

**Appendix J-8**  
**Endangered Species Act Section 7 Consultation**

## Appendix J-8

### Biological Evaluation

#### A. PROJECT DESCRIPTION

The New York State Department of Transportation (NYSDOT), in cooperation with the Federal Highway Administration (FHWA), has prepared a Draft Design Report/Draft Environmental Impact Statement (DDR/DEIS) for the Interstate 81 (I-81) Viaduct Project (the “Project”) in accordance with the requirements of the Council on Environmental Quality’s regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA) (40 CFR §1500-1508), the FHWA’s Environmental Impact and Related Procedures: Final Rule (23 CFR §771), the NYSDOT Procedures for Implementation of the State Environmental Quality Review Act (17 NYCRR Part 15), and the NYSDOT Project Development Manual.

The purpose of the Project is to address structural deficiencies and non-standard highway features while creating an improved transportation corridor through the City of Syracuse that meets the transportation needs and provides the infrastructure to support long-range transportation planning efforts.

As part of the environmental review, a Biological Evaluation (BE) has been prepared to document the likelihood and severity of potential effects on Federally-listed species for each build alternative included in the DDR/DEIS in accordance with Section 7 of the Endangered Species Act. It also evaluates potential effects on the bald eagle, which is not Federally Threatened or Endangered, but is Federally protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 USC § 668-668c).

#### PROJECT ALTERNATIVES

##### *NO BUILD ALTERNATIVE*

The No Build Alternative would maintain the highway in its existing configuration, with ongoing maintenance and repairs to ensure the safety of the traveling public. The No Build Alternative would not meet the purpose and needs for the Project, but it is examined to establish a baseline condition to evaluate the potential effects of build alternatives.

##### *VIADUCT ALTERNATIVE*

The Viaduct Alternative would reconstruct I-81 from between approximately Colvin Street and Hiawatha Boulevard and would reconstruct I-690 between Leavenworth Avenue and Lodi Street. The new viaduct would provide four, 12-foot (ft) wide travel lanes (a minimum of two in each direction), as well as inside and outside shoulders. The new viaduct would be approximately 10 to 15 feet higher than the existing one at some locations. The Viaduct Alternative would address nonstandard and nonconforming design features; reconstruct the existing I-81/I-690 interchange, providing all movements between I-81 and I-690 including those that do not exist today (between eastbound I-690 and northbound I-81 and between southbound I-81 and westbound I-690); improve connections to local streets; and implement local traffic, bicycle, and pedestrian enhancements (see **Appendix J-5, Figures J-5-1 through J-5-4**). Noise barriers are also proposed as part of the Viaduct Alternative within the four study areas and described below.

##### *COMMUNITY GRID ALTERNATIVE*

The Community Grid Alternative would demolish the existing viaduct between the New York, Susquehanna and Western Railway bridge and the I-81 and I-690 interchange and would reconstruct I-690 between Leavenworth Avenue and Beech Street. It would construct new or reconfigured interchanges on I-690 (i.e., West Street, Crouse Avenue, and Irving Avenue) and on

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the remaining section of I-81 north of the I-690 interchange. The portion of the existing I-81 between its north and south interchanges with the existing I-481 would be reclassified as a business loop of I-81 (BL 81), and I-481 would be re-designated as I-81. The Community Grid Alternative would disperse traffic throughout the city grid by promoting broader use of the existing street network. Vehicular traffic would be channeled through Almond Street and along parallel corridors such as Crouse Avenue, Irving Avenue, James Street, Oswego Boulevard, State Street, and Townsend Street, as well as other local streets that would have the capacity to accommodate this traffic. The Community Grid Alternative would also improve connections to local streets and implement traffic, bicycle, and pedestrian enhancements (see **Appendix J-5, Figure J-5-1** and **Figures J-5-5 through J-5-9**). Noise barriers are also proposed as part of the Community Grid Alternative within the four study areas described below.

### STUDY AREAS

There are four distinct portions of the overall Project Area (referred to as “study areas”) (see **Appendix J-5, Figure J-5-1**): (1) the Central Study Area, (2) the I-481 South Study Area, (3) the I-481 East Study Area, and (4) the I-481 North Study Area. Under the Viaduct Alternative, the Project would be limited to the Central Study Area with the exception of noise barriers that would be constructed along the interstate in portions of the I-481 South Study Area, the I-481 East Study Area, and the I-481 North Study Area. Under the Community Grid Alternative, the Project would involve roadway work in all four study areas.

### METHODOLOGY

The study area for the assessment of, Federally- and State-listed Threatened, Endangered, special concern species and significant ecological communities, and eagles follows the guidance outlined in Section 4.4.9.3 “Endangered and Threatened Species” (August 2011) of New York State Department of Transportation’s (NYSDOT) Environmental Manual (TEM). Additional guidance, as outlined in FHWA’s New York Division: Environmental Procedures “Endangered Species Act, Section 7, Essential Fish Habitat, and Marine Mammal Protection Act: Process for Compliance and Consultation” (June 2020) of NYSDOT’s TEM (Issued by NYSDOT as TEM Section 4.4.9.3.11 Appendix G), is followed to assess the effects of the Project on Federally listed species. This BE provides the information to complete the USFWS Section 7 consultation process regarding Federally listed bats using the steps outlined in the “Species-Specific Package: Bats (Indiana Bat, Northern Long-eared bat, etc.)” as outlined in Appendix G of the TEM. It also provides the documentation to complete the United States Fish and Wildlife Service (USFWS) 7-step process for species without species specific packages.

The NYSDOT most recently reviewed the USFWS Information for Planning and Consultation (IPaC) database on February 2, 2022 and the New York Natural Heritage Program (NYNHP) database on February 3, 2022 for all study areas. In May 2021, Noise Barrier 16A&B was incorporated into the Project as part of the I-481 North Study Area. NYSDOT reviewed the NYNHP and IPaC databases on February 3, 2022 and February 2, 2022, respectively, for the area in the vicinity of the noise barrier. The IPaC “Official Species Lists” for the Project are provided in I-81 DDR/DEIS **Appendix J-4**.

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### B. FEDERALLY PROTECTED SPECIES WITHIN AND/OR ADJACENT TO THE STUDY AREAS

**Table J-8-1**  
**Federally Listed Threatened or Endangered Species**

Common Name	Scientific Name	Federal Status	IPaC Potential Study Area
Indiana bat	<i>Myotis sodalis</i>	Endangered	I-481 South I-481 East I-481 North
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Central I-481 South I-481 East
Eastern massasauga	<i>Sistrurus catenatus</i>	Threatened	I-481 South I-481 East I-481 North
American hart's-tongue fern	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	Threatened	I-481 South

As indicated in **Table J-8-1** above, four Federally-listed species are documented by the USFWS IPaC System as occurring within and/or adjacent to the Project Area: Indiana bat (*Myotis sodalis*), northern long-eared bat (*M. septentrionalis*), eastern massasauga (*Sistrurus catenatus*), and American hart's-tongue fern (*Asplenium scolopendrium* var. *americanum*). The NYNHP also has a record of non-breeding<sup>1</sup> bald eagles (*Haliaeetus leucocephalus*) on Onondaga Lake, in the vicinity of the Central Study Area and I-481 North Study Area. Bald eagles are federally protected under the BGEPA and are State-listed as threatened.<sup>2</sup>

#### INDIANA BAT

The Indiana bat is a Federally- and State-listed Endangered temperate, insectivorous bat. Indiana bats emerge from the caves or mines in which they hibernate in early spring; males then disperse and remain solitary until mating season at the end of the summer, and pregnant females form maternity colonies in which to rear their young. Maternity roosts, roosting sites of post-lactating females, and roosting sites of solitary males are usually under loose bark or in the crevices of trees. Indiana bat roosting sites have been documented in numerous species of deciduous trees; however, tree availability, diameter, height, bark characteristics, and sun exposure appear to be more important factors in roost site selection than tree species (Kurta 2004, USFWS 2007a). Roost trees in New York (Britzke et al. 2006) and elsewhere (USFWS 2007a) are typically in trees with a diameter greater than 16 inches and a height taller than 52 feet, but roosts in smaller trees are not uncommon (USFWS 2007a). Trees are usually dead or nearly dead and decayed (Menzel et al. 2001, Kitchell 2008).

Indiana bats often roost near forest gaps or edges where trees receive direct sunlight for much of the day (Callahan et al. 1997, Menzel et al. 2001). Habitats used by Indiana bats during summer are varied and include riparian, bottomland/floodplain, and upland forests (Humphrey et al. 1977,

<sup>1</sup> Non-breeding refers to birds that may exist at any time of year, including birds that do not breed during the nesting season (e.g., juveniles). USFWS considers the breeding season in NY to be between January 1 and October 1.

<sup>2</sup> Bald eagle is proposed for listing as special concern on NYSDEC's *Draft List Under Part 182.5 Pre-proposal—October 2019*. Available: [https://www.dec.ny.gov/docs/wildlife\\_pdf/preproposal182.pdf](https://www.dec.ny.gov/docs/wildlife_pdf/preproposal182.pdf) (accessed on April 30, 2021).

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Britzke et al. 2006, Watrous et al. 2006) often within highly fragmented agricultural landscapes (Murray and Kurta 2004, Watrous et al. 2006, USFWS 2007a). They will forage in the forest canopy, over open fields, over impounded waterbodies, along riparian corridors, and along forest edges (USFWS 2007a). Maternity colonies are commonly located in areas with abundant natural or artificial freshwater sources (Carter et al. 2002, Kurta et al. 2002, Watrous et al. 2006, and USFWS 2007a). Spring and autumn habitats of Indiana bats have not been well described, but appear to be largely similar to their summer habitat (Britzke et al. 2006, USFWS 2007a). During autumn, Indiana bats mate and deposit fat stores in preparation for winter hibernation. Hibernacula are typically in caves or abandoned mines where ambient temperatures remain above freezing (USFWS 2007a).

### *SITE SPECIFIC INFORMATION*

The Indiana bat is listed by the USFWS IPaC System as having the potential to occur within three study areas (I-481 South, I-481 East, and I-481 North). The USFWS IPaC System results do not identify the Indiana bat as having the potential to occur within the Central Study Area. The NYNHP has records of an Indiana bat hibernaculum and roost trees adjacent to the I-481 South and the I-481 East Study Areas. In addition, the NYNHP has no records of Indiana bat hibernating or roosting within 2.5 miles of the Central or I-481 North Study Areas.

The woodland fragments bordering the east and west sides of the I-481 South Study Area may represent suitable roosting and foraging habitat for Indiana bats. Therefore, Indiana bats are considered to have the potential to occur within the I-481 South Study Area. The closest summer roosting habitat to the I-481 East Study Area that is suitable for Indiana bats is a woodland area (i.e., floodplain forest) east of I-481 and south of I-90 (New York State Thruway). Suitable roost trees are likely abundant in this area and two utility rights-of-way intersecting the woodland may provide foraging corridors and commuting routes for Indiana bats. The wooded area around Butternut Creek northeast of the CSX rail line in the I-481 East Study Area may also support Indiana bats. Indiana bats are less likely to occupy habitats within the Central Area or I-481 North Study Area due to the high density of urban development. However, Indiana bats may still have the potential to occur in these areas on rare occasions.

### **NORTHERN LONG-EARED BAT**

The northern long-eared bat is a Federally- and State-listed Threatened temperate, insectivorous bat that hibernates in caves and mines during winter, and then emerges in early spring to disperse to summer habitat. Like Indiana bats, the males remain solitary until mating season at the end of the summer and the pregnant females form maternity colonies in which they rear their pups. Summer habitat typically includes mature, closed-canopy, upland and riparian forest within heavily forested landscapes (Ford et al. 2005, Henderson et al. 2008), usually within about 60 miles of the hibernaculum (Caceras and Barclay 2000, USFWS 2014).

The northern long-eared bat is considered to be an interior forest-dependent species that is sensitive to urbanization and fragmentation and requires large tracts of unbroken forest for both foraging and breeding (Foster and Kurta 1999, Broders et al. 2006, Henderson et al. 2008, Segers and Broders 2014). Unlike many other bats of the Northeast, northern long-eared bats will commonly glean prey from leaves and other surfaces rather than strictly hawking flying insects in the air, and are thereby well-adapted to foraging in cluttered, structurally complex, forest interior habitat (Owen et al. 2003, Lacki et al. 2007). Most foraging occurs in the forest mid-story (Brack and Whitaker 2001, Harvey et al. 2011, USFWS 2014) in interior areas with a tall and closed canopy (Owen et al. 2003, Patriquin and Barclay 2003, Adams 2013). Northern long-eared bats

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do not concentrate along riparian corridors or other linear landscape features as much as strictly aerial-foraging species do (Owen et al. 2003, Ford et al. 2005, Harvey et al. 2011, USFWS 2014), and most radio-telemetry and acoustic studies have found that they typically avoid roads and other sharp forest edges (Owen et al. 2003, Patriquin and Barclay 2003, Carter and Feldhammer 2005, Morris et al. 2010, Segers and Broders 2014), where prey availability is expected to be lower than in the forest interior (Owen et al. 2003). Mature forest is considered to be the most important foraging habitat for the northern long-eared bat (USFWS 2013, 2014).

Roost trees are also usually within large tracts of intact forest, close to the core and away from large clearings, roads, or other sharp edges (Menzel et al. 2002, Owen et al. 2003, Carter and Feldhammer 2005). Roosts are usually in cavities or, less often, under exfoliating bark of large-diameter trees that form a high and dense canopy (Foster and Kurta 1999, Menzel et al. 2002, Carter and Feldhammer 2005; reviewed by Barclay and Kurta 2007). However, the USFWS (2014) considers trees as small as three inches DBH to be potential roost sites. Northern long-eared bats, including lactating females, will use many different summer roost trees, often switching roosts every one to five days and moving hundreds of feet between successive locations (Menzel et al. 2002, Owen et al. 2002, Johnson et al. 2009).

### *SITE SPECIFIC INFORMATION*

The northern long-eared bat is listed by the USFWS IPaC System as having the potential to occur within two study areas (I-481 South and I-481 East). The USFWS IPaC System results do not identify the northern long-eared bat as having the potential to occur within the Central and I-481 North Study Areas. The NYNHP has records of northern long-eared bat roosting within 1.5 miles of the Central Study Area. The NYNHP has no records of this species roosting within 1.5 miles of any of the other three study areas. However, a northern long-eared bat hibernaculum is located adjacent to the I-481 South and I-481 East Study Areas.

As discussed above, northern long-eared bats are sensitive to urbanization and fragmentation and prefer large tracts of interior forest for roosting and foraging. The woodland fragments bordering the east and west sides of the I-481 South Study Area may be too small and have too high of an edge to area ratio to be preferred habitat of northern long-eared bats, but there remains a marginal possibility that this species could occur within these sections of the I-481 South Study Area.

The closest summer habitat to the I-481 East Study Area that is most suitable for northern long-eared bats is the woodland area east of I-481 and south of I-90 (New York State Thruway). This approximately one-mile wide and 0.7-mile long woodland is bisected by two utility rights-of-way, but may be large enough to support northern long-eared bats. Suitable roost trees are likely abundant in this area. The wooded area around Butternut Creek northeast of the CSX rail line in the I-481 East Study Area may also represent suitable habitat for the northern long-eared bat. Because of the well-documented avoidance of urban areas and sharp edges by northern long-eared bats (Owen et al. 2003, Patriquin and Barclay 2003, Carter and Feldhammer 2005, Morris et al. 2010, Segers and Broders 2014), habitats within the I-481 North Study Area are also not considered suitable, and northern long-eared bats are less likely to occur in this area.

### **EASTERN MASSASAUGA**

The eastern massasauga is a Federally-listed Threatened and State-listed Endangered rare and declining, range-restricted rattlesnake. It occurs in small, highly isolated populations from central New York State and southern Ontario to south-central Illinois and eastern Iowa. Population declines are primarily attributable to wetland drainage, habitat fragmentation, overcollecting, and

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now, the advancement of early successional vegetation into later successional stages in the few areas in which remnant populations persist (Gibbs et al. 2007). Only two populations of eastern massasauga are known to remain within all of New York State (Gibbs et al. 2007).

Unlike other rattlesnakes, eastern massasaugas hibernate for the winter individually rather than communally. Hibernation sites used by eastern massasaugas in New York State populations are usually under shrubs and sphagnum hummocks. They emerge from hibernation in April and then return in late September. Reproduction occurs only every two years, with birthing of live young usually occurring between mid-August and mid-September. Female eastern massasaugas are believed to mate during one summer, and then give birth the next summer (Gibbs et al. 2007).

### *SITE SPECIFIC INFORMATION*

The USFWS IPaC System lists the eastern massasauga as having the potential to occur in three study areas (I-481 South, I-481 East, I-481 North). The USFWS IPaC System results do not identify the eastern massasauga as having the potential to occur within the Central Study Area. The NYNHP has a record of the eastern massasauga occurring adjacent to the I-481 North Study Area. There are no NYNHP records of the eastern massasauga occurring within or adjacent to the I-481 South, the I-481 East, or the Central Study Areas.

Mud Creek, on the eastern edge of the I-481 North Study Area, has a hydrological connection to this known population via small, potentially ephemeral, unnamed NYSDEC Class C streams that wind through and under roads and other heavily developed areas. The eastern massasauga exhibits extremely small activity ranges and restricted movements within overlapping territories and has not been found to disperse or migrate outside of their known area (Johnson 2000). Other habitat types used by eastern massasaugas in other portions of the species' range in the U.S. include fens, marshes, and wet prairies (Gibbs et al. 2007).

Wetlands within the I-481 North Study Area are limited to drainage ditches and highly disturbed roadside segments of Mud Creek and disturbed common reed-dominated and forested wetlands along I-481 and within the quadrants at the northern I-81/I-481 interchange. As such, no habitat that is appropriate for the eastern massasauga is present in the I-481 North Study Area, and eastern massasaugas are therefore not expected to occur in the area. Roads, residential neighborhoods, and other human-altered landscapes are barriers to eastern massasauga movements (Moore and Gillingham 2006), and movement of eastern massasaugas out of their current location to the east along Mud Creek and its tributaries within the I-481 North Study Area is considered extremely unlikely. These streams extend through heavily developed areas and are culverted under major roads in several locations, and therefore would not be expected to be used by eastern massasaugas to disperse outside of their current location. Additionally, as previously noted, telemetry studies of eastern massasaugas have not observed any movements of individuals outside of their current location via these streams or otherwise (Johnson and Breisch 1993; Johnson 1995, 2000). For each of these reasons, eastern massasaugas would not be expected to occur within the I-481 North Study Area. Eastern massasaugas are also not expected to occur within the other three study areas because they lack appropriate habitat and are fully disconnected and distant from their current known location.

### **BALD EAGLE**

As described above, the bald eagle is not Federally Threatened or Endangered, but is Federally protected under the BGEPA, and state-listed as Threatened. According to the NYNHP, areas with development or other human disturbances would likely be unsuitable for nesting and wintering

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bald eagles. Disturbance to wintering birds can be especially detrimental because it may deplete the birds' energy reserves. Bald eagles spend most of the winter sedentary (approximately 99%); energy is reserved for foraging, feeding, thermoregulation, and other essential activities (Nye 1994). Depleted energy may result in a drop in an individual's reproductive rate for the year, or death (Nye 1994). In addition, if a feeding bald eagle is disturbed it may abandon its food and most likely will not return to the area for the rest of the day. A minimum buffer of 250-300 meters is recommended for perching and feeding sites (Nye 1994). Banning DDT has greatly increased the reproductive health of bald eagles, but there are many other contaminants that continue to affect the reproductive success of adult pairs such as lead, mercury, and PCBs. Onondaga Lake was designated a Federal superfund site in 1994 for a diversity of pollutants including PCBs and Mercury. The bald eagle is currently Federally protected under the 1962 BGEPA. It is no longer listed as a Federally Threatened or Endangered species. It was removed from the list in 2007 because the population improved to a point that the USFWS determined it appropriate for delisting.

### *SITE SPECIFIC INFORMATION*

According to the NYNHP database (February 3, 2022) bald eagles have been observed perching and foraging along the shoreline of Onondaga Lake. They have also been observed foraging in nearby rivers (Seneca and Oswego) during winter in areas where water usually remains open most years. The area of Onondaga Lake mapped as bald eagle foraging area is within and adjacent to the Central Study Area and I-481 North Study Area. The bald eagle is not expected to occur within I-481 South and I-481 East Study Areas.

### **AMERICAN HART'S-TONGUE FERN**

American hart's-tongue fern is a Federally- and State-listed Threatened perennial and evergreen fern. It requires deep shade and grows in cool, moist, rocky, calcareous substrates, usually within small cracks in large rocks (NYNHP 2015). American hart's-tongue fern is found in close association with outcrops of dolomitic limestone and other calcareous rocks. It has been found in cave entrances, gorges, and sinkholes in mature hardwood forests (NYNHP 2015, USFWS 2015). Populations of American hart's-tongue fern tend to be scattered due to its habitat requirements. In New York, native populations of this fern are restricted to two counties in the vicinity of Syracuse: Onondaga and Madison Counties (USFWS 2012). It is known to occur in glacial plunge basins in these two counties (NYNHP 2015). In Onondaga County, American hart's-tongue fern is known to occur in four locations (USFWS 2012).

### *SITE SPECIFIC INFORMATION*

The USFWS IPaC System search indicates that there is the potential for American hart's-tongue fern to occur only within the I-481 South Study Area. The NYNHP has a record of the American hart's-tongue fern occurring adjacent to the I-481 South Study Area. There are no NYNHP records of the American hart's-tongue fern occurring within or adjacent to the I-481 North, the I-481 East, or the Central Study Areas.

Overall, habitat for this species (i.e., deep shade in cool, moist, rocky, calcareous substrates), is not present within the disturbed habitats of the Central, I-481 East, I-481 North or I-481 South Study Areas. However, the I-481 South Study Area contains a disturbed roadcut cliff/slope



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community (6.0 acres).<sup>3</sup> A targeted search for American hart's tongue fern was conducted in this ecological community on April 18, 19, and 20, 2017 within the project limits of the I-481 South Study Area. American hart's-tongue fern was not found within the I-481 South Study Area.

### C. EFFECTS OF VIADUCT ALTERNATIVE

#### INDIANA BAT

The Viaduct Alternative would primarily involve work within the Central Study Area, where Indiana bats are not likely to occur. However, as part of this alternative, noise barriers would be constructed in portions of the other three study areas. **Appendix J-5, Figures J-5-1 through J-5-4** show the approximate location of the proposed work in the Central Study Area and the noise barriers in the I-481 South, I-481 East, and I-481 North Study Areas.

Under the Viaduct Alternative 12.2 acres of total land would be impacted as a result of the noise barrier footprint<sup>4</sup> in the I-481 South, I-481 East, and I-481 North Study Areas. The noise barriers under the Viaduct Alternative would permanently affect 9.0 acres of terrestrial cultural ecological communities, 1.6 acres of successional southern hardwoods, 0.3 acres of successional old field, 0.8 acres of successional shrubland, 0.4 acres of floodplain forest, 0.06 acre of freshwater wetland, and 0.003 acre of surface waters. All tree removal would be limited to within 100 feet of existing road surfaces. Although some trees that would be cleared are large enough to be potential roost trees, their location within small and isolated forest fragments immediately adjacent to interstate highway greatly limits their quality and the likelihood of them being used as roost sites by Indiana bats.

As per **Table J-8-2** below, the NYNHP has no records of Indiana bat roost trees within 2.5 miles of the Central Study Area, where the majority of construction would occur, and the closest hibernaculum is more than 2.5 miles away. The USFWS IPaC System results do not identify the Indiana bat as having the potential to occur within the Central Study Area. Tree removal associated with the installation of noise barriers in the I-481 East and I-481 North Study Areas would be limited to approximately 0.77 acres. Tree removal would not be required in the I-481 South Study Area as a result of the installation of Noise Barrier 9. As indicated in **Table J-8-2**, the NYNHP has records of Indiana bat roost trees within 0.2 miles from the I-481 South Study Area and within 2.5 miles from the I-481 East Study Area. Additionally, the NYNHP has records of an Indiana bat hibernaculum within 2.5 miles from the I-481 South Study Area and greater than 2.5 miles from the I-481 East Study Area. There are no known Indiana bat roost trees or hibernaculum within 2.5 miles of the I-481 North Study Area. **Appendix J-6, Figures J-6-1 through J-6-2** show the approximate area of tree removal for the Viaduct Alternative.

Roost tree availability is unlikely to currently be a limiting factor in the regulation of Indiana bat population sizes now that there are so few tree-roosting bats on the landscape due to white-nose syndrome (WNS). Even prior to the recent loss of more than 90% of Indiana and northern long-eared bats to WNS, it was uncertain whether roost tree availability limited population sizes of

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<sup>3</sup> Roadcut cliff/slope is a sparsely vegetated cliff or steep slope, along a road, that was created by blasting or digging during road construction (Edinger et al. 2014).

<sup>4</sup> The acreages for the "noise barrier footprints" include a 10-foot buffer area around the potential noise barriers. Unless otherwise stated, up to approximately 30 percent of the noise barrier effects overlap with the roadway effects (portions of the noise barriers would be built on pavement). This 30 percent is included in these effects calculations as a conservative measure. The areas of roadway/noise barrier overlap are in disturbed communities of the Project Area.

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these or other tree-roosting bat species (Sedgeley and O'Donnell, 1999, Crampton and Barclay 1998, Kunz and Lumsden, 2003, Hayes and Loeb 2007). As WNS has greatly reduced the size of bat populations, unoccupied roosting habitat has become increasingly available for remaining bats (USFWS 2016a). Colonies and social networks of Indiana bats have been shown to be robust to the loss of previously used roost trees, which is likely due to the ephemeral nature of the dead and dying trees that they usually use as roost sites (Silvis et al. 2014a). Urban street trees and trees within small and isolated fragments within 100 feet of existing roadways, like those that would be removed for the Viaduct Alternative, would remain common throughout the Syracuse metropolitan area and available for any Indiana bats potentially displaced during noise barrier construction. For these reasons, the Viaduct Alternative would not likely adversely affect roosting habitat availability for Indiana bats in the Syracuse area. As a precaution to avoid any potential for direct impacts, all tree clearing for the noise barriers in the I-481 North and I-481 East Study Areas would be restricted to the winter hibernation period (November 1 – March 31) (see **Section E, Conservation Measures**). This tree clearing for the noise barriers under the Viaduct Alternative would be consistent with the tree removal Avoidance and Minimization Measures in the USFWS/FHWA Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat (USFWS/FHWA RWPC).

Indiana bats are known to sometimes also roost under bridges in lieu of natural roosting habitat (Keeley and Tuttle 1999). Noise barriers would be constructed over bridges present in the I-481 North Study Area as part of the construction of the Viaduct Alternative. As such, all existing bridges involving work as part of the Project in the I-481 North Study Area would be inspected in accordance with the FHWA New York Division Bridge Bat Survey Form during the roosting season (April 1 to September 30) to determine if there is any evidence of bats actively using them. Bridges in the Central Study area would not require Bridge Bat Surveys, as the IPaC System does not identify the Indiana bat as occurring in this study area. Noise barriers would not be constructed on bridges in the I-481 South and I-481 East Study Areas as part of the Viaduct Alternative. In the event that bats are observed on any of the bridges, all bridge Avoidance and Minimization Measures in the USFWS/FHWA RWPC would be adopted to the greatest extent possible. FHWA would be consulted in the event that any of the measures could not be implemented to determine the proper course of action.

The areas where tree clearing would occur for the proposed noise barriers along I-81 and I-481 for the Viaduct Alternative are unlikely to represent quality foraging habitat for Indiana bats. The trees are in heavily urbanized areas, all within 100 feet of the existing roadway and closely bound by urban development. Foraging Indiana bats have been found to avoid roads, often reversing course when a road is encountered. This appears to be due more so to the presence of motor vehicles than the physical presence of the road itself (Zurcher et al. 2010, Bennett and Zurcher 2013). The areas where tree clearing would occur for the Viaduct Alternative are subjected to high levels of motor vehicle traffic noise, which is expected to limit the likelihood that they are used for foraging by Indiana bats. Loss of these trees would not be expected to substantially affect foraging habitat availability for the region's population of Indiana bats.

Dust generated during construction of the Viaduct Alternative would be minimized in accordance with NYSDOT air quality standards and is unlikely to affect any Indiana bats potentially present in the Central Study Area. A dust control plan would be implemented. Measures that could be included in the dust control plan include:

- Requiring trucks that are hauling loose material to be equipped with tight-fitting tailgates and have their loads securely covered, and

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- The use of water sprays for demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air.

Such measures would effectively reduce emissions from dust-generating construction activities and the potential for impacts to Indiana bats.

Noises generated during construction of the noise barriers would not be expected to affect any Indiana bats potentially occurring in the I-481 North and I-481 East Study Areas, given that noise levels in the area are already extremely high under existing conditions. Current occurrence of Indiana bats under these conditions would inherently indicate a high tolerance of the anthropogenic disturbances that are associated with urban and roadside environments. Indiana bats in general have been known to roost near construction sites, major airports, and other extremely noisy locations (Sparks et al. 1998, Keeley and Tuttle 1999, Niver 2009), suggesting that while they are roosting, they are tolerant of loud noises and vibrations caused by human activity. Continued roosting of Indiana bats following the start of new construction activity has been observed and indicates a tolerance of and ability to acclimate to construction noises (ESI 2008, USFWS 2011). Foraging behavior of Indiana bats has also been found to be unaffected by extremely loud noises and reverberations, such as artillery fire on military bases (Shapiro and Hohmann 2005). Sounds generated by heavy construction equipment and similar sources typically fall well below the hearing and echolocation frequency ranges of bats, which may largely explain this tolerance of loud noises (Delaney and Grubb 2004, Niver 2009). In contrast, higher frequency noises like those of cars and light trucks can displace foraging Indiana bats and other *Myotis* species from an area (Schaub et al. 2008, Zurcher et al. 2010, Bennett and Zurcher 2013). Given that the portions of the I-481 East and I-481 North Study Areas where construction would occur are already chronically subjected to high frequency noises from motor vehicles, the heavy construction equipment noise that would be generated by the Project would be unlikely to affect roosting or foraging of Indiana bats. Therefore, construction of the Viaduct Alternative would not be expected to impact any Indiana bats potentially occurring those study areas. Similarly, operation of the Viaduct Alternative would be comparable to current traffic conditions and therefore would not elevate noise disturbance or vibration levels to an extent that would potentially affect Indiana bats. The noise barriers that would be constructed along portions of I-81 and I-481 would further avoid the potential for increased noise or visual disturbance in neighboring areas during operation of the Viaduct Alternative.

Temporary lighting used during construction and permanent lighting used during operation would follow the relevant Avoidance and Minimization Measures in the USFWS/FHWA RWPC. These include directing temporary construction lighting away from suitable habitat during the active season, using downward-facing, full cut-off lens lights during project operation, and directing lighting away from suitable habitat when installing new or replacing existing permanent lights.

Given that the Project under the Viaduct Alternative would limit tree clearing in the I-481 East and I-481 North Study Areas to the winter hibernation period (November 1–March 31) within 100 feet of existing roadways, is less than 2.5 miles from a hibernaculum, is less than 2.5 miles from a known roost tree, and would follow the applicable Avoidance and Minimization Measures of the USFWS/FHWA RWPC, NYSDOT has made a preliminary effect determination of “*may affect, not likely to adversely affect*” for the Indiana bat for the Viaduct Alternative.

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**Table J-8-2**

**Viaduct Alternative: Tree Cutting Distances for Indiana Bat**

Study Area	Roost Trees	Hibernaculum
Central Study Area	>2.5 miles	>2.5 miles
I-481 South Study	>2.5 miles	<2.5 miles
I-481 East Study Area	<2.5 miles	>2.5 miles
I-481 North Study Area	>2.5 miles	>2.5 miles

### NORTHERN LONG-EARED BAT

The Viaduct Alternative would primarily involve work within the Central Study Area. Additionally, as part of this alternative, noise barriers would be constructed in portions of the other three study areas. **Appendix J-5, Figures J-5-1 through J-5-4** show the approximate location of the proposed work in the Central Study Area and the noise barriers in the I-481 South, I-481 East, and I-481 North Study Areas.

Under the Viaduct Alternative 8.2 acres of total land would be impacted as a result of the noise barrier footprint<sup>5</sup> in the I-481 East and Central Study Areas. The noise barriers under the Viaduct Alternative would permanently affect 6.2 acres of terrestrial cultural ecological communities, 1.5 acres of successional southern hardwoods, 0.3 acres of successional old field, and 0.2 acres of successional shrubland. The remaining area of disturbance consists of impervious surface, ditches, mowed lawn with trees, successional old field, wetland, and surface waters. All tree removal would be limited to within 100 feet of the existing road surface. As previously discussed in **Section B**, northern long-eared bats are sensitive to urbanization and avoid small forest fragments and sharp edges in favor of large tracts of interior forest for roosting and foraging and are therefore not expected to occur immediately adjacent to I-81 and I-481 in the other study areas where the Project would be constructed. As indicated in **Table J-8-3**, the NYNHP has no records of northern long-eared bat roost trees within 1.5 miles of the I-481 North Study Area and the closest hibernaculum is greater than 5 miles away.

The noise barriers that would be constructed in the I-481 East and Central Study Areas would be along segments of interstate highway that border densely developed residential neighborhoods and other areas where suitable forested habitat for northern long-eared bats is lacking. The clearing of a total of 9.9 acres of trees in the I-481 East and Central Study Areas would not be expected to represent a substantial loss of potential roosting habitat for Indiana bats. As previously noted for Indiana bats, roost tree availability is unlikely to be a limiting factor in the regulation of northern long-eared bat population sizes now that there are so few tree-roosting bats on the landscape due to WNS. Trees within small and isolated fragments within 100 feet of existing roadways, like those that would be removed for the Viaduct Alternative, would nevertheless remain common throughout the Syracuse metropolitan area and available for any northern long-eared bats potentially displaced from the affected area. Like Indiana bats, northern long-eared bats are also considered to be robust to the loss of previously used roost trees, which is likely due to the

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<sup>5</sup> The acreages for the “noise barrier footprints” include a 10-foot buffer area around the potential noise barriers. Unless otherwise stated, up to approximately 30 percent of the noise barrier effects overlap with the roadway effects (portions of the noise barriers would be built on pavement). This 30 percent is included in these effects calculations as a conservative measure. The areas of roadway/noise barrier overlap are in disturbed communities of the Project Area.

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ephemeral nature of the dead and dying trees that they usually use as roost sites (Silvis et al. 2014b). For these reasons, the Viaduct Alternative would not likely adversely affect roosting habitat availability for northern long-eared bats in the Syracuse area. As a precaution to avoid any potential for direct impacts, however, all tree clearing would be restricted to the winter hibernation period (November 1–March 31) (see **Section E, Conservation Measures**). This and all other aspects of tree clearing for the Viaduct Alternative would be consistent with the tree removal Avoidance and Minimization Measures in the USFWS/FHWA RWPC.

Tree removal associated with the installation of noise barriers in the I-481 East and Central Study Areas would total approximately 0.4 acres. Tree removal would not occur within the I-481 South Study Area as a result of the installation of Noise Barrier 9. As indicated in **Table J-8-3**, the NYNHP has no records of northern long-eared bat roost trees within 1.5 miles from the I-481 North, I-481 South, or I-481 East, or Study Areas. However, NYNHP has records of northern long-eared roost trees within 1.5 miles of the Central Study Area. In addition, the NYNHP has records of a northern long-eared bat hibernaculum less than 5 miles from the I-481 South Study Area and less than 5 miles from the I-481 East Study Area. There are no known northern long-eared bat hibernacula within 5 miles of the I-481 North Study Area. **Appendix J-6, Figures J-6-1 through J-6-2** show the approximate area of tree removal for the Viaduct Alternative.

Like Indiana bats, northern long-eared bats have been found to sometimes roost under bridges in lieu of natural roosting habitat (Feldhamer et al. 2003). Noise barriers would be constructed in the I-481 East Study Area, but they would not be constructed on bridges as part of the construction of the Viaduct Alternative. The IPaC System does not list the northern long-eared bat as occurring in the vicinity of the Central Study Area and noise barriers would not be constructed on bridges in the I-481 South Study Area. As described above, NYNHP lists non-wintering northern long-eared bat as having the potential to occur within 1.5 miles of the Central, I-481 South, and I-481 East Study Areas and noise barriers would be constructed in the vicinity of bridges in these study areas as part of the Viaduct Alternative. As such, all existing bridges involving work as part of the Project in the these Study Areas would be inspected in accordance with the FHWA New York Division Bridge Bat Survey Form during the roosting season (April 1 to September 30) to determine if there is any evidence of bats actively using them. In the event that bats are observed on any of the bridges, all bridge Avoidance and Minimization Measures in the USFWS/FHWA RWPC would be adopted to the greatest extent possible. FHWA would be consulted in the event that any of the measures could not be implemented to determine the proper course of action.

The areas where tree clearing would occur along I-81 and I-481 for the Viaduct Alternative do not represent suitable foraging habitat for northern long-eared bats. The trees are in a heavily urbanized area, all within 100 feet of the existing roadway. Northern long-eared bats require large tracts of unbroken forest for foraging, and they strongly avoid roads and other sharp edges (Owen et al. 2003, Patriquin and Barclay 2003, Carter and Feldhammer 2005, Morris et al. 2010, Segers and Broders 2014). Tree clearing for the Viaduct Alternative would not eliminate foraging habitat availability for the region's population of northern long-eared bats.

Dust generated during construction of the Viaduct Alternative would be minimized in accordance with NYSDOT air quality standards and unlikely to affect any northern long-eared bats potentially present in the area. A dust control plan would be implemented. Measures that could be incorporated into the dust control plan may include, but are not limited to:

- Trucks that haul loose material be equipped with tight-fitting tailgates and their loads be securely covered.

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- The use of water sprays for demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air.

Such measures would effectively reduce emissions from dust-generating construction activities and the potential for impacts to northern long-eared bats.

Noises and vibrations generated during construction of the noise barriers would not be expected to affect northern long-eared bats given that they are not expected to occur in the area and noise and vibration levels in the area are already extremely high under existing conditions. Presence of northern long-eared bats under these conditions would inherently indicate a high tolerance of, and habituation to, the anthropogenic disturbances that are associated with urban and roadside environments. To our knowledge, there have not been any studies of the sensitivity of northern long-eared bats to construction noises or other forms of noise disturbance. However, northern long-eared bats have been observed roosting in areas with substantial noise and vibration levels, such as near the Indianapolis International Airport (Sparks et al. 1998) and under bridges (Feldhamer et al. 2003), which suggests that they can be tolerant of chronic anthropogenic noise disturbances and reverberations while roosting if the habitat is otherwise suitable. Like Indiana bats, loud noises like those generated by heavy construction equipment are well below the expected hearing and echolocation frequency ranges of northern long-eared bats (Delaney and Grubb 2004, Niver 2009). Higher frequency noises, however, like those of cars and light trucks, can displace foraging *Myotis* bats (Schaub et al. 2008, Zurcher et al. 2010, Bennett and Zurcher 2013) like northern long-eared bats from an area. Given that the I-481 East Central Study Areas are already chronically subjected to high frequency noises from motor vehicles, the heavy construction equipment noise that would be generated by the Project would be unlikely to affect roosting or foraging northern long-eared bats, therefore construction of the Viaduct Alternative would not be expected to impact any northern long-eared bats potentially occurring in the area. Similarly, operation of the Viaduct Alternative would be comparable to current traffic conditions and therefore would not elevate noise and vibration levels to an extent that would potentially affect northern long-eared bats. Noise barriers that would be constructed along portions of I-81 and I-481 would further avoid the potential for increased noise or visual disturbance in neighboring areas during operation of the Viaduct Alternative.

Temporary lighting used during construction and permanent lighting used during operation would follow the relevant Avoidance and Minimization Measures in the USFWS/FHWA RWPC. These include directing temporary construction lighting away from suitable habitat during the active season, using downward-facing, full cut-off lens lights during project operation, and directing lighting away from suitable habitat when installing new or replacing existing permanent lights.

Given that the Project under the Viaduct Alternative would limit tree clearing for the noise barriers to the winter hibernation period (November 1 – March 31), is more than 0.5 miles from a hibernaculum and more than 150 feet from a known roost tree, is within 100 feet of existing roadways, and would follow the applicable Avoidance and Minimization Measures of the USFWS/FHWA RWPC, NYSDOT has made a preliminary effect determination of “*may affect, not likely to adversely affect*” for the northern long-eared bat for the Viaduct Alternative.

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**Table J-8-3**

**Viaduct Alternative: Tree Cutting Distances for Northern Long-Eared Bat**

Study Area	Roost Trees	Hibernaculum
Central Study Area	<1.5 miles	>5.0 miles
I-481 South Study	>1.5 miles	<5.0 miles
I-481 East Study Area	>1.5 miles	<5.0 miles
I-481 North Study Area	>1.5 miles	>5.0 miles

### EASTERN MASSASAUGA

The Viaduct Alternative would primarily involve work within the Central Study Area, which encompasses a heavily urbanized portion of downtown Syracuse that does not contain any habitat capable of supporting eastern massasaugas. Construction in the three other study areas for the Viaduct Alternative would be limited to the construction of noise barrier walls alongside portions of I-481. **Appendix J-5, Figures J-5-1 through J-5-4** show the approximate location of the proposed work in the Central Study Area and the noise barrier in the I-481 South, I-481 East and I-481 North Study Areas. As discussed in greater detail below, under “Community Grid Alternative” no habitat within the I-481 South, I-481 East, or I-481 North Study Areas is considered suitable for eastern massasaugas and there are no NYNHP records of this species occurring anywhere locally aside from an isolated population adjacent to the I-481 North Study Area. For these reasons, eastern massasaugas are not expected to occur in any portion of the Project Area. Therefore, NYSDOT has made a preliminary effect determination of “*no effect-no habitat*” for the eastern massasaugas for the Viaduct Alternative.

### BALD EAGLE

As discussed above, NYNHP has a record of non-breeding bald eagles perching and foraging along the shoreline of Onondaga Lake. This area is on the periphery of the Central Study Area and I-481 North Study Area and therefore non-breeding bald eagles have the potential to occur there. The sensitivity of bald eagles to human disturbance is greatest during courtship and nest-building, which take place in New York between December and March, and then declines as the nesting period progresses and eventually ends (USFWS 2007b). Decades ago, bald eagles were considered to be sensitive to human disturbance even outside of the breeding season (e.g., Stalmaster and Newman 1978, Nye 1994, Stalmaster and Kaiser 1997), with concern that repeated displacement from important roosting and foraging areas could waste energy reserves at a time of year when energy demands are high (Stalmaster and Gessaman 1984). Since then, however, bald eagles have shown a rapid and substantial generational habituation to human disturbance during both the breeding and non-breeding periods, and an increasing tolerance of development, including urbanization (Johnson 2010, Guinn 2013). In many parts of their range, bald eagles are increasingly nesting and occurring during the non-breeding periods in areas with heavy levels of human activity where they would almost never be found only a few decades ago (Millsap et al. 2004, Guinn 2013). This includes nesting by bald eagles in recent years within major metropolitan areas, including New York City, Washington D.C., Philadelphia, and Pittsburgh (Sullivan 2016). The use of Onondaga Lake in the City of Syracuse by bald eagles is another such example of bald eagles having acclimated to an urban area with extremely high levels of disturbance. Any non-breeding bald eagles utilizing the lake and its shorelines inherently display a high tolerance of human activity as well as degraded habitat.

The Viaduct Alternative would include the construction and operation of a reconstructed system of ramps connecting I-81 to Park Street, State Route 370, Old Liverpool Road (Central Study

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Area), and noise barrier construction in the vicinity of Exits 25a and 26 (I-481 North Study Area). The closest construction activity to Onondaga Lake would consist of road repaving approximately 200 feet away from the southeastern shoreline. At slightly greater distances, the road reconstruction would likely include louder activities such as jack-hammering and pile-driving. The USFWS Bald Eagle Management Guidelines (USFWS 2007b) do not provide guidance on buffer distances for construction disturbance near habitats used by non-breeding eagles but recommend a minimum buffer of 330 feet from nests. Given the reduced sensitivity of bald eagles to disturbance during the non-breeding period compared to the nesting period (USFWS 2007b) and the high existing levels of disturbance and urban setting of the area of Onondaga Lake where non-breeding bald eagles have been observed, a minimum distance of 200 feet from the closest area of construction to the closest point of lakeshore where non-breeding eagles could occur is expected to greatly reduce the likelihood of any potential disturbance from construction noise. In the event that any bald eagles would be displaced by construction noise from the small area of the lake and shoreline near the site of construction, the effect would be highly temporary, and the eagles would be able to easily distance themselves from the activity and utilize nearby areas of the lake and its shoreline without negative consequence. Operation of the Viaduct Alternative would not bring motor vehicle traffic any closer to the Onondaga Lake shoreline than at present or increase existing levels of disturbance. Given that paved roads with heavy traffic are already present near the shoreline in this area, operation of the Viaduct Alternative would not eliminate quality habitat or otherwise permanently alter the current conditions on Onondaga Lake for non-breeding bald eagles. The Viaduct Alternative would not create disruptive activities or development in the direct flight paths of eagles between roost sites and important foraging areas, and in all other aspects would be in accordance with the USFWS Bald Eagle Management Guidelines' "recommendations for avoiding disturbance at foraging areas and communal roost sites" (USFWS 2007b). Therefore, no impacts to the NYNHP mapped bald eagle foraging and perching area are anticipated and NYSDOT has made a preliminary effect determination of "*Take Unlikely*" for the bald eagle for the Viaduct Alternative.

### AMERICAN HART'S-TONGUE FERN

As described above, the NYNHP database indicates that the American hart's-tongue fern has been documented adjacent to the I-481 South Study Area and the USFWS IPaC database indicates that the species had the potential to occur within the I-481 South Study Area. The NYNHP has no known occurrences of the American hart's-tongue fern within or adjacent to the I-481 North, I-481 East, or Central Study Areas and there is no suitable habitat for this species within or adjacent to these study areas. Additionally, the American hart's-tongue fern did not come up on the USFWS's IPaC database search for these three study areas. **Appendix J-5, Figure J-5-4** shows the approximate location of the proposed work in the I-481 South Study Area.

On July 13, 2017, a site investigation was conducted in the vicinity of proposed Noise Barrier 9 in the I-481 South Study Area to determine if habitat for American hart's-tongue fern is present. Habitat in the vicinity of Noise Barrier 9 consists of a disturbed right-of-way. It was determined that no suitable habitat for American hart's-tongue fern is present in the vicinity of proposed Noise Barrier 9.

As discussed above, American hart's-tongue fern's preferred habitat is not present within the I-481 East, the Central or the I-481 North Study Areas and no species were found during the field investigation in the I-481 South Study Area. Therefore, NYSDOT has made a preliminary effect determination of "*no effect*" for the American Hart's tongue fern for the Viaduct Alternative.



### D. EFFECTS OF COMMUNITY GRID ALTERNATIVE

#### INDIANA BAT

Construction of the Community Grid Alternative would include all of the actions described above for the Viaduct Alternative in the Central Study Area, as well as additional road construction in the I-481 North, I-481 South, and the I-481 East Study Areas. **Appendix J-5, Figure J-5-1 and Figures J-5-5 through J-5-9** show the approximate location of the proposed work in the Central, I-481 South, I-481 East and I-481 North Study Areas. As discussed under **Section B**, Indiana bats are considered unlikely to occur in the I-481 North and Central Study Areas due to the high density of urban development and lack of quality habitat, whereas they are expected to have the potential to occur in woodlands near the I-481 East and I-481 South Study Areas. Tree clearing within the I-481 North (2.8 acres) Study Area would be limited to within 100 feet of the existing I-81 roadway and as such, would not be expected to substantially affect roost tree availability for Indiana bats under the Community Grid Alternative.

Construction in the I-481 East Study Area would require the clearing of 0.3 acres of land with trees for permanent roadway. In the northern portion of the study area, tree clearing would occur immediately adjacent to and within 100 feet of the existing boundaries of I-481 and the Exit 5W on- and off-ramps. The trees that would be removed along the eastern and western sides of I-481 and the exit ramps are not part of a tract of contiguous forest and instead are part of narrow roadside fragments that are closely bound between I-481 and other roads or forms of development in each direction. The trees that would be removed on the east side of I-481 are part of an approximately 200-ft wide linear fragment that is bound by I-481 to the west and Pheasant Road to the east (see **Appendix J-6, Figure J-6-7**), such that the larger tract of forest to the east of Pheasant Road that may support Indiana bats would not be directly affected. Indiana bats would not be expected to utilize this narrow band of trees along the highway margin over the larger tract of more suitable mature forest and utility corridor habitat immediately to the east of Pheasant Road. The tree removal that would occur in the southern portion of the I-481 East Study Area would also be limited to within 100 feet of the existing roadway, where habitat suitability for Indiana bats is considered low. Occurrences of Indiana bats in this area are less likely than in the floodplain forest further to the east and more removed from the disturbances associated with I-481. The characteristics and integrity of this floodplain forest around Butternut Creek would not be affected by the removal of trees adjacent to the highway, and this area of habitat would have the same potential to be used for foraging and/or roosting by Indiana bats under the Community Grid Alternative as at present.

Construction in the I-481 South Study Area would require the removal of a total of 7.6 acres of land with trees (for the roadway) bordering the eastern and western sides of I-81. These trees make up the current roadside edge of narrow, linear forest fragments that parallel the highway on both sides. They are bounded by I-81 in one direction, and roads, housing subdivisions, and other forms of development in the other direction. Tree clearing in this area would be limited to within 100 feet of the existing I-81 roadway and as such, would not substantively alter habitat conditions in the portions of these fragments that would remain. These areas of woodland bordering the highway are already narrow and isolated, such that the removal of trees along their edges would not cause any additional fragmentation of forest or otherwise compromise forest integrity.

Overall, the clearing of 7.6 total acres of woodland along I-81 in the I-481 South Study Area, 0.3 total acres of woodland along I-481 in the I-481 East Study Area, and 2.8 acres of woodland (a total of 10.7 acres) in the I-481 North Study Area would not be expected to represent a substantial

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loss of quality potential roosting or foraging habitat for Indiana bats. As discussed above, roost tree availability is unlikely to be a limiting factor in the regulation of Indiana bat population sizes, and colonies and social networks of Indiana bats have been shown to be robust to the loss of previously used roost trees. Indiana bats are known to naturally change roost trees on a regular basis on a scale of hundreds of feet to more than a mile (Kurta et al. 2002, Menzel et al. 2002, Owen et al. 2002, Johnson et al. 2009), and when primary roosts are lost, the bats relocate to new roosting areas (Silvis et al. 2014a,b). Small and narrow fragments of woodland along major roadways, like those that would be affected in the I-481 East and I-481 South Study Areas for the Community Grid Alternative, would remain common throughout the Syracuse metropolitan area and available for any Indiana bats potentially displaced from the affected areas. For these reasons, the Community Grid Alternative would not be expected to substantially affect roost tree availability for Indiana bats in the Syracuse area. As a precaution to avoid any potential for direct impacts, all tree clearing would be restricted to the winter hibernation period (November 1 – March 31) (see **Section E, Conservation Measures**). This and all other aspects of tree clearing for the Community Grid Alternative would be consistent with the tree removal Avoidance and Minimization Measures in the USFWS/FHWA RWPC.

As indicated in **Table J-8-4**, the NYNHP indicates known Indiana bat roost trees 0.25 to 2.5 miles from the I-481 South Study Area and less than 2.5 miles from the I-481 East Study Area. The closest Indiana bat hibernaculum is greater than 2.5 miles from the I-481 South Study Area and greater than 2.5 miles from the I-481 East Study Area. There are no Indiana bat hibernaculum or roost trees within 2.5 miles from the Central or I-481 North Study Areas.

Trees would not be removed for noise walls in the I-481 South Study Area (see **Appendix J-6, Figure J-6-3**). **Appendix J-6, Figures J-6-3 through J-6-7** show the approximate area of tree removal for the Community Grid Alternative.

There are bridges in the I-481 North, I-481 South, and the I-481 East Study Areas that would be modified, removed, or replaced as part of the Community Grid Alternative. These bridges would be inspected in accordance with the FHWA New York Division Bridge Bat Survey Form during the roosting season (April 1 to September 30) to determine if there is any evidence of bats actively using them. In the event that any bats are observed utilizing a bridge, all bridge Avoidance and Minimization Measures in the USFWS/FHWA RWPC would be adopted to the greatest extent possible. FHWA would be consulted in the event that any of the measures could not be implemented to determine the proper course of action.

Similar to roosting habitat, the areas in which tree clearing would occur in the I-481 South, I-481 East, and I-481 North Study Areas for the Community Grid Alternative are unlikely to represent quality foraging habitat for Indiana bats because they are located immediately adjacent to major roadways. Bridges in the Central Study area would not require Bridge Bat Survey as the IPaC System does not identify the Indiana bat occurring in the study area. As discussed above for the Viaduct Alternative, foraging Indiana bats have been found to avoid roads, often reversing course when a road is encountered. This appears to be due more so to the presence of motor vehicles than the physical presence of the road itself (Zurcher et al. 2010, Bennett and Zurcher 2013). The areas where tree clearing would occur for the Community Grid Alternative are subjected to high levels of motor vehicle traffic noise and visual disturbance, which is expected to limit the likelihood that they are used for foraging by Indiana bats. Loss of these trees would not be expected to substantially affect foraging habitat availability for the region's population of Indiana bats. Comparable roadside edge habitat would remain abundant along I-481 and other major roadways in the region.

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As with the Viaduct Alternative, noises and vibrations generated during construction of the Community Grid Alternative would not be expected to affect any Indiana bats potentially occurring in any of the study areas, given that noise levels are already extremely high under existing conditions. Current occurrence of Indiana bats under these conditions would inherently indicate a high tolerance of, and habituation to, the anthropogenic disturbances that are associated with the roadside environment along I-81 and I-481. Indiana bats in general have been known to roost near construction sites, major airports, and other extremely noisy locations (Sparks et al. 1998, Keeley and Tuttle 1999, Niver 2009), suggesting that while they are roosting, they are tolerant of loud noises and vibrations caused by human activity. Foraging behavior of Indiana bats has also been found to be unaffected by extremely loud noises and reverberations, such as artillery fire on military bases (Shapiro and Hohmann 2005). Sounds generated by heavy construction equipment and similar sources typically fall well below the hearing and echolocation frequency ranges of bats, which may largely explain this tolerance of loud noises (Delaney and Grubb 2004, Niver 2009). In contrast, higher frequency noises like those of cars and light trucks, can displace foraging Indiana bats and other *Myotis* species from an area (Schaub et al. 2008, Zurcher et al. 2010, Bennett and Zurcher 2013). Given that the I-481 South and I-481 East Study Areas are already chronically subjected to high frequency noises from motor vehicles, and the heavy construction equipment noise that would be generated by the Project would be unlikely to be heard by roosting or foraging of Indiana bats, construction of the Community Grid Alternative would not be expected to impact any Indiana bats potentially occurring in these areas. Similarly, operation of the Community Grid Alternative would be comparable to current traffic conditions and therefore would not elevate disturbance levels to an extent that would potentially affect Indiana bats. Noise barriers that would be constructed along portions of I-81 and I-481 would further avoid the potential for increased noise or visual disturbance in neighboring areas during operation of the Community Grid Alternative.

Temporary lighting used during construction and permanent lighting used during operation would follow the relevant Avoidance and Minimization Measures in the USFWS/FHWA RWPC. These include directing temporary construction lighting away from suitable habitat during the active season, using downward-facing, full cut-off lens lights during project operation, and directing lighting away from suitable habitat when installing new or replacing existing permanent lights.

Given that the Project under the Community Grid Alternative would limit tree clearing to the winter hibernation period (November 1 – March 31), is within 100 feet of existing roadways, is more than 0.5 miles from a hibernaculum, but less than 2.5 miles from a known roost tree, and would follow the applicable Avoidance and Minimization Measures of the USFWS/FHWA RWPC; NYSDOT has made a preliminary effect determination of “*may affect, not likely to adversely affect*” for the Indiana bat for the Community Grid Alternative.

**Table J-8-4**

**Community Grid Alternative: Tree Cutting Distances for Indiana Bat**

Study Area	Roost Trees	Hibernaculum
Central Study Area	>2.5 miles	>2.5 miles
I-481 South Study	<2.5 miles	<2.5 miles
I-481 East Study Area	<2.5 miles	>2.5 miles
I-481 North Study Area	>2.5 miles	>2.5 miles

### NORTHERN LONG-EARED BAT

Construction of the Community Grid Alternative would include all of the actions described above for the Viaduct Alternative in the Central Study Area, as well as additional construction in the I-481 North, I-481 South, and the I-481 East Study Areas. **Appendix J-5, Figure J-5-1 and Figures J-5-5 through J-5-9** show the approximate location of the proposed work in the Central, I-481 South, I-481 East and I-481 North Study Areas. As discussed above, the USFWS IPaC System has records of northern long-eared bat in the vicinity of the I-481 South and I-481 East Study Areas. There are no USFWS IPaC System records of northern long-eared bats occurring in the vicinity of the I-481 North Study Area.

Because northern long-eared bats are sensitive to urbanization and fragmentation and prefer large tracts of interior forest for roosting and foraging (Foster and Kurta 1999, Broders et al. 2006, Henderson et al. 2008, Segers and Broders 2014), there is little habitat in the Project Area that is considered potentially suitable for northern long-eared bats. One area where northern long-eared bats could potentially occur is in the woodland fragments bordering the east and west sides of the I-481 South Study Area, but these fragments may be too small and have too high of an edge to area ratio to be suitable. The closest summer habitat to the I-481 East Study Area that is most suitable for northern long-eared bats is the woodland east of I-481 and south of I-90 (New York State Thruway). This approximately 1-mile wide and 0.7-mile long woodland is bisected by two utility rights-of-way (ROW), but may be large enough to support northern long-eared bats. Suitable roost trees are likely abundant in this area. The wooded area around Butternut Creek northeast of the CSX rail line in the I-481 East Study Area may also represent suitable habitat for the northern long-eared bat. Because of their well-documented avoidance of urban areas and sharp edges (Owen et al. 2003, Patriquin and Barclay 2003, Carter and Feldhammer 2005, Morris et al. 2010, Segers and Broders 2014), northern long-eared bats are not likely to occur within the Central or I-481 North Study Areas.

Construction in the I-481 East Study Area would require the clearing of 0.3 acres of land with trees. In the northern portion of the study area, the tree clearing would occur immediately adjacent to and within 100 feet of the existing boundaries of I-481 and the Exit 5W on- and off-ramps. These trees that would be removed along the eastern and western sides of I-481 and the exit ramps are not part of a tract of contiguous forest and instead are part of narrow roadside fragments that are closely bounded between I-481 and other roads or forms of development in each direction. These trees along the roadside edge are not expected to represent potential roosting habitat for northern long-eared bats, given their well-documented avoidance of sharp edges in favor of interior forest. As such, their removal would not be likely to reduce roosting habitat availability in the area for northern long-eared bats. The trees that would be removed on the east side of I-481 are part of an approximately 200-ft wide linear fragment that is bound by I-481 to the west and Pheasant Road to the east (see **Appendix J-6, Figure J-6-7**), such that the larger tract of forest to the east of Pheasant Road that may support northern long-eared bats would not be directly affected. Northern long-eared bats would not be expected to utilize this narrow band of trees along the highway margin over the larger tract of more suitable mature forest habitat immediately to the east of Pheasant Road. The tree removal that would occur in the southern portion of the I-481 East Study Area would also be limited to within 100 feet of the existing roadway, immediately adjacent to major transportation infrastructure, where roosting habitat suitability for northern long-eared bats is considered extremely low. Any northern long-eared bats potentially present in the vicinity of this area would be most likely to occur in the floodplain forest that is further to the east and more removed from the disturbances associated with I-481. The characteristics and integrity of this floodplain forest around Butternut Creek would not be affected by the removal of trees

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adjacent to the highway, and this area of habitat would have the same potential to be used for foraging and/or roosting by northern long-eared bats under the Community Grid Alternative as at present.

Construction in the I-481 South Study Area would require the clearing of a total of approximately 7.6 acres of land with trees (for the roadway) that borders the eastern and western sides of I-81. These trees make up the current roadside edge of narrow, linear forest fragments that parallel the highway on both sides. They are closely bound by I-81 in one direction and roads, housing subdivisions, and other forms of development in the other direction, and therefore lack any interior, forest core habitat that is preferred by northern long-eared bats. Tree clearing in this area would be limited to within 100 feet of the existing I-81 roadway, where northern long-eared bats are unlikely to roost. Clearing along the edges of these forest fragments would further reduce their width, but because they are already too narrow to contain any interior, core forest habitat, habitat suitability for northern long-eared bats and the likelihood of their occurrence in these areas would not be expected to change.

Overall, the clearing of 7.6 total acres of woodland along I-81 in the I-481 South Study Area, 0.3 total acres of woodland along I-481 in the I-481 East Study Area, and 7.7 acres of woodland (a total of 15.6 acres) in the Central Study Area would not be expected to represent a substantial loss of quality potential roosting or foraging habitat for northern long-eared bats. As discussed above, roost tree availability in general is not believed to currently be a limiting factor in the regulation of northern long-eared bat population sizes, and northern long-eared bats are known to be robust to the loss of previously used roost trees. Northern long-eared bats naturally change roost trees throughout the summer on a scale of hundreds of feet to more than a mile (Menzel et al. 2002, Owen et al. 2002, Johnson et al. 2009), and when primary roosts are lost, the bats relocate to new roosting areas (Silvis et al. 2014b). Small and narrow fragments of woodland along major roadways, like those that would be affected in the I-481 South, I-481 East Study Areas, and Central Study Areas for the Community Grid Alternative, would remain common throughout the Syracuse metropolitan area and available for any northern long-eared bats potentially displaced from the affected areas. For these reasons, the Community Grid Alternative would not likely adversely affect habitat availability for northern long-eared bats in the Syracuse area. As a precaution to avoid any potential for direct impacts, all tree clearing would be restricted to the winter hibernation period (November 1–March 31) (see **Section E, Conservation Measures**). This and all other aspects of tree clearing for the Community Grid Alternative would be consistent with the tree removal Avoidance and Minimization Measures in the USFWS/FHWA RWPC.

As indicated in **Table J-8-5**, the NYNHP has no records of northern long-eared bat roost trees within 1.5 miles from the I-481 North, I-481 South, or I-481 East Study Areas. However, NYNHP has records of northern long-eared roost trees within 1.5 miles of the Central Study Area. In addition, the NYNHP has records of a northern long-eared bat hibernaculum greater than 5 miles from the Central and I-481 North Study Areas and less than 5 miles from the I-481 South and I-481 East Study Areas, and a roost location more than 1.5 miles away from the Central Study Area. **Appendix J-6, Figures J-6-3 through J-6-7** show the approximate area of tree removal for the Community Grid Alternative.

There are bridges in the I-481 South, I-481 East, and Central Study Areas that would be modified, removed, or replaced as part of the Community Grid Alternative. These bridges would be inspected in accordance with the FHWA New York Division Bridge Bat Survey Form during the roosting season (April 1 to October 31) to determine if there is any evidence of bats actively using them. In the event that bats are observed, applicable bridge Avoidance and Minimization Measures

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in the USFWS/FHWA RWPC would be adopted to the greatest extent possible. FHWA would be consulted in the event that any of the measures could not be implemented to determine the proper course of action.

Similar to roosting habitat, the areas where tree clearing would occur in the I-481 South, I-481 East, and Central Study Areas for the Community Grid Alternative are unlikely to represent quality foraging habitat for northern long-eared bats because they are located immediately adjacent to major roadways. As discussed above for the Viaduct Alternative, foraging northern long-eared bats have been found to avoid roads, often reversing course when a road is encountered. This appears to be due more so to the presence of motor vehicles than the physical presence of the road itself (Zurcher et al. 2010, Bennett and Zurcher 2013). The areas where tree clearing would occur for the Community Grid Alternative are subjected to high levels of motor vehicle traffic noise and visual disturbance, which is expected to limit the likelihood that they are used for foraging by Indiana bats. Loss of these trees would not be expected to substantially affect foraging habitat availability for the region's population of northern long-eared bats. Comparable roadside edge habitat would remain abundant along I-481 and other major roadways in the region.

As with the Viaduct Alternative discussed above, construction noises generated during construction of the Community Grid Alternative would not be expected to affect any northern long-eared bats potentially occurring in the study areas, given that noise levels are already extremely high under existing conditions. Presence of northern long-eared bats under these conditions would inherently indicate a high tolerance of, and habituation to, the anthropogenic disturbances that are associated with the roadside environment along I-81 and I-481. To our knowledge, there have not been any studies of the sensitivity of northern long-eared bats to construction noises or other forms of noise disturbance. However, northern long-eared bats have been observed roosting in areas with substantial noise and vibration levels, such as near the Indianapolis International Airport (Sparks et al. 1998) and under bridges (Feldhamer et al. 2003), which suggests that they can be tolerant of chronic anthropogenic noise disturbance and vibration while roosting if the habitat is otherwise suitable. Like Indiana bats, loud noises like those generated by heavy construction equipment are well below the expected hearing and echolocation frequency ranges of northern long-eared bats (Delaney and Grubb 2004, Niver 2009). Higher frequency noises, however, like those of cars and light trucks, can displace foraging *Myotis* bats (Schaub et al. 2008, Zurcher et al. 2010, Bennett and Zurcher 2013), like northern long-eared bats, from an area. Given that the I-481 South, I-481 East, and Central Study Areas are already chronically subjected to high frequency noises from motor vehicles, and the heavy construction equipment noise that would be generated by the Project would be unlikely to affect roosting or foraging of northern long-eared bats, construction of the Community Grid Alternative would not be expected to impact any northern long-eared bats potentially occurring in these areas. Similarly, operation of the Community Grid Alternative would be comparable to current traffic conditions and therefore would not elevate disturbance levels to an extent that would potentially affect northern long-eared bats. Noise barriers that would be constructed along portions of I-81 and I-481 would further avoid the potential for increased noise or visual disturbance in neighboring areas during operation of the Community Grid Alternative.

Temporary lighting used during construction and permanent lighting used during operation would follow the relevant Avoidance and Minimization Measures in the USFWS/FHWA RWPC. These include directing temporary construction lighting away from suitable habitat during the active season, using downward-facing, full cut-off lens lights during project operation, and directing lighting away from suitable habitat when installing new or replacing existing permanent lights.

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Given that the Project under the Community Grid Alternative would limit tree clearing in the I-481 South, I-481 East, and Central Study Areas to the winter hibernation period (November 1 – March 31), is more than 0.5 miles from a hibernaculum and more than 150 feet from a known roost tree, is within 100 feet of existing roadways, and would follow the applicable Avoidance and Minimization Measures of the USFWS/FHWA RWPC; NYSDOT has made a preliminary effect determination of “*may affect, not likely to adversely affect*” for the northern long-eared bat for the Community Grid Alternative.

**Table J-8-5**

**Community Grid: Tree Cutting Distances for Northern Long-Eared Bat**

Study Area	Roost Trees	Hibernaculum
Central Study Area	<1.5 miles	>5.0 miles
I-481 South Study Area	>1.5 miles	<5.0 miles
I-481 East Study Area	>1.5 miles	<5.0 miles
I-481 North Study Area	>1.5 miles	>5.0 miles

### EASTERN MASSASAUGA

Construction of the Community Grid Alternative would include all of the actions described above for the Viaduct Alternative in the Central Study Area, as well as additional construction in the I-481 North, I-481 South, and the I-481 East Study Areas. **Appendix J-5, Figures J-5-5 through J-5-9** show the approximate location of the proposed work in the Central, I-481 South, I-481 East and I-481 North Study Areas. As discussed under **Section C**, eastern massasaugas are considered unlikely to occur in any of the four study areas due to the high density of urban development and lack of the species’ preferred habitat of fens, marshes, and wet prairies. As discussed above the NYNHP has only one record of this species occurring within the Project Area and that is adjacent to the I-481 North Study Area.

The Community Grid Alternative would affect a total of 2.6 acres of ditches, 64.0 acres of impervious surfaces, 61.6 acres of mowed lawns/mowed lawns with trees, 7.6 acres of successional southern hardwood forests,<sup>6</sup> 18.9 acres of successional old fields, 15.2 acres of successional shrublands, 23.2 acres of floodplain forests, 0.6 acres of freshwater wetlands, and 0.04 acres of surface waters in the I-481 North Study Area. Although Mud Creek, on the eastern edge of the I-481 North Study Area, has a hydrological connection to a known location of the eastern massasaugas via unnamed NYSDEC Class C streams, the habitat types within the I-481 North Study Area are not suitable for the eastern massasauga. As discussed under **Section C**, roads, residential neighborhoods, and other human-altered landscapes are barriers to eastern massasauga movements (Moore and Gillingham 2006), and movement of eastern massasaugas out of their current location to the east along these unnamed NYSDEC Class C streams that eventually connect to Mud Creek within the I-481 North Study Area is considered extremely unlikely. These streams extend through heavily developed areas and are culverted under major roads in several locations, and therefore would not be expected to be used by eastern massasaugas to disperse

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<sup>6</sup> Successional southern hardwoods vegetation is present in the roadcut cliff/slope community and for this reason acreages associated with this community are included in the successional southern hardwoods acreages. Approximately 5.7 acres of roadcut cliff/community within the 69.4 acres of successional southern hardwoods effects would be affected by the Community Grid Alternative.

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outside of their current location. Additionally, as noted above, telemetry studies of eastern massasaugas in their current location have not observed any movements of individuals outside of their current location via these streams or otherwise (Johnson and Breisch 1993; Johnson 1995, 2000). For each of these reasons, eastern massasaugas would not be expected to occur within the I-481 North Study Area. The acreage of roadside lawn, successional old field, shrubland, woodland, wetland, ditch, surface water, and impervious surface that would be impacted within the limits of disturbance in the I-481 North Study Area would not eliminate any habitat that would be capable of supporting the species. Nevertheless, as a protective measure to avoid any potential for direct impacts to any eastern massasaugas, rattlesnake fencing would be erected around the limits of disturbance prior to construction to prevent eastern massasaugas from being able to enter the construction area.

For these reasons, eastern massasaugas are not expected to occur in any portion of the Project Area. Therefore, NYSDOT has made a preliminary effect determination of “*no effect-no habitat*” for the eastern massasaugas for the Community Grid Alternative.

### BALD EAGLE

As discussed above, NYNHP has a record of non-breeding bald eagles perching and foraging along the shoreline of Onondaga Lake. This area is on the periphery of the Central Study Area and the I-481 North Study Area, and therefore non-breeding bald eagles have the potential to occur there. The sensitivity of bald eagles to human disturbance is greatest during courtship and nest-building, which take place in New York between December and March, and then declines as the nesting period progresses and eventually ends (USFWS 2007b). Decades ago, bald eagles were considered to be sensitive to human disturbance even outside of the breeding season (e.g., Stalmaster and Newman 1978, Nye 1994, Stalmaster and Kaiser 1997), with concern that repeated displacement from important roosting and foraging areas could waste energy reserves at a time of year when energy demands are high (Stalmaster and Gessaman 1984). Since then, however, bald eagles have shown a rapid and substantial generational habituation to human disturbance during both the breeding and non-breeding periods, and an increasing tolerance of development, including urbanization (Johnson 2010, Guinn 2013). In many parts of their range, bald eagles are increasingly nesting and occurring during the non-breeding periods in areas with heavy levels of human activity where they would almost never be found only a few decades ago (Millsap et al. 2004, Guinn 2013). This includes nesting by bald eagles in recent years within major metropolitan areas, including New York City, Washington D.C., Philadelphia, and Pittsburgh (Sullivan 2016). The use of Onondaga Lake in the City of Syracuse by bald eagles is another such example of bald eagles having acclimated to an urban area with extremely high levels of disturbance. Any non-breeding bald eagles utilizing the lake and its shorelines inherently display a high tolerance of human activity as well as degraded habitat.

Construction and operation of the Community Grid Alternative in the Central Study Area and I-481 North Study Area would be the same as described above for the Viaduct Alternative. The Community Grid Alternative would include the construction and operation of a reconstructed system of ramps connecting I-81 to Park Street, State Route 370, Old Liverpool Road (Central Study Area), and noise barrier construction in the vicinity of Exits 25a and 26 (I-481 North Study Area). The closest construction activity to Onondaga Lake would consist of road repaving approximately 200 feet away from the southeastern shoreline. At slightly greater distances, the road reconstruction would likely include louder activities such as jack-hammering and pile-driving. The USFWS Bald Eagle Management Guidelines (USFWS 2007b) do not provide guidance on buffer distances for construction disturbance near habitats used by non-breeding



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eagles but recommend a minimum buffer of 330 feet from nests. Given the lower sensitivity of bald eagles to disturbance during the non-breeding period compared to the nesting period (USFWS 2007b) and the high existing levels of disturbance and urban setting of the area of Onondaga Lake where non-breeding bald eagles have been observed, a minimum distance of 200 feet from the closest area of construction to the closest point of lakeshore where non-breeding eagles could occur is expected to be more than sufficient for reducing the likelihood of any potential disturbance from construction noise. In the event that any bald eagles would be displaced by construction noise from the small area of the lake and shoreline near the site of construction, the effect would be highly temporary, and the eagles would be able to easily distance themselves from the activity and utilize nearby areas of the lake and its shoreline without negative consequence. Operation of the Community Grid Alternative would not bring motor vehicle traffic any closer to the Onondaga Lake shoreline than at present or increase existing levels of disturbance. Given that paved roads with heavy traffic are already present near the shoreline in this area, operation of the Community Grid Alternative would not eliminate quality habitat or otherwise permanently alter the current conditions on Onondaga Lake for non-breeding bald eagles. The Community Grid Alternative would not create disruptive activities or development in the direct flight paths of eagles between roost sites and important foraging areas, and in all other aspects would be in accordance with the USFWS Bald Eagle Management Guidelines' "recommendations for avoiding disturbance at foraging areas and communal roost sites" (USFWS 2007b). Therefore, no impacts to the NYNHP mapped bald eagle foraging and perching area are anticipated and NYSDOT has made a preliminary effect determination of "*Take Unlikely*" for the bald eagle for the Community Grid Alternative.

### AMERICAN HART'S-TONGUE FERN

As described above, the NYNHP database indicates that the American hart's-tongue fern has been documented adjacent to the I-481 South Study Area and the USFWS IPaC database indicates the species had the potential to occur within the I-481 South Study Area. The NYNHP has no known occurrences of the American hart's-tongue fern within or adjacent to the I-481 North, I-481 East, or Central Study Areas and there is no suitable habitat for this species within or adjacent to these study areas. Additionally, the American hart's-tongue fern did not come up on the USFWS's IPaC database search for these three study areas. **Appendix J-5, Figures J-5-8 and J-5-9** show the approximate location of the proposed work in the I-481 South Study Area.

Because the NYNHP database shows American hart's-tongue fern as occurring adjacent to the I-481 South Study Area and limited forested/roadcut cliff/slope cut communities (i.e., rocky habitats) are present within the limits of disturbance, a targeted search for the American hart's-tongue fern was conducted in the vicinity of the roadcut cliff/slope (6.0 acres) communities located in the limits of disturbance of the I-481 South Study Area. A team of two plant ecologists conducted a survey for the American hart's-tongue fern on April 18, 19, and 20, 2017 within forested (i.e., southern successional hardwoods) habitats containing roadcut cliff/slope habitat of the I-481 South Study Area.<sup>7</sup> The field biologists walked meandering transect lines, generally oriented south to north, spaced approximately 20 feet wide, as the areas and the terrain would allow. The team walked at a slow walking pace, stopping approximately every 50 feet for closer examination of species and habitat suitability. Potential habitat areas were traversed at a slower

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<sup>7</sup> The vegetation of the roadcut cliff/slope ecological community within the I-481 South Study Area consists of successional southern hardwoods. Therefore, roadcut cliff/slope ecological community acreages (6.0 acres) are counted with the successional southern hardwoods acreages.

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pace and up to five minutes were taken at stopping points, for closer examination of plants and habitat. No American hart's-tongue fern individuals were found within the I-481 South Study Area during the targeted searches for this species.

In addition, as described above, on July 13, 2017, a site investigation was conducted in the vicinity of proposed Noise Barrier 9 in the I-481 South Study Area to determine if habitat for American hart's-tongue fern is present. Habitat in the vicinity of the expanded portion of the I-481 South Study Area consists of a disturbed ROW. It was determined that no suitable habitat for American hart's-tongue fern is present in the vicinity of proposed Noise Barrier 9.

As discussed above, American hart's-tongue fern's preferred habitat is not present within the I-481 East, the Central or the I-481 North Study Areas and no species were found during a field survey in the I-481 South Study Area. Therefore, NYSDOT has made a preliminary effect determination of "*no effect*" for the American hart's-tongue fern for the Community Grid Alternative.

### E. CONSERVATION MEASURES

#### INDIANA BAT

All tree clearing in the I-481 South, I-481 East, and I-481 North Study Areas, under both the Viaduct Alternative and the Community Grid Alternative, would be limited to the winter hibernation period of Indiana bats to avoid any potential for direct impacts that could result from the removal of an active roost tree. Under FHWA/USFWS guidance, tree clearing during the November 1 to March 31 hibernation period "*may affect, not likely to adversely affect*" the Indiana bat. As an additional conservation measure, all tree clearing under both alternatives would be limited to within 100 feet of existing roads, where habitat conditions are degraded, and high-quality roosting or foraging habitat is not likely to be lost. This would avoid any unnecessary fragmentation or loss of larger tracts of woodland habitat in and near the study areas that are more distant from the disturbances associated with I-81 and I-481. In accordance with tree removal Avoidance and Minimization Measures in the USFWS/FHWA RWPC, all tree clearing areas would be clearly and brightly marked for Contractors. All of the tree clearing would occur more than 0.25 miles away from a known roost tree. Also, no trees within 0.5 miles of a known hibernaculum would be removed. Because of the possibility of Indiana bats roosting under bridges, all bridges that would be affected by the Viaduct Alternative or the Community Grid Alternative would be inspected in accordance with the FHWA New York Division Bridge Bat Survey Form during the roosting season (April 1 to September 30) to determine if there is any evidence of bats actively using them. In the event that bats are observed, applicable bridge Avoidance and Minimization Measures in the USFWS/FHWA RWPC would be adopted to the greatest extent possible. FHWA would be consulted in the event that any of the measures could not be implemented to determine the proper course of action.

Temporary lighting used during construction and permanent lighting used during operation would also follow the relevant Avoidance and Minimization Measures in the USFWS/FHWA RWPC. These include directing temporary construction lighting away from suitable habitat during the active season, using downward-facing, full cut-off lens lights during project operation, and directing lighting away from suitable habitat when installing new or replacing existing permanent lights.

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### NORTHERN LONG-EARED BAT

As discussed above for the Indiana bat, all tree clearing in the I-481 South, I-481 East, and Central Study Areas, under both the Viaduct Alternative and the Community Grid Alternative, would be limited to the winter hibernation period of northern long-eared bats to avoid any potential for direct impacts that could result from the removal of an active roost tree. Under FHWA/USFWS guidance, tree clearing outside of the May 1 to July 31 pup-rearing season of northern long-eared bats “*may affect, not likely to adversely affect*” the species. As an additional conservation measure, all tree clearing under both alternatives would be limited to within 100 feet of existing roads, where northern long-eared bat habitat suitability is likely very poor given their avoidance of sharp edges and small forest fragments. This would avoid any unnecessary fragmentation larger tracts of woodland habitat in and near the study areas that might be capable of supporting northern long-eared bats. Under both alternatives, northern long-eared bats would be expected to occur in these areas that are outside of the limits of disturbance with the same likelihood and in the same abundance as at present. In accordance with tree removal Avoidance and Minimization Measures in the USFWS/FHWA RWPC, all tree clearing areas would be clearly and brightly marked for Contractors, and no trees that are or are within 150 feet of known roosts or foraging areas or within 0.5 miles of a known hibernaculum would be removed. Because of the possibility of northern long-eared bats roosting under bridges, any bridges affected by construction of the Viaduct Alternative or the Community Grid Alternative would be inspected in accordance with the FHWA New York Division Bridge Bat Survey Form during the roosting season (April 1 to September 30) to determine if there is any evidence of bats actively using them. In the event that bats are observed, all bridge Avoidance and Minimization Measures in the USFWS/FHWA RWPC would be adopted to the greatest extent possible. FHWA would be consulted in the event that any of the measures could not be implemented to determine the proper course of action.

Temporary lighting used during construction and permanent lighting used during operation would also follow the relevant Avoidance and Minimization Measures in the USFWS/FHWA RWPC. These include directing temporary construction lighting away from suitable habitat during the active season, using downward-facing, full cut-off lens lights during project operation, and directing lighting away from suitable habitat when installing new or replacing existing permanent lights.

### EASTERN MASSASAUGA

Under both alternatives and in all four study areas, construction impacts would be limited to disturbed, roadside habitats that are not among the habitat types with which eastern massasaugas are associated. As a precautionary conservation measure, rattlesnake fencing would be erected around the limits of disturbance for the Viaduct Alternative and the Community Grid Alternative in the I-481 North Study Area because of its hydrological connection (via Mud Creek and its tributaries) to the known location of eastern massasaugas. Although eastern massasaugas are not known to occur anywhere in the county outside of their current location, this would ensure that no eastern massasaugas would have the potential to enter the construction area.

### BALD EAGLE

Bald eagles have become increasingly tolerant of human disturbance and more common in heavily developed landscapes. They are the least sensitive to disturbance during the non-breeding season. Non-breeding bald eagles have been documented Onondaga Lake, which is in an urban area, surrounded by development and subjected to high levels of human disturbance. Any non-breeding bald eagles utilizing the lake and its shorelines is inherently tolerant of human activity and

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degraded habitat. Construction of either alternative would not eliminate quality habitat for bald eagles or limit their foraging or roosting opportunities on Onondaga Lake. It is possible that construction activity would displace bald eagles from potentially occurring in the immediate vicinity of the work, but any such displacement would be temporary. Any bald eagles that could potentially be temporarily displaced from the small and immediate area of construction would be able to easily distance themselves from the activity and utilize nearby areas of the lake and its shoreline without negative consequence. Because only a small portion of shoreline in the southeastern corner of the lake might be subjected to disturbance from the construction of either alternative, there would be no disruptive activities or development in the direct flight paths of eagles between roost sites and important foraging areas. This and all other aspects of the activity in the Central Study Area and I-481 North Study Area would be in accordance with the USFWS Bald Eagle Management Guidelines' "recommendations for avoiding disturbance at foraging areas and communal roost sites" (USFWS 2007b). For these reasons, no specific conservation measures would be expected to be needed to avoid adverse impacts to bald eagles.

### AMERICAN HART'S-TONGUE FERN

Under both alternatives and in all four study areas, construction impacts would be limited to disturbed, roadside habitats that are not among the habitat types with which American hart's-tongue fern is known to occur. No individuals of this species were identified during the targeted surveys for this species that were conducted within the limits of disturbance of the I-481 South Study Area. Should American hart's-tongue fern individuals be found during construction of the Project, coordination with USFWS for a Protection Plan for these individuals would occur immediately upon discovery.

### CONCLUSIONS

Based on NYSDOT's commitment to cut trees in the winter tree cutting window (November 1–March 31) in the I-481 South, I-481 East, and I-481 North Study Areas, and the Viaduct Alternative is more than 0.5 miles from a hibernaculum, more than 0.25 miles from a known Indiana bat roost tree, more than 150 feet from a known northern long-eared bat roost tree, is within 100 feet of existing roadways, and NYSDOT would incorporate necessary Avoidance and Minimization Measures in the USFWS/FHWA RWPC (for the bats), the lack of preferred habitat (for eastern massasauga, Indiana bat and northern long-eared bat), and the lack of preferred habitat/no individuals found during the field survey for the American hart's-tongue fern NYSDOT has made the following preliminary effect determinations for the Viaduct Alternative:

- Indiana bat – *“may affect, not likely to adversely affect”*
- Northern long-eared bat – *“may affect, not likely to adversely affect”*
- Eastern massasauga – *“no effect-no habitat”*
- Bald eagle – *“take unlikely”*
- American hart's-tongue fern – *“no effect”*

Based on NYSDOT's commitment to cut trees in the winter tree cutting window (November 1 – March 31) in the I-481 South, I-481 East, and I-481 North Study Areas, and the Community Grid Alternative is more than 0.5 miles from a hibernaculum, more than 0.25 miles from a known Indiana bat roost tree, more than 150 from a known northern long-eared bat roost tree, is within 100 feet of existing roadways, and NYSDOT would incorporate necessary Avoidance and Minimization Measures in the USFWS/FHWA RWPC (for the bats), the lack of preferred habitat (for eastern massasauga), and the lack of preferred habitat/no individuals found during the field

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survey (for the American hart's-tongue fern) NYSDOT has made the following preliminary effect determinations for the Community Grid Alternative:

- Indiana bat – “*may affect, not likely to adversely affect*”
- Northern long-eared bat – “*may affect, but not likely to adversely affect*”
- Eastern massasauga – “*no effect-no habitat*”
- Bald eagle – “*take unlikely*”
- American hart's-tongue fern – “*no effect*”

## F. LITERATURE CITED

- Adams, A.M. 2013. Assessing and analyzing bat activity with acoustic monitoring: challenges and interpretations. Ph.D. Dissertation, University of Western Ontario, London, Canada. Available from: <http://ir.lib.uwo.ca/cgi/viewcontent.cgi?article=2679&context=etd>
- Barclay, R.M. and A. Kurta. 2007. Ecology and behavior of bats roosting in tree cavities and under bark. Pp. 17-59 in: Bats in forests: conservation and management (M.J. Lacki, J.P. Hayes, and A. Kurta, eds.). Johns Hopkins Press, Baltimore, MD.
- Bennett V.J. and A.A. Zurcher. 2013. When corridors collide: Road-related disturbance in commuting bats. *Journal of Wildlife Management*. 77:93-101.
- Brack, V. and J.O. Whitaker. 2001. Foods of the Northern myotis, *Myotis septentrionalis*, from Missouri and Indiana, with notes on foraging. *Acta Chiropterologica* 3(2): 203-210.
- Britzke, E.R., A.C. Hicks, S.L. Von Oettingen, S.R. Darling. 2006. Description of spring roost trees used by female Indiana bats in the Lake Champlain Valley of Vermont and New York. *Am Midland Nat* 155:181-187.
- Broders, H.G., G.J. Forbes, S. Woodley, and I.D. Thompson. 2006. Range extent and stand selection for forest-dwelling northern long-eared and little brown bats in New Brunswick. *Journal of Wildlife Management* 70: 1174-1184.
- Caceres, M. and R.M.R. Barclay. 2000. *Myotis septentrionalis*. *Mammal Species* 634:1-4.
- Callahan, E.V., R.D. Drobney and R.L. Clawson. 1997. Selection of summer roosting sites by Indiana bats (*Myotis sodalis*) in Missouri. *Journal of Mammalogy* 78:818-825.
- Carter, T.C., and G.A. Feldhamer. 2005. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. *Forest Ecology and Management* 219:259-268.
- Carter, T.C, S.K. Carroll, J.E. Hofmann, J.E. Gardner, G.A. Feldhamer. 2002. Landscape analysis of roosting habitat in Illinois. Pp. 160-164 in A. Kurta and J. Kennedy (eds.), *The Indiana bat: biology and management of an endangered species*. Bat Conservation International, Austin, TX.
- Crampton, L.H. and R.MR. Barclay. 1998. Selection of roosting and foraging habitat by bats in different-aged aspen mixedwood stands. *Conservation Biology* 12:1347–1358.

## Biological Evaluation

---

- Delaney, D.K. and T.G. Grubb. 2004. Sound recordings of road maintenance equipment on the Lincoln National Forest, New Mexico. USDA Forest Service, Rocky Mountain Research Station Research Paper RMRS-RP-49, Fort Collins, CO.
- Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (Eds). 2014. Ecological Communities of New York State, 2nd Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.
- Environmental Solutions and Innovations (ESI). 2008. Roosts of Indiana bats (*Myotis sodalis*) near the Indianapolis International Airport (1997-2001). Proceedings of the Indiana Academy of Science 117:193-202. Available from: <http://www.environmentalsi.com/DOCS/PDFs/110.pdf>
- Feldhamer, G.A., Carter, T.C., Morzillo, A.T. and Nicholson, E.H., 2003. Use of bridges as day roosts by bats in southern Illinois. Transactions of the Illinois State Academy of Science 96:107-112.
- Ford, W.M., M.A. Menzel, J.L. Rodrigue, J.M. Menzel, and J.B. Johnson. 2005. Relating bat species presence to simple habitat measures in a central Appalachian forest. Biological Conservation 126: 528-539.
- Foster, R.W. and A. Kurta, A. 1999. Roosting ecology of the northern bat (*Myotis septentrionalis*) and comparisons with the endangered Indiana bat (*Myotis sodalis*). Journal of Mammalogy 80: 659-672.
- Gibbs, J.P., A.R. Breisch, P.K. Ducey, G. Johnson, J.L. Behler, and R.C. Bothner. 2007. The amphibians and reptiles of New York State. Oxford University Press, New York.
- Harvey, M.J., J.S. Altenbach, and T.L. Best. 2011. Bats of the United States and Canada. Johns Hopkins University Press, Baltimore.
- Hays, J. and S. Loeb. 2007. The influence of forest management on bats in North America. Pp. 207-235 in: Bats in forests: conservation and management (M.J. Lacki, J.P. Hayes, and A. Kurta, eds.). Johns Hopkins Press, Baltimore, MD.
- Henderson, L.E., L.J. Farrow, and H.G. Broders. 2008. Intraspecific effects of forest loss on the distribution of the forest-dependent northern long-eared bat (*Myotis septentrionalis*). Biological Conservation 141:1819-1828.
- Humphrey, S.R., A.R. Richter, J.B. Cope. 1977. Summer habitat and ecology of the endangered Indiana bat, *Myotis sodalis*. J Mammal 58:334-346.
- Johnson, J.B., J.W. Edwards, W.M. Ford, and J.E. Gates. 2009. Roost tree selection by northern myotis (*Myotis septentrionalis*) maternity colonies following prescribed fire in a Central Appalachian Mountains hardwood forest. Forest Ecology and Management 258:233-242.

## Biological Evaluation

---

- Johnson, G. 2000. Spatial ecology of the eastern massasauga (*Sistrurus c. catenatus*) in a New York peatland. *Journal of Herpetology* 2000:186-192.
- Johnson, G. 1995. Spatial ecology, habitat preference, and habitat management of the eastern massasauga, *Sistrurus c. catenatus* in a New York weakly-minerotrophic peatland. Dissertation, State University of New York, College of Environmental Science and Forestry, Syracuse, NY.
- Johnson, G. and A.R. Breisch. 1993. The eastern massasauga rattlesnake in New York: occurrence and habitat management. Pp. 48-54 in: *Proceedings of the International Symposium and Workshop on the Conservation of the Eastern Massasauga Rattlesnake, Sistrurus catenatus*. Metro Toronto Zoo, West Hill, Ontario, Canada.
- Keeley, B.W. and M.D. Tuttle. 1999. Bats in American bridges. Bat Conservation International Resource Publication 4.
- Kitchell, M.E. 2008. Roost selection and landscape movements of female Indiana bats at the Great Swamp National Wildlife Refuge, New Jersey. M.S. thesis, William Patterson University of New Jersey. 178pp.
- Kunz, T.H. and L.F. Lumsden. 2003. Ecology of cavity and foliage roosting bats, p. 3–89. In: T. H. Kunz and M. B. Fenton (eds.). *Bat ecology*. The University of Chicago Press, Chicago, Illinois.
- Kurta, A. 2004. Roosting ecology and behavior of Indiana bats in summer. Pp. 29-42 In: *Proceedings of the Bat and Coal Mining Interactive Forum*, K.C. Vories and A. Harrington, Eds. U.S. Department of Interior, Office of Surface Mining, Alton, Illinois.
- Kurta, A., S.W. Murray, D.H. Miller. 2002. Roost selection and movements across the summer landscape. Pp. 118-129 in A. Kurta and J. Kennedy (eds.), *The Indiana bat: biology and management of an endangered species*. Bat Conservation International, Austin, TX.
- Lacki, M.J., S.K. Amelon, and M.D. Baker. 2007. Foraging ecology of bats in forests. Pp. 83-127 in: *Bats in forests: conservation and management* (M.J. Lacki, J.P. Hayes, and A. Kurta, eds.). Johns Hopkins Press, Baltimore, MD.
- Menzel, M.A., J.M. Menzel, T.C. Carter, W.M. Ford and J.W. Edwards. 2001. Review of the forest habitat relationships of the Indiana bat (*Myotis sodalis*). USDA Forest Service Gen. Tech. Rep. NE-284. Newtown Square, PA. 21 p.
- Menzel, M.A., S.F. Owen, W.M. Ford, J.W. Edwards, P.B. Wood, B.R. Chapman, and K.V. Miller. 2002. Roost tree selection by northern long-eared bat (*Myotis septentrionalis*) maternity colonies in an industrial forest of the central Appalachian Mountains. *Forest Ecology and Management* 155:107-114.
- Moore, J.A., and J.C. Gillingham. 2006. Spatial ecology and multi-scale habitat selection by a threatened rattlesnake: the eastern massasauga (*Sistrurus catenatus catenatus*). *Copeia* 2006:742-51.

## Biological Evaluation

---

- Morris, A.D., D.A. Miller, and M.C. Kalcounis-Reuppell. 2010. Use of forest edges by bats in a managed pine forest landscape. *Journal of Wildlife Management* 74: 26-34.
- Murray, S.W. and A. Kurta 2004. Nocturnal activity of the endangered Indiana bat (*Myotis sodalis*). *Journal of Zoology* 262:197-206.
- New York Natural Heritage Program (NYNHP). 2015. Online Conservation Guide for *Asplenium scolopendrium* var. *americanum*. Available from: <http://www.acris.nynhp.org/guide.php?id=9819>. Accessed May 9th, 2017.
- Niver, R. 2009. Biological opinion on the proposed activities on the Fort Drum military installation (2009-2011). US Fish and Wildlife Service, Cortland, NY.
- Nye, P.E., D. Mildner, and E. Leone. 1994. An assessment of the status of bald eagles on Iona Island, New York and recommendations for their management.
- Owen, S.F., M.A. Menzel, W.M. Ford, B.R. Chapman, K.V. Miller, J.W. Edwards, and P.B. Wood. 2003. Home-range size and habitat used by the northern myotis (*Myotis septentrionalis*). *American Midland Naturalist* 150:352-359.
- Owen, S.F., M.A. Menzel, W.M. Ford, J.W. Edwards, B.R. Chapman, K.V. Miller, P.B. Wood. 2002. Roost tree selection by maternal colonies of northern long-eared myotis in an intensively managed forest. U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 6 p.
- Patriquin, K.J. and R.M.R. Barclay. 2003. Foraging by bats in cleared, thinned and unharvested boreal forest. *Journal of Applied Ecology* 40:646-657.
- Schaub, A., J. Ostwald and B.M. Siemers. 2008. Foraging bats avoid noise. *Journal of Experimental Biology* 211:3174-3180.
- Sedgeley, J.A. and C.F.J. O'Donnell. 1999. Factors influencing roost cavity selection by a temperate rainforest bat (*Chalinolobus tuberculatus*, Vespertilionidae) in New Zealand. *Journal of Zoology* 249:437-446.
- Segers, J. L. and H. G. Broders. 2014. Interspecific effects of forest fragmentation on bats. *Canadian Journal of Zoology* 92: 665-673.
- Shapiro, A. and M.G. Hohmann. 2005. Summary of threatened and endangered bat-related restrictions on military training, testing, and land management. U.S. Army Corps of Engineers Report ERDC/CERL TR-05-13.
- Silvis, A., A.B. Kniewski, S.D. Gehrt, and W. M. Ford. 2014a. Roosting and foraging social structure of the endangered Indiana bat (*Myotis sodalis*). *PLoS One*: e96937.
- Silvis A, W.M. Ford, E.R. Britzke, and J.B. Johnson. 2014b. Association, roost use and simulated disruption of *Myotis septentrionalis* maternity colonies. *Behavioral Processes* 103: 283-290.



## Biological Evaluation

---

- Sparks, D.W., J.A. Laborda, and J.O. Whitaker Jr. 1998. Bats of the Indianapolis International Airport as compared to a more rural community of bats at Prairie Creek. *Proceedings of the Indiana Academy of Science* 107:171-180.
- U.S. Fish and Wildlife Service (USFWS). 2016a. Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat. *Federal Register* 81(9):1900-1922. January 14, 2016. Available from:  
<http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf>
- U.S. Fish and Wildlife Service (USFWS). 2015. "American Hart's Tongue Fern Fact Sheet." USFWS Endangered Species. October 15, 2015.  
<https://www.fws.gov/midwest/endangered/plants/amerihtf.html>.
- U.S. Fish and Wildlife Service (USFWS). 2014. Northern long-eared bat interim conference and planning guidance. Available from:  
<http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf>.
- U.S. Fish and Wildlife Service (USFWS). 2013. Northern long-eared bat. Available from:  
<http://www.fws.gov/midwest/endangered/mammals/nlba/nlbaFactSheet.html>
- U.S. Fish and Wildlife Service (USFWS). 2012. "American Hart's-Tongue Fern (*Asplenium Scolopendrium* var. *americanum*) 5-Year Review: Summary and Evaluation." U.S. Fish and Wildlife Service Ecological Services Field Office.  
[https://ecos.fws.gov/docs/five\\_year\\_review/doc4110.pdf](https://ecos.fws.gov/docs/five_year_review/doc4110.pdf).
- U.S. Fish and Wildlife Service (USFWS). 2011. Guidance on Developing and Implementing an Indiana Bat Conservation Plan. Available from:  
[http://www.fws.gov/northeast/pafo/pdf/IBAT\\_conservation\\_plan\\_guidance\\_PAFO\\_072611.pdf](http://www.fws.gov/northeast/pafo/pdf/IBAT_conservation_plan_guidance_PAFO_072611.pdf).
- U.S. Fish and Wildlife Service (USFWS). 2007a. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision, April 2007. USFWS Great Lakes-Big Rivers Region - Region 3, Fort Snelling, MN.
- U.S. Fish and Wildlife Service (USFWS). 2007b. National bald eagle management guidelines. <https://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf>
- Watrous, K.S., T.M. Donovan, R.M. Mickey, S.R. Darling, A.C. Hicks, S.L. Von Oettingen. 2006. Predicting minimum habitat characteristics for the Indiana bat in the Champlain Valley. *Journal of Wildlife Management* 70:1228-1237.
- Zurcher, A.A., D.W. Sparks, and V.J. Bennett. 2010. Why the bat did not cross the road? *Acta Chiropterologica* 12:337-340.

### G. LIST OF PREPARERS

The Biological Evaluation was prepared by Chad Seewagen, Ph.D., Technical Director and Senior Wildlife Biologist at AKRF Inc., with additional contributions from Aubrey McMahon, Senior Technical Director/Certified Arborist at AKRF, Inc.

Dr. Seewagen is a primary resource at AKRF for diverse projects relating to wildlife and threatened and endangered species, as well as other natural resources. He has 18 years of experience working as a professional wildlife biologist in the Northeast and has a strong working knowledge of the region's federally and state-listed species, including both terrestrial and aquatic organisms. At AKRF he often conducts targeted surveys for threatened and endangered species, and frequently prepares Endangered Species Act Section 7 Biological Evaluations and similar impact assessments. Dr. Seewagen has prepared several Section 7 Biological Evaluations and Biological Assessments for Indiana and northern long-eared bats, each of which has received concurrence with their determinations by USFWS.

Ms. McMahon is a primary plant ecologist at AKRF, Inc. for projects related to plants and trees including threatened and endangered species. She has 18 years of experience working as a plant ecologist in New York. At AKRF, she often conducts targeted surveys for threatened and endangered plants. Ms. McMahon has conducted numerous plant species surveys where listed individuals or populations of plants have been identified in the field. As part of her survey work, she has prepared documentation regarding her findings as well as numerous plant species transplanting and protection plans. Ms. McMahon has also supervised maintenance crews during the transplanting and/or care of listed plants that she has identified in the field.