a total of 32,600 acres of land in this summer action area, of which approximately 5,533 acres (16.9%) are forested.



0 1 2 4 Miles

**Legend**

- ▲ Ft Drum Conn Roost Trees
- ✚ Ft Drum Conn Net Sites
- ▲ Ft Drum 2007\_Summer Roosts
- ▲ NYSDEC 2005
- ▲ Eagle Ridge 2006 Roost Trees
- ★ IbatHib

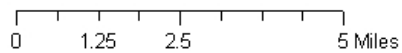
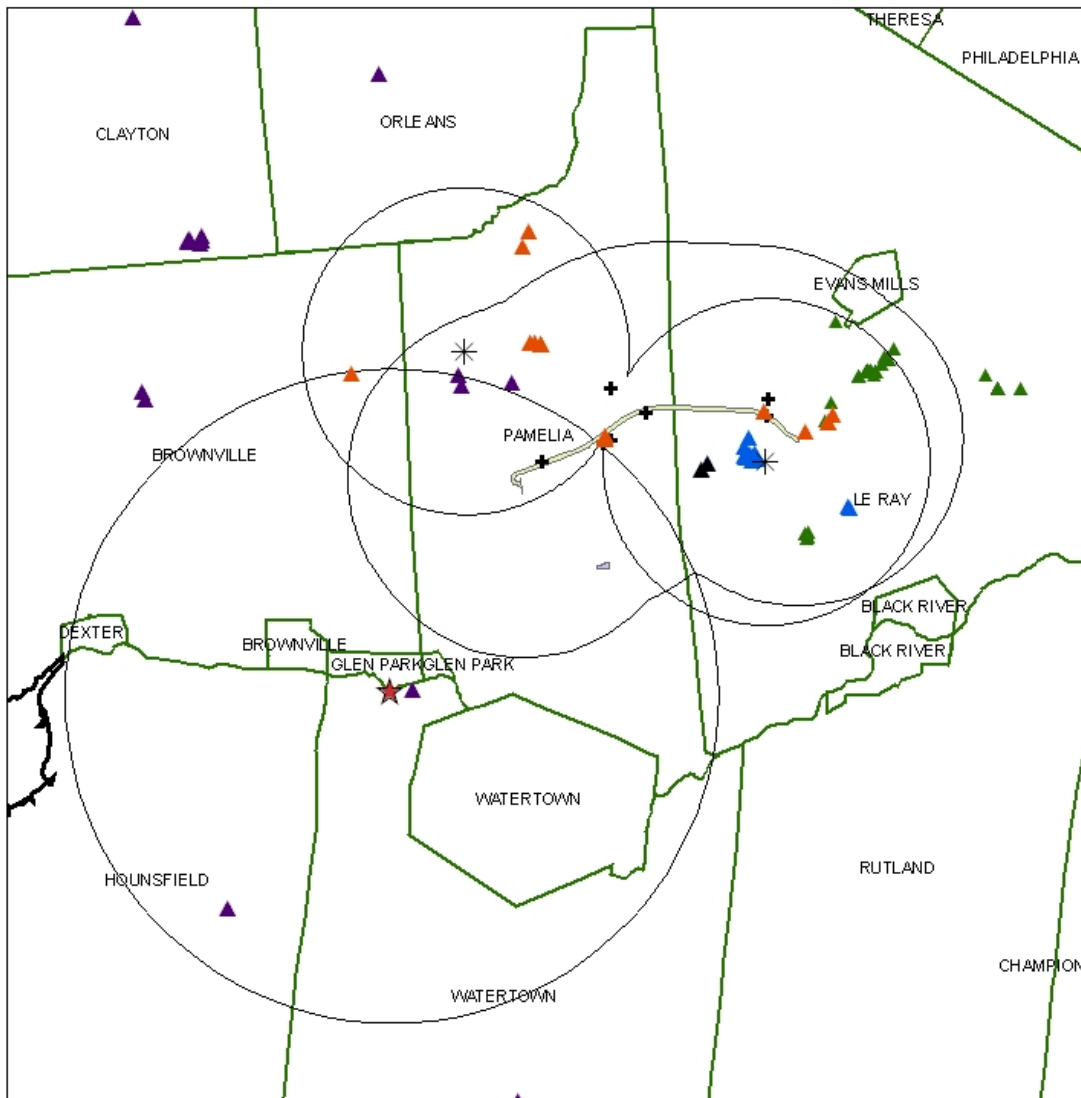
**Figure 4. Fort Drum Connector Summer Action Area.**

### *Fall/Winter*

The western terminus of the project corridor is located approximately 3.6 miles northeast of Glen Park Cave. When the BA was developed we assumed that the foraging, roosting, swarming, commuting, and hibernating habitats used by the nearby hibernating population include Glen Park Cave and appropriate habitat types (e.g., forests, streams, fence rows, field edges) within approximately five miles of Glen Park Cave. This was a standard distance used by the Service based on previous studies (e.g., Kiser and Elliott 1996, Rommé et al. 2002). Brack (2006) found a range of 0.2 to 0.9 mi between roost trees, used by male and female Indiana bats during fall swarming in Virginia, although he could not follow bats if they left the “project area,” so the range may have been greater. However, during the fall of 2003 and 2004, Hawkins et al. (2005) conducted a fall swarming study at Wyandotte Cave and observed Indiana bats traveling as far as 31 km (19 mi) from the cave in a single night during fall swarming. During September 11 - October 1, 2007, three Indiana bats in Jefferson County, New York, were also documented traveling or remaining farther than five miles from their hibernacula during fall foraging or swarming activities (Environmental Solutions and Innovations, Inc. 2008a). Regardless of our assumed action area for purposes of analysis, the same wintering Indiana bat population may be affected. If anything, our analysis of potential impacts to fall foraging or swarming habitat is more conservative by assuming more concentrated behaviors on the landscape during that period. Potential impacts to Indiana bats from loss of fall foraging/swarming habitat would be greater than if you considered a larger fall action area. Total forested habitat within the winter action area is 6,210 acres (2,513 hectares) or 12.4% of the landscape.

In addition, effects to female members of the Glen Park Cave hibernating population may affect the maternity colonies to which they belong. For example, if females enter hibernation with reduced body fat due to reduced foraging success in the fall, some of those females would not be anticipated to survive the winter to make it back to their maternity colonies. We have information on approximately 10 maternity colonies known to use Glen Park Cave as their hibernacula. The action area could extend to these maternity colonies and their habitat, although the effects may be indeterminable. We believe there is only a low probability of minor impacts to Indiana bats during fall swarming/foraging and no further review of this potential larger action area is warranted because the anticipated effects will occur to Indiana bats during the spring and summer in a smaller geographic area. In addition, some members of the identified maternity colonies could originate from hibernacula other than the Glen Park Cave, however we have no information to suggest that this is the case.

In summary, the identified summer action area includes the project corridor and two identified Indiana bat activity areas (associated with 3 maternity colonies) and any Indiana bat habitat within 2.5 miles of those areas (including the wetland mitigation site and bat conservation areas); the fall/winter action area includes Indiana bat habitat within approximately five miles of Glen Park Cave (Figure 5). The combination of these areas is the total action area.



**Legend**

- ▲ Ft Drum Conn Roost Trees
- ✚ Ft Drum Conn Net Sites
- ▲ Ft Drum 2007\_Summer Roosts
- ▲ NYSDEC 2005
- ▲ Eagle Ridge 2006 Roost Trees
- ★ IbatHib

**Figure 5. Fort Drum Connector Action Area.**

## **STATUS OF THE SPECIES**

### **Listing Status**

The Indiana bat is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and summers in wooded areas. The Indiana bat was officially listed as an endangered species on March 11, 1967 (Federal Register 32[48]:4001), under the Endangered Species Preservation Act of October 15, 1966 (80 Stat. 926; 16 U.S.C. 668aa[c]). The ESA extended full protection to the species.

### **Critical Habitat**

Critical habitat was designated for the species on September 24, 1976 (41 FR 14914, September 24, 1976). Eleven caves and two mines in six states were listed as critical habitat:

Illinois - Blackball Mine (LaSalle Co.);  
Indiana - Big Wyandotte Cave (Crawford Co.), Ray's Cave (Greene Co.);  
Kentucky - Bat Cave (Carter Co.), Coach Cave (Edmonson Co.);  
Missouri - Cave 021 (Crawford Co.), Caves 009 and 017 (Franklin Co.), Pilot Knob Mine (Iron Co.), Bat Cave (Shannon Co.), Cave 029 (Washington Co.);  
Tennessee - White Oak Blowhole Cave (Blount Co.); and  
West Virginia - Hellhole Cave (Pendleton Co.).

### **Recovery Plan Status**

The Service has published a recovery plan (Service 1983) which outlines recovery actions. Briefly, the objectives of the plan are to: (1) protect hibernacula; (2) maintain, protect, and restore summer maternity habitat; and (3) monitor population trends through winter censuses. An agency draft of a revised plan was published in 1999 but this was never finalized. A revised draft recovery plan was published in 2007 (Service 2007a) (Appendix A). The Recovery Priority of the Indiana Bat is 8, which means that the species has a moderate degree of threat and high recovery potential.

### **Species Description**

The Indiana bat is a medium-sized bat in the genus *Myotis*. Its forearm length is 1 3/8-1 5/8 in), and the head and body length ranges from 1 5/8-1 7/8 in. This species closely resembles the little brown bat (*M. lucifugus*) and the northern long-eared bat (*M. septentrionalis*). The Indiana Bat Draft Recovery Plan (Service 2007a) provides a comprehensive summary of the description of the species and is incorporated by reference.

### **Population Distribution and Abundance**

Because the vast majority of Indiana bats form dense aggregations or "clusters" on the ceilings of a relatively small number of hibernacula (i.e., caves and mines) each winter, conducting standardized surveys of the hibernating bats is the most feasible and efficient means of

estimating and tracking population and distribution trends across the species' range. Collectively, winter hibernacula surveys provide the Service with the best representation of the overall population status and relative distribution that is available.

For several reasons, interpretation of the census data must be made with some caution. First, winter survey data have traditionally been subdivided by state due to the nature of the data collection. As described below, each state does not represent a discrete population center. Nevertheless, the range-wide population status of the Indiana bat has been organized by state thus far. Second, as will be further discussed, available information specific to the "reproductive unit" (i.e., maternity colony) of the Indiana bat is limited. While winter distribution of the Indiana bat is well documented, little is known as to the size, location, and number of maternity colonies for the Indiana bat. As described below, it is estimated that the locations of more than 90% of the estimated maternity colonies remain unknown.

Additionally, the relationship between wintering populations and summering populations is not clearly understood. For example, while it is known that individuals of a particular maternity colony come from one to many different hibernacula, the source (hibernacula) of most, if any, of the individuals in a maternity colony is not known.

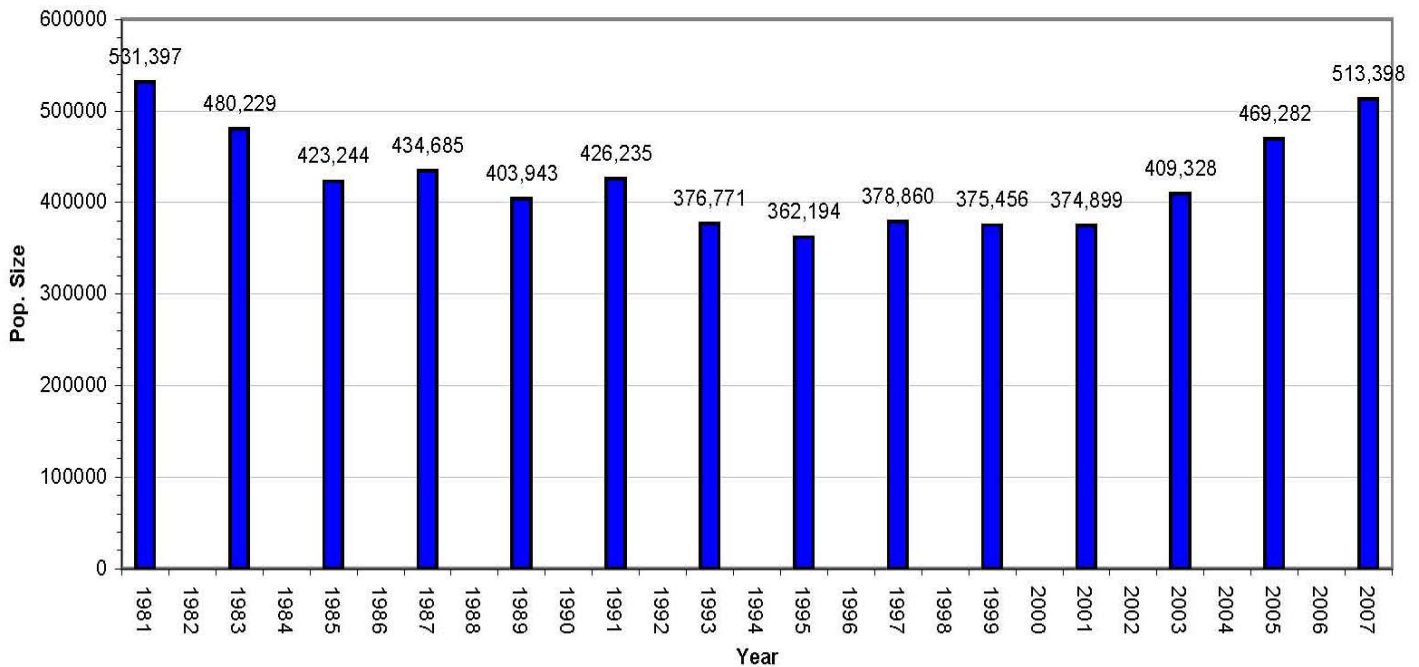
There is limited information on the historic distribution of Indiana bats. However, paleontological evidence suggests that prehistoric abundance of Indiana bats may have exceeded our current population estimates, as well as historic estimates, by an order of magnitude (Service 2007a). A summary of prehistoric and historic distribution and abundance can be found in the Indiana Bat Draft Recovery Plan (Service 2007a).

### Current Abundance

The Service compiled winter hibernacula survey information from 2006 and 2007 to develop the most recent range-wide population estimate of 513,398 Indiana bats. Winter counts ranged from 531,397 in 1981 down to 362,194 in 1995 and back up to 513,398 in 2007 (Figure 6). In New York, winter counts range from 22 Indiana bats in 1981 (Haile's Cave only) to 52,696 in 2006-2007. In that 25-year span, new sites or new sections of sites were discovered and added to the surveys. In addition, in 2004-2005, the survey methodology in New York of taking photographs and counting bats back at the office was modified with enhanced digital photography imaging. Additional information on short- and long-term trends can be found in the Indiana Bat Draft Recovery Plan (Service 2007a).

## Indiana Bat Rangewide Population Estimates 1981- 2007

(from USFWS Indiana Bat Hibernacula Database, Bloomington, Indiana Field Office)



**Figure 6. Indiana bat range-wide population estimates 1981-2007 (Service 2008).**

### Categorization of Hibernacula

In the Indiana Bat Draft Recovery Plan (Service 2007a), Indiana bat hibernacula are assigned priority numbers primarily on the basis of winter population sizes and to protect essential hibernation sites across the species' range.

**Priority 1 (P1):** Essential to recovery and long-term conservation of Indiana bat. Priority 1 hibernacula typically have (1) a current and/or historically observed winter population  $\geq 10,000$  Indiana bats and (2) currently have suitable and stable microclimates (e.g., they are not considered "ecological traps" as defined below). Priority 1 hibernacula are further divided into one of two subcategories, "A" or "B," depending on their recent population sizes. Priority 1A (P1A) hibernacula are those that have held 5,000 or more Indiana bats during one or more winter surveys conducted during the past 10 years. In contrast, Priority 1B (P1B) hibernacula are those that have sheltered  $\geq 10,000$  Indiana bats at some point in their past, but have consistently contained fewer than 5,000 bats over the past 10 years.

**Priority 2 (P2):** Contributes to recovery and long-term conservation of Indiana bat. Priority 2 hibernacula have a current or observed historic population of 1,000 or greater but fewer than 10,000 and an appropriate microclimate.

**Priority 3 (P3):** Contribute less to recovery and long-term conservation of Indiana bat. Priority 3 hibernacula have current or observed historic populations of 50-1,000 bats.



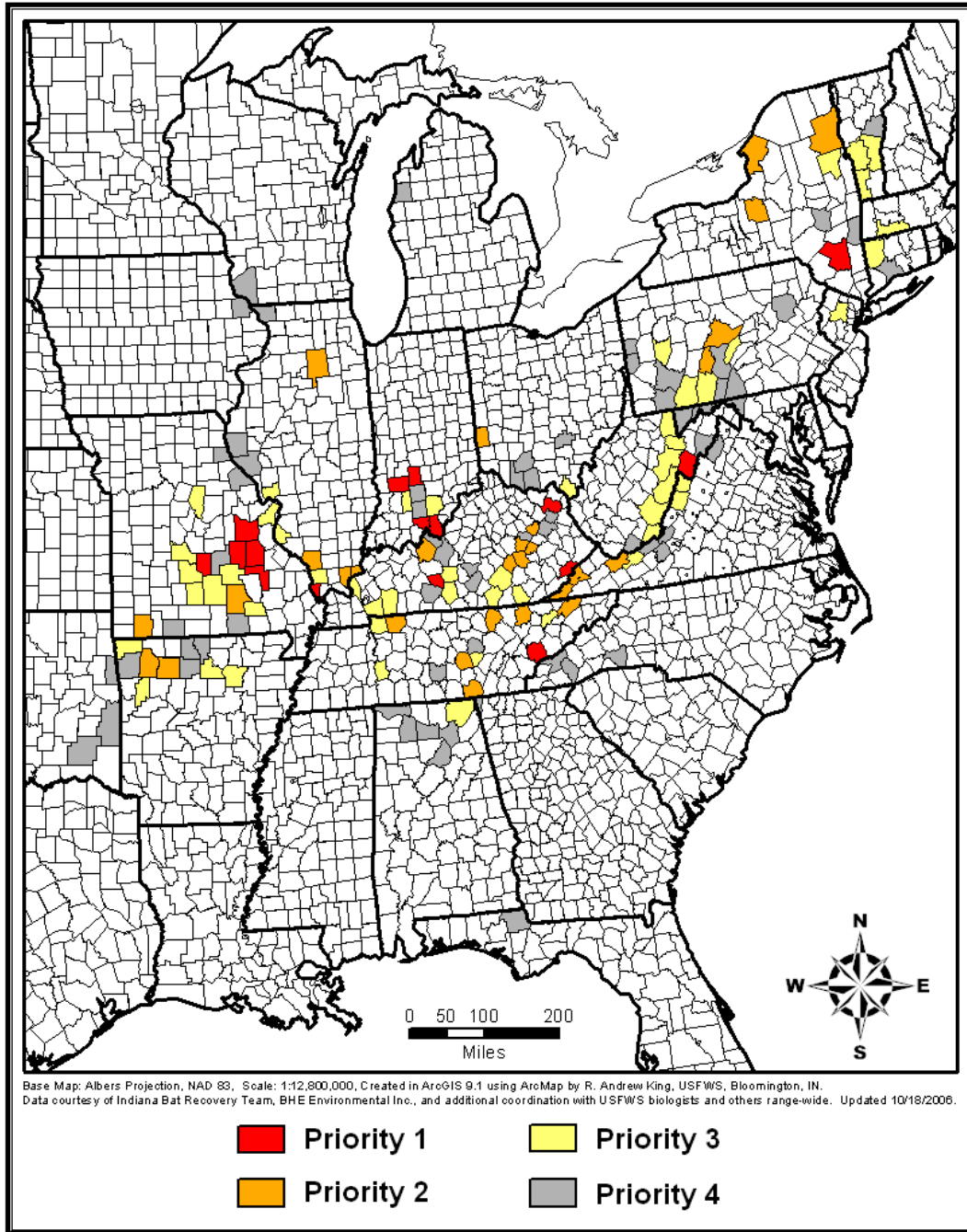
**Priority 4 (P4):** Least important to recovery and long-term conservation of Indiana bat. Priority 4 hibernacula typically have current or observed historic populations of fewer than 50 bats.

**High Potential (HP):** A special designation given to P2, P3, or P4 hibernacula that are deemed capable of supporting 10,000 or more Indiana bats in the future if (1) an appropriate microclimate is restored (or created in the case of some mines) and/or (2) the site is protected from disturbance. These sites typically have no recorded direct observations of significant numbers of Indiana bat (i.e., at least none that can be readily confirmed; they differ from a P1B site in this respect). Instead most “high-potential” hibernacula have one or more forms of indirect evidence indicating previous use by large numbers of *Myotis* and/or Indiana bat (e.g., anecdotal historic accounts and/or paleontological evidence such as bones, mummified remains, ceiling staining, etc.). As of October 2006, two caves had been designated as having HP – Mammoth Cave in Kentucky and Rocky Hollow Cave in Virginia.

**Ecological Trap (ET):** A hibernaculum having a history of repeated flooding or severe freezing events that have resulted in the mortality of most hibernating Indiana bat. Hibernacula with other environmental conditions that pose a severe and/or imminent threat to the majority of hibernating bats may also be designated as “ecological traps” by the Service (e.g., threat of catastrophic collapse). As of October 2006, three caves had been preliminarily designated as ETs – Bat Cave (Shannon Co.) in Missouri (freezing), Haile’s Cave in New York (flooding), and Clyfty Cave in Indiana (flooding). These preliminary designations were made based on the recommendations of Indiana bat experts familiar with these caves and on the history of Indiana bat mortality in these caves. The designations will be reevaluated when procedures for evaluation and designation of hibernacula as ETs are developed.

#### Current Winter Distribution

The following is a summary from the Indiana Bat Draft Recovery Plan (Service 2007a); additional information from the Plan is incorporated by reference. As of November 2006, the Service has winter records of extant winter populations (i.e., positive winter occurrence since 1995) of the Indiana bat at approximately 281 different hibernacula located in 19 states (Figure 7). Likewise, based on the 2005 winter surveys, there were a total of 23 Priority 1 hibernacula in seven states – Illinois (n=1), Indiana (n=7), Kentucky (n=5), Missouri (n=6), New York (n=2), Tennessee (n=1), and West Virginia (n=1). A total of 53 Priority 2 hibernacula are known from the aforementioned states, as well as Arkansas, Ohio, Pennsylvania, and Virginia. A total of 150 Priority 3 hibernacula have been reported in 16 states. A total of 213 Priority 4 hibernacula have been reported in 23 states.



**Figure 7. Distribution of counties with known Indiana bat hibernacula records and their current priority numbers (Service 2007a). Note: For counties with multiple hibernacula with different priority numbers, only the color of the highest priority hibernacula is shown.**

Winter surveys in 2006-2007 found hibernating Indiana bats dispersed across 15 states. However, over 90% of the estimated range-wide population hibernated in five states – Indiana (46.4%), Missouri (12.6%), Kentucky (13.4%), Illinois (10.5%), and New York (10.3%) (Service 2008).

### Current Winter Population Groups

The following summary is from the Indiana Bat Draft Recovery Plan (Service 2007a). M.J. Vonhof and G.F. McCracken's statistical analysis of genetic samples (mtDNA extracted from wing membrane punches) collected from hibernating Indiana bats from widely dispersed hibernacula suggested that genetic variance among samples was best explained by dividing sampled hibernacula (n=13) into four separately defined population groups, as follows:

- Midwest, included sampled populations in AR, MO, IN, KY, OH, Cumberland Gap Saltpeter Cave in southwestern VA, and Jamesville Quarry Cave in Onondaga Co., NY,
- Appalachia, included White Oak Blowhole Cave in east TN, and Hellhole Cave in WV,
- Northeast 1 (NE1), included Barton Hill Mine and Glen Park Caves in northern NY (Essex and Jefferson Counties, respectively), and
- Northeast 2 (NE2), included Walter Williams Preserve Mine in Ulster Co., NY (Service 2007a).

For more information on wintering bat distribution, abundance, and potential genetic variation, see the Indiana Bat Draft Recovery Plan (Service 2007a).



## U.S. Fish & Wildlife Service

### 2007 Rangewide Population Estimate for the Indiana Bat, *Myotis sodalis*

Estimates are based on winter surveys conducted at all known Priority 1 and 2 hibernacula throughout the species' range. Data from Priority 3 and 4 hibernacula has also been included for states that conducted surveys at these sites in 2006 or 2007.

USFWS Region	State	2001	2003	2005	2007	% Change from 2005	% of 2007 Total
Region 2	Oklahoma	0	5	2	0	-100.0%	0.0%
Region 3	Indiana	173,076	183,337	206,610	238,009	15.2%	46.4%
	Missouri	67,900	67,089	65,157	64,554	-0.9%	12.6%
	Illinois	21,053	43,028	54,630	54,033	-1.1%	10.5%
	Ohio	9,788	9,831	9,769	7,629	-21.9%	1.5%
	Michigan	20	20	20	20	0.0%	0.0%
	<b>Total</b>		<b>271,837</b>	<b>303,305</b>	<b>336,186</b>	<b>364,245</b>	<b>8.3%</b>
Region 4	Kentucky	49,999	48,535	63,211	68,668	8.6%	13.4%
	Tennessee	9,258	9,265	9,971	8,410	-15.7%	1.6%
	Arkansas	2,475	2,228	2,067	1,779	-13.9%	0.3%
	Alabama	173	265	296	258	-12.8%	0.1%
	<b>Total</b>		<b>61,905</b>	<b>60,293</b>	<b>75,545</b>	<b>79,115</b>	<b>4.7%</b>
Region 5	New York	29,642	32,924	41,702	52,696	26.4%	10.3%
	Pennsylvania	702	853	746	1,038	39.1%	0.2%
	West Virginia	9,714	9,742	13,417	14,597	8.8%	2.8%
	Virginia	833	1,090	735	723	-1.6%	0.1%
	New Jersey	107	644	652	659	1.1%	0.1%
	Vermont	159	472	297	325	9.4%	0.1%
	<b>Total</b>		<b>41,157</b>	<b>45,725</b>	<b>57,549</b>	<b>70,038</b>	<b>21.7%</b>
<b>Rangewide Total:</b>		<b>374,899</b>	<b>409,328</b>	<b>469,282</b>	<b>513,398</b>		<b>100.0%</b>

<b>2-yr. Net Increase of:</b>	<b>34,429</b>	<b>59,954</b>	<b>44,116</b>
<b>% Increase of:</b>	<b>9.2%</b>	<b>14.6%</b>	<b>9.4%</b>

**NOTE:** Missouri's 2001 - 2007 estimates assume 50,550 Indiana bats in Pilot Knob Mine based on previously calculated capture rates by R. Clawson and others.

Compiled by Andy King, U.S. Fish and Wildlife Service, Bloomington, Indiana, Ecological Services Field Office from data gathered from bat biologists throughout the species' range. (andrew\_king@fws.gov)

For additional information regarding the Indiana bat go to <http://www.fws.gov/midwest/Endangered/mammals/inba/index.html>

Revised 1-31-08

**Table 1. 2007 Range-wide Population Estimate for the Indiana Bat, *Myotis sodalis* (Service 2008).**

## Current Summer Distribution

Summer distribution of the Indiana bat occurs throughout a wider geographic area than its winter distribution. Most summer occurrences are from the upper Midwest including southern Iowa, northern Missouri, much of Illinois and Indiana, southern Michigan, Wisconsin, western Ohio, and Kentucky. Recently, many summer maternity colonies have been found in the northeastern states of Pennsylvania, Vermont, New Jersey, New York, West Virginia, and Maryland. Maternity colonies extend south as far as northern Arkansas, southeastern Tennessee, and southwestern North Carolina (Britzke et al. 2003, Service 2007a). Non-reproductive summer records for the Indiana bat have also been documented in eastern Oklahoma, northern Mississippi, Alabama, and Georgia.

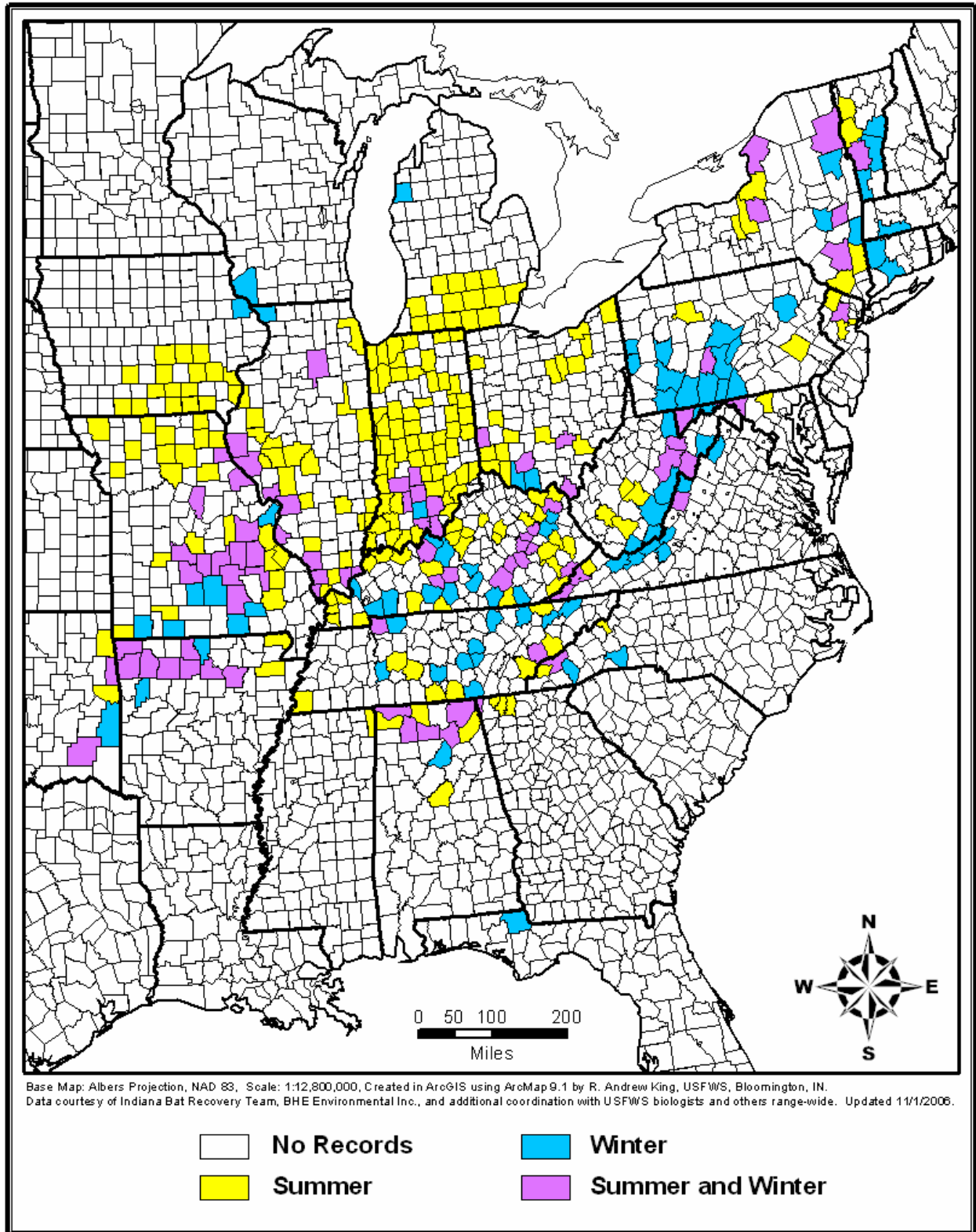
### *Maternity Colonies*

The first Indiana bat maternity colony was not discovered until 1971 in east-central Indiana (Cope et al. 1974). As of publication of the Indiana Bat Draft Recovery Plan (Service 2007a), we have records of 269 maternity colonies in 16 states that are considered locally extant. Of the 269 colonies, 54% (n=146) have been found, mostly during mist-netting surveys, within the past 10 years (i.e., since 1997) (Figure 4). This number is an underestimate as additional colonies were discovered in New York and probably found elsewhere in 2007. Because maternity colonies are widely dispersed during the summer and difficult to locate, it is presumed that all the combined summer survey efforts have found only a fraction of the maternity colonies based on the range-wide population estimates derived from winter hibernacula surveys.

In New York, there are approximately 35 documented maternity colonies across the landscape in 8 counties – Cayuga, Dutchess, Essex, Jefferson, Onondaga, Orange, Oswego, and Ulster. Many of these colonies have been located by tracking females as they emerge from hibernation to their spring roosting areas using radio telemetry. Each documented roost tree was recorded using a Global Positioning System handheld unit. Many of the radio transmitter batteries lasted into “summer” season (after May 15) documenting the use of these sites by potential colonies. Many sites had large exit counts in spring either before or after May 15 and many sites were documented as colonies by subsequent mist-netting and radio telemetry efforts.

### *Adult Males*

Male Indiana bats are found throughout the range of the species, but in summer are most common in areas near hibernacula (Gardner and Cook 2002, Figure 8).



**Figure 8. Distribution of counties with known summer and winter records of the Indiana bat as of publication of the Indiana Bat Draft Recovery Plan (Service 2007a).**

## **Life History**

The average life span of the Indiana bat is 5 to 10 years, but banded individuals have been documented living as long as 14 and 15 years (Humphrey and Cope 1977). Female survivorship in an Indiana population was 76% for ages 1 to 6 years and 66% for ages 6 to 10 years. Male survivorship was 70% for ages 1 to 6 years and 36% for ages 6 to 10 years (Humphrey and Cope 1977).

The Indiana bat is a migratory bat, hibernating in caves and mines in the winter (typically October through April) and migrating to summer habitat. Although some Indiana bat bachelor colonies have been observed (Hall 1962, Carter et al. 2001), males and non-reproductive females typically do not roost in colonies and may stay close to their hibernaculum (Whitaker and Brack 2002) or migrate long distances to their summer habitat (Kurta and Rice 2002). Reproductive females may migrate up to 357 mi (Winhold and Kurta 2006) to form maternity colonies to bear and raise their young. However, much shorter movements have been observed in New York. Both males and females return to hibernacula in late summer or early fall to mate and enter hibernation. The Indiana Bat Draft Recovery Plan (Service 2007a) provides a comprehensive summary of Indiana bat life history and are incorporated by reference.

## **Food Habits**

The Indiana bat feeds primarily on aquatic and terrestrial insects. Diet varies seasonally and variations exist among different ages, sexes, and reproductive status (Service 1999). Numerous foraging habitat studies have been completed for the Indiana bat. These studies found that Indiana bats forage in closed to semi-open forested habitats and forest edges located in floodplains, riparian areas, lowlands, and uplands. Forested habitats are very important for foraging bats, but old fields and agricultural areas seem to also be somewhat important habitats in studies completed in Indiana (Service 2007a). At a study site near the Indianapolis International Airport, Sparks et al. (2005b) found Indiana bats spending nearly 51% of their time foraging over agricultural fields with movements focused on a riparian corridor. Indiana bats, using open habitats for foraging at other sites, are probably utilizing forest-field edges and crowns of large scattered trees within the open canopy habitats.

## **Habitat Requirements**

In this section we provide summaries of habitat requirements for Indiana bats. The Indiana Bat Draft Recovery Plan (Service 2007a) and BA provide more comprehensive summaries and are incorporated by reference.

During winter, Indiana bats are restricted to suitable underground habitats known as hibernacula. The majority of hibernacula consist of limestone caves, especially in karst areas of east central United States, but abandoned underground mines, railroad tunnels, and even hydroelectric dams can provide winter habitat throughout the species' range (Service 2007a). In New York, the largest and most rapidly growing populations of Indiana bats occur in abandoned underground mines (Hicks and Novak 2002). Hibernacula with stable and/or growing populations of Indiana

bats have stable low temperatures that allow the bats to maintain a low rate of metabolism and conserve fat reserves through the winter.

Spring emergence occurs when outside temperatures have increased and insects (forage) are more abundant (Richter et al. 1993). In New York, spring emergence studies have consistently shown that Indiana bats emerge once evening temperatures remain higher than 50°F after April 15 (A. Hicks, pers. comm.). Some bats may remain in close proximity of the cave for a few days before migrating to summer habitats. This activity is known as spring staging. Others head directly to summer habitat. Roost trees used by adult females during this mid-spring period are similar to those used during the summer in terms of species, size, and structure (Britzke et al. 2006).

Indiana bats exhibit strong site fidelity to their traditional summer colony areas and foraging habitat, that is, they return to the same summer range annually to bear their young (Kurta et al. 2002, Service 1999). Traditional summer sites that maintain a variety of suitable roosts are essential to the reproductive success of local populations. It is not known how long or how far female Indiana bats will search to find new roosting habitat if their traditional roost habitat is lost or degraded during the winter. If they are required to search for new roosting habitat in the spring, it is assumed that this effort places additional stress on pregnant females at a time when fat reserves are low or depleted and they are already stressed from the energy demands of migration and pregnancy.

Summering Indiana bats (males and females) roost in trees in riparian, bottomland, and upland forests. Roost trees generally have exfoliating bark which allows the bat to roost between the bark and bole of the tree. Cavities and crevices in trees also may be used for roosting. A variety of tree species are used for roosts including, but not limited to, silver maple (*Acer saccharinum*), sugar maple (*Acer saccharum*), shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), eastern cottonwood (*Populus deltoides*), northern red oak (*Quercus rubra*), post oak (*Quercus stellata*), white oak (*Quercus alba*), shingle oak (*Quercus imbricaria*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), and sassafras (*Sassafras albidum*) (Rommé et al. 1995). Structure is probably more important than the species in determining if a tree is a suitable roost site; tree species which develop loose, exfoliating bark as they age and die are likely to provide roost sites. Male bats disperse throughout the range and roost individually or in small groups. In contrast, reproductive females form larger groups, referred to as maternity colonies in which they raise their offspring. Non-reproductive females may roost individually or in small groups but occasionally are found roosting with reproductive females. While Indiana bats primarily roost in trees, some colonies have been found in artificial roost sites. Only four maternity colonies have been found in buildings; in comparison, more than 400 roost trees have been documented for female Indiana bats (Service 2007a).

Indiana bat roost trees have been described as either primary or alternate depending on the number of bats in a colony consistently occupying the roost site. In Missouri, Callahan (1993) defined primary roost trees as those with exit counts of more than 30 bats on more than one occasion; however, this number may not be applicable to small-to-moderate sized maternity colonies. Kurta (2005) summarized summer habitat information from 11 states and found most



exit counts at primary roosts are at least 20-100 adults with a typical maximum of 60-70 adults in a primary roost at any given time. Primary roost trees are almost always located in either open canopy sites or in the portion of a tree used by bats that is above the canopy cover of the adjacent trees (Callahan et al. 1997; Kurta et al. 2002). Alternate roost trees can occur in either open or closed canopy habitats. Maternity colonies use a minimum of 8-25 trees per season (Callahan et al. 1997; Kurta et al. 2002). On the average, Indiana bats typically switch roosts every two to three days with reproductive condition of the female, roost type, weather conditions, and time of year affecting switching behavior (Kurta et al. 2002; Kurta 2005).

Exposure of trees to sunlight and location relative to other trees are important to suitability. Cool temperatures can delay development of fetal and juvenile young and selection of maternity roost sites may be critical to reproductive success. Dead trees with southeast and south-southwest exposures allow warming solar radiation. Some living trees may provide a thermal advantage during cold periods (Service 1999). Maternity colonies use multiple roosts in both dead and living trees that are grouped. Extent and configuration of a use area is probably determined by availability of suitable roost sites. Distances between roosts can be a few meters to a few kilometers. Reasons for frequent roost switching may be a response to weather changes, changing needs of females in different reproductive conditions, or an attempt by the bats to maintain social contacts or knowledge of alternate roost sites (Barclay and Kurta 2007).

Primary roosts are often located in openings or at the edge of forest stands, while alternate roosts can be in either openings or the interior of the forest stand. Primary roosts are usually surrounded by open canopy and are warmed by solar radiation. Alternate roosts may be used when temperatures are above normal or during precipitation. Shagbark hickories are good alternate roosts because they are cooler during periods of high heat and tight bark shields the bats from rain (Service 1999). Weather has been found to influence bat behavior and habitat use (Humphrey et al. 1977).

Very little research has focused on the use of travel corridors by Indiana bats. Most information pertaining to bat movements and travel corridors is incidental to other portions of a study and/or general observations. However, Murray and Kurta (2004) showed that Indiana bats increased commuting distance by 55% to follow tree-lined paths rather than flying over large agricultural fields, some of which were at least 0.6 mile (1 km) wide. Apparently suitable forest patches may not be available to Indiana bats unless they are connected by a wooded corridor, however, we do not know the maximum size of an opening Indiana bats may cross.

There are numerous observations of Indiana bats crossing interstate highways and open fields. Recent work conducted in this area found that on average, Indiana bats crossed a road some 11.5 times per night with small unpaved and gravel roads being readily crossed (D. Sparks, pers. comm.). Bats did cross an interstate highway, but much less frequently at <0.5 times per night. In New York, Indiana bats tracked from hibernacula to spring and summer roosts have crossed I-81, the Hudson River, Interstate 87, and other highways. These crossings primarily occurred during the initial migration from hibernacula to spring and summer habitats, rather than during nightly foraging bouts.

During the study for the Fort Drum Connector Route, an Indiana bat was captured on the east side of I-81 and roosted in a tree on the west side. Another bat was radio-tracked and observed foraging along a tree line on one side of the Highland Meadows Golf Course and then flew approximately 0.25 mile (0.40 km) straight across the open, well-manicured field to reach a different forest. As stated above, even though some data exists, biologists still do not know how large an open area must be before Indiana bats hesitate or refuse to cross, but the distance seems to be greater than the width of an interstate highway.

### **Causes of Past/Current Decline**

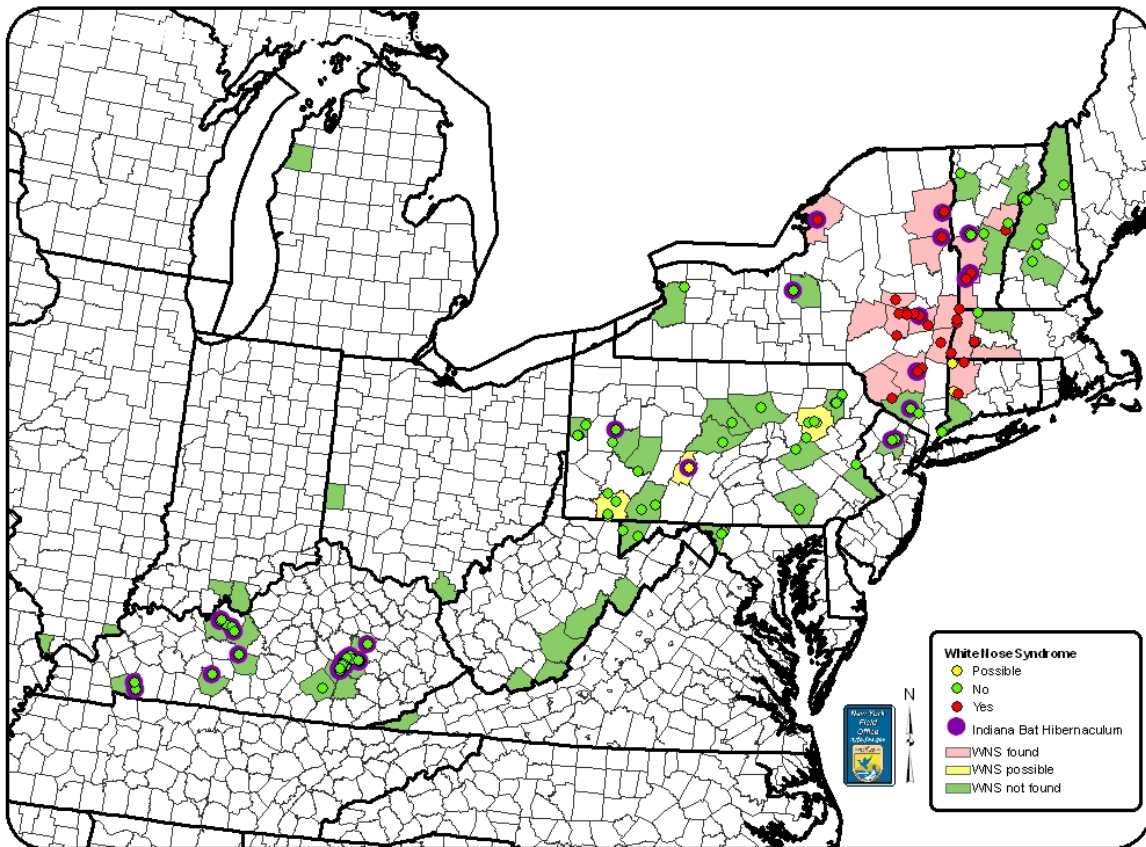
Over the long term, from 1965-2001, there has been an overall decline in Indiana bat populations and winter habitat modifications have been linked to changes in populations at some of the most important hibernacula (Service 2007a). Most of these modifications were human-induced for either commercialization of the cave, control of cave access, or for mining. Improper gating and other structures have rendered many historical hibernacula unavailable to Indiana bats. Other documented threats involving hibernacula include human disturbance, vandalism, indiscriminate collecting, handling, and/or banding of hibernating bats, flooding of caves for reservoirs, and destruction by limestone quarries. Natural alterations of hibernacula can include flooding, entrance and passage collapse, and blocked sinkholes which can all alter the temperature regime within the cave and even prevent entry by bats. Natural and human-induced changes to hibernacula can alter the climate required by Indiana bats which adversely affects the population.

Summer habitat modification is also suspected to have contributed to the decline of bat populations, however, it is difficult to generalize how forest management or disturbance may affect Indiana bats. Forests used by foraging and roosting Indiana bats during spring, summer, and autumn have changed dramatically from pre-settlement conditions. The forest has been fragmented in areas, fire has been suppressed, and much of the vegetation in flatter terrain (i.e., prairie) has been converted for agricultural purposes (Service 1999). Summer habitat can include small woodlots connected by hedgerows or extensive forests. The removal of such habitats is occurring rapidly in some portions of the Indiana bat's range due to urban development, mining, and other infrastructure, including roadways and utility corridors.

In addition, chemical contamination while bats are outside of hibernacula has been suggested as a cause for the decline of Indiana bats (Service 1999). The effect of acute or chronic toxicity to population declines is still unknown. However, additional research will improve our knowledge of the effects of chemical contaminants on bats. More recently, climate change has been suggested as a cause of population shift from southern hibernacula to northern hibernacula (Clawson 2002). Collisions with man-made objects (e.g., wind turbines, communication towers, and vehicles) are also a potential risk for Indiana bats.

## White-nose Syndrome

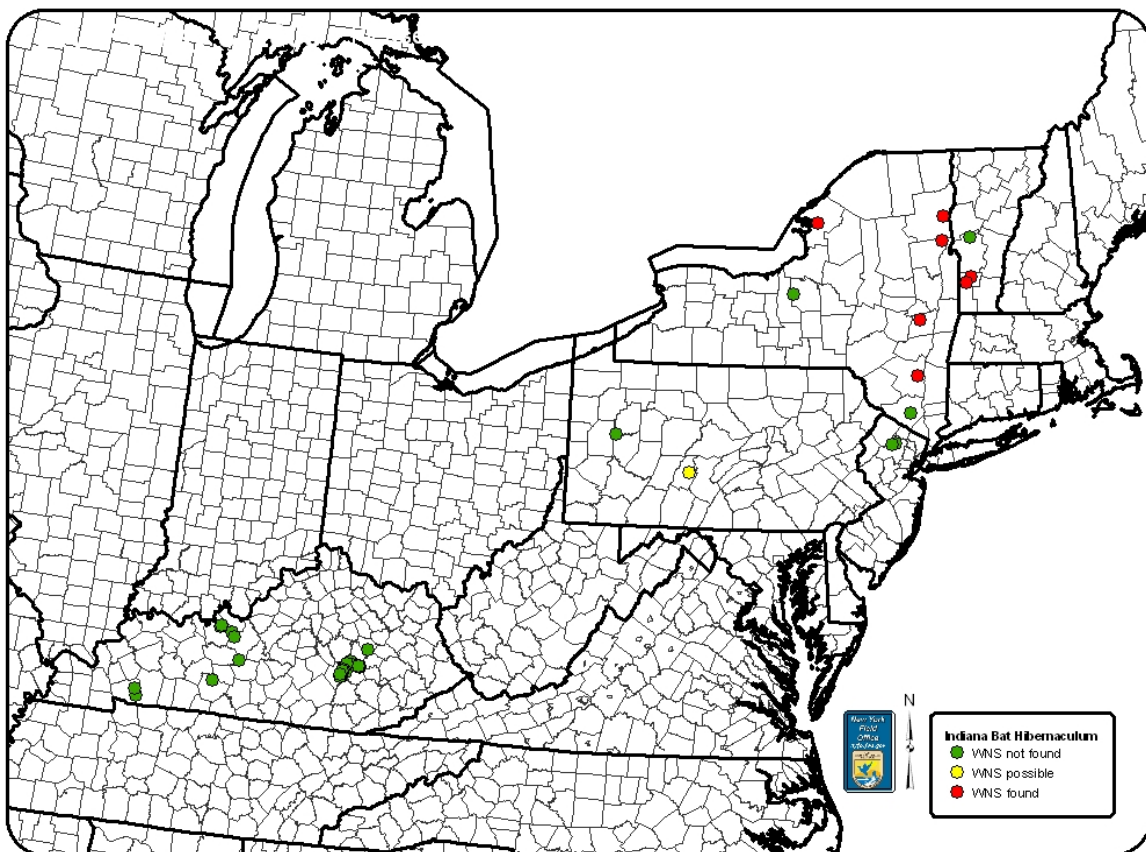
First documented at four sites in New York in the winter of 2006-07 (although recently reviewed photographs of bats at a fifth site in February 2006 point to a likely earlier start), White-nose syndrome (WNS) refers to a white fungus on the noses of many affected bats. Fungus has also been observed on the ears, tails, and wing membranes of bats. At least 30 sites in four states (New York, Vermont, Massachusetts, and Connecticut) have been documented with WNS (Figure 9, Service unpublished data). At several of those sites, significant bat mortality has been observed. The fungus may be a symptom and not the cause of the mortality observed to date. Bats affected with WNS do not always have a grossly visible fungus, but may display abnormal behaviors. These behaviors include bats (primarily little brown bats to date) roosting towards the entrances of caves/mines where the temperatures and humidity are far less stable than traditional roosting sites. Bats are also leaving their hibernacula far too early in the winter/spring in the northeast during cold temperatures before any insects are available for foraging. Many bats still inside hibernacula have not responded to human presence during surveys as healthy, unaffected bats would do. Affected bats appear to be using up their essential fat reserves well before spring emergence and are starving to death.



**Figure 9. Summary of winter 2007-2008 surveys for signs of White-nose Syndrome (Service, unpub. data).**

It is unclear at this point if or how WNS is transmitted. Eastern pipistrelle, little brown, northern long-eared, small-footed, and Indiana bats have been found with WNS. Big brown bats are typically found in lower numbers in the affected sites; only two big brown bats have been found with small white patches of fungus, although it is currently unclear if this was associated with WNS. It is unclear if susceptibility actually varies by species within and among caves or if observed symptoms are expressed differentially by species (see below for further discussion). It is also unclear how long symptoms take to manifest after exposure to an unidentified agent(s). Finally, it is unclear what the long-term effects (e.g., geographic spread, mortality within affected sites) to the Indiana bats will be.

As of April 3, 2008, all surveyed Indiana bat hibernacula in New York, except for Jamesville Quarry Cave and a newly-discovered site (P3 or P4) in Orange County (Bull Mine), have been documented with WNS (Figure 10, Service unpublished data). In addition, two Indiana bat hibernacula in Vermont (Aeolus and Skinner Hollow) have been documented with WNS. However, spot checks of several other Indiana bat hibernacula across the range found no signs of WNS in the winter of 2007-2008.



**Figure 10. Summary of winter 2007-2008 surveys for signs of White-nose Syndrome at Indiana bat hibernacula (Service, unpub. data).**

At affected Indiana bat hibernacula, impacts to Indiana bats are inconsistent. The NYSDEC redid photographic surveys of all New York State Indiana bat hibernacula in March of 2008 to compare with the 2006-2007 counts. At this point, we only have summaries of the survey results. For example, Indiana bat numbers and roosting locations appear normal at Barton Hill and Williams Hotel as well (NYSDEC, pers. comm.). However, at Glen Park Cave, while the K-cluster of Indiana bats appeared to be normal in location at the end of March 2008, preliminary estimates were 1,200-1,400 bats (Hicks et al. 2008, NYSDEC, pers. comm.). This count is down from the count of 1,932 Indiana bats in 2006-2007. Haile's Cave represents the worst-case scenario for Indiana bats at WNS affected sites. Surveys of Haile's Cave in 2006-2007 found no Indiana bats (living or dead), while every previous survey since 1981 documented their presence (Hicks and Newman 2007). In 2004-2005, 685 Indiana bats were recorded. While this loss was certainly unanticipated, Haile's Cave had already been classified as an ecological trap hibernaculum in the Indiana Bat Draft Recovery Plan (Service 2007a) due to the risk of flooding and freezing events at this site. In addition, late winter counts in Williams Preserve and Williams Lake are down by 92-99% when compared to 2006-2007 mid-winter surveys. In 2006-2007, there were approximately 13,014, and 1,003 Indiana bats in the Williams Preserve and Williams Lake, respectively. In April 2008, counts were closer to 124 and 80 Indiana bats (Hicks et al. 2008). It is unclear if some of the Indiana bats may have moved to new hibernacula or whether all should be considered dead. No carcasses were found at these two sites and bats found outside the Williams Hotel cannot account for that large of a drop in counts.

In addition to potential differences in mortality among sites, the NYSDEC has observed differential symptoms of WNS between Indiana bats and little brown bats within sites. Of a total of 1,190 bats counted from clusters containing both species, 5.5% of the Indiana bats and 51% of the little brown bats had obvious signs of facial fungus.

In summary, WNS is currently limited to sites in the northeast, not all hibernacula are affected in affected states, the degree of impact to bats within sites varies, and the observed impacts among bat species varies. Given the information currently available, it is impossible to say that the status of the species has significantly changed at this point. Winter counts in 2008-2009 will provide valuable insights into geographic spread and effects at which point range-wide, population level impacts and the status of the species can be re-evaluated. Meanwhile the Service, States, and multiple researchers are continuing to try to identify the cause of WNS and determine options for minimizing additional WNS-associated mortalities.

## **Species Recovery**

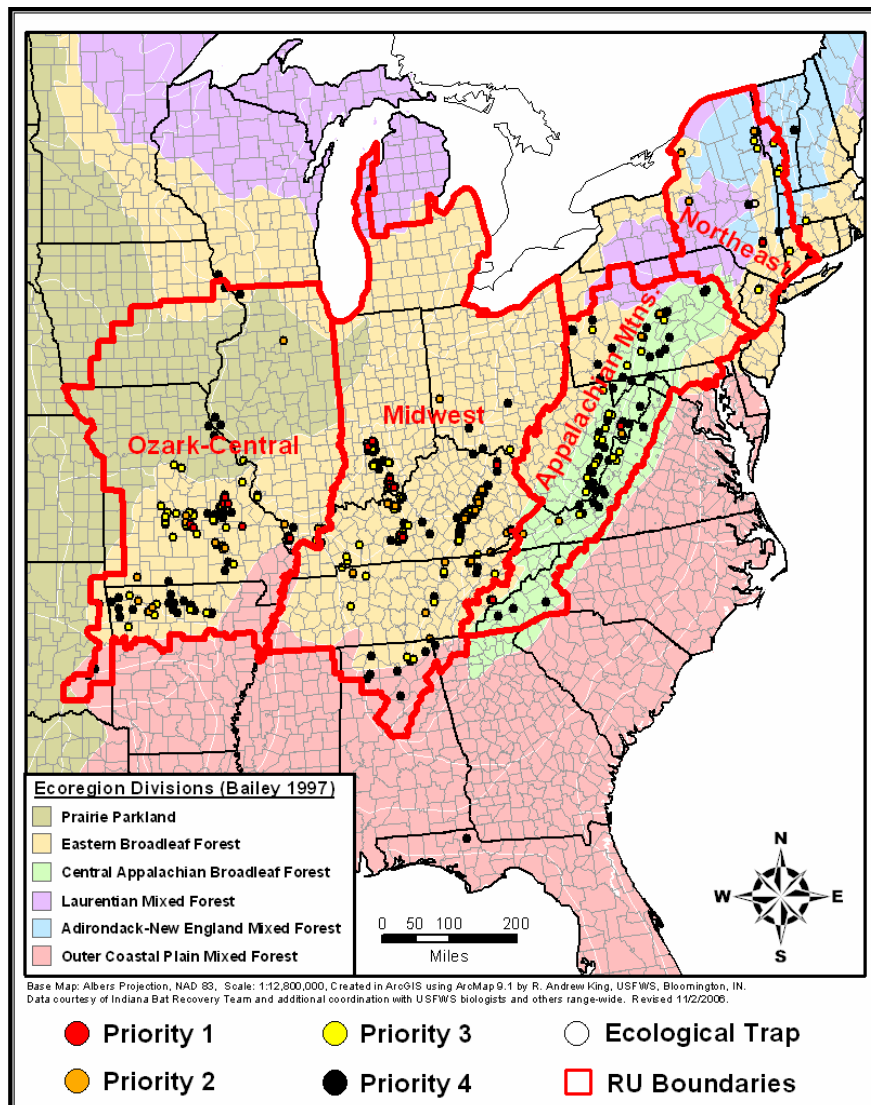
The existing recovery program for the Indiana bat focuses on protection of hibernacula (Service 1983). The proposed recovery program for this species has four broad components:

- 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 (Service 2007a).

This recovery program continues to have a primary focus on protection of hibernacula but also increases the focus on summer habitat and proposes use of Recovery Units.

## Recovery Units

The Service's proposed delineation of Recovery Units relied on a combination of preliminary evidence of population discreteness and genetic differentiation, differences in population trends, and broad-level differences in macrohabitats and land use. When Recovery Unit delimitations suggested by these factors were geographically close to state boundaries, the Recovery Unit borders were shifted to match the state boundaries in order to facilitate future conservation and management. The Indiana Bat Draft Recovery Plan proposes four Recovery Units for the species: Ozark-Central, Midwest, Appalachian Mountains, and Northeast (Figure 11) (Service 2007a).



**Figure 11. Proposed Indiana bat Recovery Units (Service 2007a).**

## Previous Incidental Take Authorizations

There has been no previous incidental take authorization for the Indiana bat in the State of New York. In addition, there has been limited incidental take authorization for the Indiana bat in the proposed Northeast Recovery Unit.

Prior formal consultations involving the Indiana bat have involved a variety of action agencies and project types. These have included:

- (a) The Forest Service for activities implemented under various Land and Resource Management Plans on National Forests in the eastern United States;
- (b) The FHWA for various transportation projects;
- (c) The Corps, Tennessee Valley Authority, and West Virginia Department of Environmental Protection for various water-related and coal mining projects;
- (d) The Department of Defense for operations at several different military installations; and
- (e) The National Park Service for vegetation management and prescribed burn activities.

Additionally, an incidental take permit has been issued under Section 10 of the ESA to an Interagency Taskforce for expansion and related development at the Indianapolis Airport in conjunction with the implementation of a Habitat Conservation Plan (i.e., Six Points Road Interchange HCP).

A summary of formal consultations completed over the past 10 years was provided in the Final BO on the Reconstruction of U.S. 119 from Partridge to Oven Fork in Letcher County (Service 2007b, Appendix B) and is incorporated by reference. A table of previous consultations is provided in Appendix C.

In conducting many of these consultations, Indiana bat presence/absence survey information was unavailable; therefore, the action agency and Service often assumed that Indiana bats were present in the action area and could be subject to incidental take. This type of conservative approach is generally protective of Indiana bats because it tends to over-estimate the incidental take that may occur.

Previous consultations have addressed impacts to hibernating or swarming bats, known maternity areas, or summer habitat that was assumed occupied. Due to the various life stages affected, the types of conservative assumptions made (as mentioned above), and the difficulty in documenting actual take to Indiana bats (as more fully described in each BO and the **Incidental Take Statement** section of this BO), different methods have been used to estimate the amount of potential take. Depending on the consultation, take has been measured either by estimating numbers of affected roost trees, individual bats or maternity colonies, or acres of potentially suitable and/or occupied habitat. However, the Service typically has determined the incidental take measure that was used based on the most accurate and reasonable means available for each site-specific analysis. There are multiple biological opinions that were issued that, based on new information, resulted in subsequent “not likely to adversely affect” determinations.

In addition, reinitiation of consultation of several projects has resulted in reduced levels of anticipated take. Therefore, it is difficult, for the reasons discussed previously in this section, to measure the effects of previously authorized take without knowing the details of each BO and closely evaluating the outcome of each consultation. Furthermore, even when we have the details of a BO and are able to evaluate the outcome, we may not be able to draw realistic conclusions regarding the short- and/or long-term effect of any incidental take that has occurred due to the difficulty in monitoring and estimating incidental take of Indiana bats.

With the exception of three – Fort Knox, Great Smoky Mountains National Park, and Laxare East and Black Contour Coal Mining projects – none of the BOs and associated incidental take statements issued for non-Forest Plan activities anticipated the loss of a maternity colony. Subsequent information has shown that maternity colonies have persisted in areas addressed in these BOs. For example, additional monitoring of the maternity colony following the completion of the 2004 BO for the Laxare East and Black Castle Contour projects documented a colony much larger than previously anticipated. Reinitiation of that consultation in 2006 concluded that while the colony would experience adverse effects, the colony should be able to persist through the life of the project, largely, however, because subsequent surveys determined that the colony's primary roosts and much of their foraging areas were located outside the area of direct habitat destruction.

Required monitoring for three additional consultations – Camp Atterbury, Newport Military Installation, and Indianapolis Airport – has confirmed that the affected colonies persisted through the life of the project and continue to exist today. We recognize that given the philopatric nature of Indiana bats and the long lifespan, the full extent of the anticipated impacts may not yet have occurred. Nonetheless, these monitoring results, and the lack of data to suggest otherwise, indicate that the conservation measures to avoid and minimize the impacts of Federal projects appear to be effective.

In summary, we believe the take authorized to date via Section 7 consultations has primarily resulted in temporary non-lethal effects to Indiana bats. As many of these consultations necessarily made conservative assumptions about Indiana bat presence, we believe that the number of Indiana bats actually exposed to the environmental impacts of the Federal actions is less than anticipated. Furthermore, pre- and post-project implementation monitoring of several maternity colonies preliminarily suggests that proposed conservation measures, when employed in concert, appear to be effective in minimizing adverse effects on the affected Indiana bats, including maternity colonies, although this information cannot be considered definitive.

For reasons stated above, the Service concludes that the aggregate effects of the activities and incidental take covered in previous BOs on the Indiana bat have not degraded the overall conservation status (i.e., environmental baseline) of the Indiana bat.

### **Analysis of the Species/Critical Habitat to be Affected**

The Service has reviewed the BA and supporting information for the proposed construction of the Fort Drum Connector. The BA evaluated the potential and likely effects of the proposed



highway construction project on the Indiana bat. There are no other Federally-listed or proposed species known or likely to occur within the action area.

The Service concurs with the FHWA's determination that the proposed project may adversely affect the Indiana bat as the proposed project is likely to result in harm of Indiana bats due to the loss, alteration, fragmentation, or displacement of roosting and foraging habitat. In addition, bats may be struck by vehicles during road operation. Critical habitat has been designated for the Indiana bat, but none of those critical habitat areas occur within the project area. Therefore, the proposed project is not likely to adversely modify critical habitat for the species.

## **ENVIRONMENTAL BASELINE**

Under Section 7(a)(2) of the ESA, when considering the "effects of the action" on Federally-listed species, the Service is required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and the past and present impacts of all Federal, State, or private actions and other activities in the action area (50 CFR 402.02), including Federal actions in the area that have already undergone Section 7 consultation, and the impacts of State or private actions that are contemporaneous with the consultation in process. As such, the environmental baseline is "an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including critical habitat), and ecosystem, within the action area (Service and NMFS 1998, page 4-22)." The environmental baseline is, therefore, a "snapshot" of the species' health at a given point in time, but it does not include the effects of the proposed action.

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

The identified action area includes the roosting and foraging habitat used by three maternity colonies. In addition, the action area is likely to be used in the fall, and perhaps the spring, by Indiana bats that hibernate in the nearby Glen Park Cave. Therefore, the status of both the maternity colonies and nearby hibernating population is examined below.

**Winter Hibernation** The Glen Park Cave is located approximately 3.6 miles southwest of the western terminus of the Fort Drum Connector and is the hibernaculum for approximately 1,932 Indiana bats. The cave is privately owned. The NYSDEC monitors Indiana bat use of the cave by conducting mid-winter counts of the bats every two years. The number of Indiana bats observed in the cave between 1997 and 2007 ranges from approximately 1,704-3,129 bats.

Glen Park Cave is documented as a WNS-affected site and it appears that the K-cluster of Indiana bats is smaller than in previous winters. However, we have not observed any dead Indiana bats or Indiana bats with significant fungal growth at this site to date. It is unclear what the long-term impacts of WNS may be on Indiana bats at this site and range-wide. See **Status of the Species** Section for additional information.

**Spring Emergence Study** In April 2005, 32 Indiana bats (30 females and 2 males) were captured at Glen Park Cave prior to spring emergence, fitted with radio transmitters, and tracked for the life of the transmitters. Twenty-four females and two males were successfully tracked to

at least one roost tree, all of which remained within 20 miles of their hibernaculum. Eight maternity colonies (conservative estimate) were identified during this project. Three of these were subsequently verified by additional mist-netting and radio-tracking studies (see below).

**Project-related Mist-netting and Tracking** The following is a summary of field work conducted for the proposed project. Additional information can be found in the BA.

A total of seven mist-net sites (MS) were surveyed for the Indiana bat within and adjacent to the proposed project corridor from July 10-18, 2007. Five reproductive female Indiana bats were captured during mist-net surveys. Four were captured in canopy-covered golf cart trails at mist-net sites MS-1 and MS-3 at the Highland Meadows Golf Course. The remaining Indiana bat was captured along a narrow hedgerow dominated by sugar maple and bitternut hickory. This bat was attempting to fly through an opening in the hedgerow to get from one hayfield to another. This hedgerow and mist-net site (MS-6) is located between Anable Avenue and Waddingham Road. Radio-transmitters were attached to five adult female Indiana bats from July 10-18, 2007, so roost sites could be located. The five Indiana bats captured during this survey were tracked to 12 different diurnal roost trees located in six different areas. For the purpose of this BO, area names are used as descriptors for roost trees including the Golf Course, Bonny Road, Knowlesville, Perch Lake, Fort Drum, and Anable. The forest adjacent to Knowlesville Road and on Fort Drum contained three trees each, while two trees were near Perch Lake and Highland Meadows Golf Course, and one tree was found at Bonny Road and Anable Avenue. The distance between capture sites and roost sites, used by five Indiana bats captured during this survey, ranged from 0.08 to 4.00 miles (0.13 to 6.44 km).

Emergence counts were conducted at each tree to determine the number of bats occupying the roost on a given day. With the exception of five roost trees – one at Highlands Meadow Golf Course (GC-2), one at Anable Avenue, and the roost trees on Fort Drum (FD-1, FD-2, and FD-3) – biologists conducted three emergence counts on every roost tree documented during this survey. Emergence counts at roost trees ranged from 74 bats at the Bonny Road tree (BR-1) to zero bats at Highland Meadows Golf Course (GC-1 and GC-2), Knowlesville (K-1), and Perch Lake (PL-1). Emergence count efforts at the Bonny Road tree (BR-1) produced counts of 74, 66, and 10 individuals on July 15<sup>th</sup>, 16<sup>th</sup>, and 22<sup>nd</sup>, respectively. This tree was also used by an Indiana bat tracked during a separate study in 2007 (*Horse Creek Wind Farm* - see below) and we assume there is a maternity colony (Perch Lake WMA South maternity colony) associated with roosts in this area.

The roost tree (PL-1) near Perch Lake accounted for the second highest number of bats with 45, 28, and 19 individuals on July 16<sup>th</sup>, 21<sup>st</sup>, and 26<sup>th</sup>, respectively. Emergence counts at one of the Knowlesville trees (K-1) resulted in 32, 22, and 21 individuals on July 12<sup>th</sup>, 14<sup>th</sup>, and 16<sup>th</sup>, respectively. Two other trees at Knowlesville, K-2 and K-3, were used by 14 and 10 bats, respectively. The Knowlesville trees are in very close proximity (<0.75 mile) to previous roosts documented during the 2005 NYSDEC spring emergence study (Perch Lake maternity colony); the Perch Lake and Knowlesville roosts are within 2.5 miles of each other. This reconfirms the presence of at least one maternity colony in this area.

The three trees (GC-1, GC-2, and A-1) located adjacent to the Fort Drum Connector Route were all used by only one or two bats during emergence counts, which indicates their status as alternate roosts. The A-1 roost is within 1 mile of the Fort Drum roosts, within 2.5 miles of multiple roosts on the installation, and within 0.75 mile of multiple roosts documented during netting and tracking of 4 Indiana bats associated with a residential housing project (see below). Two bats tracked during this project spent all or most of their time on the military installation. Therefore, we conclude there is at least 1 maternity colony (Fort Drum maternity colony) in this area.

Emergence count data for this study show maternity colonies started disbanding during the third week in July. The number of bats emerging from each primary roost tree was much lower after July 21<sup>st</sup>. No primary roost trees were found within the construction footprint of the Fort Drum Connector Route. The long distance traveled by the three bats captured in the corridor and tracked to their primary roost trees could be an indication that trees having appropriate conditions for primary roosts are absent within the project area. However, tree characteristics change from year to year; a tree used as an alternate roost tree during one season may become a primary roost tree the following season.

In summary, it appears that at least three maternity colonies were verified in the Action Area during the Fort Drum Connector study.

### **Additional Studies in the Vicinity of the Fort Drum Connector**

#### *Eagle Ridge and Fort Drum Military Installation*

During the summer (August 8-13) of 2006, four Indiana bats (three adult males and one post-lactating female) were captured during mist-netting associated with a residential housing project (Eagle Ridge) in the Town of LeRay, Jefferson County (Environmental Solutions and Innovations, Inc. 2006). This development (now under construction) is approximately 0.8 mile south of the proposed project. Each bat was tracked for a minimum of six days after capture and eighteen day-roosts were located. Two of these were located on the Fort Drum Military Installation. Foraging data was collected between August 15-20 with all foraging points to the south of the proposed project.

During the summer (May to August) of 2007, 18 Indiana bats were captured on the Fort Drum Military Installation (Environmental Solutions and Innovations, Inc. 2008b). Eleven of these were adult females, two were adult males, and five were juveniles. Seven adult females, one adult male, and two juvenile females were subsequently fitted with radio-transmitters and nine of these were successfully tracked to 24 day-roosts. While several seemingly distinct roosting areas were documented during this study, we conclude that Fort Drum has at least one maternity colony.

During the fall (September 11 to October 1) of 2007, additional mist-netting was done on Fort Drum and three Indiana bats (one adult female, one adult male, and one juvenile female) were captured, radio-tagged, and subsequently tracked to a combined total of 29 day-roosts

(Environmental Solutions and Innovations, Inc. 2008a). In addition, foraging data were collected for these bats on 26 nights.

Roosting and foraging areas documented during the summer and fall 2007 Fort Drum studies overlapped with roosts and foraging areas for four Indiana bats tracked in 2006 and with two females captured during the 2007 Fort Drum Connector study.

*Horse Creek Wind Farm*

During the summer (May to August) of 2007, 23 Indiana bats were captured in the Towns of Clayton, Orleans, and Brownville, Jefferson County (west of the proposed project). Of these, 17 were fitted with radio-transmitters and 14 were successfully tracked to day-roosts (Stantec Consulting 2007). Results of these studies suggest a minimum maternity colony size of 25-74 bats. This study reconfirmed two maternity colony locations identified during the NYSDEC 2005 spring emergence work (Conklin/Black Creek and Morris Track maternity colonies). In addition, as stated above, this study documented a third maternity colony at which one of the roost trees was used by an Indiana bat tracked from both this study and from the Fort Drum Connector Route study.

In summary, a minimum of 10 maternity colonies (conservative estimate) has been documented in Jefferson County (eight initially during the 2005 spring emergence study and two by a combination of other netting and telemetry work). Three of these colonies located in the Action Area. Other netting and telemetry studies occurred in Jefferson County in 2007, for which the Service has not yet received the results. These may confirm additional colonies. In addition, additional colonies may be confirmed on the Fort Drum Military Installation.

The ten maternity colonies are listed below.

<u>Colony Number</u>	<u>Colony Name</u>	<u>Studies Verifying</u>
1.	Conklin/Black Creek Maternity Colony	NYSDEC 2005, Horse Creek 2007
2.	Morris Track Maternity Colony	NYSDEC 2005, Horse Creek 2006-2007
3.	Mitchell Maternity Colony	NYSDEC 2005
4.	Perch Lake Maternity Colony	NYSDEC 2005, <b>Fort Drum Connector 2007</b>
5.	Cady Road Maternity Colony	NYSDEC 2005
6.	Fralic Maternity Colony	NYSDEC 2005
7.	Minkler Maternity Colony	NYSDEC 2005
8.	Holmdale Maternity Colony	NYSDEC 2005
9.	Perch Lake WMA South	<b>Fort Drum Connector 2007</b> , Horse Creek 2007
10.	Fort Drum	Eagle Ridge 2006, <b>Fort Drum Connector 2007</b> , Fort Drum 2007

Five adult female Indiana bats were captured directly adjacent to the proposed footprint of the project and these appear to be associated with at least three maternity colonies. The majority of identified roosts for two of these colonies occur along the western end of the proposed project approximately 1.6-3.2 miles from the project footprint. Two alternate roosts were identified directly adjacent to the footprint within the Golf Course forest patch. The majority of identified roosts for the third colony occur on the Fort Drum Installation on the eastern end of the project. No primary roosts were identified within the project footprint.

**Non-reproductive Females and Males** Some male Indiana bats likely remain in and around Glen Park Cave during the summer. Non-reproductive females and males are less colonial than either reproductively active females or juveniles. Although there is little information available, male Indiana bats in the action area appear to have similar roosting preferences as females.

**Fall Swarming** The foraging and/or roosting areas for many of the ~2,000 or more Indiana bats seasonally present in the action area have not been identified, but habitat features used by maternity colonies would also be available for the hibernating population in the spring and fall. Habitat use during the fall swarming period probably varies somewhat from year to year due to weather conditions, prey availability, and the proximity and quality of available roosts.

### **Factors Affecting the Species' Environment within the Action Area**

In order to ensure the consideration of all potential direct, indirect, and cumulative effects of the proposed action on the Indiana bat, the Service determined that the action area under consideration will include the project corridor and two identified Indiana bat activity areas, any Indiana bat habitat within 2.5 miles of those areas (including the wetland mitigation site and bat conservation areas) (summer action area), and Indiana bat habitat within approximately five miles of Glen Park Cave (winter action area). Additional description of the action area is provided in the **Action Area** section above.

Numerous land use activities that affect the Indiana bat and that likely occur within the action area include hunting and other outdoor recreation, agriculture, timber harvest, residential and commercial development associated with expansions at the Fort Drum Military Installation, and soldier training and other activities on Fort Drum. Many of these are private actions but many involve Corps permits for impacts to waters of the United States. In addition, all activities on Fort Drum involve a Federal action and the Department of Army and Service currently complete consultations on a project-by-project basis. The Department of Army is currently developing a BA to evaluate projects on a larger scale for several years at a time. The Service is unaware of any quantifiable information relating to the extent of private timber harvests within the action area. The Service is engaged with the Town of LeRay in developing a Town master plan and is actively involved with reviewing most, if not all, development projects within the Town (regardless of other Federal [e.g., Corps] involvement). We are working with the Town and developers to conserve and connect suitable Indiana bat habitat whenever possible and hope to work with other towns in the area in a similar fashion.

In addition to land activities, WNS has the potential to affect Indiana bats in the action area. As stated in the **Status of the Species** section, WNS has been documented at Glen Park Cave. At

this point, we have no way of knowing whether significant WNS-associated mortality at Glen Park Cave may occur over time. However, based on our current understanding of WNS, as discussed in the **Status of the Species** section, we cannot say that the status of the species has significantly changed. Additional monitoring during the winter of 2008-2009 will shed light into the potential short-term impacts of WNS on Indiana bats at Glen Park.

## **EFFECTS OF THE ACTION**

"Effects of the action" refers to the direct and indirect effects of an action on listed species or critical habitat, together with the effects of other activities interrelated and interdependent with that action which will be added to the environmental baseline. The ESA defines indirect effects as those caused by the proposed action and that are later in time, but are still reasonably certain to occur [50 CFR §402.02]. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

This section includes an analysis of the direct and indirect effects of the proposed action on the species and/or critical habitat and its interrelated and interdependent activities. While analyzing direct and indirect effects of the proposed action, the Service considered the following factors:

Proximity of the action: As stated in the environmental baseline, at least three maternity colonies are known to occur in the action area. It is unlikely that all primary or secondary roost trees have been discovered to date given the limited period of tracking of each radioed bat in the action area. In addition, there is a high probability that not all Indiana bats within a maternity colony have been counted to date, as multiple trees are used by a colony and varying numbers of bats use many of these trees in a given night. Therefore, it is likely that additional females utilize the habitat within these home ranges and that other primary and secondary roost trees are present with these home ranges.

One Indiana bat hibernaculum (Glen Park Cave) is located within the action area. No designated critical habitat for the Indiana bat is located within the action area.

Suitable roosting, foraging, and potential maternity habitats for the Indiana bat occur within and adjacent to the project area. These habitats likely support spring staging and migration, summer roosting, maternity, fall migration, and/or fall swarming periods of Indiana bats within the project area.

Distribution: The project will have direct effects on the species within the construction disturbance limits including associated waste areas. Indirect effects on the species may also occur as a result of the project throughout all or some of the remainder of the action area defined previously due to fragmentation, alteration of maternity, foraging, and swarming habitats, alterations to individual bat behavior patterns, and modifications of population dynamics in the action area.

Timing: Removal or destruction of habitat during the spring staging and migration, summer roosting, maternity, fall migration, and/or fall swarming periods of the Indiana bat would cause

the removal of habitat during a time that the species actively need and/or use the habitat. However, direct effects from tree removal will be avoided as all tree removal activities will occur while bats are in hibernation (November 15-March 31). Other construction activities will occur during the active period of Indiana bats. Potential effects associated with the construction and habitat removal are discussed below.

Nature of the effect: It is likely that the proposed project will have a variety of effects on individual Indiana bats and the associated maternity colonies. In particular, the proposed project activities are expected to (a) eliminate occupied and potential foraging and roosting habitat through removal and/or conversion of that habitat (e.g., removal of roost trees and foraging habitat); (b) alteration of habitat (e.g., fragmentation of foraging habitat, modification of travel corridors); (c) alteration and/or modification of normal Indiana bat behaviors (e.g., reproduction effects, foraging effects, and sheltering behaviors); and (d) potentially cause the mortality and/or injury of individual bats from future road operation. Additional details are discussed below.

Duration: The proposed action will cause the permanent destruction, alteration, and fragmentation of the available habitat for Indiana bats utilizing these forested areas throughout various needed times of the year.

Disturbance frequency: The disturbance will be a one-time disturbance that will likely be sustained over two spring staging and migration, summer roosting/foraging, fall migration, and/or fall swarming periods while the proposed project is being constructed. After completion of the construction, the disturbance will be continuous because the habitat will be lost permanently and the Fort Drum Connector Route will be under constant use, which may result in Indiana bat mortality or cause Indiana bats to modify their normal behavior patterns.

Disturbance intensity: Thirty-five acres of forest and 4,181 linear feet (1,274 m) of hedgerow will be permanently lost. In addition, reduced habitat quality of remaining roosting/foraging habitat adjacent to the road is anticipated.

Disturbance severity: The species' resiliency to natural and anthropogenic disturbances on some level has been demonstrated through monitoring (see **Previous Incidental Take Authorizations** and **Status of the Species** in the **Action Area** sections above). While the proposed project will result in some incidental take of Indiana bats, previous studies suggest that most bats should adjust to construction activities and limited habitat removal.

## **Analyses of Effects of the Action**

### Loss of Foraging Habitat

The primary effect of the proposed activities on Indiana bats in the action area will be the loss of 31.6 acres (but estimated at up to 36 acres to account for possible changes during the final design) of forest, all of which are potentially suitable Indiana bat foraging habitat. There are three forest patches that will be impacted by the proposed project. The highest quality foraging habitat occurs north of Highland Meadows Golf Course. This is a 66.4-acre patch of potential Indiana bat roosting and/or foraging habitat, dominated by sugar maple, American beech,

basswood, and bitternut hickory. Of this, 9.1 acres of forest will be removed. The I-81 interchange forest contains approximately 25.5 acres of potential habitat. Of this, 10.4 acres of forest will be removed. The Anable Avenue forest patch contains approximately 45.5 acres of potential habitat. Of this, 8.1 acres of forest will be removed. Four additional acres of forest will be impacted along West Creek. In total, approximately 36 acres of the 137 acres of forest will be lost. The remaining 102 acres of forest in the three patches will be bisected by the road. This fragmentation results in smaller forest patches and, when combined with disturbance from the road (see Noise discussion below), is anticipated to result in reduced foraging and/or roosting in these forest patches.

In addition, 4,181 linear feet (1,274 m) of hedgerows will be removed. Hedgerows may be especially important for roosting or foraging or connecting additional foraging and roosting habitat in an already fragmented landscape. As most of the hedgerows impacted by the project run perpendicular to the proposed road, only small segments (width of road corridor) will be lost; Indiana bats may continue to fly over the road to the next area of hedgerow or may find completely new routes due to the presence of the road. Replanting of 4,200 linear feet of hedgerows parallel to the road in the right-of-way should minimize loss of connectivity among hedgerows and woodlots in the action area. While the plantings may have limited utility in the first few years, more use is likely later. In addition, Indiana bats already use sparsely treed hedgerows with shrubs as travel corridors in the action area (Environmental Solutions and Innovations, Inc. 2006), increasing the likelihood of use within a short time after planting.

Four female Indiana bats were captured in the Golf Course patch during mist-netting for the project and one female Indiana bat was captured along a hedgerow between the Anable forest patch and an adjacent patch. No foraging data were collected for these bats; however, when considering that Indiana bats were captured in these patches and then roosted in areas a few miles away, it appears that the Golf Course and Anable forest patches are likely to be used for foraging or as part of their travel corridors. In addition, foraging data from three Indiana bats captured on the Fort Drum Military Installation suggest use of the Anable forest (Environmental Solutions and Innovations, Inc. 2008a). There is no information to confirm or reject whether Indiana bats are currently using the I-81 forest patch for foraging, but of all the patches in the action area, this appears to be least likely to be used given its proximity to I-81. However, the loss of forest in this area is considered as loss of actual or potential foraging or commuting habitat.

There is a total of 32,600 acres of land in this summer action area, of which approximately 5,533 acres (16.9%) are forested. The construction of the Fort Drum Connector Route would impact 36 acres or 0.65% of the forested habitat in the summer action area. Total forested habitat within the winter action area is 6,210 acres (2,513 hectares) or 12.4% of the landscape. The construction of the Fort Drum Connector Route would impact approximately 15 acres (6 hectares) or 0.24% of the forested habitat in the winter action area. While the loss of 0.24 or 0.65% of potentially suitable forest may appear low, this is a highly fragmented landscape already and impacts to important forest patches is likely to result in impacts to Indiana bats.

We focus our analysis around known roost trees and available foraging habitat. Forest cover varies widely at the scale of individual maternity sites in some states (i.e., Indiana); where



landcover within 2.5 miles of the primary roosts of known maternity colonies ranges from 9% to over 80% forested (Service 2007a). The removal of forested habitats within the 2.5-mile radius of roost trees GC-1 and GC-2, and capture sites MS-1 and MS-3, where forested habitats range between 10.5 and 10.8%, will result in reductions of 2.1% to 2.2% in forested habitats, respectively. These forested habitat losses at Indiana bat roost sites may adversely affect local bats since they are within the lower limits (9-80%) of occupied forested habitats reported throughout the species' range. The distances traveled by bats between primary roost trees and foraging habitats at the Highland Meadows Golf Course from the Bonny Road roost tree (BR-1), Perch Lake roost tree (PL-1), and roost trees at Fort Drum (FD-1, 2, and 3) likely indicates the lack of foraging habitats near these trees or the lack of suitable roosting habitat near locally present high quality foraging habitats.

While Indiana bats using the affected forest patches for foraging will have alternative foraging habitat available within the action area, they will likely have to shift or expand their foraging ranges into areas previously unused by them to make up for the loss of foraging habitat. The impact of shifting flight patterns and foraging areas on individual bats will vary. Recovery from the stress of hibernation and migration may be slower as a result of the added energy demands of searching for new foraging habitat especially in an already fragmented landscape such as this one where forested habitat is limited. Pregnant females displaced from preferred foraging areas will have to expend additional energy to search for alternative foraging habitat; which would likely result in reduced reproductive success (failure to carry to full term or failure to raise pup through first summer) for some females. Females that do give birth may have pups with lower birth weights given the increased energy demands associated with longer flights, or their pups may experience delayed development. These longer flights would also be experienced by pups once they become volant which could affect the survival of these pups as they enter hibernation with potentially reduced fat reserves. Indiana bats may also experience higher rates of predation or competition when searching for new foraging areas. Overall, the effect of the loss of foraging habitat on individual bats from the maternity colonies in the action area is anticipated to range from no effect to death. The effect on the colonies would then be reduced reproduction and loss of a small portion of the colony. These effects are anticipated to be relatively short-lived as Indiana bats are anticipated to acclimate to the altered landscape.

As discussed in the **Conservation Measures** section, the FHWA is permanently protecting 56 acres of forest habitat within the action area and replanting 4,200 linear feet of hedgerows to connect forest patches and remaining hedgerows along the project corridor. While permanent protection of existing forest will not offset the loss of 36 acres of forest and degradation of the three forest patches (~102 acres) bisected by the road, it will prevent the loss of those particular patches and maintain roosting/foraging sites for Indiana bats in the action area. Given the intense development pressure around Routes 342 and 11 from the expansion of Fort Drum, we believe that permanent protection of existing forest is essential to maintain Indiana bats on the landscape.

#### Loss of Roosting Habitat

As stated above, 36 acres of forest and 4,181 linear feet (1,274 m) of hedgerows (short segments that cross the right-of-way) will be permanently lost as a result of the proposed project.

However, 4,200 linear feet of hedgerows will be planted parallel to the road connecting the bisected hedgerows. While no known roost trees will be lost as a result of the project, one female Indiana bat was documented roosting in two trees in the Golf Course patch and one female was documented roosting in the Anable forest patch. It is important to recognize that our knowledge of roosting activities in the action area is based on few studies with limited duration; additional potential roost trees likely occur within each of the forest patches. There is no information to confirm or reject whether Indiana bats are currently using the I-81 forest patch for roosting, but of all the patches in the action area, this appears to be least likely to be used given its proximity to I-81. However, the loss of forest in this area may still be considered as loss of actual or potential roosting habitat. This will reduce the number of suitable roosts within the colonies' current summer range. However, based on existing information, the major roosting areas, including all known primary roosts, will not be directly impacted by the proposed project. The major effect to roosting habitat is expected to be the loss of potential future roost sites, rather than immediate effects of loss of roosting habitat. Measures to minimize impacts to Indiana bats as discussed above are intended to provide permanent protection of both roosting and foraging habitat. The FHWA is also constructing artificial roost structures, which may provide roost sites for little brown bats or perhaps Indiana bats. While the Service does not view the use of artificial roost structures as adequate to address losses of natural roosting habitat, however, they may provide an outreach opportunity for the public and potential short term roosting sites for bats.

#### Loss of Travel Corridors

The bat use of hedgerows and tree-lined fence rows by bats within the project corridor is unknown. Data collected from the nearby Eagle Ridge residential development did show some use of these linear features (i.e., hedgerows and tree-lined fence rows) by Indiana bats (Environmental Solutions and Innovations, Inc. 2006). Construction of the Fort Drum Connector Route will bisect seven tree-lined fence rows, resulting in gaps about 333 feet (100 m) wide. A total of 4,181 linear feet (1,274 m) of hedgerow, 662 feet (202 m) and 875 feet (277 m) of intermittent stream, and 56 feet (17 m) to 46 feet (46 m) of perennial streams within the Philomel, Lowell, and West Creek drainages will be impacted by the proposed project.

These linear features may provide travel corridors for Indiana bats within the project area; however, most of the streams flow through non-forested habitats which are less likely to be used as travel corridors. The impacted hedgerows are primarily located in the western half of the project; three of these are connected by scrub-shrub to the Golf Course forest, which contains two of the alternate roost trees, GC-1 and GC-2. An impacted hedgerow between SR-11 and Anable Avenue forest is near alternate roost tree (A-1) and possibly connects the forest with some scrub-shrub. As a result of loss of forest and hedgerows, Indiana bats may alter current flight paths between roosting and foraging habitat which may increase their overall flights or they may fly over the new road and continue to use previous foraging areas.

A study in Michigan found Indiana bats increasing their commuting distance by 55% to follow tree-lined paths, rather than flying over large agricultural fields (Murray and Kurta 2004). However, the open habitat crossed along those tree-lined corridors was at least 0.6 mile (1 km) wide. It is unclear whether construction of the Fort Drum Connector Route through hedgerows and tree-lined fence rows will create a barrier to the Indiana bat. Roads create barriers for many

animals, but such barriers are dependent upon the size and type of roads. There are numerous examples where Indiana bats, both reproductive females and bachelor males, have crossed open habitats, including other four-lane roads during nightly traveling and foraging activities.

Even though some data exists, biologists still do not fully understand how large an open area must be before Indiana bats hesitate or refuse to cross, but the distance seems to be greater than the width of an interstate highway. However, design features and conservation measures incorporated into the project are likely to aid bats crossing the new road (see **Conservation Measures** section). These features include reducing the width of the right-of-way in the three forested areas and leaving trees in the median at the Golf Course and in the middle of the loop at I-81 interchange. By reducing the width of the right-of-way and leaving trees in the median, Indiana bats can fly above moving vehicles by moving from tree crown to tree crown to cross the new road at the Golf Course. The new roadway elevation in the Golf Course forest will only be a maximum of 3.9 feet (1.2 m) above the existing ground. Assuming the average height of trees in the affected forest areas is equal to or greater than the average height (59 feet [18 m]) of roost trees found during this survey, and that vehicles traveling on the Fort Drum Connector Route are 18 feet (5.5 m) or less in height, flying bats will have a minimum of a 37-foot area to fly between vehicles and the top of the canopy. Additionally, the new road at the Anable Avenue forest will have an elevation that ranges from 5.2 feet (1.6 m) above the existing ground to 7.9 feet (2.4 m) below the existing ground because of a required road-cut. This design will also allow bats to fly above moving vehicles. However, the final elevation of the road in the I-81 forest is much higher than previously mentioned areas. Because of the ramp required to transition from I-81 to the Fort Drum Connector Route, the final road elevation ranges from 6.6 feet (2 m) to 19 feet (6 m) above the existing ground. This provides only about 18 feet height of canopy space for bats to move from tree canopy to tree canopy across the road and above traffic. However, bat movement may occur along the edge of fill at this interchange and no Indiana bat activity has been documented in that forest patch to date. In addition to minimizing the right-of-way, as discussed above, the FHWA is replanting 4,200 linear feet of trees along the right-of-way to connect hedgerows bisected by the road and forest patches.

#### Effects on Fall Swarming Habitat

The potential effects to fall swarming habitat are the same as those discussed above. Small amounts of actual and/or potential roost trees, foraging habitat, and sections of travel corridors will be lost. Indiana bats will be using the summer and winter action areas described above during fall swarming activities.

#### Effects on Wintering Bats

The project will result in no direct physical impacts to the Glen Park Cave. In addition, given the distance of the project to the cave, no indirect impacts to the cave from project construction, operation, or maintenance are likely. No impacts to wintering bats are anticipated from noise or vibration.

## Effects on Habitat Quality

In addition to habitat loss, proposed actions may result in a decrease in the quality of remaining habitat in the action area. Factors that may lead to reduced habitat quality include habitat fragmentation, increased human disturbance (*e.g.*, noise, lighting, dust), and water quality impacts.

### *Construction Noise*

Increased noise created by construction equipment within the project area could disturb bats day roosting in nearby forests during spring, summer, and autumn. This potential disturbance would be short-term, lasting approximately two years, and noise would not be generated throughout the entirety of the project area during construction. 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 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 farther away or may temporarily abandon these roosting areas completely. However, the alteration of the forest patches through tree-clearing during the prior winter may alter roosting behaviors prior to spring and summer construction activities. Gardner et al. (1991) suggested that noise and exhaust emissions from machinery could possibly disturb colonies of roosting bats, but such disturbances would have to be severe to cause roost abandonment. Callahan (1993) noted that the likely cause of the bats in his study area abandoning a primary roost tree was disturbance from a bulldozer clearing brush adjacent to the tree. No auditory data and/or the effects from noise are available for the Indiana bat. However, a similar species, the little brown bat, is sensitive to sound between 10 kilohertz (kHz) and 130 kHz, with greatest hearing sensitivity between 35 and 40 kHz (Grinnell 1963). Based on analysis in Montgomery Watson and 3D/I (1998), operation of heavy equipment (bulldozers and earthmovers) at Fort Leonard Wood, Missouri, generated sound frequencies between 25 and 20,000 Hz with peak frequencies less than 125 Hz. For the purpose of the Fort Drum Connector Route, we assume that construction equipment used will generate sound in a similar frequency range. While bats may hear sounds generated by construction equipment and vehicles at the Fort Drum Connector Route, peak sound energy from vehicles is likely to be well below frequencies audible to bats.

There are many examples of Indiana bats tolerating noise. During studies for this project, a primary Indiana bat roost tree containing as many as 45 bats on July 16, 2007, was found along I-81. This maternity colony was apparently not affected by noise created by vehicles traveling north and south on I-81. According to forecasted traffic volumes, the average annual daily traffic on the Fort Drum Connector Route will be about 9,240 vehicles. This is about half the current number of vehicles driving by the primary roost tree along I-81, which is apparently not affected by the noise. In addition, during spring emergence studies, we have documented roost

trees 195 and 207 meters of I-81, 113 meters of I-481, and 65 meters of I-84. However, bats roosting in these situations may have become habituated to the noise. In addition, female bats in Illinois used roosts at least 1640 ft (500 m) from paved roadways (Garner and Gardner 1992), suggesting potential avoidance. Overall, it is reasonable to assume that some Indiana bats may be temporarily disturbed by noise and vibration of construction activities within or directly adjacent to previous roosting habitat and that combined with the loss of forest habitat, we would anticipate a shift in roosting behavior away from the project corridor.

### *Construction Dust*

The creation of airborne dust by construction equipment is likely to occur in all earth moving projects, the magnitude is dependent on many factors, including humidity, wind velocities and direction, and location of soil disturbances. Dust will be created during the spring, summer, and autumn when Indiana bats are roosting in adjacent forested habitats and possibly foraging throughout the project corridor. Any potential effects from dust would be very local within and immediately adjacent to the corridor. The implementation of dust control strategies and presence of adjacent vegetation will eliminate or greatly reduce the settling distance. It is very unlikely that dust created from construction would drift underneath the bark where an Indiana bat is roosting.

Dust is known to coat adjacent vegetation, thus possibly reducing insect production locally along a narrow band; this may result in decreased foraging opportunities adjacent to the road. Data are not available for the effect of dust on bats. However, contractors will implement dust control strategies (i.e., watering down disturbed soil) during construction activities as described in the **Conservation Measures** section.

### *Construction Lighting*

Night lighting is not anticipated for the project, as night construction is unnecessary.

### *Water Quality During Construction*

Temporary effects on water quality could occur during construction, which could reduce local insect populations. Insects associated with aquatic habitats make up part of the diet of Indiana bats; therefore, impacts to water quality may result in temporary, short-term indirect effects on foraging Indiana bats during spring, summer, and autumn. Construction would start by removing trees during the November 15-March 31 period to prevent direct affects to the Indiana bat. It is also possible that grubbing of scrub-shrub in non-forested habitats would occur prior to or during this period, but could occur throughout the year. Both grubbing and construction may cause erosion; however, Best Management Practices incorporated into the SWPPP will minimize erosion and subsequent sedimentation, thus reducing potential impacts on aquatic ecosystems (See **Conservation Measures** section).

Temporary measures will be incorporated into the project to protect water quality during construction. However, it is still possible to have periods where erosion and sedimentation may cause short-term declines in aquatic insect populations in adjacent wetlands, ponds, and Lowell,

Philomel, and West Creeks. Since potential impacts from sedimentation are expected to be localized and remain within the project area, foraging Indiana bats will be able to relocate upstream or downstream to forage. The frequency of foraging activities within these habitats is unknown and suspected to be minimal due to the absence of protective tree cover in adjacent open fields and marshes.

Construction of the Fort Drum Connector Route would also impact 12 wetlands resulting in a total of 4.70 acres (1.90 hectares) of wetland loss, of which 1.57 acres (0.64 hectare) consists of emergent marsh, 2.04 acres (0.82 hectare) of scrub-shrub swamp, and 1.10 acres (0.44 hectare) of forested wetland. All of these aquatic systems may contribute to the local insect communities which may be consumed by Indiana bats, but most of them appear to provide only open canopy foraging opportunities. Forested wetlands may also provide potential spring, summer, and autumn roosting and foraging habitat. Avoidance and minimization during project design has reduced the impacts to most of these wetlands.

In addition, numerous other wetlands adjacent to the corridor were avoided. If Indiana bats forage within these wetland communities, it could result in short-term indirect effects on foraging behaviors. However, the Indiana bat is considered a selective, opportunistic forager and should be able to locate additional aquatic and/or terrestrial insects nearby since numerous wetlands will remain. Additionally, the loss of all wetlands impacted by the project will be compensated, resulting in about 7.54 acres (3.05 hectare) of wetland creation and/or restoration. The wetland compensatory mitigation area will provide permanently protected wetlands for bat use within both the winter and summer action areas.

The Service believes that water quality impacts will cause a reduction in prey base and drinking resources for the Indiana bat. However, we presume that the surrounding landscape will continue to provide an abundant prey base of both terrestrial and aquatic insects during project construction, operation, and maintenance. Therefore, any potential direct effects to Indiana bats from a reduction in water quality are anticipated to be insignificant.

#### *Summary of Construction Impacts*

In summary, when considering the combination of all potential construction impacts (noise, dust, lighting, changes to water quality), temporary (during construction activities) reductions in foraging or roosting opportunities for Indiana bats may occur along the project corridor. Indiana bats may change roosting and/or foraging areas and seek roosts and foraging habitats that are farther away from the active disturbance area. However, there are observations of Indiana bat tolerance to disturbance in the literature and we cannot definitively say that Indiana bats will shift or abandon their roosts/foraging areas as a result of the proposed construction actions.

#### *Road Operation and Maintenance Noise and Lighting*

Noise impacts are anticipated to be greatest during construction (discussed above). We anticipate Indiana bats to acclimate to noise associated with operation and maintenance activities. In addition, noise walls at a few select locations (e.g., Anable Avenue) will likely be

installed to reduce noise impacts to human residences. This will also serve to buffer noises to any bats using forest patches in the vicinity.

The Fort Drum Connector will not be lit except at the Route 11 interchange. This area already has residential and commercial development, therefore, any impacts from lighting are anticipated to be insignificant.

#### *Road Operation and Maintenance Water Quality Impacts*

Accidents during project operation could result in the leakage of hazardous chemicals into the environment which could affect water quality resulting in reduced densities of aquatic insects that bats consume. The road will improve access between I-81 and Fort Drum by removing curves and congestion which typically are factors in accidents. If an accident occurred and hazardous chemicals leaked into the environment, a rapid response from NYSDEC would limit the size of the spill area. However, if chemicals did reach surface waters (streams and wetlands), a short-term reduction in both aquatic and terrestrial insects could occur, thus reducing the spring, summer, or autumn prey base for foraging Indiana bats. If this occurred, it would be localized, thus allowing foraging Indiana bats to move nearby and continue foraging. Since the road will be safer, a reduction in overall accidents should be less, and the likelihood of an accident involving chemicals greatly reduced. The effects of a possible accident involving leakage of hazardous chemical are unlikely to occur.

These activities include such actions as pavement and shoulder maintenance, ditch and culvert cleaning, pavement marking, and guide rail maintenance. These activities are restricted to the maintained right-of-way and as a group are more likely to occur during the spring, summer, and autumn when the Indiana bat is roosting and foraging in adjacent habitats. Potential effects on the Indiana bat from these activities would be restricted to noise, dust, and water quality. Noise and dust impacts are discussed above. Erosion and sedimentation created from these maintenance activities would be localized and normally maintained by various control measures to reduce impacts on surface waters. However, some activities such as ditch and culvert cleaning could result in some sedimentation in surface waters, which could indirectly affect foraging and watering behavior of the Indiana bat. Indiana bats have been captured drinking water from muddy, water-filled road-rut ponds in eastern Kentucky and southeastern Ohio (J. Kiser, unpublished data); thus, muddy streams are not likely to have an effect on bats consuming water. Although sedimentation from routine highway maintenance is not expected to reach levels to affect aquatic insects, it is possible that some pollution intolerant species could be temporarily eliminated from surface waters. If this occurs and they are species that Indiana bats consume as prey, then it could result in a short-term indirect effect on foraging behavior. However, the Indiana bat is considered a selective opportunistic forager and thus would be able to locate additional aquatic and/or terrestrial insects nearby.

Snow and ice control operations will be conducted in accordance with current NYSDOT Snow and Ice Control Guidelines. Activities associated with snow and ice control include plowing snow and ice from the road and applying both salt and liquid solutions to provide for safe driving conditions. The plowing of snow and ice from the road is restricted to the pavement and adjacent shoulders. Since this activity will occur during cold, snowy weather conditions

primarily during winter, it will have no effect on the Indiana bat. The Indiana bat will be hibernating during this period and will not be active.

Once the snow and ice melts, the deicing agents would be carried from the roadway and shoulders by surface water. While some of this diluted salt and liquid solution will be filtered from surface water by vegetated shoulders and swales, some will settle out in surface water areas, especially wetlands. This could occur in any of the adjacent wetlands, ponds, or streams, including Lowell, Philomel, and West Creeks. NYSDOT will only use the required amount of deicing agents to provide safe road conditions and will pre-treat roads before snowfall events occur. This proactive treatment will result in smaller amounts of deicing agents used. Deicing agents have been documented as having short-term effects on aquatic macroinvertebrates depending on dilution rates. Long-term impacts to herbaceous roadside vegetation are possible. Greater impacts from deicing agents would be expected on isolated wetlands because of less dilution opportunities. Even though application of deicing agents will occur during the winter, potential indirect effects to Indiana bats, if they occur, would be during the spring and summer foraging periods. Deicing agents are not expected to reach levels to affect most aquatic insects, but it is possible that some pollution intolerant species could be temporarily eliminated from the affected surface waters. If this occurs and they are species that Indiana bats consume as prey, then it could result in a short-term indirect effect on foraging behavior. However, the Indiana bat is considered a selective opportunistic forager and thus would be able to locate additional aquatic and/or terrestrial insects nearby.

#### *Road Operation and Maintenance Vegetation Control*

The NYSDOT uses mowing, brush and tree removal, and herbicides. Mowing will be restricted to the clear zone and will occur two-three times during the year. This activity will occur along the entire length of the Fort Drum Connector Route during the spring, summer, and autumn. Mowing will be the primary method used for managing vegetation within the Fort Drum Connector Route corridor. Mowing would primarily be completed during the day when Indiana bats are roosting in adjacent trees. However, it could also be completed during the night when Indiana bats are foraging or traveling between foraging and roosting areas. Potential effects from mowing on Indiana bats include noise and dust. Noise created by mowing could affect roosting bats in adjacent forests but, as discussed above, several colonies of bats have been found near mowed right-of-ways of major roads and appear to not be affected by noise created by mowing and traffic. In addition, noise created by mowing would be experienced by roosting or foraging bats for a very short duration, because mowers would pass quickly by any area having bats. Dust created by mowing would also be present in areas occupied by Indiana bats for a very short duration.

In addition to mowing, brush and tree removal would occur when needed to maintain safe conditions, but is expected to occur infrequently along the Fort Drum Connector Route due to the wider right-of-way. This could occur anytime during the year when NYSDOT deems it necessary to remove brush and/or trees from the right-of-way that pose a hazard to vehicular traffic using the road.



Herbicide may also be used to control broadleaf weeds throughout the right-of-way (clear zone) of the Fort Drum Connector Route. Treatment of broadleaf weeds will result in a reduction in the amount and frequency of mowing activities. In addition, herbicides will also be used to control vegetation in site-specific areas, such as around sign posts, guide rails, etc., and to treat invasive species that may eventually occur throughout the right-of-way. Treatments would typically occur in spring or early summer. Herbicide application would only be applied once during the year either by hand or from a truck-mounted boom sprayer having spray heads designed to minimize drift. Application would occur during the day when Indiana bats are roosting under sloughing bark of trees adjacent to the maintained right-of-way. Since herbicide will be applied to vegetation growing at heights much lower than typical bark roosts for Indiana bats, no overspray is expected to reach locations where bats may be roosting.

It is possible that some non-water safe herbicide could accidentally get into surface waters, which may affect bat's drinking water and/or cause bats to ingest chemicals through drinking or through bioaccumulation from eating affected insects. However, this is very unlikely due to the minimal amounts of herbicide (one treatment/year) proposed by NYSDOT to remove unwanted vegetation from right-of-ways, especially from around all highway structures within the maintained right-of-way. In addition, all herbicides will be used in accordance to their label instructions. Effects from herbicide exposure or indirect effects to insects (prey) consumed by the Indiana bat are insignificant and discountable, very unlikely to occur, or can not be detected or measured. Vegetation control may affect, but is not likely to adversely affect the Indiana bat.

#### *Roadway-induced Mortality*

Indiana bats will be subject to the hazard of being struck by vehicles along the route. As stated above, Indiana bats are known to cross major highways during migratory flights in the spring and fall. Occasional observations of highway crossings during commuting between roosting and foraging have also been observed (e.g., studies associated with this project). In Pennsylvania, Indiana bats have been documented crossing U.S. Route 22 near the Canoe Creek Church (Pennsylvania Game Commission 2003). Route 22 is directly in the path between known maternity roosting and foraging habitat, therefore, Indiana bats cross this road on a daily basis. On 19 days between May and August 2002, the Pennsylvania Game Commission observed 12 dead bats (no Indiana bats) along a 4.3 km stretch of Route 22.

If Indiana bats cross the Fort Drum Connector during foraging bouts or commuting between roosting and foraging habitat, they are at risk of vehicle collision. As discussed above, we have no foraging data for Indiana bats captured during the project; however, it is likely that the Golf Course and Anable forest patches are currently used as foraging habitat. We also assume that the I-81 forest patch provides foraging habitat for Indiana bats. Alternative to the Canoe Creek situation, we do not have evidence to suggest that Indiana bats would be likely to cross the proposed road during daily foraging bouts. Two of the maternity colonies roost north of the proposed road and include the Golf Course and I-81 (potentially) forest patches as part of their foraging range, however, foraging data collected from the Horse Creek Wind project for one of the colonies (Perch Lake WMA South) showed most activity near Perch Lake WMA which is to the west of the proposed road. Indiana bats from another colony (Fort Drum) primarily roosted to the south and east of the proposed road. Environmental Solutions and Innovations, Inc.

(2008a) documented three Indiana bats from Fort Drum foraging on both sides of the proposed road near the Anable forest patch. However, the majority of the foraging points were to the east of the road on the Fort Drum Installation and along West Creek. In summary, while no foraging data was collected on the five Indiana bats captured during studies associated with this project, there are other foraging points to consider when evaluating the potential home ranges and habitat-use in the action area.

Indiana bats may use alternate routes between roosting and foraging habitats or shift their home ranges to avoid crossing the corridor. Sparks (pers. comm.) observed <0.5 Indiana bat crossings/night of two-lane highways with shoulders and multi-lane divided highways compared to crossings of jeep trails at 6-7 times/night. The use of plantings to connect hedgerows and forest patches should provide alternative foraging and commuting corridor options for Indiana bats in certain areas which is anticipated to reduce the likelihood of future crossings of the road and, therefore, reduce the likelihood of mortality.

#### *Summary of Operations and Maintenance Impacts*

In summary, when considering the combination of all potential operations and maintenance impacts, temporary reductions in foraging or roosting opportunities for Indiana bats may occur along the project corridor during or immediately after certain activities. Indiana bats are likely to change roosting and/or foraging areas and seek roosts and foraging habitats that are farther away from the active disturbance area. In addition, limited mortality due to road collisions may be expected.

### **CUMULATIVE EFFECTS**

Cumulative effects include the combined effects of any future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation under Section 7 of the ESA.

Construction of the Fort Drum Connector is not anticipated to result in increased residential or commercial development along the route. The Fort Drum Connector will have controlled access with no on- or off-ramps except at I-81 and Route 11; therefore, no development pressure is expected along the corridor except at those locations. In addition, increased development is already occurring in the action area as a result of expansions at the Fort Drum Military Installation and would be expected to continue with or without the proposed road.

As stated in the **Environmental Baseline** section, hunting and other outdoor recreation, agriculture, timber harvest, residential and commercial development associated with expansions at the Fort Drum Military Installation, and soldier training and other activities on Fort Drum are reasonably certain to occur within the action area. Many of these are private actions, but many involve Corps permits for impacts to waters of the United States or are activities conducted on Fort Drum and authorized by the Department of Army. The Service is unaware of any quantifiable information relating to the extent of private timber harvests within the action area. The Service is engaged with the Town of LeRay in developing a Town master plan and is

actively involved with reviewing most, if not all, development projects within the Town (regardless of Federal involvement). We are working with the Town and developers to conserve and connect suitable Indiana bat habitat whenever possible and hope to work with other towns in the area in a similar fashion.

## **CONCLUSION**

After reviewing the current status of the Indiana bat, the environmental baseline for the action area, the effects of the proposed construction, maintenance, and use of the Fort Drum Connector Route, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Indiana bat. Critical habitat for the Indiana bat has been designated at a number of locations throughout its range; however, this action does not affect any of those designated critical habitat areas and no destruction or adverse modification of that critical habitat is expected.

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

The species' resiliency to some level of natural and anthropogenic disturbances has been demonstrated (See Previous Incidental Take Authorizations). 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 Northeast regional population (proposed Northeast Recovery Unit) or 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. When considering that the status of the species has not significantly changed, that the environmental baseline has not been greatly reduced, even with the presence of WNS at Glen Park, and the intensity, frequency, and duration of the project impacts, the proposed project is unlikely to greatly decrease the reproduction, numbers, or distribution of the Indiana bat.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the ESA and Federal regulations under Section 4(d) of the ESA prohibit the taking 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 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 such as breeding, feeding, or sheltering. Harass is defined by the 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 that 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 under the ESA, 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 so that they become binding conditions of any funding, permits, and/or approvals, as appropriate, issued to NYSDOT 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 1) fails to require NYSDOT to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, authorization, or funding document; and/or 2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA or NYSDOT 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)].

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

The Service anticipates incidental take of the Indiana bat will be difficult to detect for the following reasons:

1. The individuals are small and occupy summer habitats where they are difficult to find;
2. Indiana bats form small (i.e., 25-100 individuals), widely dispersed maternity colonies under loose bark or in the cavities of trees, and males and non-reproductive females may roost individually which makes finding the species or occupied habitats difficult;
3. Finding dead or injured specimens during or following project implementation is unlikely;
4. The extent and density of the species within its summer habitat in the action area is unknown; and
5. Most incidental take will be non-lethal and undetectable.

Because of the difficulty in determining a level of take based on the number of Indiana bats that will be adversely affected, the Service has decided that it is appropriate to base the level of authorized incidental take on the known presence of Indiana bats in the vicinity and habitat acreage that will be affected by the proposed project, in addition to the long-term potential mortality associated with operation of the road.

We anticipate harm of a small percentage of Indiana bats known to winter in the Glen Park Cave and who travel, roost, forage, and swarm within the action area and a small percentage of Indiana bats associated with three maternity colonies that are traveling, roosting, and foraging within the

action area as a result of the removal of 36 acres of forest and 4,181 linear feet (1,274 m) of hedgerows, and the degradation of remaining forest patches (~102 acres) directly along the project corridor. “Harm,” as defined within the definition of “take” in the Act, means an act that actually kills or injures wildlife. Such acts may include significant habitat loss and/or alteration where the act actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. This impact is anticipated in the first spring/summer after tree removal has occurred and foraging patterns/range may be shifted. Alternative foraging areas are available in the action area and likely used (little foraging data are available) and limited impacts are anticipated in subsequent years. In addition, after several years, plantings (described in **Conservation Measures** section) will provide additional commuting corridors and foraging opportunities for Indiana bats.

In addition, we anticipate mortality of a small number (<10) of Indiana bats throughout the life of road operation.

### **EFFECT OF THE TAKE**

In the accompanying BO, the Service determined that this level of anticipated take is not likely to result in jeopardy to the Indiana bat or destruction or adverse modification of critical habitat.

### **REASONABLE AND PRUDENT MEASURES**

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize impacts of incidental take of the Indiana bat:

1. The FHWA will ensure that the described proposed project components, including all conservation measures, will occur as planned and documented in the BA.
2. For conservation measures without sufficient details in the BA, the FHWA will conduct all activities in a fashion designed to accomplish intended conservation benefits (e.g., as per discussion on April 4, 2008).
3. The FHWA must monitor its activities associated with the proposed project to determine if the Terms and Conditions of this biological opinion are being implemented adequately in order to ensure that take is minimized and provide an annual report of those activities to the Service.

### **TERMS AND CONDITIONS**

In order to be exempt from the prohibitions of Section 9 of the ESA, the FHWA (and Corps where denoted) must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The FHWA shall ensure that the location and extent of the proposed road alignment and associated “waste areas” are accomplished according to the plans reviewed under this

biological opinion to minimize the amount of forest impacts. Project plans will depict the extent of forest impact within the project corridor. Project excavation waste will be placed within the corridor, in highway embankment/fill areas. Tree removals will be disposed of separately. This Term and Condition is associated with Reasonable and Prudent Measure 1.

2. The FHWA shall ensure that no wetland impacts will occur in borrow areas. In addition, FHWA shall ensure that contractors do not disturb hedgerows or intact forest. Any scattered trees larger than 5 inches d.b.h. will be cut in the winter. These assurances will be done through standard spec #107-08 in contracts and as special notes in project plans. This Term and Condition is associated with Reasonable and Prudent Measure 2.
3. The FHWA shall permanently protect 21 acres of forest within the right-of-way and a minimum of 35 acres of forest off the right-of-way, as shown on the Preservation Plan. These areas may be transferred (fee title or conservation easement) to an appropriate conservation entity (to be agreed upon by the FHWA and Service in consultation with the Corps) at a future date. This Term and Condition is associated with Reasonable and Prudent Measure 2.
4. The FHWA shall plant 4,200 linear feet of trees to form new hedgerows. The FHWA shall permanently protect these hedgerows, and plantings shall be part of special note in project plans. The final hedgerow locations shall be agreed to by the Service prior to the start of any ground disturbance activities associated with the project. This Term and Condition is associated with Reasonable and Prudent Measure 2.
5. The Service, FHWA, Corps, NYSDOT, NYSDEC, and their representatives shall have access to conservation lands (protected and planted areas) for future research and monitoring. This access will be granted through a Highway Work Permit and can be obtained through the Regional NYSDOT Maintenance office. The Regional Environmental Group should also be contacted. The Highway Work Permit will not be unreasonably denied. This Term and Condition is associated with Reasonable and Prudent Measures 2 and 3.
6. The FHWA shall ensure that all project personnel, including subcontractors, will be instructed about the terms of this opinion (standard spec #107-01 & 108-05 in contracts). This Term and Condition is associated with Reasonable and Prudent Measures 1-3.
7. The FHWA may request an extension, for the Service's consideration, to the time limitations in meeting the requirements outlined in all terms and conditions. An extension request shall be provided to the Service in writing within one year from the completion date of this biological opinion and clearly identify the additional timeframe needed. This Term and Condition is associated with Reasonable and Prudent Measures 1-3.
8. FHWA and Corps. Any dead bats located **in the action area** during construction, operations and maintenance, or monitoring activities, regardless of species, should be

immediately reported to the Service's New York Field Office at 607-753-9334, and subsequently transported on ice to that office. No one, with the exception of researchers contracted to conduct bat monitoring activities, should attempt to handle any live bat, regardless of its condition; report bats that appear to be sick or injured to NYFO and the NYSDEC. NYFO and/or NYSDEC will make a species determination on any dead or moribund bats. If an Indiana bat is identified, NYFO will contact the appropriate Service law enforcement office. In the extremely rare event that someone has been bitten by a bat, please keep the bat in a container and contact the Jefferson County Public Health Service at 315-786-3770.

In conclusion, the Service believes that no more than 36 acres of forest habitat that are currently suitable roosting and foraging habitat for Indiana bats, and 4,181 linear feet (1,274 m) of hedgerows that are currently suitable for summer foraging and travel corridors, will be permanently lost. An additional 102 acres of forest habitat may be temporarily or permanently less suitable for Indiana bat use. The Service believes that a small number of Indiana bats will be incidentally taken as a result of the proposed action. The take associated with construction is anticipated to occur over a total of 2 years, beginning in the first year of construction. The take associated with operation of the project will occur throughout the life of the project. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded (i.e., more than 36 acres of forest and 4,181 linear feet [1,274 m] of hedgerows are cleared, or clearing occurs during April 1 to November 15, or >10 dead Indiana bats are observed along the road), such incidental take represents new information requiring re-initiation 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 ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help carry out recovery plans, or to develop information.

The Service has identified the following actions that, if undertaken by NYSDOT and/or the FHWA, would further the conservation and assist in the recovery of the Indiana bat:

1. Provide funding for additional research, inventory, and monitoring work that is necessary to better understand the ecology of the Indiana bat.
2. Work with the Service to develop standard best management practices to address potential impacts to Indiana bats from transportation-related projects. We understand that the NYSDOT is currently exploring the development of conservation frameworks and programmatic consultations with the Service and encourage those efforts.

3. Pursue additional acquisition of parcels or easements to protect Indiana bat roosting, foraging, and commuting habitat. We understand that the NYSDOT is already inquiring about the potential purchase and preservation of an additional two sites totaling 100 acres along the corridor (dependent on willing sellers). These two sites would create larger contiguous preservation blocks to the acreage protected through conservation measures.

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

### **REINITIATION NOTICE**

This concludes formal consultation on the actions outlined in the information presented with the November 20, 2007, requests for initiation of formal consultation. As written 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 the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action 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. 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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## **APPENDICES**

## **APPENDIX A**

U.S. Fish and Wildlife Service. 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp. - *Provided electronically.*

## **APPENDIX B**

U.S. Fish and Wildlife Service. 2007. Biological Opinion on the Reconstruction of U.S. 119 from Partridge to Oven Fork in Letcher County, Kentucky, and its effects on the Indiana bat. Kentucky Field Office, Frankfort, KY. - *Provided electronically.*



**APPENDIX C.** Indiana bat biological opinions including amount and form of incidental take authorized.

<b>PROJECTS</b>	<b>SERVICE OFFICE AND DATE BO ISSUED</b>	<b>INCIDENTAL TAKE (IT) FORM</b>	<b>TAKE EXEMPTED or SURROGATE MEASURE TO MONITOR</b>
<a href="#">1996 Programmatic Biological Opinion for Surface Coal Mining Regulatory Programs Under the Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87)</a>	Washington DC October 1996	IT by harm, harassment, and killing of all current and future listed species	Unquantifiable
<a href="#">Cherokee National Forest LRMP:</a> Note: As a result of new information, this Forest is now operating under a “not likely to adversely affect” determination, and this BO is no longer in effect.	Tennessee FO January 1997	IT by killing, harming, or harassing	1,300 acres annually
<a href="#">Spillway Rehabilitation at Tippy Dam, MI</a>	East Lansing FO January 1997	IT by harming, harassing, or killing	3-65 individuals
Relocation of US Army Chemical School & US Military Police School to Fort Leonard Wood, Missouri	Missouri FO	IT by harming, harassing, or killing	56 hibernating bats from fog oil and TPA smoke pots; summer bats difficult to determine sub-lethal take
<a href="#">Daniel Boone National Forest LRMP:</a> Note: This BO has been superseded by a March 2004 BO.	Tennessee FO April 1997	IT by killing, harming, or harassing	4,500 acres annually
<a href="#">Ozark-St. Francis National Forest LRMP:</a>	Arkansas FO June 25, 1998	IT by killing, harming, or harassing	Annually 8,000 acres of timber harvest in hardwoods, 11,000 acres harvest of pine and pine/hardwoods; 30,000 acres of prescribed burning
<a href="#">Construction of New Training Facilities at Fort Knox, KY</a>	Tennessee FO October 1998	IT by killing, harming, or harassing	2,000 acres
<a href="#">Construction of a Qualification Training Range at Fort Knox, KY</a>	Tennessee FO October 1998	IT by killing, harming, or harassing	80 acres
<a href="#">Construction &amp; operation of the Multi-purpose training Range at the Camp Atterbury Army National Guard Training Site-Edinburgh Indiana</a> NOTE: Superseded by November 2000 Amendment	Indiana FO December 4, 1998	IT by harm through habitat loss and exposure to toxic agents	1 maternity colony (200 bats total) and 99.7 ha of forest
<a href="#">Disposition of Lands Acquired by the Tennessee Valley Authority for the Columbia Dam Project, Maury County, Tennessee</a>	Tennessee FO March 1999	No take provided	No take provided

<a href="#">Proposed stream bank stabilization at Yano Range and upgrade of the Wilcox Tank Range at Fort Knox, KY</a>	Tennessee FO April 1999	IT by loss of summer roosting, foraging, and maternity habitat	1800 acres; 2 maternity colonies
<a href="#">Agricultural Pesticide Application Practices at Newport Chemical Depot, Newport, IN</a>	Indiana FO April 13, 1999	IT by harm through exposure to pesticides	2 maternity colonies with 74 bats total
<a href="#">Ouachita National Forest LRMP</a> ; Note: As a result of new information, this Forest is now operating under a “not likely to adversely affect” determination and this BO is no longer in effect	Arkansas FO April 26, 1999	IT by killing, harming, or harassing	Annually up to: 40,000 acres commercial harvest; 3,000 acres wildlife management & road construction/reconstruction; 24,000 acres thinning; 200,000 acres prescribed burning
<a href="#">Mark Twain National Forest LRMP</a> ; NOTE: This BO has been superseded by the September 2005 BO	Missouri FO June 23, 1999	IT by killing, harming, or harassing	Timber harvest – 20,000 acres per year; Prescribed fire - 12,000 acres/yr; Wildlife habitat improvement -2000 acres/yr; Timber stand improvement – 4000 acres/yr; Soil & water improvement – 150 acres/yr; Range management – 50 acres/yr; Mineral exploration & development – 50 acres/yr; Wildfire fire lines – 50 acres/yr; Special use – 50 acres/yr; Road construction – 25 acres/yr
<a href="#">Impacts of Forest Management and Other Activities to the Bald Eagle, Indiana Bat, Clubshell, and Northern Riffleshell on the Allegheny National Forest, Pennsylvania</a> ; NOTE: As a result of new information, this Forest is now operating under a “not likely to adversely affect” determination, and this BO is no longer in effect.	Pennsylvania FO June 1999	IT by killing, harming, or harassing	Within a 5-year period (1999 to 2003), the disturbance of 45,594 acres
<a href="#">National Forests in Alabama</a> ; Note: As a result of new information, this Forest is now operating under a “not likely to adversely affect” determination and this BO is no longer in effect.	Alabama FO December 10, 1999	IT by killing, harming, or harassing	No more than 100 trees
<a href="#">Supplement for Proposed Bridges &amp; Alignments Modifications to Kentucky Lock Addition Project</a>	Tennessee FO January 2000	IT by killing, harming, or harassing	No more than 20% of available suitable habitat
<a href="#">Green Mountain National Forest LRMP</a> ; Note: As a result of new information, this Forest is now operating under a “not likely to adversely affect” determination and this BO is no longer in effect.	New England FO 2000	IT by harming or harassing	300 acres annually

<a href="#">White Mountain National Forest LRMP</a> ; Note: As a result of new information, this Forest is now operating under a “not likely to adversely affect” determination and this BO is no longer in effect.	New England FO 2000	IT by harming or harassing	1,500 acres
<a href="#">Nantahala and Pisgah National Forests LRMP Amendment #5</a>	Asheville (NC) FO 2000	IT by killing, harming, or harassing	4,574 acres per year
<a href="#">Daniel Boone National Forest LRMP and the Proposed Special Habitat Needs and Silviculture Amendment</a>	Tennessee FO May 2000	No take provided	No take provided
<a href="#">Hazard Tree Removal and Vegetation Management Program at Mammoth Cave National Park</a>	Tennessee FO June 2000	IT by loss of roosting habitat, direct mortality, or by forcing bats to abandon tree	No take provided
<a href="#">Salvage Harvest Necessitated by 1998 Storm Damage on the Daniel Boone National Forest</a>	Tennessee FO July 2000	IT by killing, harming, or harassing	3,100 acres
Revised: <a href="#">Construction &amp; operation of the Multi-purpose training Range at the Camp Atterbury Army National Guard Training Site – Edinburgh, Indiana</a>	Indiana FO November 2000	IT by harm through habitat loss and exposure to toxic agents	121 ha of forest
<a href="#">North East research Station – Fernow Experimental Forest – Five year plan</a> NOTE: Superseded by the December 2005 BO	West Virginia FO November 2000	IT by potential harm or mortality of roosting bats	210 acres timber harvest and 95 acres prescribed burn
<a href="#">Bankhead National Forest</a> ; Modification of 1999 BO for National Forests in Alabama	Alabama FO January 23, 2001	IT by killing, harming, or harassing	Level of take changed for southern pine beetle suppression areas – upper limit of 65 suitable roost trees
<a href="#">Hoosier National Forest LRMP</a> ; NOTE: This BO has been superseded by a January 2006 BO.	Indiana FO June 13, 2001	IT by harm	Pine clear cuts – 578 acres; Pine shelterwood cuts – 391 acres; Pine thinning – 408 acres; Hardwood group selection cuts – 777 acres; HW single tree selection cuts – 100 acres; HW even aged salvage cuts – 518 acres; Prescribed fire treatment – 7000 acres; Forest openings maintenance – 3311 acres; Timber stand improvement – 2264 acres; Special use permits – 286 acres; Wildfire management – 250 acres; Road construction – 16 acres; Hazard tree removal – 100 trees; Trail construction – 15 miles

<a href="#">Wayne National Forest LRMP</a> ; NOTE: BO has been superseded by a November 2005 BO.	Ohio FO September 20, 2001	IT by harm	Permanent loss of habitat – 2,504 acres; Habitat alteration – 8,102 acres plus 125 trees
<a href="#">Ozark-St. Francis National Forest Prescribed Fire Plan</a> (an amendment to June 1998 LRMP BO).	Arkansas FO March 21, 2002	IT by loss of roost trees and potential roost trees	Prescribed fire - 153,000 acres/yr
<a href="#">1986 (as amended) Monongahela National Forest Land and Resource Management Plan (Forest Plan)</a> ; NOTE: This BO has been superseded by a July 2006 BO.	West Virginia FO March 2002	IT by killing, harming, or harassing	A maximum of 6,125 acres annually and prescribed burning on a maximum of 300 acres annually.
<a href="#">BO for the Six Points Road interchange and Associated Development</a>	Indiana FO March 2002	IT by killing, harming, or harassing	139 ha of roosting and foraging habitat (includes 149 reproductive females & young; unquantifiable number of adult males and unproductive females)
<a href="#">Huron-Manistee National Forest LRMP</a> ; NOTE: This BO has been superseded by a March 2006 BO.	Michigan FO June 13, 2003	IT by killing, harming, or harassing	0-65 bats; 3,150 ac (1,275 ha) of potential Indiana bat habitat may be harvested and 2,648 ac (1,071 ha) of habitat may be burned for fire management or wildlife habitat management activities for the duration of this proposed action
<a href="#">Great Smoky Mountains National Park Prescribed Burning</a>	Tennessee FO August 12, 2003	IT by loss of suitable roosting or foraging habitat	One maternity colony
<a href="#">Big Monon Ditch Reconstruction Project</a>	Indiana FO August 5, 2003	IT by harming and harassing	Permanent loss of 75 acres of occupied summer habitat
<a href="#">Proposed Construction, Operation, and Maintenance of Alternative 3C of Interstate 69 from Indianapolis to Evansville</a> NOTE: This has been replaced by a 2006 revised BO	Indiana FO December 3, 2003	IT by harming, killing	Summer action area: permanent direct & indirect loss of up to 1527 acres of forested habitat and 40 acres of non-forested wetlands. Winter action area: permanent loss of up to 947 acres of forest habitat around 10 known hibernacula. Death by vehicle collisions: 10 Indiana bats per year.
<a href="#">2003 Revised Jefferson National Forest Land and Resource Management Plan, Virginia, West Virginia, Kentucky</a>	Virginia FO January 2004	IT by killing, harming, or harassing	16,800 acres total (15,000 fire; 1,800 other habitat manipulations) per year
<a href="#">Reinitiation: Wayne National Forest LRMP</a> NOTE: Superseded by November 2005 BO	Ohio FO March 8, 2004	IT by harm	Additional 11,892 acres of habitat alteration

<a href="#">2004 Daniel Boone National Forest Revised LRMP</a> NOTE: BO has been superseded by an April 2007 BO.	Kentucky FO March 20, 2004	IT by killing, harming, or harassing	Green tree harvest – 4000 acres; Salvage/sanitation – 350 acres; Prescribed burning during summer – 50,000 acres
<a href="#">Upper Mississippi River – Illinois Waterway System Navigation Feasibility Study</a>	Rock Island (IL) FO August 2004	IT by injury, death, harming, or harassing	511 acres of forested habitat annually for 50 years. Less than 20 bats per year.
<a href="#">Impacts of the Laxare East and Black Castle Contour Coal Mine Projects on the Indiana bat</a> NOTE: BO has been superseded by the 2006 revised BO	West Virginia FO February 2005	IT by killing, harm, and harassment	No more than 40 adult females & their pups; permanent loss of 2199 acres forested habitat; 917 acres of habitat fragmentation and degradation; 11.95 miles of stream loss
<a href="#">Department of the Army 88<sup>th</sup> Regional Readiness Command, US Army Reserve Center</a>	Ohio FO April 14, 2005	IT by harming or harassing	18 acres of high quality roosting and foraging habitat
<a href="#">Construction, Operation, and Maintenance of the U.S. 33 Nelsonville Bypass</a>	Ohio FO April 15, 2005	IT by harming, death, injury	No more than 10 Indiana bats
<a href="#">Mark Twain National Forest 2005 Forest Plan, Missouri</a> ; NOTE: Replaces June 1999 BO.	Missouri FO September 2005	IT through removal of roost trees	10 occupied roost trees , 19,400 acres and 240 miles of fire line over 10 years;
<a href="#">Construction .Operation, and Maintenance of the US 24 New Haven, Indiana to Defiance, OH Project</a>	Ohio FO September 30, 2005	IT by harming, harassing, and killing	Not to exceed 10 individuals
<a href="#">BO on the Interstate 69 (I-69) preferred alternative #2 from Henderson, Kentucky, to Evansville, Indiana, and its effects on the Indiana bat; Henderson County, Kentucky, and Vanderburgh County, Indiana</a>	Kentucky FO October 2005	IT through harm, harassment, and/or mortality	The level of take authorized is for those wooded areas of occupied and/or potentially occupied Indiana bat habitat within the construction limits of the proposed project that lie within the Indiana bat focus area identified in the BA, which was determined to be about 28 acres of wooded habitat and all of the potential Indiana bat roost trees contained within those 28 acres.
<a href="#">Wayne National Forest Land and Resource Management Plan</a> ; NOTE: Replaces September 20, 2001, BO.	Ohio FO November 2005	IT through removal of roost trees	No more than 4 occupied roost trees will be incidentally taken over the next ten years; Permanent Road Construction & Reconstruction - 392 acres; Temporary Road Construction -146 acres; Skid Trails and Log Landings - 740 acres; Utility Development - 50 acres; Fire Lines - 74 miles

<a href="#">Shawnee National Forest LRMP</a>	Illinois FO December 3, 2005	IT through harming, harassing, and killing	First 10 Years of plan: -- 11,565 acres of timber harvest/mgt. and minerals mgt. -- 5,630 acres of timber stand improvement and wetlands mgt. Second 10 Years of plan: 21,255 acres of timber harvest/mgt. and minerals mgt.; 13,289 acres of timber stand improvement and wetlands mgt. Mortality of up to 2 individuals during research and monitoring.
<a href="#">North East Research Station – Fernow Experimental Forest –</a> Five year plan; NOTE: Replaced November 2000 5-year BO.	West Virginia FO December 2005	IT by potential harm or mortality of roosting bats	124 acres timber harvest and 466 acres of prescribed burns (previous 210 acres timber harvest and 154 acres prescribed burn) over 5 years
<a href="#">Final Biological Opinion on implementation of the 2003 Ice Storm Recovery Project and its effects on the Indiana bat.</a> Morehead Ranger District, Daniel Boone National Forest, Rowan County, Kentucky	Kentucky FO December 2005	IT through harm, harassment, and/or mortality	The level of incidental take authorized is 4,704 acres of commercial removal of damaged trees and restoration and creation of bat habitat when accomplished during the summer roosting period of the Indiana bat (April 1 to September 15).
<a href="#">Hoosier National Forest LRMP:</a> NOTE: This BO replaced the June 2001 BO.	Indiana FO January 2006	IT by injury or death or harassing	No more than four (4) occupied roost trees/year and between four (4) and twelve (12) individuals injured or killed each year. 2956 acres; 60 hazard trees; 100 “accident” trees per year
<a href="#">Huron-Manistee National Forest LRMP</a> NOTE: Replaces 2003 BO	Michigan FO March 2006	IT through harming, harassing, and killing	For first 10 years of revised Forest Plan: Thinning = 59,497 Clearcut = 45,144 Shelterwood = 8,261 Selection = 0
<a href="#">Biological Opinion – Impacts of the Laxare East and Black Castle Contour Coal Mining Projects on the Indiana bat;</a> NOTE: Reinitiation of February 2005 BO.	West Virginia FO March 2006	IT in the form of harm due to habitat loss, degradation, and fragmentation; Harassment during active mining; Permanent loss of foraging loss and roosting habitat; Habitat fragmentation and degradation; Permanent loss of streams and their associated watering; Prey base for Indiana bats; long-term alteration of streams	No more than 17 adult females and their pups; 912 acres of forested habitat and 5.0 miles of stream

<a href="#">Allegheny National Forest, West Branch Tionesta Site</a>	Pennsylvania FO April 2006	IT through harming, harassing, and killing	574 acres of forested habitat loss or alteration from prescribed burning
<a href="#">Hoosier National Forest's Proposed Tell City Windthrow 2004 Salvage Timber Harvest</a>	Indiana FO April 2006	Death and injury from direct felling of occupied trees; Harassment of roosting bats from noises/vibrations/disturbance levels causing roost-site abandonment and atypical exposure to day time predators while fleeing and seeking new shelter during the day-time; and harm through the loss of primary and/or alternate roost trees	Project-wide Combined Total: 8,525 acres
<a href="#">Final Programmatic BO On Minor Road Construction Projects In Kentucky And Their Effects On The Indiana Bat</a>	Kentucky FO June 2006	IT through harming, harassment, mortality	The level of take authorized is for those wooded areas of Indiana bat habitat within the construction limits of a proposed project covered by Tier 2 during KYTC FY 2006 through KYTC FY 2010, which was determined to be 500 acres of Indiana bat habitat as described in the HAM in KYTC FY06, 600 acres in KYTC FY07, 720 acres in KYTC FY08, 864 acres in KYTC FY09, 1,037 acres in KYTC FY10.
<a href="#">Programmatic Biological Opinion for the Monongahela National Forest 2006 Forest Plan Revision</a>	West Virginia FO July 2006	IT through harming, harassment, and/or mortality	10,052 acres of suitable Indiana bat habitat annually
<a href="#">Revised BO on the Proposed Construction, Operation, and Maintenance of Alt. 3C of Interstate 69 from Evansville to Indianapolis</a>	Indiana FO August 2006	Death/kill and/or injury/wound from direct felling of occupied trees, direct collision with vehicles, and other sources.	2,148 acres of forested habitat and 20 acres of non-forested wetlands within summer action area; 1,097 acres of forested habitat within winter action area; 11 individuals per year from collision with vehicles
<a href="#">Programmatic BO for the Crab Orchard National Wildlife Refuge</a>	Illinois FO August 8, 2006	IT by harm, harass, and kill	Loss of no more than 15 occupied roost trees plus up to 2 individuals from research/monitoring
<a href="#">Meads Mill Project, Allegheny National Forest: USFWS Project #2006-1408</a>	Pennsylvania FO September 2006	IT through harm, harassment, and/or death	549 acres of forested habitat by prescribed fire



<a href="#">BO on the Ohio DOT's Statewide Transportation Program for the Indiana bat</a>	Ohio FO January 2007	IT through harm, harassment, and/or death	22,118 acres of suitable Indiana bat habitat over 5 years
<a href="#">2007 Daniel Boone National Forest Revised BO on implementation of the revised LRMP and its effects on the Indiana bat</a> NOTE: Replaced March 20, 2004, BO.	Kentucky FO April 2007	IT by killing, harming, or harassing	Annually: Green tree harvest – 4000 acres; Salvage/sanitation – 350 acres; Prescribed burning during summer – 50,000 acres
<a href="#">BO and ITS for Indiana bat (<i>Myotis sodalis</i>) at the Herrington Place Subdivision, Reminderville, Summit County, Ohio</a>	Ohio FO April 2007	IT through harm, harassment, and/or death	Permanent loss of 61.7 acres high quality roosting & foraging habitat and fragmentation of suitable habitat on the 125 acre site. Mortality of 1 adult male and 1 adult female
<a href="#">The Effects of the U.S. 6219, Section 019, Transportation Improvement Project</a> (Meyersdale, Somerset County, Pennsylvania, to I-68 in Garrett County, Maryland) on the Indiana bat	Pennsylvania FO October 2007	IT through harm and/or harassment	All Indiana bats dependent on 375 acres of potential foraging and roosting habitat and near blasting/construction
<a href="#">Final Biological Opinion on the Reconstruction of US 119 from Partridge to Oven Fork in Letcher County</a>	Kentucky FO November 2007	IT through harm, harass, and/or death	456 wooded acres of occupied and/or potentially occupied Indiana bat habitat within the construction limits of the proposed project
<a href="#">Biological Opinion On The USDA Forest Service Application Of Fire Retardants On National Forest System Lands</a>	Washington DC February 2008	No take provided	No take provided



**APPENDIX D. – June 25, 2008, letter from FHWA.**



U.S. Department  
of Transportation

**Federal Highway  
Administration**

**New York Division**

June 25, 2008

Leo W. O'Brien Federal Building, Suite 719  
Clinton Avenue & North Pearl Street  
Albany, NY 12207

In Reply Refer To:  
HPD-NY

Ms. Robyn Niver, Endangered Species Biologist  
U.S. Fish and Wildlife Service  
New York Field Office  
3817 Luker Road  
Cortland, NY 13045

Dear Ms. Niver:

As per the discussion during the June 19<sup>th</sup>, 2008 meeting regarding the Section 7 consultations for the Fort Drum Connector project (NYSDOT PIN 7804.26), the Federal Highway Administration (FHWA) and the New York State Department of Transportation (NYSDOT) agreed to complete mist-netting surveys (surveys) and monitoring of installed artificial roost structures (monitoring) in association with the project. FHWA and NYSDOT will accomplish the activities as part of FHWA's Section 7(a) 1 responsibilities under the Endangered Species Act to aid in the conservation of the Indiana Bat and as part of NYSDOT Environmental Initiative which seeks opportunities to cooperatively advance Federal, State and local environmental policies, programs and objectives as part of the Department's work. The US Fish and Wildlife Service (USFWS) during its review of the project evaluated the surveys and the monitoring and the conclusions of the USFWS Biological Opinion are based on the completion of the activities.

FHWA and NYSDOT will be required to complete the surveys and monitoring as an environmental commitment that will be provided in FHWA's Record of Decision for the project. FHWA and NYSDOT, in cooperation with the USFWS, will perform the work under a separate project agreement between FHWA and NYSDOT. The project agreement will identify federal and/or state funds that will be used to complete the work, as well as, the scope and timing of the work. The project agreement will include the post-construction mist-netting survey and the artificial roost structures monitoring. For logistical and timing purposes, FHWA and NYSDOT choose to complete the pre-construction survey under the project's existing PIN number. If deemed appropriate, FHWA, NYSDOT and the USFWS may invite other wildlife agencies or parties to participate in portions of the work or to collaborate efforts in expanding the scope of the work. FHWA and NYSDOT will participate in any such expanded work scope on a proportional basis and the terms will be described in a separate MOU.

FHWA and NYSDOT will complete mist-netting surveys and the artificial roost structures monitoring as described below.

### Mist-netting Surveys

The mist-netting surveys will be consistent with the size and scope of the surveys completed during the summer of 2007 in preparation of the Biological Assessment. The mist-netting will be conducted in forest patches within the Action Area where Indiana Bats were captured during the 2007 surveys. The mist-netting will be conducted following established protocol and by a qualified biologist. The surveys will be conducted at two different times. The first will occur one (1) year prior to the commencement of construction activities (estimated Summer 2009) and the second will occur three (3) years after final acceptance of the construction by NYSDOT and FHWA (estimated Summer 2014). The exact location of the mist-netting sites will be determined by the biologist conducting the surveys in consultation with the USFWS and NYSDOT.

The mist-netting surveys will include banding all captured Indiana Bats with a radio transmitter. Each banded Indiana bat will be tracked to its day roosts for a minimum of 1 week (or until the transmitter is lost or fails). FHWA and NYSDOT anticipate the tracking of up to 5 Indiana Bats. For each of the tracked bats the biologists will conduct a minimum of three (3) exit counts on the identified roost tree.

NYSDOT and FHWA will produce two (2) reports in connection with the mist-netting. The first report will be an interim report due one (1) year after the pre-construction surveys is completed. The interim report will detail the methodology and findings of the survey. The second report will be a final report due one (1) year after the post-construction survey. The final report will detail the methodology and findings of the post-construction survey and include a discussion relating the 2007 survey with the pre- and post- construction surveys. The discussion should attempt to draw conclusions regarding the impact of the Fort Drum Connector on Indiana Bat populations. Both reports will be submitted to the USFWS and other interested parties.

### Artificial Roost Structure monitoring

The FHWA and NYSDOT will monitor the use of artificial roost structures once a month between May 15<sup>th</sup> and August 15<sup>th</sup> in years one (1), three (3), and five (5) starting in the calendar year after the roosts initial installation. In cooperation with USFWS, NYSDOT may accomplish the monitoring using a third party under a separate MOU. Monitoring activities will follow accepted protocol provided by the USFWS. The monitoring will focus on the presence/absence of bats within the boxes. No species identification will be done due to the restrictions of non-qualified personnel handling endangered species. NYSODT anticipates using Regional staff to complete the work.

NYSDOT and FHWA will produce a report detailing the results of each years monitoring and submit it to the USFWS and other interested parties.

Prior to approving the PS&E package for the Fort Drum Connector, FHWA will ensure that the funding mechanism for the above describe work is approved and available for use. FHWA will retain full oversight of the surveys and monitoring to ensure that the work is accomplished. If during the survey and monitoring work FHWA determines that new information is identified which may increase the anticipate level of impacts to the Indiana Bat or if the level of *take* as described in the Biological Opinion is exceeded, FHWA will re-initiate formal consultation with the USFWS.

FHWA understands that the USFWS will revise the Biological Opinion to reflect the inclusion of the survey and monitoring work being completed as connected to, but separate from, the Fort Drum Connector Project. Furthermore, FHWA understands that the USFWS will revise the Terms and Conditions of the Incidental Take Statement to reflect other items discussed and agreed upon during the June 19<sup>th</sup>, 2008 meeting.

Sincerely,

\s\CHRIS WOODS

Chris Woods  
Environmental Program Coordinator

cc:

Ernie Reape, Assistant Design Engineer, Region 7, NYSDOT  
Dan Hitt, EAB, 4<sup>th</sup> Floor, NYSDOT  
Debra Nelson, EAB, 4<sup>th</sup> Floor, NYSDOT

bcc:

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