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October 23, 2020

Mr. Chris Hamilton
Assistant State Conservationist – Water Resources and Easements
Natural Resources Conservation Service
601 Business Loop 70 W Suite 250
Columbia, MO 65203

Subject: Biological Opinion for the East Locust Creek Reservoir Project (Reference Number:
03E14000-2018-F-0820)

Dear Mr. Hamilton,

This document is in response to the Natural Resources Conservation Service (NRCS) June 8, 2020, request for confirmation of initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the East Locust Creek Reservoir Project (Project) in Sullivan County, Missouri, and transmits our final biological opinion (BO) under Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Pursuant to 50 CFR 402.12(j), this BO is based on information provided in the October 20, 2020 Final Biological Assessment (BA) prepared by Olsson (Olsson Project Number A11-1513), on behalf of NRCS and the federal partners on this Project, other available literature, survey data, and other sources of information. A complete administrative record of this consultation is on file at the Missouri Ecological Services Field Office.

The Project on which we are consulting is the funding, authorization, and construction of a 2,328-acre multipurpose reservoir in Sullivan County, Missouri. NRCS is the lead federal agency, but this consultation includes the actions of federal funding provided through Federal Highway Administration (FHWA) via a grant program, U.S. Department of Agriculture – Rural Development (USDA – RD) is providing federal loans and grants, and a U.S. Army Corps of Engineers (Corps) Clean Water Act (CWA) Section 404 individual permit for impacts to streams, e.g., East Locust Creek, and wetlands due to the Project. The findings within the BA conclude that the Project may affect, and is likely to adversely affect the federally endangered Indiana bat (*Myotis sodalis*). The Service concurs with the likely to adversely affect determination for the Indiana bat, and the BO provides a statement of anticipated incidental take as a result of the Project. The Incidental Take Statement (ITS) issued exempts the NRCS and the Project's partners from the prohibitions of take under Section 9 of the Endangered Species Act provided that such taking is in compliance with the terms and conditions of the ITS.

The NRCS has determined that Project activities also are likely to adversely affect the northern long-eared bat (*Myotis septentrionalis*) and your determination concluded the Project will not result in any prohibited take. The Project activities are consistent with those described in the Service's programmatic BO for the final 4(d) rule dated January 5, 2016, and there are no effects beyond those previously disclosed in the programmatic BO. Thus, any take that may occur incidental to this Project is not prohibited under the final 4(d) rule (50 CFR § 17.40 (o)). Therefore, the programmatic BO satisfies the NRCS and the Project's partners responsibilities under ESA section 7(a)(2) relative to the northern long-eared bat for this Project. Please keep in mind that NRCS must 1) coordinate with the Service if the Project plans change such that activities will no longer comply with the conservation measures in the 4(d) rule and 2) report to the Service results of any surveys conducted or any dead, injured, or sick northern long-eared bats that are found.

If you have any questions or concerns regarding this consultation and BO, please contact Mr. John Weber, Deputy Field Supervisor at (573) 234-5040.

Sincerely,

Karen Herrington
Field Supervisor

cc: MDC, Policy Division

Enclosure

Biological Opinion

for the

East Locust Creek Reservoir

Prepared by:

**U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive Suite A
Columbia, MO 65203-0057**

23 October 2020

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) for the East Locust Creek Reservoir Project (Project) in Sullivan County, Missouri. This BO evaluates the potential and actual consequences of the Project activities on the Indiana bat (*Myotis sodalis*) in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.).

As stated in this Project's biological assessment (BA; Olsson 2020), the proposed action is the construction of a 2,328-acre multipurpose reservoir in Sullivan County, Missouri, approximately 6 miles north of Milan and west of Green City. The proposed East Locust Creek Reservoir (Reservoir) is expected to provide water supply, reduce flood damages, and increase recreational opportunities within the 10-county region that includes Adair, Chariton, Grundy, Linn, Livingston, Macon, Mercer, Putnam, Schuyler, and Sullivan counties.

The Indiana bat occurs throughout Missouri and uses forested habitat in the spring, summer, and fall for roosting and foraging. This species uses both dead and live trees for roosting and rearing young and require one or more primary trees plus multiple alternate trees to meet their roosting needs during an annual cycle. Individuals, small colonies, or large maternity colonies can be present in forested habitats from April through October (active season) and exhibit high site fidelity for summer habitats. The proposed Project will result in permanent removal of known roosting and foraging habitat for the Indiana bat.

Formal consultation was initiated on June 8, 2020, upon receipt of all federal Project partners acceptance of the May 2020 BA. Updates to the Project description led all federal Project partners accepting the August 2020 version of the BA on or before August 28, 2020, and minor revisions occurred resulting in the October 20, 2020 Final BA. The purpose of the formal consultation process is for the Service to write a BO that addresses the adverse effects identified in the BA.

This BO is based on information provided in the October 20, 2020 Final BA prepared by Olsson (Olsson Project Number A11-1513), on behalf of NRCS and their federal partners [i.e., U.S. Corps of Engineers (Corps), U.S. Department of Agriculture – Rural Development (USDA – RD), and Federal Highway Administration (FHWA)] on this Project, the 2007 Indiana Bat Draft Recovery Plan (First Revision; USFWS 2007), and other sources of information available to the Service or in the Service's database. The Service has determined that implementation of the proposed activities described in the BA will not jeopardize the continued existence of the Indiana bat but will result in incidental take of the species.

CONSULTATION HISTORY

A brief summary of the more recent consultation period includes:

September 25, 2015	Federal, State, and Project consultants met to discuss the Project.
April 29, 2016	NRCS and their consultants submitted the Project's Indiana Bat and Northern Long-eared Bat Study Plan.
September 19, 2016	A meeting for the Project was conducted to discuss the ESA Section 7 consultation process between the Service and NRCS and their consultants.
February 2017	The NRCS and their consultants provided a Bat Survey Report for the Project.
October 6, 2017	The Service met with NRCS, their consultants, and the North Central Missouri Regional Water Commission (NCMRWC) to discuss the required tree clearing for the property boundary fence-building project.
October 6, 2017	A meeting was held to discuss impacts to the Indiana bat and Northern long-eared bat.
October 24, 2017	A follow-up meeting was held to discuss impacts to the Indiana bat and Northern long-eared bat and mitigation potential for various properties around the Project.
December 12, 2017	The NRCS hosted a Project site visit.
February 1, 2018	NRCS completed the online request for the Service's Information for Planning and Consultation (IPaC) response.
August 2018	NRCS and their consultants provided a draft BA for the Project.
October 4, 2018	The Service reviewed and provided comments to NRCS on their draft BA.
October 29, 2018	A draft Project Conceptual Bat Mitigation Plan was provided to the Service.
November 2, 2018	The Service and NRCS met to discuss the maps/plans for tree clearing areas and guidance on potential mitigation for bat habitat.
January 31, 2019	The Service provided recommendations for the proposed tree clearing for fence construction for the Project to NRCS.
March 22, 2019	State and Federal agencies met to discuss mitigation plans for the Project.

July 2, 2019	The NRCS requested an updated official species list from IPaC.
July 3, 2019	A meeting was held to discuss draft BA.
July 11, 2019	The Service provided comments on the Project's draft BA.
October 17, 2019	NRCS provided a revised version of the Project's BA to the Service.
December 4, 2019	The Service provided comments to NRCS on the Project's draft BA.
February 28, 2020	The Service received the Project's revised BA from NRCS.
March 27, 2020	The Service provided comments to NRCS on the current version of the Project's BA.
April 7, 2020	The Service, NRCS, and their consultants conducted a meeting to discuss comments and concerns from the Service.
May 22, 2020	The NRCS solicited acknowledgment and agreement from fellow federal Project sponsors on the Project's BA.
June 8, 2020	All of the Project's federal sponsors acknowledge the Project's BA to initiate formal consultation.
June 10, 2020	The Service confirms the NRCS' request to initiate formal consultation for the Project with several areas of concern that needed to be addressed to finalize the Project's BA.
July 9, 2020	The Service inquired with NRCS on their progress of addressing the concerns stated in the June 10, 2020, email as well as an additional clarification needed in the BA.
July 23, 2020	An additional email from the Service was sent to NRCS and their consultants to determine the progress on the Project concerns the Service stated in the June 10, 2020 email to allow the Service to finish drafting the Project's BO.
August 3, 2020	NRCS provided responses and clarification to several aspects of the Project's BA.
August 10, 2020	NCMRWC passed several resolutions for the Project, including the conservation easement resolution.
August 13, 2020	NRCS provided the Project's final BA to their fellow federal Project partners for their acknowledgment and agreement to their respective regulatory authority Project activities.

August 28, 2020	All federal Project partners accepted the August 2020 version of the BA on or before this date.
September 24, 2020	The Service received the minor edits, creating a new final BA for the Project.
September 25, 2020	The Service provided a draft BO for the Project to NRCS.
October 2, 2020	NRCS and their consultants provided their comments in the draft BO.
October 7, 2020	NRCS, their consultants, MCHF, and the Service participated in a conference call for clarification on the Project.
October 9, 2020	NRCS and their consultants provided minor edits leading to an updated final BA for the Project.
October 16, 2020	The Service provided an updated draft BO for the Project to NRCS.
October 20, 2020	NRCS and their consultants provided their comments to the draft BO and minor edits to the final BA for the Project.
October 22, 2020	The Service and NRCS discussed minor clarifications to the draft BO.
October 23, 2020	The Service transmitted the Project's Final BO.

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

Project Background and Description

The East Locust Creek Reservoir Project (Project) includes the construction and operation of a 2,328-acre multipurpose reservoir in Sullivan County, Missouri, approximately 6 miles north of Milan and west of Green City (Figure 1). The NRCS is the federal lead and partially funding this Project under the Watershed Protection and Flood Prevention Act, Public Law (PL) 83-566. Other federal actions include the U.S. Army Corps of Engineers (Corps) Clean Water Act (CWA) Section 404 individual permit for impacts to streams, e.g., East Locust Creek, and wetlands due to the Project. Funding has recently been identified through the 2019 Better Utilizing Investments to Leverage Development (BUILD) grant program. As a result of this program, federal funding is provided through FHWA to the BUILD project sponsor to invest in road, rail, and transit projects improving access and minimize transportation disturbances due to this Project. USDA – RD is providing loans and grants to aid the sponsor in meeting the local cost share obligations. The Project's local sponsor is the North Central Missouri Regional Water Commission (NCMRWC).

The Project is intended to provide water supply, reduce flood damages, and increase recreational opportunities within the 10-county region that includes Adair, Chariton, Grundy, Linn, Livingston, Macon, Mercer, Putnam, Schuyler, and Sullivan counties (Figure 1 inset). The East Locust Creek Reservoir (Reservoir) has a contributing drainage area of 32.7 square miles and the 0.5-mile-long dam intent is to impound water to a normal pool maximum depth of 56 feet. At this depth, the Project would have a normal pool surface area of 2,328 acres and a storage volume of 54,000 acre-feet. This baseline storage volume was established in the final environmental impact statement and would provide the 7 million gallons per day (MGD) average daily demand needed for water supply.

Reducing flood damages is another goal of the Project. The Project could provide a 50 percent reduction to damages incurred by flooding along the 22.5 miles of East Locust Creek between 6 miles south of Pollock and Browning, Missouri. The estimated flood damage reduction benefit provided by this Project is an estimated \$173,600 annually.

The Reservoir is estimated to provide 91,956 user days of recreation. Recreational facilities including a boat ramp, docks, access lane, and parking spaces would be constructed to support recreational opportunities for the 10-county region.

Construction Timing and Access

The Project construction activities are proposed to start in the Fall 2020 and be completed in 2022. It is estimated that the Project will reach a normal pool level within two to ten years following the dam construction, depending on rainfall events. Construction will impact forest resources that are currently estimated at approximately 1,341 acres. The Project includes

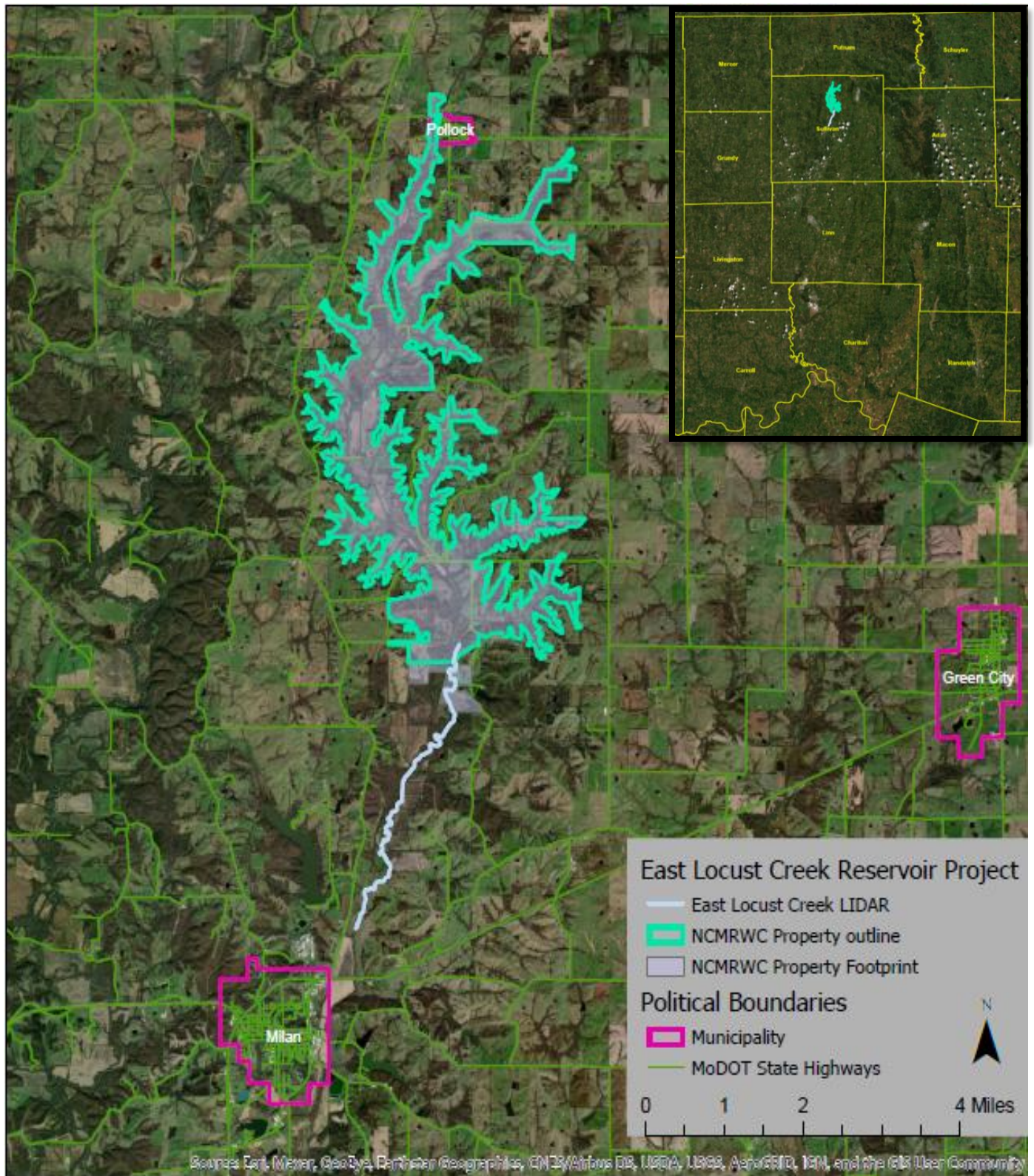


Figure 1. The East Locust Creek Reservoir Project and North Central Missouri Regional Water Commission property boundary with an inset of the 10-county region that includes Adair, Chariton, Grundy, Linn, Livingston, Macon, Mercer, Putnam, Schuyler, and Sullivan counties.

construction of a dam that would inundate a section of a stream, adjacent to and including East Locust Creek, during normal flow conditions (normal pool) and would inundate a larger area during flood conditions (flood pool). Land has been purchased to the top-of-dam height. Additional construction activities associated with the Project would include constructing recreational facilities that would allow boating, camping and fishing access, relocating existing utilities and roads, constructing a raw water line from the Project to the Milan water treatment plant, and upgrading the Milan water treatment facility.

East Locust Creek Dam Construction

The Reservoir dam design is approximately 0.5-mile-long, 25 acres in area, and will be located approximately 1 mile south of State Highway N at Boynton. The dam will be constructed in three phases, first the dam will be built on the eastern and western sides of East Locust Creek prior to constructing the center portion that blocks East Locust Creek. Six borrow areas totaling 84 acres are designed to provide fill for the dam (Figure 2). Four of the six borrow sites are located north of the dam and within the area that will be the Reservoir's normal pool. The two borrow sites located outside the Reservoir's normal pool are located west of the dam (25 acres in size) and northwest of the dam (22 acres in size). These borrow sites were selected to avoid tree clearing and the marina was selected on a borrow area to provide a secondary use.

A concrete spillway constructed on the eastern end of the dam will extend 1,247 feet southwest to the East Locust Creek main channel (Figure 2). The spillway will provide the downstream flow in East Locust Creek because there will be no outlet pipe in the dam. The spillway will be 55 feet wide and will taper down to 25 feet wide. The spillway impact area would total 1.3 acres.

Two, 25-foot-wide temporary roads will provide dam construction access from the eastern and western sides of East Locust Creek. The eastern access road would extend from Finch Road and would be 2,266 feet from Finch Road to the dam. The eastern temporary road access would be entirely within the normal pool. The western temporary access road would extend from England Road and would be 4,430 feet from England Road to the dam. The western temporary access road would be partially within the dam footprint and borrow site footprints and would create 2,153 feet (1.2 acres) of additional impacts outside the dam and borrow site. A total of 23 forest acres will be impacted as a result of dam construction activities. Forest acres inundated by the normal pool are included in the normal pool impacts and are not included in the dam construction impacts. The normal pool overlaps the dam and there are forest impacts associated with the overlapping area. Forest acres that overlap the dam and the normal pool (i.e., upstream side of the dam) are included with the normal pool impacts. The normal pool forest impacts total 973 acres because of inundation. Overall, all the Project activities will result in 1,341 acres of permanent and predicted forest loss (Table 1).

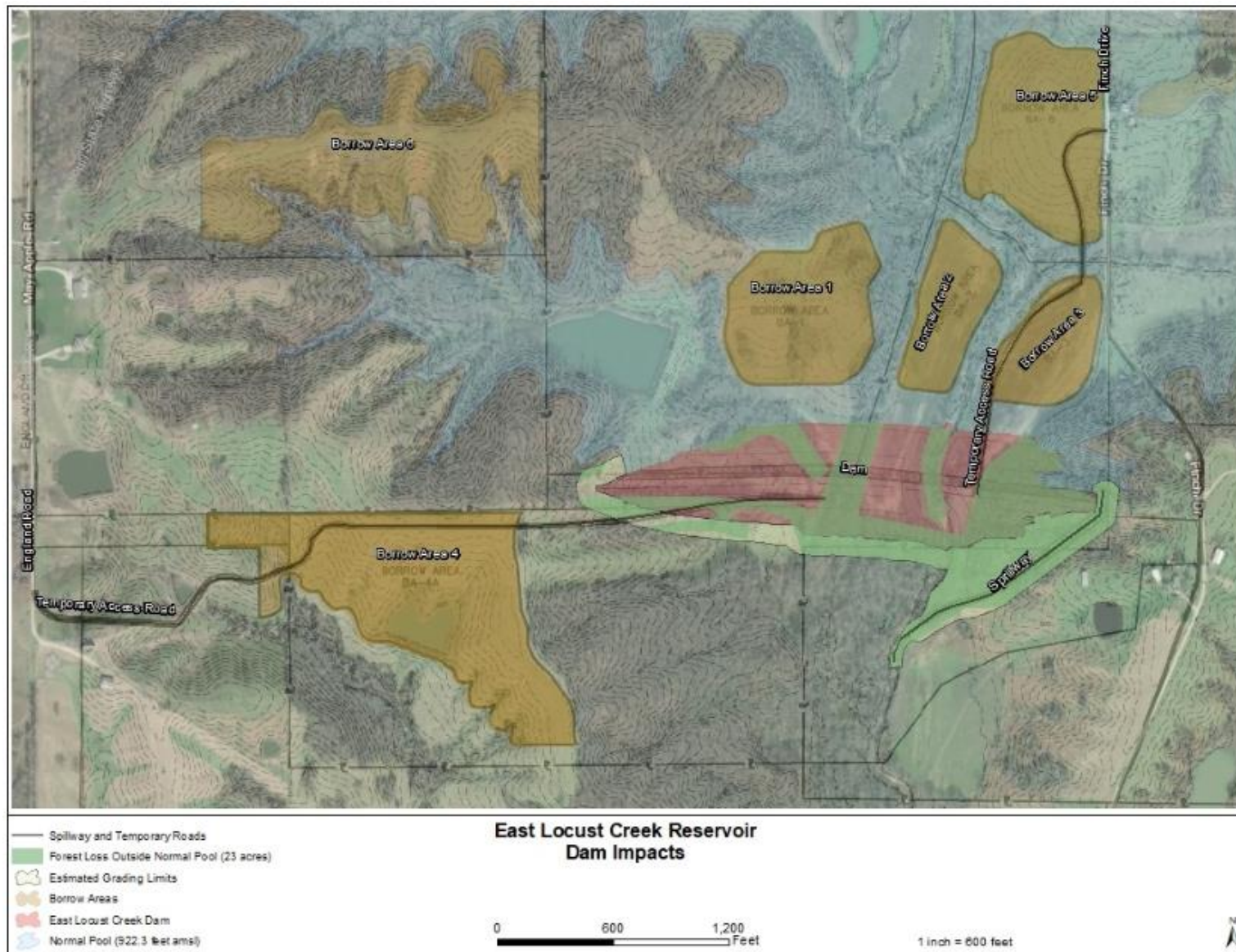


Figure 2. Locations of the six borrow areas (shown in brown polygons in figure; totaling 84 acres) intended to provide fill for the East Locust Creek dam construction

Table 1. Unavoidable permanent and predicted forest loss due to the East Locust Creek Reservoir Project.

Project Element	Permanent and Predicted Future Forest Loss (acres)
Normal Pool Inundation	973
Recreational Facilities Development	27
Utilities and Road Relocation	34
Dam Construction, Borrow Sites, Spillway Construction, and Temporary Dam Access Roads	23
Tree Clearing on NCMRWC Property Because of Development	69
Residential Development	162*
Future Water Transmission Lines	53*
TOTAL FOREST LOSS	1,341

*Note: Forest loss because of residential development and future water transmission are not controlled by the NCMRWC (i.e., not within NCMRWC property boundaries) and may be avoided or reduced upon design and construction. Therefore, these predicted forest effects are further described in the “Other Activities Caused by the Action” section below.

East Locust Creek Reservoir Downstream Flow

The Project spillway will be a two-stage labyrinth weir with the first stage at normal pool and the second stage at the 25-year flood level. There is no auxiliary or emergency spillway as the principal spillway is designed to handle all events up to 75 percent of the probable maximum precipitation (PMP) storm. Approximately 10 feet below normal pool will be a passive flow system that will pass an average of 0.5 cubic feet per second (cfs) to the existing stream below the Reservoir. This passive flow system will allow flow at diminishing rates as the Reservoir water level drops until flow ceases when the Reservoir is approximately 10 feet below normal pool. The openings may be outfitted with changeable plates so that outfall rates can occasionally be modified through an adaptive management process. In addition, minor seepage through the dam is expected to pass additional flow downstream.

The Reservoir is expected to provide a more reliable low flow to the stream below the dam because of the passive flow system and seepage through the dam. East Locust Creek currently goes dry and could also run dry during Reservoir operation under an extended drought if the Reservoir level drops more than 10 feet. Storm pulses will be passed downstream through the principal spillway during times when the Reservoir is full or near full. During times when the Reservoir is below normal pool, some storm pulses will not be able to pass through the Reservoir.

Detention by the Reservoir will result in less floodplain connectivity but not in relatively small events where the floodplain is already disconnected. The largest reduction in floodplain connectivity will be for events between the 5-year and 25-year thresholds. During storms bigger than the 25-year storm level, the second stage of the principal spillway will be activated and allow relatively unimpeded flow through the spillway. Impacts to the riparian corridor including forested areas is difficult to determine. Forested habitat is anticipated to continue to persist, but

species composition may be modified based on changes to overland flow during flood events. Changes in species composition are not anticipated to impact listed bat species.

Recreational Facilities Development

Recreational fishing, boating, camping, and picnic facilities around the Project are intended to be designed in coordination with Missouri Department of Conservation (MDC) following the completion of the permitting process. Forest removal related to recreational facility development and operation would total 27 acres (Table 1). These acres are primarily a result of the marina development since the campsites were selected in areas that are not forested. Camping will not affect Indiana bats because additional tree clearing by the campers will not be allowed.

A full-service marina, including a boat ramp, docks, and parking, is planned for the southwestern side of the Reservoir near the dam. The marina has yet to be designed, and the needed number of parking stalls, docks, and boat ramps is not known. The area designed as a marina totals 48 acres (i.e., 27 forest acres and 21 pastures acres) and may include primitive and recreational vehicle (RV) camping. The marina area was selected to coincide with a soil borrow area that would be reestablished to permanent herbaceous vegetation.

Designated primitive camping areas may occur throughout the property owned by the NCMRWC as well as at two locations on the northern side of the Reservoir. Camping sites will be designated for both primitive and RV camping areas. Handicap-accessible facilities will be associated with the marina, campgrounds, jetties, and at Reservoir access locations throughout the Reservoir.

Utilities and Transportation Relocation

Forest impacts from utilities and transportation relocation are estimated to total 34 acres based on the National Land Cover Database (NLCD) forest layer.

Existing Drinking Water Lines

The Project will affect drinking water lines and pressure zones through dam creation and inundation. Impacts will occur to two pressure zones that will affect the flows, pressures, and recovery rates of the two elevated storage tanks.

To maintain the existing flow, pressures, and system recovery capacity, the existing radial lines that will be inundated will be combined prior to inundation and replaced with two reservoir crossings in the area of Knob Hill Road and the dam. Construction of the new lines would be included in the right-of-way with the electrical and telecommunication line relocations.

Electrical and Telecommunication Lines

The Project will affect single-phase and three-phase power lines and telecommunication lines located along Route N and nearby gravel roads. To replace the existing service, the areas with disconnected service would be served by a new utility corridor south of the dam and on an

earthen utility corridor built across the Project along the Knob Hill Road to Highway VV corridor.

Transportation Relocation

The Project will inundate five miles of existing county roads and one mile of a state highway. The Reservoir inundation results in the loss of two East Locust Creek bridge crossings that represent the only stream crossings between Highway 6 at Milan to the Village of Pollock located approximately 13 miles to the north. The bridges will be left in place and would be inundated after dam construction.

The BUILD Grant surface transportation project will result in the improvement of a network of roads that include: the replacement of portions of Missouri Route N with county roads downstream from the dam; the replacement of county roads connecting Missouri Route VV to Missouri Route 5; improvements to Missouri Route 5 intersections with county routes; and upgrades to county roads accessing the new Reservoir. This surface transportation project is needed to assist in developing the transportation roadway safety and capacity improvements for safe access, emergency response, and intersection turn lanes.

Raw Water Line

An approximately 24,700-foot raw water line will be constructed from a water intake near the dam and run to the water treatment plant at Milan. The raw water line would cause impacts to a width of approximately 40 feet and, generally, would run along the existing abandoned rail line to the southwest until it reaches the water treatment plant north of Milan. The alignment may vary from the currently proposed design in locations to minimize impacts. A maintenance easement would be established within the 40-foot width and would be maintained clear of trees and result in permanent impacts to forested areas. Forest impacts would total 4.2 acres.

Water Treatment, Transmission, and Distribution

The NCMRWC water treatment plant at Milan has a current capacity of 2.2 MGD and will need to be expanded to the 7 MGD design capacity over the life of the Reservoir. The water treatment plant expansion would occur on-site and would not have additional environmental or forest impacts.

The NCMRWC's Milan water treatment plant currently serves three water systems out of the 19 primary water systems that serve the 10-county region. Three of the 19 water systems are outside the 10-county region and would not be supplied water by the Project. Water transmission lines (i.e., movement of water from NCWRWC to an entity's water system) would be needed to provide water to a subset of the 16 primary water systems that currently provide water to the 10-county region; however, water transmission lines are not part of the federal action (see "Other Activities Caused by the Action" below).

Water distribution lines (i.e., water sold to customers) will require ongoing maintenance. All 16 primary water systems already have distribution lines in place and the distribution systems will continue to be the primary water systems' responsibility.

Reservoir Operation

The Reservoir operation includes the ongoing needs for the Project to supply a 7 MGD water supply, provide 91,956 user days of recreation, and reduce flood damages on 22.5 miles of East Locust Creek. The NCMRWC staff will provide the Reservoir's operation to meet the Project purposes. Reservoir operation will include maintaining and operating pumps that withdraw water from the Reservoir and pump water to treatment facilities; maintaining access roads for public recreation and to Reservoir components (i.e., pumps, spillway, dam); and maintaining recreational facilities including campgrounds, docks, and boat ramps. Forest loss is not anticipated due to Reservoir operation; however, snags may become present at recreational facilities or access roads. A winter inspection of access roads and recreational facilities will be performed to identify snags and potential snags. Any snags identified will be cleared between November 1 and March 31. If snags appear in high-risk areas outside the November 1 and March 31 clearing period, they will be removed immediately to reduce the risk to human life.

Potential Development around the Project

The potential residential development area was determined by drawing land outside the NCMRWC property that is within the East Locust Creek watershed and within 0.5 mile of the normal pool. Land outside the East Locust Creek watershed would slope away from the Reservoir and would have reduced Reservoir visibility; therefore, reducing the development value. Similarly, land farther than 0.5-mile from the normal pool would have reduced Reservoir access and reduced development value. The 0.5-mile distance would allow multiple layers of Reservoir-view property.

The NCMRWC began contemplating water protection, source water protection, land oversight and habitat preservation in 2009 when it drafted and advocated for the passage of a first-of-kind Lake Authority Legislation that provides the NCMRWC the ability to control and prevent contamination threats from the top of the watershed to the dam even on private property. The Lake Authority was passed as Revised Statute of Missouri 67.4520 and allows zoning and planning powers. The NCMRWC has also implemented a 100-foot buffer along streams within the High Impact Zone, established through Resolution #6-2018. The High Impact Zone extends 500 feet outside NCMRWC-owned property and surrounds the Reservoir. Within the High Impact Zone the 100-foot buffer along streams preserves 50 forest acres and will protect water quality and bat habitat. The 50 acres of forest preservation will be comprised of multiple, small riparian parcels on neighboring property, i.e., outside NCMRWC's property boundary.

The NCMRWC will not be involved in land development outside NCMRWC property; therefore, residential development is not part of the federal action (see "Other Activities Caused by the Action" below).

The NCMRWC will maintain control of the approximately 2,360 acres of land outside the Reservoir’s normal pool (i.e., 2,328 acres) of the total 4,688 acres within NCMRWC’s property boundary (Table 2). The NCMRWC property is further broken down into various land uses and easements in Table 2. The land outside the Reservoir’s normal pool includes land within the top-of-dam elevation and parcels outside the top-of-dam elevation that could not reasonably be split.

Table 2. The NCMRWC property of 4,688 acres will have various levels of impacts to the landscape effecting bat habitat.

NCMRWC Property Use Breakdown
<ul style="list-style-type: none"> • NCMRWC Property – 4,688 <ul style="list-style-type: none"> ○ Normal Pool – 2,328 acres ○ Land Outside the Normal Pool -2,360 acres <ul style="list-style-type: none"> ▪ Conservation Easement - 1,236 acres <ul style="list-style-type: none"> • Preservation – 683 acres • Tree Planting – 553 acres ▪ Non-Conservation Easement – 1,124 acres <ul style="list-style-type: none"> • Cropland/Pasture (To Be Prairie) – 666 acres <ul style="list-style-type: none"> ○ May be maintained as permanent herbaceous vegetation or allowed to “go-back” to forest (no easement). • Forested – 458 <ul style="list-style-type: none"> ○ Anticipated impacts due to development = 69 acres* ○ Anticipated impacts due to recreation = 27 acres ○ Anticipated impacts due to utilities/road relocation= 11 acres ○ Anticipated impacts due to dam construction = 23 acres ○ Anticipated preserved forest (no easement) = 328 acres

*Note: Impacts due to development are included in the previous discussions on 15 percent tree clearing for a Reservoir view.

NCMRWC will establish a conservation easement on at least 1,236 acres that includes a minimum of 683 acres of forest preservation and 553 acres of tree plantings within the Action Area (Figure 3). No residential development will occur within these acres. The tree plantings are focused on areas near the Indiana bat maternity roost trees and along streams. The conservation easement areas are intended to provide the highest benefit to bat species by preserving and planting trees near maternity roost trees and foraging corridors.

The primary purpose of the remaining forest owned by the NCMRWC outside the normal pool but without a conservation easement is to serve as a vegetative buffer to protect the Reservoir’s water quality. The NCMRWC property outside the normal pool and not under a conservation easement totals 1,124 acres. There are 458 acres of forest and 666 acres of prairie outside the normal pool that will not have a conservation easement outside the normal pool. However, to support recreational development, utilities and road relocation and dam construction activities, additional tree clearing will occur. In addition, it is possible that neighbors will ask to clear trees to allow Reservoir visibility from adjacent properties. Any such tree clearing is anticipated to be

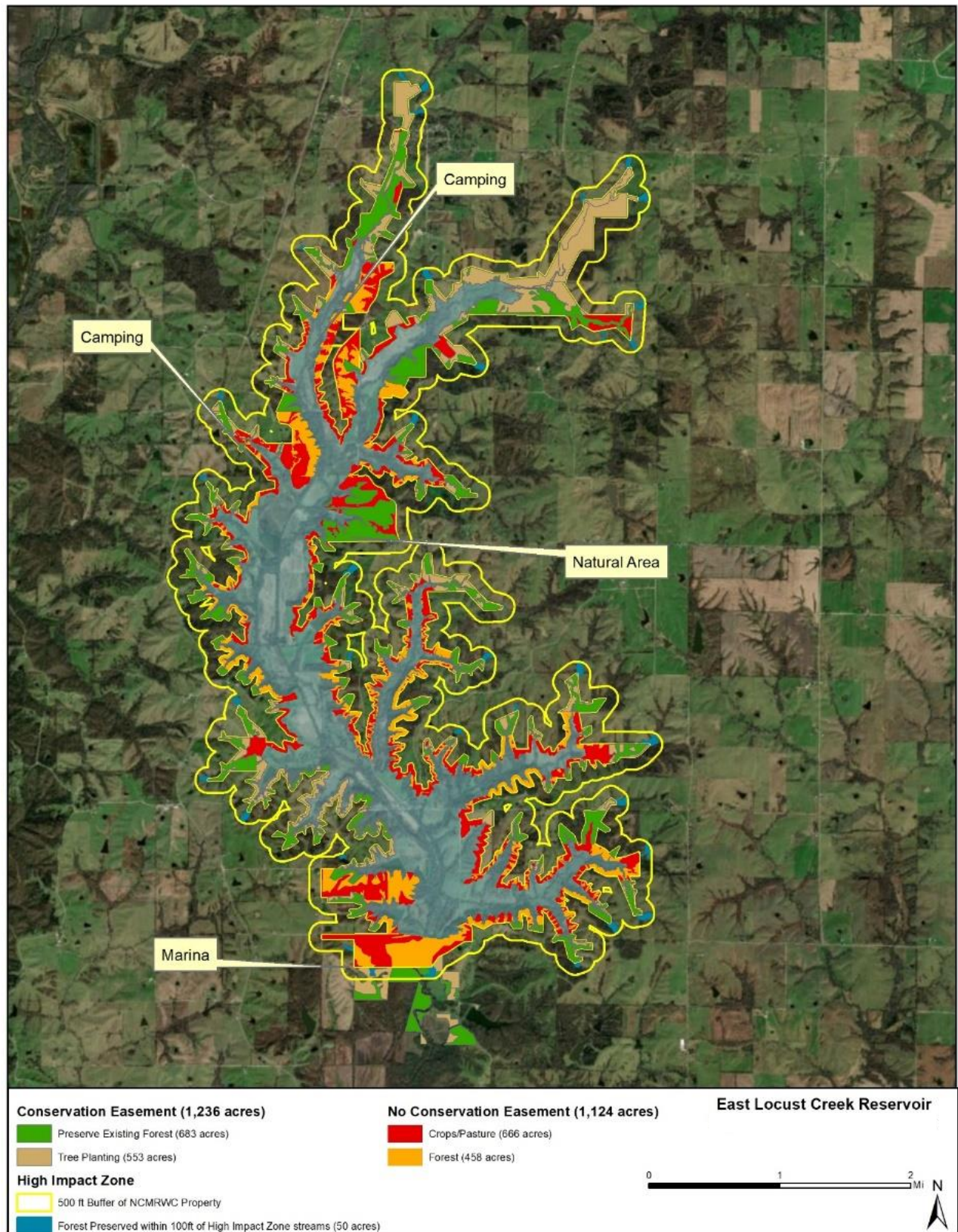


Figure 3. A total of at least 1,236 acres will be protected through a conservation easement with the NCMRWC property.

minimized to the extent possible and will require approval by the NCMRWC. An estimated 15 percent, or 69 forested acres, may be cleared for a Reservoir view within NCMRWC property boundary. Where the purpose of this clearing is only to allow a view of the Reservoir, the cleared area will be planted as appropriate with permanent vegetation. Additionally, areas currently in pasture will be maintained as permanent vegetation. A total of 328 acres of forest are anticipated to be established and/or managed, but will not have a conservation easement.

Conservation Measures

Conservation measures are actions that benefit or promote the recovery of a listed species that a Federal agency includes as an integral part of its proposed action and that are intended to avoid, minimize or compensate for potential adverse effects of the action on the listed species. Because they are included in the action, these measures are mandatory. Refer to the BA for further details and benefits of the following conservation measures.

- 1) *Winter Tree Clearing:* All tree clearing will occur between November 1 and March 31.
- 2) *Winter Hazard Tree Removal Plan:* To minimize impacts to the Indiana bat, potential hazard trees will be identified through an annual targeted hazardous tree assessment of recreational facilities, public activity areas, and Reservoir operation areas. Potential hazard trees identified during the targeted assessment will be removed between November 1 and March 31 (i.e., winter tree clearing period). Hazard trees created outside the clearing period by storm events, high-wind events, or other natural events may be removed immediately to allow for Reservoir operation or to protect public safety.
- 3) *Lake Authority Tree Clearing Restriction:* The NCMRWC will follow restrictions on clearing trees greater than a three-inch diameter at breast height (DBH) between March 31 and November 1 on NCMRWC property and related to the Reservoir development.

The NCMRWC will lead and underwrite the establishment of the Lake Authority, including the drafting of by-laws and policies. As part of that effort, NCMRWC is currently (October 2020) preparing zoning requirements and recommendations for the entire East Locust Creek watershed, with a particular emphasis on what NCMRWC terms the “High Impact Zone”, which encompasses approximately 500-feet back from the NCMRWC property line on private property. The primary purpose is the protection of the environment in and around the Reservoir. The NCMRWC will strongly recommend tree clearing restrictions for the protection of bats in this zone.

On August 10, 2020, NCMRWC passed a resolution (Resolution #14-2020) recommending that the Lake Authority require all clearing of deciduous trees larger than a three-inch DBH tree within the High Impact Zone be done in the inactive season for bats, i.e., November 1 through March 31. Additionally, Resolution #14-2020 will require the property owners to self-certify that they acted and will act in compliance with this requirement before receiving any construction permit from the Lake Authority. Appropriate provisions will be included for the removal of trees that pose a safety hazard to life and property, as previously discussed.

- 4) *Water Systems Coordination with the Service:* The NCMRWC commits to requiring that entities removing trees for construction of water transmission lines certify that they have adhered to the ESA if actions under consideration have not been consulted upon with the Service and another State or Federal entity.

On August 10, 2020, the NRMWRC passed a resolution (i.e., Resolution #15-2020) requiring that any entity removing trees for construction of water transmission lines for the purpose of purchasing and transmitting water from the East Locust Creek Reservoir or the NCMRWC water treatment plant to the entity's water system must confer with the Service regarding impacts to federally listed species that could result from transmission line construction.

- 5) *Lacustrine Habitat:* Construction of the Project will result in lacustrine habitat that includes up to 2,328 acres of open water and 82 miles of shoreline. The shoreline and open water may provide habitat for foraging bats.
- 6) *Wetland and Stream Mitigation:* The Project will implement compensatory mitigation to offset unavoidable impacts to streams and wetlands. The wetland and stream mitigation would provide beneficial impacts for bats that could include both foraging habitat and roosting habitat.

Mitigation for Waters of the U.S. (WOTUS) is being considered under the 1980's WOTUS Rule and subsequent Supreme Court cases (i.e., *Rapanos v. United States*) and the recently passed (June 2020) navigable WOTUS Rule. Wetland mitigation under the 1980's guidance would address impacts to 354 wetland acres consisting of 280 acres of emergent wetlands, 64 acres of forested wetlands, and 10 acres of shrub-scrub wetlands. Stream mitigation would be provided for 48.1 miles of stream, which includes 25.9 miles of ephemeral, 13.7 miles of intermittent, and 8.8 miles of perennial stream within the normal pool. Under the 2020 Navigable Waters Protection Rule which replaced the WOTUS rule, ephemeral streams and any wetland adjacent to an ephemeral stream would be considered non-jurisdictional and therefore would not be included in the Project's wetland and stream mitigation plan. However, jurisdictional determinations have not been finalized with the Corps at this time under the new WOTUS Rule.

- 7) *Habitat Compensation Plan:* The habitat compensation plan will detail the following unavoidable impacts as well as the forest creation and preservation that will occur to minimize those impacts, as listed below. The goal of the plan is to preserve or replace nearby forest to account for all forest impacts.
 - a. *Forest Creation:* A total of at least 553 acres of new forest will be created on NCMRWC property to provide large, contiguous areas of forest (Figure 3). The 553 acres of new forest will be planted on subareas of the NCMRWC property with at least ½ acre of land available for forest plantings. Parcels with acreage less than ½ acre, generally found along the Reservoir, will not be planted with trees because of the small size of these areas, but will be allowed to naturally succeed into forest. Tree species for planted areas will be selected based on the

natural forest community and on favorable tree species for bat roosting habitat (See Conservation Measure 7d for information about the Forest Management Plan).

- b. *Forest Preservation:* A total of at least 683 acres of existing forest outside the normal pool and on NCMRWC property will be preserved and will have a permanent conservation easement established (Figure 3). A Service-approved forest management plan (Conservation Measure 7d) will be implemented to maintain the long-term integrity of the forest for bat habitat.

An additional 328 acres of existing forest, at a minimum, is intended to remain in perpetuity to protect water quality surrounding the Reservoir but will not be included in the conservation easement. Further, the Lake Authority will protect 50 acres of forest along stream resources on private property within 500 feet of the NCMRWC property boundary as discussed above in the “Development around the Project” subheading.

- c. *Conservation Easement:* A permanent conservation easement will be established on at least 1,236 acres including 553 acres of tree planting and 683 acres of forest preservation on the NCMRWC property, as discussed in parts 7a and 7b above (Figure 3).

The 50 forested acres along streams, discussed in part 7b, within the High Impact Zone will not have a permanent conservation easement, but will be included as a zoning requirement under the Lake Authority as discussed above in the “Potential Development Around the Project” subheading.

Final negotiations are under way (as of October 2020) with the Missouri Conservation Heritage Foundation (MCHF) to hold the conservation easements. The Reservoir property is being broken into management compartments with varying compatible uses, including tree preservation and planting in many compartments. Management activities and compatible uses for each compartment will make up a comprehensive management plan written to meet the endangered species preservation goals. Those compartments with tree preservation and planting will have associated GIS shapefiles specifying the forest preservation and planting areas for monitoring and maintenance. The NCMRWC will collaborate with the Service and MCHF to complete the conservation easement and management plan (as outlined in the Reasonable and Prudent Measures below).

- d. *Forest Management Plan:* Service-approved forest management plans have been initiated and will be submitted following completion (as outlined in the Reasonable and Prudent Measures in the Incidental Take Statement below).
- e. *Financial Assurances:* The Project’s Plan-of-Finance fully funds all required mitigation solutions as well as their ongoing maintenance. The majority of the mitigation project funding will come from NRCS with the NCMRWC providing a

smaller portion in match funds from a USDA – RD loan, grant package supported by NCMRWC revenues, and state appropriations through the Multi-Purpose Water Resources Fund.

The NCMRWC has passed a resolution that commits to the Habitat Compensation Plan detailed in the BA (Appendix B). When the final negotiations are completed with MCHF to hold the easements, an endowment will be made to the trust to cover long-term easement monitoring and implementation of the forest management plans.

Other Activities Caused by the Action

A BO evaluates all consequences to species or critical habitat caused by the proposed Federal action, including the consequences of other activities caused by the proposed action, that are reasonably certain to occur (i.e., [50 CFR §402.02](#) for “effects of the action”). Additional regulations within [50 CFR §402.17\(a\)](#) identify factors to consider when determining whether activities caused by the proposed action (but not part of the proposed action) are reasonably certain to occur. These factors include, but are not limited to:

- 1) past experiences with activities that have resulted from actions that are similar in scope, nature, and magnitude to the proposed action;
- 2) existing plans for the activity; and
- 3) any remaining economic, administrative, and legal requirements necessary for the activity to go forward.

In their request for consultation, the NCRS did not describe, and the Service is not aware of any additional activities caused by the Action that are not included in the following Description of the Proposed Action. However, within this section it does describe actions outside the control and authority of NRCS, Corps, FHWA, USDA – RD, and NCWRWC that will occur as a result of the Reservoir construction.

The Project does not have water storage capacity to serve all the water suppliers in the entire 10-county region, but will serve the water suppliers within the 10-county region that are projected to have an inadequate water supply during the drought of record. New water transmission lines are needed to serve water to the 10-county region and would follow existing utility and roadway corridors with very limited exceptions. The new water transmission lines will be constructed at the time that the primary water producers need a new water supply or to add resiliency to their existing water supplies. Currently, a potential configuration of water transmission lines in the 10-county region has been proposed; however, no plans have been finalized (Figure 4).

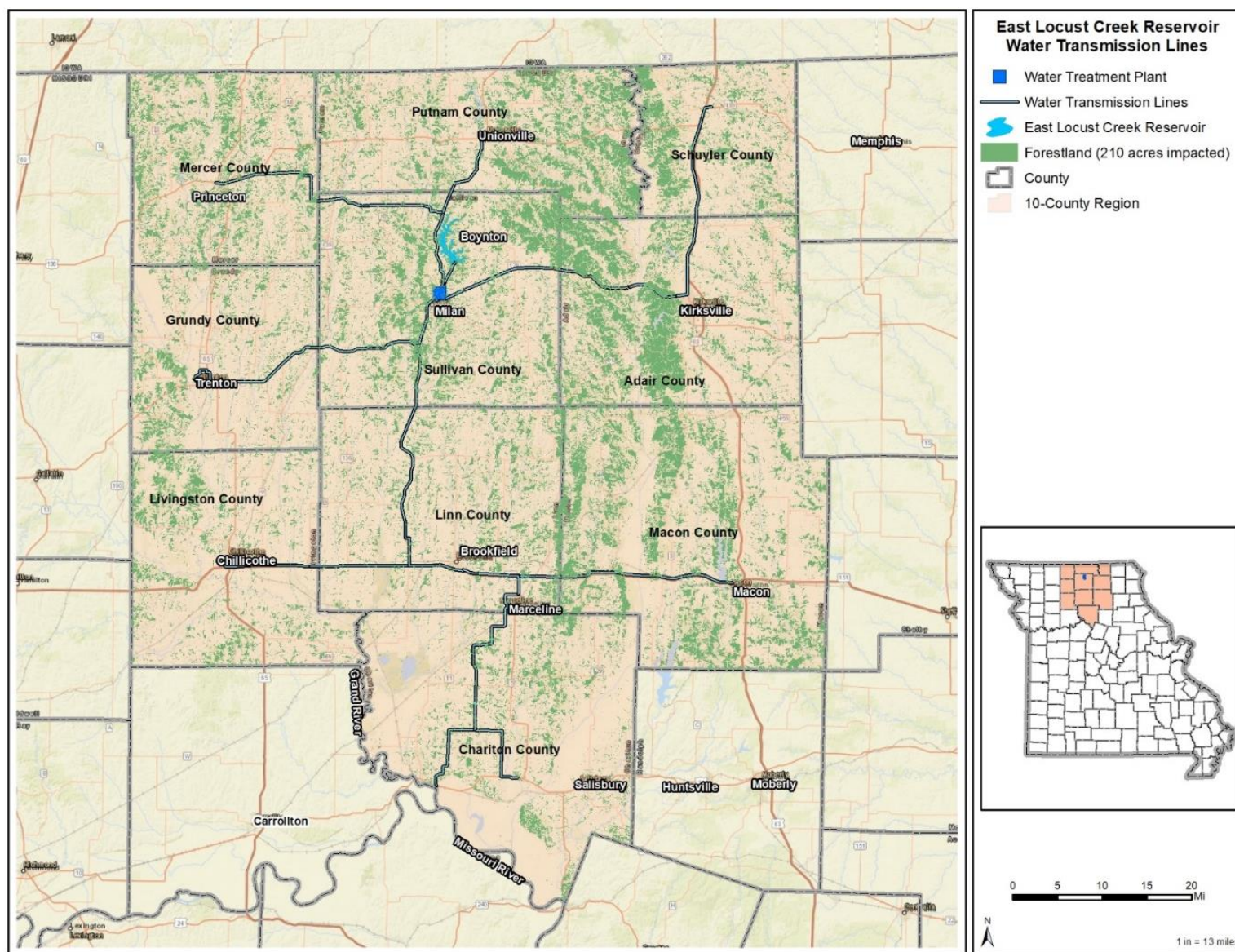


Figure 4. The proposed configuration of the water transmission lines for the 10-county region.
 Note: Forest Layer based on National Land Cover Database (Homer et al. 2015).

Forest loss from future transmission lines could occur in existing rights-of-way or should a new right-of-way be needed. Due to costs and to minimize forest losses, new rights-of-way will be designed to avoid forest impacts. Because transmission lines have not been designed, the exact alignment is not known. Forest losses are estimated at 53 acres, accounting for new rights-of-way and forested rights-of-way. The 53 acres of forest loss were calculated by totaling the forested acres within a 50-foot utility easement (210 acres) using the NLCD and allowing for a 25 percent loss in forest. Future transmission line construction and operation will not be conducted by the NCMRWC; however, the NCMRWC does approve water contracts with the primary water system operators. Because the NCMRWC has agreed that they will require the primary water system operators to consult with the Service prior to constructing new transmission lines, the impact of future transmission lines are not covered in this Section 7 consultation. As a result, the permanent and predicted forest loss of the 53 acres has been excluded from the Project's total forest loss acreage; therefore, no further discussion on the future transmission line construction will occur in this BO.

The land within the East Locust Creek watershed upstream of the dam will be subject to watershed zoning regulations to protect the water quality of the Reservoir. Residential development would be allowed by the zoning regulations and may occur outside the NCMRWC property boundary. The rate of development, areas that will develop, and types of development that will occur are unknown at this time. There are 1,622-forested acres within the potential residential development area that is not within NCMRWC property boundaries. A predicted ten percent or 162 acres are estimated for tree clearing resulting in forest loss because of residential development. However, no plans currently exist for residential development outside the NCMRWC property boundaries (Table 2).

Action Area

The Action Area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR §402.02). The Action Area is defined by measurable or detectable changes in land, air, and water or to other measurable factors that would result from the proposed action. The Action Area is not limited to the “footprint” of the project but rather encompasses the aerial extent of the biotic, chemical, and physical impacts to the environment resulting from the action.

Because disturbance or removal of roosts within the Project area could disrupt Indiana bat dynamics throughout the rest of their home range, the Action Area for the East Locust Creek Reservoir Project includes the Project area plus a 2.5-miles¹ (4.0-km) radius around the Project area. In addition, due to the Reservoir development, the Project area includes 5.0-miles of downstream effects to East Locust Creek and a buffer of 2.5-miles (4.0-km) radius of the creek. Thus, the total Action Area comprises a total of approximately 58,089 acres, which encompasses the 2.5-mile (4.0-km) radius around the NCMRWC property boundary and the downstream effects to East Locust Creek (Figure 5).

¹ The 2.5-mi (4.0-km) radius represents what the Service considers is the average diameter of an Indiana bat's home range from a known maternity roost tree.

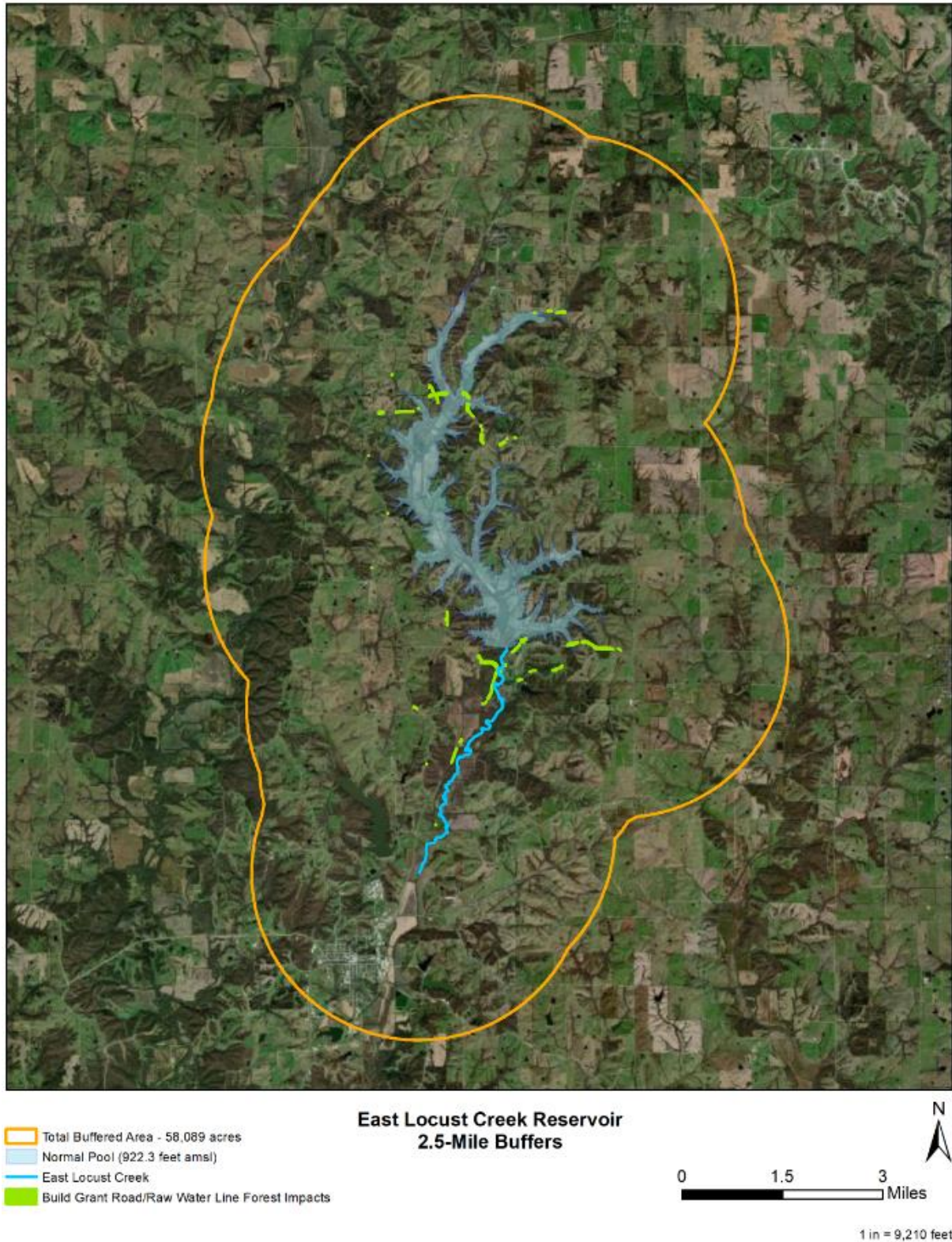


Figure 5. The East Locust Creek Reservoir Project Action Area includes a 2.5-mile radius around the Project (i.e., a 2.5-mile buffer from the Reservoir’s normal pool, East Locust Creek, and BUILD grant forest impacts) and 5.0-miles of East Locust Creek downstream of the dam face with a 2.5-mile buffer to determine the effects to the Indiana bat.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this BO considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the species in the Action Area, the factors responsible for that condition, and the relationship of the Action Area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the species; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the Action Area on the species.

II. STATUS OF THE SPECIES

This section presents the biological or ecological information relevant to formulating this BO. Appropriate information on the species’ life history, its habitat and distribution, and other data on factors necessary to its survival are included to provide background for analysis in later sections. This analysis documents the effects of past human and natural activities or events that have led to the current range-wide status of the species. Portions of this information are also presented in listing documents, the recovery plan (USFWS 1983), and the draft recovery plan, and first revision (USFWS 2007) and available literature.

Species Description

The Indiana bat was originally listed as an endangered species by the Service in 1967. Thirteen winter hibernacula (11 caves and two mines) in six states were designated as critical habitat for the Indiana bat in 1976 (USFWS 1976). Six of these hibernacula are in Missouri.

The Indiana bat is an insectivorous, temperate, medium-sized bat that migrates annually from winter hibernacula to summer habitat in forested areas. The Indiana bat has a head and body length that ranges from 41 to 49 mm, with a forearm length of 35 to 41 mm. The fur is described as dull pinkish-brown on the back but somewhat lighter on the chest and belly, and the ears and wing membranes do not contrast with the fur (Barbour and Davis 1969). Although the bat resembles the little brown bat and the northern long-eared bat, it is distinguished by its distinctly keeled calcar.

Life History and Biology

The key stages in the annual cycle of Indiana bats are: hibernation, spring staging, pregnancy, lactation, volancy/weaning, migration and swarming. While there is variation based on weather and latitude, generally bats begin winter torpor in mid-September through late-October and begin emerging in April. Females depart shortly after emerging and are pregnant when they reach their summer area. Birth of young occurs between mid-June and early July and then nursing continues until weaning, which is shortly after young become volant (i.e., able to fly) in mid- to late-July. Migration back to the hibernaculum may begin in August, peak in September, and continue into October.

Winter Hibernation: After the summer maternity period, Indiana bats migrate back to traditional winter hibernacula. Some male bats may begin to arrive at hibernacula as early as July. Females typically arrive later and by September the number of males and females are present in comparable numbers. Autumn “swarming” occurs prior to hibernation. During swarming, bats fly in and out of cave entrances from dusk to dawn and use trees and snags as day roosts (Cope and Humphrey 1977). Swarming continues for several weeks and mating occurs during the latter part of the period. Fat supplies are replenished as the bats forage prior to hibernation. By late September many females have entered hibernation, but males may continue swarming well into October in what is believed to be an attempt to breed with late arriving females.

All cohorts of Indiana bats are hibernating by November and remain in hibernacula through April (Hall 1962, LaVal and LaVal 1980), depending upon local weather conditions. Indiana bats hibernate in caves and mines with cold, stable microclimates. They form large, dense clusters, ranging from 300 bats per square foot to 484 bats per square foot (Clawson et al. 1980, Clawson, pers. observ. October 1996 in USFWS 2000). Clusters form in the same area in a cave each year, with more than one cluster possible in a particular cave (NatureServe 2007). Indiana bats, especially females, are philopatric to hibernacula (i.e., they return annually to the same hibernaculum). Bands returns from a mine in Missouri during winter surveys have documented one female Indiana bat present in a cluster in the same location for three years (Marquardt, pers. comm.).

Summer Roosting and Foraging: After hibernation ends in late March or early April, most Indiana bats migrate to summer roosts. Females emerge from hibernation ahead of males. Reproductively active females store sperm from autumn copulations through winter, and ovulation takes place after the bats emerge from hibernation. The period after hibernation and just before spring migration is referred to as “staging,” a time when bats forage and a limited amount of mating occurs (USFWS 2007).

In spring when fat reserves and food supplies are low and females are pregnant, migration is probably hazardous (Tuttle and Stevenson 1977). Consequently, mortality may be higher in the early spring, immediately following emergence. Once en route to their summer destination, females move quickly across the landscape. Radio-telemetry studies in New York documented females flying between 10 and 30 miles in one night after release from their hibernaculum, arriving at their maternity sites within one night. Indiana bats can migrate hundreds of miles from their hibernacula. Observed migration distances range from just 34.1 mi to 356.5 mi (USFWS 2007).

Females seek suitable habitat for maternity colonies, which is a requisite behavior for reproductive success. They exhibit strong site fidelity to summer roosting and foraging areas, generally returning to the same summer range annually to bear their young (Garner and Gardner 1992). For example, surveys conducted in summer 2014 in a maternity colony homerange first documented in 1985, indicated continued presence of a maternity colony in the area. Females arrive in their summer habitats as early as April 15 in Illinois (Garner and Gardner 1992), and usually start grouping into larger maternity colonies by mid-May. Garner and Gardner (1992) reported that Indiana bats first arrived at their maternity roost in early May in Indiana, with many individuals arriving in mid-May. During this early spring period, a number of roosts may be used temporarily until a roost with larger numbers of bats is established.

In general, Indiana bats roost in large, often dead or partially dead trees with exfoliating bark and/or cavities and crevices (Callahan et al. 1997; Farmer et al. 2002; Kurta et al. 2002). Trees in excess of 16-inch diameter at breast height (DBH) with exfoliating bark are considered optimal for maternity colony roost sites, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat (Romme et al. 1995). Rittenhouse et al. (2007) considered roost trees as suitable at approximately 7 inches DBH, but the suitability index (SI; SI = 0.00 to 1.00) of roost trees increased with greater DBH with trees reaching a SI of 0.50 at approximately 12 inches DBH and a SI of 1.00 at approximately 20 inches DBH or greater.

Indiana bat maternity roosts can be described as primary or alternate based upon the proportion of bats in a colony consistently occupying the roost site. Maternity colonies typically use 10 to 20 trees each year, but only one to three of these are primary roosts used by the majority of bats for some or all of the summer (Gardner and Gardner 1992; Miller et al. 2002). Alternate roosts are used by individuals, or a small number of bats, and may be used intermittently throughout the summer or used only once or for a few days. Females frequently switch roosts to find optimal roosting conditions, switching roosts every few days on average, although the reproductive condition of the female, roost type, and time of year affect switching. When switching between day roosts, Indiana bats may travel as little as 23 feet or as far as 3.6 miles (Kurta et al. 1996; Kurta et al. 2001; Kurta et al. 2002).

Maternity colonies typically contain 100 or fewer adult females (Harvey 2002), but as many as 384 have been observed from a single maternity roost tree in Indiana (Whitaker and Brack 2002). The average sized maternity colony in Indiana was 80 females (Whitaker and Brack 2002). Birth of young occurs in late June and early July (Easterla and Watkins 1969, Humphrey et al. 1977). The young are able to fly between mid-July and early August (Mumford and Cope 1958, Cope et al. 1974, Humphrey et al. 1977, Clark et al. 1987, Gardner et al. 1991, Kurta et al. 1996). An exit count conducted on July 17, 2014 on U.S. Army Corps of Engineers property (Wappapello Lake) in Missouri yielded a count of 195 individuals exiting a 26-inch DBH cottonwood snag (York-Harris, pers. comm). Volant pups likely were included in the count, but at least 96 adults were present in the primary tree.

The home range of a maternity colony is the area within a 2.5-mile radius (i.e., 12,560 acres) around documented roosts or within a 5-mile radius (i.e., 50,265 acres) around capture location of a reproductive female or juvenile Indiana bat or a positive identification of Indiana bat from

properly deployed acoustic devices and acceptable analysis of data. Based on data provided in the Indiana bat draft revised recovery plan (USFWS 2007), a maternity colony needs at least 10% suitable habitat (i.e., forested habitat that provides adequate roost sites and foraging areas) to exist at a given point on the landscape. Garner and Gardner (1992) found that females in Illinois utilized larger foraging ranges than males, whereas Menzel et al. (2005) found no difference in home range sizes of males and females in west-central Illinois.

Male Indiana bats may be found throughout the entire range of the species. Some males spend the summer near hibernacula, as has been observed in Missouri (LaVal and LaVal 1980) and West Virginia (Stihler, pers. observ. October 1996 in USFWS 2000). Males appear to roost singly or in small groups, except during brief summer visits to hibernacula. Males have been observed roosting in trees as small as 3 inches DBH, but the average roost diameter for male Indiana bats is 13 inches (USFWS 2007).

Indiana bats forage over a variety of habitat types but prefer to forage in and around the tree canopy of both upland and bottomland forest, along roads, or along the corridors of small streams. Menzel et al. (2005) found that females foraged significantly closer to forests, roads, and riparian habitats than agricultural land and grasslands. Womack et al. (2012) documented selection by reproductive females of forests with higher canopy cover but more open mid-stories caused by management via prescribed fire. Females in Illinois were found to forage most frequently in areas with canopy cover of greater than 80% (Garner and Gardner 1992). Bats forage between dusk and dawn at a height of approximately 6-90 feet above ground level and feed exclusively on flying insects, primarily moths, beetles, and aquatic insects (Humphrey et al. 1977).

Population Dynamics

The population of the Indiana bat has decreased significantly from an estimated 808,000 in the 1950s (USFWS 2007). Based on censuses taken at all hibernacula, the current total known Indiana bat population in 2019 is estimated to number approximately 537,297, which represents a 4% decline since 2017 and a 19% decline since 2007 when White-nose Syndrome was first discovered in the United States (Figure 6).

Missouri, Indiana, and Kentucky have historically had the highest estimated numbers of hibernating bats; all had estimates of greater than 10,000 bats in 1965. Over the period 1965 to 2005, estimated numbers of hibernating bats in Missouri and Kentucky clearly declined (USFWS 2007). Among the group of states in which aggregate hibernaculum surveys have never reached 100,000 bats, hibernaculum surveys in Arkansas, Tennessee, and Virginia consistently declined from 1965 to 2000. Hibernacula surveys in Illinois, New York, Ohio, and West Virginia were greater in 2000 than in 1965, but trends are not entirely consistent through the period. Thus, the southern tier of states in the species' range shows declines in counts at hibernacula, whereas some states in the upper Midwest show increasing counts (USFWS 2007).

Status and Distribution

The current species range includes much of the eastern half of the United States, from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida. The

species has disappeared from, or greatly declined, in most of its former range in the northeastern United States. The current revised recovery plan (USFWS 2007) delineates recovery units based on population discreteness, differences in population trends, and broad level differences in land-use and macro-habitats. There are currently four recovery units for the Indiana bat: Ozark-Central, Midwest, Appalachian Mountains, and Northeast.

Historically, the Indiana bat winter range was restricted to areas of cavernous limestone in the karst regions of the east-central United States. Hibernacula are divided into groups and defined in the Service’s Draft Recovery Plan (USFWS 2007): Priority 1 (P1) hibernacula typically have a current and/or historically observed winter population of greater than or equal to 10,000 Indiana bats; P2 have a current or observed historic population of 1,000 or greater, but fewer than 10,000; P3 have current or observed historic populations of 50 to 1,000 bats; and P4 have current or observed historic populations of fewer than 50 bats. Based on 2009 winter surveys, there were a total of 24 P1 hibernacula in seven states: Illinois (one); Indiana (seven); Kentucky (five); Missouri (six); New York (three); Tennessee (one); and West Virginia (one). One additional P1 hibernaculum was discovered in Missouri in 2012. A total of 55 P2, 151 P3, and 229 P4 hibernacula are also known from the aforementioned states, as well as 15 additional states.

The historical summer range of the Indiana bat is similar to its modern range. However, the bat has been locally extirpated due to loss of summer habitat. The majority of known maternity sites have been located in forested tracts and riparian areas in agriculturally dominated landscapes such as Missouri, Iowa, Indiana, Illinois, southern Michigan, western Ohio, and western Kentucky. They have been documented to use roost trees in highly fragmented areas as well as more contiguous forested patches. Recent surveys for a proposed utility corridor documented a primary maternity roost tree in a narrow-forested corridor in northwest Missouri (Marquardt, pers. comm).

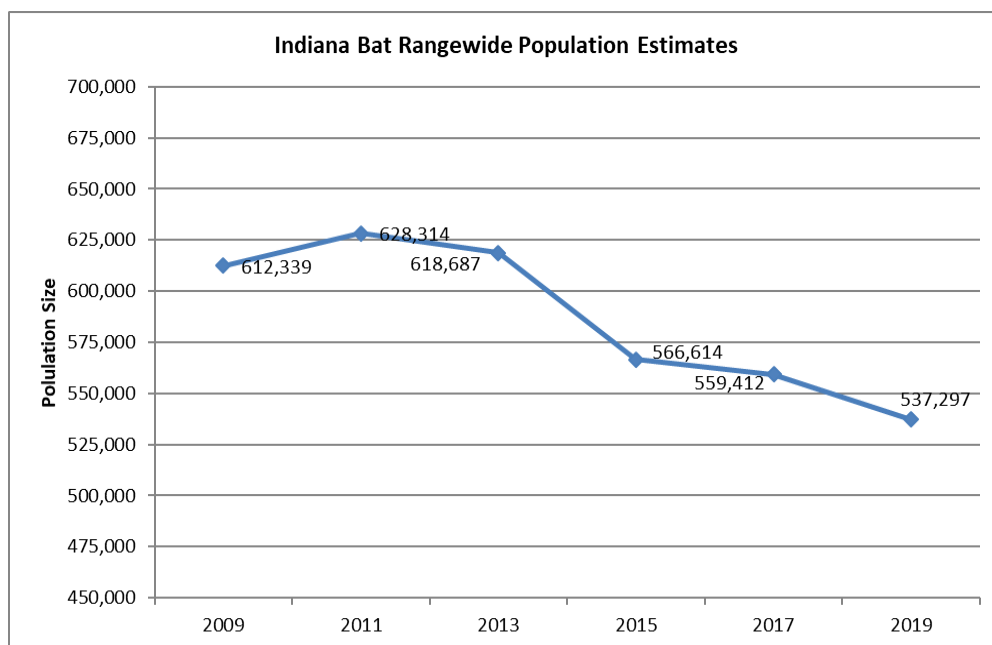


Figure 6. Indiana bat range-wide population estimates from 2009 – 2019 (USFWS 2019).

The reasons for listing the Indiana bat were summarized in the original Recovery Plan (USFWS 1983) including: declines in populations at major hibernacula despite efforts to implement cave protection measures, the threat of mine collapse and the potential loss of largest known hibernating population at Pilot Knob Mine, Missouri, and other hibernacula throughout the species range were not adequately protected. Although several known human-related factors have caused declines in the past, they may not solely be responsible for recent declines. Documented causes of Indiana bat population decline include: 1) human disturbance of hibernating bats; 2) improper cave gates and structures rendering them unavailable or unsuitable as hibernacula; and 3) natural hazards like cave flooding and freezing. Suspected causes of Indiana bat declines include: 1) changes in the microclimate of caves and mines; 2) dramatic changes in land use and forest composition; and 3) chemical contamination from pesticides and agricultural chemicals. Current threats from changes in land use and forest composition include forest clearing on private and public land within the summer range, woodlot management and wetland drainage by landowners, and other private and municipal land management activities that affect the structure and abundance of forest resources.

Climate change is also an emerging threat to the Indiana bat, primarily because temperature is an essential feature of both hibernacula and maternity roosts. Potential impacts of climate change on temperatures within Indiana bat hibernacula were reviewed by V. Meretsky (pers. comm., 2006 in USFWS 2007). Climate change may be implicated in the disparity of population trends in southern versus northern hibernating populations of Indiana bats (Clawson 2002), but Meretsky noted that confounding factors are clearly involved. Potential impacts of climate change on hibernacula can be compounded by mismatched phenology in food chains (e.g., changes in insect availability relative to peak energy demands of bats; V. Meretsky, pers. comm., 2006 in USFWS 2007). Changes in maternity roost temperatures may also result from climate change, and such changes may have negative or positive effects on development of Indiana bats, depending on the location of the maternity colony. The effect of climate change on Indiana bat populations is a topic deserving additional consideration.

The greatest current threat to Indiana bats is white nose syndrome (WNS). WNS was first documented in New York in February of 2006 and has since been confirmed in 20 states and 4 Canadian Provinces (www.whitenosesyndrome.org/resources/map). It is currently unknown if WNS is the primary cause or a secondary indicator of another pathogen, but it has been correlated with erratic behavior such as early or mid-hibernation arousal that leads to emaciation and mortality in several species of bats, including the Indiana bat (<http://whitenosesyndrome.org/>; www.fws.gov).

Overall mortality rates, primarily of little brown bats, have ranged from 90 to 100 percent in hibernacula in the northeastern United States. It is currently estimated that 5.7 to 6.7 million bats have died from WNS in infected regions (www.whitenosesyndrome.org/about-white-nose-syndrome). Apparent losses of 685 Indiana bats in Hailes Cave and 12,890 (previous population was 13,014) Indiana bats in the Williams Preserve Mine in New York were documented during the first winter WNS was observed at each site. Additionally, Indiana bat surveys conducted at hibernacula in New York during early 2008 estimated the population declined 15,662 bats, which represents 3.3% of the 2007 revised rangewide population estimate. The number of confirmed cases of WNS has increased significantly in the Ozark-Central Recovery Unit since

2011 (www.whitenosesyndrome.org/resources/map) and if trends continue, it is likely that additional reductions in the Indiana bat population will occur in this region.

WNS is thought to be transmitted by direct bat contact with an infected bat and by transmission of the causative agent from cave to cave. The distribution of WNS appears to be expanding in all directions from its epicenter in New York. Between 2007 and 2008, it was documented to have spread from a 9 km radius to a 200 km radius, and at the end of the 2008-2009 winter, it was documented in all major hibernacula in New York. Most recently it has been found throughout Missouri, northern Alabama, Illinois, and suspected in eastern Iowa. The Service and partners are conducting research to develop management strategies to reduce the spread and impacts of WNS. However, it remains a significant and immediate threat to the Indiana bat.

At the time the revised recovery plan was drafted in 2007, the causative agent for WNS had not yet been discovered and the additive impacts to the already declining Indiana bat were not yet considered. Given the documented deaths of Indiana bat due to WNS in the Northeast since 2006, the species is further threatened with extinction. Numerous research projects have been completed and are ongoing at a rapid rate since the first discovery of WNS, a national response plan has been completed (available at www.whitenosesyndrome.org), multiple states and agencies have approved or are in the process of developing response action plans, and various management actions have been undertaken with the hope of slowing the spread of the disease (e.g., cave closures, the development of decontamination protocols, etc.). Despite these efforts, there is no known cure for the disease and all bats in North America that hibernate in caves could be detrimentally impacted and, in some cases, threatened with extinction.

Status Within the Ozark-Central Recovery Unit: The Indiana bat populations in the Ozark-Central Recovery Unit have declined significantly since 1990 but has been relatively stable from 2009 to 2017 (USFWS 2017, 2019). Historically, the Ozark-Central Recovery Unit had the largest numbers of Indiana bats in hibernacula; however, populations have declined such that the Midwest RU unit hosts the largest populations of Indiana bats. Prior to 2012, the majority of hibernating bats in the Ozark-Central RU were assumed to overwinter in Pilot Knob Mine in Missouri. Dramatic declines in the hibernating population at this site occurred since the early 1980s from an original estimation of approximately 100,000 in the 1970s to an estimation of 1,678 in the 2000s. The discovery of the Sodalis Nature Preserve population in Hannibal, Missouri has increased the baseline size of the population in the Ozark-Central Recovery Unit, but not the overall trend across the range of the species. Based on observations by private cavers, the site has been occupied by Indiana bats since the 1970s. These bats are not considered to be bats that moved from Pilot Knob Mine following a partial collapse of the mine. In 2017, Sodalis Nature Preserve housed approximately 197,000 hibernating Indiana bats. The most recent survey in 2019 showed the first signs of a WNS-caused decline in this population with the count being approximately 180,000 hibernating Indiana bats. The current 2019 population estimate for the Ozark-Central Recovery Unit is approximately 271,965.

IV. ENVIRONMENTAL BASELINE

The purpose of the environmental baseline is to describe past and ongoing human and natural factors that have contributed to the current status of the species and its habitat in the project

vicinity. Range-wide factors affecting the Indiana bat include those listed previously under *Reasons for Decline – Documented Causes* and *Reasons for Decline – Suspected Causes*. Other factors having the potential to adversely affect roosting habitat and foraging of both species include: (1) forest clearing by private industry within the summer range in Missouri, (2) woodlot management that fails to provide adequate roosting and foraging habitat, and (3) other private and municipal land management activities that affect the structure and abundance of forest resources in Missouri.

Status of the Species within the Action Area

As described previously, the Action Area for the East Locust Creek Reservoir Project includes the NCMRWC property boundary and 5-miles downstream of the proposed Reservoir dam of East Locust Creek, plus a 2.5-mi (4.0-km) radius around the Project areas. Thus, the total Action Area comprises a total of approximately 58,089 acres.

The Reservoir will be located in Sullivan County, Missouri. Based on soils types, Sullivan County consists of 67 percent rangeland and 32 percent forestland, with the remaining areas consisting of water and undefined areas.

Sullivan County, Missouri, has known Indiana bat maternity roosts and summer habitat. The nearest Priority 1 hibernaculum to the Action Area is approximately 115 miles southeast of Sullivan County. Priority 3 and 4 hibernacula are approximately 60 miles southeast of the Project. Due to the presence of habitat and proximity to known maternity roosts, mist netting and acoustic monitoring were conducted from June 2 – July 10, 2016. The sampling methodology followed the Indiana Bat Draft Recovery Plan and the Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2007; USFWS 2015). Ten Indiana bats were captured within the property boundary over 81 net nights, and acoustic sampling indicated Indiana bat use in eight of the nine regions based on 35 detector nights (Olsson 2017). Two bats were tracked (Laela and Sushi; Figure 7), and four maternity roost trees were identified, resulting in two groups of two maternity roost trees and 9 alternate roosts. For this study, a maternity roost tree was identified as having more than five bats identified during the emergence count (Olsson 2017). Callahan (1993) defined primary roost trees in Missouri as having 30 or more bats on multiple nights. However, Kurta et al. (1996) determined this number might not be applicable to small to moderate sized maternity colonies.

Two of the four Indiana bat maternity roost trees and three of the nine alternate roosts identified occur within the normal pool of the Project (i.e., Laela 1 and Laela 2; Figure 7). A lactating female bat was tracked to each of the four maternity roost trees and the emergence count identified more than five bats. The two groups of roost trees are less than five miles apart, which suggests there could be one or two Indiana bat colonies. However, the distance between capture locations, maternity roost trees, alternate roost trees, and small amount of overlap between the areas, all indicate that two Indiana bat maternity colonies are present within the Action Area (Figure 7). The two maternity roost colonies' minimum populations are estimated at 31 bats and 40 bats. Emergence counts from alternative roost trees are not included in the minimum population sizes.

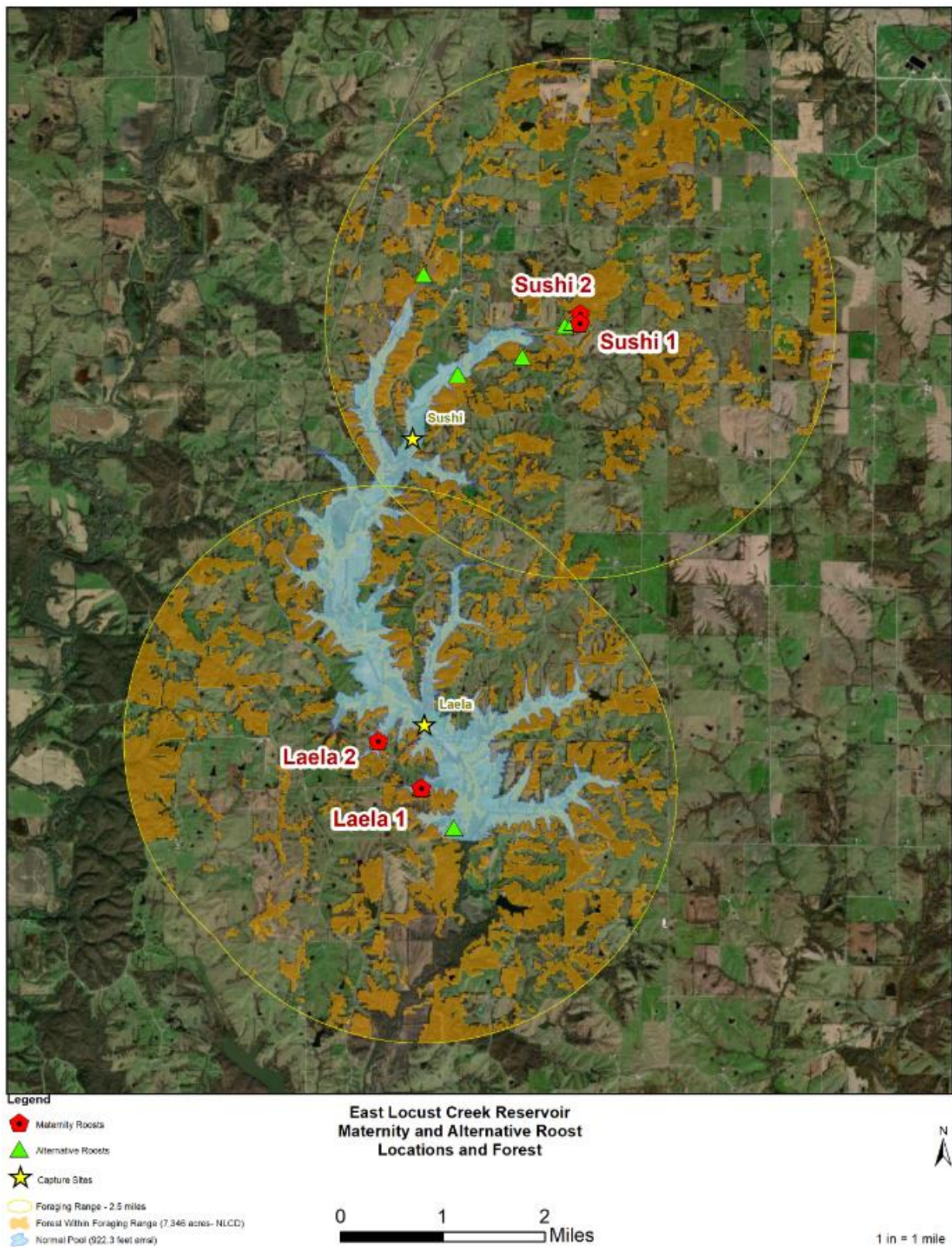


Figure 7. During Olsson's Indiana bat field study, multiple maternity roost trees were identified within the East Locust Creek Reservoir Project.

The home ranges for the two colonies were determined based on a 2.5-mile buffer around the primary maternity roost trees (Figure 7). The forested areas within the 2.5-mile buffers totals 6,566 acres with 3,732 forested acres within Laela's home range and 2,880 forested acres within Sushi's home range. There are 46 forested acres of overlap between the two maternity colony home ranges.

Additional data from other sources, including the Service's data, provides further insight to the Project effects to the Indiana bat. Within a 5-mile radius of the Project's property boundary and 5-miles downstream of the dam on East Locust Creek with an additional 5-mile radius, there are a minimum of two Indiana bat colonies outside the Project Action Area and within 5 miles of the Action Area. In 2008 and 2009, mist net surveys led to the documentation of reproductive females and a confirmed roost tree approximately 4 miles to the northeast of the Action Area. In 2017, mist net surveys led to the documentation of reproductive females and bats were tracked to seven roost trees approximately 4 miles southwest of the Project. Additional colonies may occur within 5 miles of the Action Area, but presence/probable absence surveys have been limited to these two areas.

Factors Affecting the Species Environment Within and Adjacent to the Action Area

This section describes factors affecting the environment of the species or critical habitat in the Action Area. The environmental baseline includes state, tribal, local, and private actions already affecting the species or that will occur contemporaneously with the consultation in progress. Related and unrelated Federal actions affecting the same species and critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the Action Area that may benefit listed species or critical habitat.

Factors affecting the Indiana bat environment within and adjacent to the Action Area are expected to be the same as those described under the Status of the Species section. Landownership in the Action Area is an estimated 91.78% private, 0.15% public, and 8.07% NCMRWC property. The public portion of the land use is comprised of Sears Community Lake. Current land use in the Action Area varies. In Sullivan County, Missouri, the land use consists of 67% rangeland and 32% forestland, with the remaining land use described as water or undefined areas.

V. CONSEQUENCES OF THE ACTION

Consequences of the proposed action are all reasonably certain consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. The proposed action and associated activities are discussed below in relation to the factors considered. Additionally, the expected response of the species to the listed actions is identified, where applicable.

The proposed action will remove an estimated 1,341 acres of forested habitat. As described in “Other Activities Caused by the Action”, the Service removed the forest lost acres (i.e., 53 acres) of the predicted new water transmission lines from the analysis because additional consultation will occur for those future activities (Table 1). Therefore, the Service is analyzing the consequences of the action on the remaining 1,288 acres of permanent and predicted forest loss.

The Service does not anticipate the loss of bat habitat on the bridges that will gradually become inundated as the Project is completed and the Reservoir fills in the estimated two to ten year period. In September 2019, a survey was conducted of these future inundated bridges. This survey did not find any signs of bat utilization of the bridges via bat staining or bat guano. Additionally, during the mist netting survey, telemetry did not track any bats to a bridge location.

Factors Considered

This section includes an analysis of the consequences of the proposed action on the species and critical habitat. Our analysis considers the following factors:

Proximity of the action: The proposed action will affect occupied habitat, including the permanent destruction of two known primary Indiana bat roost trees and three alternate roost trees and the permanent and predicted removal of 1,288 acres of habitat.

Distribution: The Action Area includes a relatively small fraction of the range of the Indiana bat.

Timing: With the exception of the removal of hazard trees, the manual clearing of trees on 1,288 acres will occur between during the inactive season for the Indiana bats, i.e., November 1 to March 31, to avoid consequences to the Indiana bat during their maternity season, the timeframe that is most critical for their survival and reproduction. Thus, there is very little risk of injury or direct mortality during tree clearing. There may be limited hazard tree removal during the active season, but the likelihood of felling an occupied hazard tree when bats are present is very small.

Duration and Frequency: The duration of the effects will be both short-term and long-term. Short-term duration includes felling trees during the inactive season (November 1 – March 31) over a two-year period. Short-term duration also includes increased energetic demands expended when gravid bats search for new roosting trees. Long-term effects include permanent loss of 1,288 acres of occupied roosting and foraging habitat.

Disturbance intensity and severity: In general, intensity increases as projects impact more acres of suitable habitat or greater numbers of individuals. The average home range size of Indiana maternity bat colonies is 12,560 acres (USFWS 2019b). There are currently 3,732 of forested habitat (30% of the home range) within one of the two maternity colonies, and 2,880 acres of forested habitat (23% of the home range) in the other. This project would result in the permanent removal of 813 acres for one colony (5% reduction in forested habitat; 23% of the home range will remain forested) and 226 acres in the other (13% reduction in forested habitat; 21% of the home range will remain forested).

Severity is related to the type of individuals or populations impacted; severity is highest for impacts to maternity colonies, moderate for non-maternity, swarming, and staging populations,

and is lowest for migratory individuals. Even though project activities have the potential to adversely affect individuals, we expect that impacts will not be severe given that consequences (in the form of death or injury) will be avoided by conducting tree clearing during the inactive season when bats are not present. We anticipate that some pregnant females could be harmed while searching for new maternity roost trees when they return from hibernaculum.

Impact of the Proposed Action

Consequences of Removing Active Maternity Roost Trees

Indiana bats form colonies in the summer and exhibit fission-fusion behavior where members frequently coalesce to form a group (fusion), but composition of the group is in flux, with individuals frequently departing to be solitary or to form smaller groups (fission) before returning to the main unit (Barclay and Kurta 2007). As part of this behavior, Indiana bats switch roosts often, typically every 2–3 days with adult female reproductive condition, roost type, and time of year affecting switching (Kurta et al. 2002, Kurta 2005). The bats' fission-fusion behavior is influenced by a number of factors, including temperature, precipitation, predation, parasitism, and the ephemeral nature of the habitability of roost sites (Carter and Feldhamer 2005). Bats need to proactively investigate new potential roost trees prior to their current roost tree becoming uninhabitable (e.g., tree falls over; Kurta et al. 2002, Carter and Feldhamer 2005, Timpone et al. 2010).

The exact number of roost trees a colony uses at any given time (or across the season) is not known, because: 1) not every bat in a colony can be tracked; 2) not all bats can be tracked simultaneously; 3) bats are generally tracked for a short period; and 4) number of trees used by a bat is correlated with number of days it is radio-tracked (Gumbert et al. 2002, Kurta et al. 2002). On any day, a colony is dispersed among numerous trees, with many bats occupying one or more primary roosts, while individuals and small groups reside in different alternate roosts (Kurta 2005). The number of alternates used on any day probably varies, but bats from one colony occupied at least eight trees on a single day (Carter 2003). Maternity colonies use a minimum of 8–25 different trees in one season (Callahan et al. 1997, Carter 2003, Kurta et al. 2002, Sparks 2003). Therefore, Indiana bats associated with a maternity colony are spread out across these multiple trees in any given day/night. However, one to three of these are primary roosts used by the majority of bats for some or all of the summer (Callahan et al. 1997). In a long-term study of an Indiana bat maternity colony in Indiana, Sparks et al. (2003) found that the natural loss of a single primary maternity roost led to the fragmentation of the colony (bats used more roosts and congregated less) the year following the roost loss.

This project will result in the removal of at least two primary roost trees and three alternate roosts. Removal of an Indiana bat primary roost tree (that is still suitable for roosting) in the winter is expected to result in temporary or permanent colony fragmentation. Smaller colonies may be expected to provide less thermoregulatory benefits for adults and for nonvolant pups in cool spring temperatures. Removal of multiple alternate roost trees in the winter is also expected to result in similar adverse effects.

Fidelity of Indiana bat maternity colonies to their summer range is well documented. In addition to fidelity to the general summer maternity area, roost trees, although ephemeral in nature, may be occupied by a colony for a number of years until they are no longer available (i.e., the roost

has naturally fallen to the ground) or suitable (i.e., the bark has completely fallen off of a snag). Some trees have shorter life expectancy as a roost than others (e.g., living shagbark hickories can provide suitable roosts for Indiana bat for decades while elm snags may lose their bark within a few years). Although loss of a roost (e.g., blow down, bark loss) is a natural phenomenon that Indiana bats must deal with regularly, the loss of multiple roosts, likely stresses individual bats, affects reproductive success, and impacts the social structure of a colony (USFWS 2007).

Removal of a primary roost is expected to result in increased energy expenditures for affected bats. Female bats have tight energy budgets, and in the spring need to have sufficient energy to keep warm, forage, and sustain pregnancies. Increased flight distances or smaller colonies are expected to result in some percentage of bats having reduced pregnancy success, and/or reduced pup survival. Dispersal to adjacent suitable habitat may affect in the short term by causing increased energetic demands, exposure to inter and intra-specific competition, and exposure to predation while searching unfamiliar habitat for new roosting and foraging areas if high quality roosting habitat is not available in close proximity to their previous maternity area. Removal of multiple alternate roost trees in the winter is also expected to result in similar adverse effects.

The retention of standing trees around the shallow water and edge of the Reservoir will minimize effects of roost tree removal and provide suitable roost trees over one cycle of tree decay.

Consequences of Removing Summer Habitat

Indirect effects may also occur through the removal of foraging and roosting habitat. If the removal of foraging and roosting habitat results in substantial degradation of habitat quantity or quality, a maternity colony may be harmed via a significant impairment of behavioral patterns, including breeding, feeding, or sheltering. Based on data provided in the Indiana bat draft revised recovery plan (USFWS 2007), a maternity colony needs at least 10% suitable habitat (i.e., forested habitat) to exist at a given point on the landscape. Accounting for the permanent removal of the forested habitat, both maternity colonies will continue to be more than 10% suitable habitat (23% and 21%, respectively). Loss of familiar roost trees and associated foraging habitat, while detrimental in the short term; however, are not expected to have long term consequences for a colony because of the remaining forested habitat within the known foraging range of the Indiana bat (Sparks et al. 2005) and the propensity of the species to utilize alternative roost sites (Carter and Feldhammer 2005). Though loss of non-maternity roosting habitat may impact Indiana bats, it is not anticipated to result in adverse effects by reducing survivorship or reproduction.

Consequences of the Habitat Compensation Plan

Although 1,288 acres of habitat will be lost as a result of this project, the NCMRWC and NRCS has also proposed a Habitat Compensation Plan as a condition of the action. This compensatory habitat is intended to minimize the effect on the species of the Project's anticipated incidental take, resulting from the permanent loss and degradation of the habitat described above. The protection and restoration acres will be permanently protected compensatory habitat proposed will be in the form of a conservation easement (i.e., at least 1,236 acres; 683 acres preservation and 553 acres tree planting within the Action Area). Indiana bats will likely benefit from the wetland and stream mitigation that will be required by the Corps, though the details of the stream and habitat mitigation are not yet available.

This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. NRCS and NCMRWC have made an effort to protect habitat around the Reservoir and within the Action Area, which will directly benefit the two on-site colonies in perpetuity. The compensatory lands will provide suitable habitat for breeding, foraging, sheltering, or dispersal commensurate with or habitat lost as a result of the Project. Providing this compensatory habitat, within the NCMRWC property boundary as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Species Response to the Action

Although we expect there may be harm to Indiana bats through the loss of known maternity roost trees and the loss of habitat, we expect the two maternity colonies to persist. The likely behavioral response of bats returning in the spring to the cleared area will be to disperse to adjacent suitable habitat. However, such dispersal is likely to cause a short-term delay in birth by increasing the amount of time it takes to settle into a maternity roost and increasing energetic demands. Loss of familiar roost trees and associated foraging habitat, while adverse in the short term, are not expected to have long term consequences for a colony because of the remaining forested habitat within the known foraging range of the Indiana bat (Sparks et.al. 2005), the propensity of the species to utilize alternative roost sites (Carter and Feldhammer 2005), and the habitat protection and restoration components that will benefit on-site colonies.

VI. CUMULATIVE EFFECTS

A BO must predict the consequences to species caused by future non-Federal activities within the Action Area, i.e., cumulative effects. "Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation" (50 CFR §402.02). Additional regulations at 50 CFR §402.17(a) identify factors to consider when determining whether activities are reasonably certain to occur. These factors include, but are not limited to: existing plans for the activity; and any remaining economic, administrative, and legal requirements necessary for the activity to go forward.

Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the Action Area of the proposed project.

VII. CONCLUSION

After reviewing the current status of Indiana bat, the environmental baseline for the Action Area, the effects of the proposed East Locust Creek Reservoir Project, and the cumulative effects, it is the Service's BO that the East Locust Creek Reservoir Project, as proposed, is not likely to jeopardize the continued existence of the Indiana bat. Although some individual Indiana bats may be harmed by the action, we do not anticipate population-level impacts. This determination is based on the following considerations: 1) the proposed action will impact a very small portion

of the Ozark-Central Recovery Unit; 2) the proposed Action Area is small relative to the species range; 3) the proposed action will only affect a portion of the Action Area and will not substantially alter the overall availability of Indiana bat habitat within the Action Area, and 4) mortality will be avoided by removing trees between November 1 and March 31. There is no critical habitat for the Indiana bat in the project area; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken so that they become binding conditions of any grant, permit, or federal action for the exemption of Section 7(o)(2) to apply. The NRCS, Corps, USDA – RD, and FHWA have a continuing duty to regulate the activity covered by this Incidental Take Statement. If the NRCS, Corps, USDA – RD, and/or FHWA (1) fails to assume and implement the terms and conditions, or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to any grant, contract, or permit, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the NRCS must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement, pursuant to 50 CFR § 402.14(i)(3).

Extent of Take Anticipated

As described under the Effects of the Action above, incidental take of the Indiana bat will occur when maternity roost trees and occupied habitat are removed during Project activities. In instances in which the total number of Indiana bats anticipated to be taken cannot be determined, the Service may use the acreage of habitat impacted as a surrogate. Surrogates may be used to express the amount or extent of anticipated take, provided the biological opinion or the incidental take statement: (1) Describes the causal link between the surrogate and take of the listed species; (2) describes why it is not practical to express the amount of anticipated take or to monitor take-related impacts in terms of individuals of the listed species; and (3) sets a clear standard for determining when the amount or extent of the taking has been exceeded [50 CFR 402.14(i)(i)].

The Service anticipates that incidental take of the Indiana bat will be difficult to detect because we anticipate harm, not mortality. In addition, due to its life history and ecology they may be difficult to locate due to their cryptic appearance, and finding a dead or injured individual is

unlikely due to their relatively small size, widely dispersed individuals under loose bark or in cavities of trees, and the unknown areal extent and density of the roosting and foraging populations within the Action Area. Additionally, losses of Indiana bats may also be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, or additional environmental disturbances. Since the Project's construction will result in the destruction of breeding, foraging, sheltering, and dispersal habitat, the quantification of habitat acreage serves as a direct surrogate for the Indiana bats that will be lost. The BO described the permanent and predicted impacts to 1,288 acres; however, this incidental take statement does not authorize the potential take resulting from the predicted residential development (i.e., 162 acres). Consequently, the Service anticipates that no more than 1,126 acres of habitat will be disturbed by the Federal action. Therefore, the Service is authorizing incidental take for the harm of all Indiana bats, within the Action Area of 1,126-acres of habitat inhabited by the Indiana bat.

Effect of the Take

Overall, the impact to individuals caused by Project activities is not likely to appreciably affect the status of the Indiana bat in the Ozark-Central Recovery Unit. In the accompanying BO, the Service determined that the level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

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

1. All conservation measures, as described in the BA and restated here in the Project Description section of this BO, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.
2. Report to the Service annually about the status of the Project activities until the Project and all RPMs have been implemented.
3. The NRCS, Corps, USDA – RD, and FHWA will ensure the NCMWRC will monitor take to verify that the authorized level of take has not been exceeded.
4. Any injured or dead Indiana bats incidentally observed should be reported to the Service.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, the NRCS, Corps, USDA – RD, and FHWA must ensure compliance with the appropriate terms and conditions, which implement the RPM described above. These terms and conditions are nondiscretionary. All federal agencies are required to comply with term and condition #1 of RPM 1 below; however, as the lead federal agency, NRCS is required to ensure compliance with the remaining terms and conditions.

RPM 1.

1. The NRCS, Corps, USDA – RD, and FHWA shall require and include full implementation and adherence to the Conservation Measures outlined as a condition of any permit or contract issued for the Project.
2. The following terms and conditions are the responsibility of the NRCS:
 - a. The NRCS shall ensure that all tenets of the “Habitat Compensation Plan” are fully enacted, and that a Service approved entity is selected to hold the conservation easement on at least 1,236 acres prior to the initiation of any project construction activities.
 - b. The NRCS shall ensure that drafts of the “Forest Management Plans” are produced and agreed upon by the Service prior to the initiation of any project construction activities.
 - c. The NRCS shall ensure that all entities that enter into a water purchase agreement with NCMRWC will consult with the Service regarding potential impacts to federally listed species resulting from future construction activities.
 - d. The NRCS shall require that all personnel associated with the Project are made aware of the Conservation Measures and the responsibility to implement them fully.
 - e. The NRCS shall follow the below plan and timeline for the finalization of the Project’s conservation easement and Forest Management Plans. If NRCS deviates from the timeline below significantly (i.e., beyond 30-days), they shall reinitiate consultation with the Service (Table 3). The Service must approve the final Habitat Compensation Plan prior to the easements being recorded.

Table 3. Conservation Easement, Habitat Compensation Plan, and Forest Management Plans Timeline for the Project

Timeline/Deadline	Tasks to be Accomplished
November 2020	<p>Finalize 2020 draft of the Habitat Compensation Plan, which details the individual compartments and present it to the Service as a critical element in the management of conservation easements. This plan should detail the following items:</p> <ol style="list-style-type: none"> 1. For the 553 acres of restoration through tree planting, the plan should detail restoration goals, success criteria, monitoring to ensure success criteria are met, and a plan for re-planting if the success criteria are not met. 2. For the 328 acres of existing forest that will not be included in the easements, the plan should detail how NCMRWC will ensure that these acres persist over time. A separate Forest Management Plan is necessary for these acres because they will not be included in and enforceable by the easement. 3. For the 1,236 acres under easements (i.e., 683 acres preservation and 553 acres tree planting), the plan should detail how easements will be monitored and how the Forest Management Plan will ensure that the habitat is maintained as suitable for Indiana bats in perpetuity. This includes an endowment that will cover easement monitoring and implementation of the forest management plan. If the easement holder will not be the entity implementing the Forest Management Plans, then NRCS and/or NCMRWC must document how the Forest Management Plan will be funded and how implementation is ensured.
	Project team to consult with the Service and draft the Forest Management Plans for discrete compartments.
	Draft proposed monitoring plan and endowment provided to MCHF for review and discussion with Project team and the Service.
	Concurrence with the Service and MCHF on form and format of Forest Management Plans and Monitoring Plans.
December 2020	Finalize Forest Management Plans.
	Finalize Compartment Monitoring Plans.
December 2020 – June 2021	Write individual compartment legal descriptions.
	Record Conservation Easement for each compartment.

RPM 2.

1. The NRCS will ensure that NCMRWC provides the NRCS with East Locust Creek Reservoir Forest Inventory and Indiana Bat Survey reports covering the entire Reservoir property, which will detail the area (acres) of forested habitat removed, number of active maternity roost trees removed, the conservation measures that were applied during the monitoring period, and the status of the Project. This report must include a copy of all Indiana bat survey results required in RPM 3 and RPMs implemented during the reporting period. These reports will be provided according to the following schedule:
 - a. By December 31 after the maternity season in which tree removal activities have commenced (including bat survey results);
 - b. By December 31 after completion of the dam;
 - c. By December 31 after the Reservoir initially reaches normal pool level or 3 years after dam construction is complete, whichever comes first (including bat survey results);
 - d. Additionally, East Locust Creek Reservoir Forest Inventory reports will be provided by December 31 after completion of any other NCMRWC Reservoir related construction activities affecting more than five acres of forest (e.g., roads, raw water line, public access, etc).
2. The easement holder will provide annual reports on all conservation easements describing site conditions, ongoing activities and violations beginning by December 31 of the first full year after easements are recorded.

RPM 3.

1. The NRCS will ensure the permittee will monitor presence and habitat use of maternity colonies documented during surveys conducted for this Project to determine the response to the proposed actions and the efficacy of the Conservation Measures by conducting roost tree and mist net monitoring as follows:
 - a. The remaining occupied maternity trees (i.e., roost trees to which reproductive females or juveniles were tracked) located during initial surveys will be relocated and monitored on two occasions following tree removal activities. The first monitoring event should be conducted during the maternity season after tree removal activities commence. Additional surveys should also be conducted three years after the first monitoring survey. Monitoring will include documentation of the presence and condition of the roost tree and conducting exit counts to document whether or not bats are still occupying the roost tree. In order to adequately monitor the response of the maternity colony, all surveys should

encompass the same scope for the survey efforts to ensure scientific comparability.

- b. In all survey areas where reproductive females or juveniles were captured during initial mist net surveys (i.e., presence of a maternity colony), follow-up mist net surveys, telemetry, and exit counts will be conducted on two occasions following the most recent version of the Range-wide Indiana Bat Survey Guidelines approved for the time period. The first monitoring event should be conducted during the maternity season after tree removal activities commence. Additional surveys should also be conducted three years after the first survey. In order to adequately monitor the response of the maternity colony, all surveys should encompass the same scope for both survey efforts to ensure scientific comparability. Because the two colonies were located in areas to be cleared and inundated, future monitoring efforts should be directed to areas immediately adjacent in suitable habitat.
 - c. To determine the location of occupied roost trees, researchers federally permitted to place radio transmitters on Indiana bats, and who capture the species within the project area during mist-net surveys are required to place a radio transmitter on the first reproductive female Indiana bat captured following permit conditions outlined in an approved ESA Section 10 (a)(1)(A) Federal permit and report such activities within 24 hours to the Missouri Ecological Services Field Office.
2. All monitoring results shall be submitted to the Missouri Ecological Services Field Office by December 31 of the year in which the monitoring event occurred. Reports must contain:
 - a. Any management or habitat manipulations that have occurred to date;
 - b. The results of the mist netting;
 - c. The results of the mist netting survey, including number, sex, age (i.e., mature or juvenile) and reproductive status of all bats captured, including Indiana bats, if any;
 - d. Status and occupancy of previously documented maternity roost trees;
 - e. Location and occupancy of newly documented maternity roost trees.
3. If requested, the Applicant shall ensure the Service or their authorized agents can examine the Action Area for compliance with this BO before, during, or after project completion.

RPM 4.

1. The NRCS shall immediately contact the Service's Missouri Ecological Services Field Office at (573) 234-5040 to report direct encounters between listed species and Project workers and their equipment whereby incidental take in the form of harm, injury, or death occurs. If the encounter occurs after normal working hours, the NRCS shall contact the Missouri Ecological Services Field Office at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, the NRCS shall follow the steps outlined in RPM 4.2 below.
2. Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the knowledgeable biological monitor(s) for the Project. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. Develop and implement guidelines for the future development around the Reservoir, outside the Project boundaries, for the protection of bat habitat including seasonal clearing restrictions.
2. Develop and implement guidelines for the future water transmission line construction and water purchase agreements due to the construction of the Reservoir, outside the Project boundaries, for the protection of bat habitat.
3. Control non-native and invasive species within suitable bat habitat.
4. Assist in providing research funding to the research community to further understand the ecology and stressors to the Indiana bat.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the BA. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the

amount or extent of incidental take is exceeded; (2) new information shows that the action may affect listed species in a manner or to an extent not considered in this BO; (3) the action is subsequently modified in a manner that causes an effect to the listed species not considered in this BO; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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