Stantec

Meeting Notes

East Tn Ridgeline USFWS Coordination Meeting

Project/File:	172677408
Date/Time:	January 19, 2022 / 10:30 AM Central
Location:	USFWS Cookeville Field Office, Cookeville, TN
Next Meeting:	TBD
Attendees:	David Pelren, USFWS (DP), Nicole Sikula, USFWS (NS), Robbie Sykes, USFWS (RS), Elizabeth Hambrick, TVA (EH), Gus McLachlan, Enbridge (GM), Josh Adams, Stantec (JA), James Kiser, Stantec (JK), Jeff Benefiel, Stantec (JB)
Absentees:	N/A
Distribution:	USFWS, TVA, Enbridge, Stantec

Item	Action
Project Overview- GM Enbridge exploring building ~125mile long, 30in diameter natural gas pipeline to the Kingston Power plant as TVA explores a fuel alternative for coal. Approximately 118 miles will be collocated with Enbridge's existing 3100 line built in the 1950s. To date, wetland and stream as well as cultural surveys have been initiated along the proposed route. FERC will be the lead federal agency and the goal is to prefile with FERC this spring, followed by a formal filing in mid 2023. In addition to the new pipeline, Enbridge is looking at options near Hartsville to construct a new compressor station which will be powered by a collocated solar facility. Goal of this meeting is to initiate early communication to try to reduce the chance of surprises as the project progresses.	None
USFWS- NS USFWS does not want to delay progress and doesn't want surprises either, it is likely the project should plan for Formal Consultation depending on the results of the field surveys. Formal Consultation would allow for more flexibility and should consider species that may be listed prior to construction	Stantec Meet with DP to discuss species records for survey planning
FERC Process- GM Once prefiling occurs, FERC will setup a prefiling with Enbridge and applicable federal agencies	None
Routing/Avoidance- GM, RS RS- Appears that majority of route on existing ROW, how much tree clearing anticipated?	

GM- Work on existing ROW will need at least 50 additional feet of ROW, Reroutes and off ROW will need 80-100ft. Actual amount of clearing TBD DP- Is season clearing or other avoidance measures (e.g. boring) doable GM- Seasonal clearing may be doable and HDD or boring of some features is also possible NS- Informal coordination would be more restrictive as far as avoidance measures, Formal consultation would be less restrictive based on results of survey- calculating take (formal) will provide more flexibility. Also, informal may lead to need to reconsult if route, listings, other variables change. If 'take' is exceeded during formal, will have to reconsult- avoid 'jeopardy' GM- FERC looks for developer to reduce Environmental impacts where possible NS- Possible to analyze worst case knowing that not all will be impacted **Click or tap here to enter text.**	
Species Specific Information JA- Began to go through species list, USFWS offered to have a call to go through species records and develop official list NS- In regards to bats USFWS is reviewing record buffers but want some flexibility and will be looking at habitat configuration/quality in addition to known records. Asked DP about conducting summer surveys. [more discussion needed and prior to any surveys for rare bats, a survey plan will need to be approved per conditions in Section 10 Federal Recovery Permit]. DP- Suggested looking at impacted acreage NS- Negative survey results are good for 5 years, but positive survey results don't expire. Negative surveys in known buffer won't remove the known location. By collecting recent data Enbridge would bring best available information to the table for consultation purposes. GM- FERC will likely be looking for surveys EH- TVA will be using Programmatic Biological Opinion for bats and will avoid the known listed plant population. Wants to know what conservation measures everybody was considering, so they can also be consistent. JA- Not ready to commit to conservation measures (CM) until what we are looking at as far as impacts to listed species. Need to complete required surveys prior to talking about CM's.	JA to Follow up with DP for meeting NS to follow up with MBTA information NS to follow up with dealing with species which might be listed prior to project completion

DP/NS- Some CMs to be considered, seasonal clearing for bats, no open trenching for larger stream crossings for aquatics. Should conduct targeted surveys (habitat assessments, mist-net/acoustics, etc) to determine potential effects. NS- Will have MBTA clearing restrictions as well- there is now a regional USFWS MBTA specialist in Cookeville office DP- Additional fall clearing restrictions for bat hibernacula possible, need to consider water quality impacts from winter clearing as well GM- FERC will hold project to clearing restrictions for MBTA NS- Can potentially avoid bat clearing restrictions by going through formal consultation and calculating 'take'- no take available for MBTA JA- Need to discuss survey methods and level of effort in regards to aquatics and bats, will set up meeting with USFWS to discuss known records NS- USFWS will provide official species list RS- doesn't appear to be that many aquatic records, mainly along Emory River and smaller streams near Kingston. Wanted to know how streams would be crossed GM- Stream crossing methods not developed yet, likely combination of methods RS- Rare plant: Bladderpod near Cumberland River. LH – They know of rare plant along one of their [TVA] utility lines, but not within project corridor near Clarkrange. It is the white-fringeless orchid. JA- Possible to use alternative survey methods for species screening, e.g. eDNA as a screening tool for streams and mussels NS- USFWS ok with eDNA as a screening tool but need to submit survey plan to USFWS prior to conducting work for approval JA- How to handle species potentially to be listed in coming years NS- Build in conservation measures- will look into how to handle this, most likely conferencing opinion or other document that can be removed from BA if necessary [NS- later followed up with an email discussing how to do this type of conferencing]. GM- Does service have eagle nest information? LH- Dave Henry with TWRA has a good data base RS- USFWS also has Eagle nest database JA- Will need gray bat cave info as well	

DP- Will provide	

The meeting adjourned at 12:00 PM Central.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Sincerely,

Joshua Adams
Principal
Phone: 502-212-5011
Mobile: 502-718-9512
joshua.adams@stantec.com

Attachment: [Attachment]

Crask, Amanda J

From: Pelren, David
Sent: Thursday, August 4, 2022 9:19 AM
To: Adams, Joshua
Cc: Tennessee ES, FWS; Sikula, Nicole R
Subject: FWS #2022-0036436-81 WB 9 and 10 NLAA determination
Attachments: 2022-0036436-81 Stantec FERC Ridgeline WB 9 and 10 NLAA stamp Trousdale Jackson Cos_signed.pdf

Josh –

The Fish and Wildlife Service's response regarding the proposal to add borings WB-9 and WB-10 is attached. Feel free to contact me with any questions.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
mobile phone: 931-261-5844

NOTE: This email correspondence and any attachments to and from this sender are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

Crask, Amanda J

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Friday, February 4, 2022 4:15 PM
To: Pelren, David; Kiser, James
Subject: [EXTERNAL] RE: Species surveys for E TN Ridgeline project

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Thanks Dave! Have a great weekend

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Pelren, David <david_pelren@fws.gov>
Sent: Friday, February 4, 2022 3:34 PM
To: Adams, Joshua <Joshua.Adams@stantec.com>; Kiser, James <James.Kiser@stantec.com>
Subject: Species surveys for E TN Ridgeline project

Gentlemen –

I've taken a look at our database for species hotspots. Recalling our conversation from the other day, I believe you've generally got a good idea about areas in which to anticipate potential presence of the primary species of concern. To highlight general locations of the ones that we have discussed with the most concern for potential impact, in addition to those concerns highlighted on the maps that you provided:

-gray bat – especially map sheet 2 and possibly extending into 3 and 4
-white fringeless orchid – sheet 11
-Cumberland rosemary – sheets 12 and 13
-Short's bladderpod – blufflines in the Cumberland River drainage (e.g. sheet 5)
-Virginia spiraea – I'm not seeing particular hotspots for it.

If you have further questions about any species in particular, feel free to check back in with me.

Have a great weekend!

David Pelren
Fish and Wildlife Biologist
Ecological Services

U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
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Study Plan to Conduct Indiana Bat & Northern Long-eared Bat Surveys along Enbridge's Ridgeline Expansion Project

Enbridge Ridgeline Expansion Project:

Approximately 198 km long pipeline extending from near U.S. Route 231 in western Trousdale County eastward to U.S. Route 27 in Wartburg, and south to Tennessee Valley Authority's Plant in Kingston, Tennessee

Prepared for:
Mr. David Pelren
U.S. Fish & Wildlife Service Tennessee Field Office
Endangered Species Biologist
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Prepared by:
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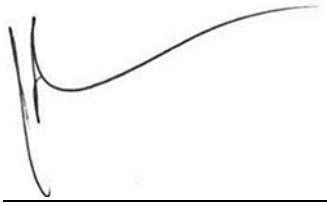
April 12, 2022

This document entitled Study Plan to Conduct Indiana Bat & Northern Long-eared Bat Surveys along Enbridge's Ridgeline Expansion Project was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Enbridge, Inc. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by

James Kiser

Reviewed by 

Josh Adams

Independent Review by

Justin Casey

Stantec

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Attachment A – Maps of Project Area

Attachment B – Federal and State Permits

1 INTRODUCTION

Enbridge, Inc. (Enbridge) is proposing to design, construct, and operate a new pipeline regulated by the Federal Energy Regulatory Commission (FERC), the Ridgeline Expansion Project (Project). The purpose of this Project is to provide natural gas to serve one of the power generation options Tennessee Valley Authority (TVA) is currently considering as a replacement for coal as a fuel source at Kingston Fossil Plant. This Project includes the construction of approximately 117 miles (188 kilometer [km]) of 30-inch diameter pipeline looping, construction of 8 miles (13 km) of 24-inch diameter lateral pipeline, and construction of one electric-powered compressor station with associated solar power generation facility.

New pipeline construction will primarily occur adjacent to an existing pipeline and will share right-of-way. The Project would start near U.S. Route 231 (US-231) in western Trousdale County and extend eastward to U.S. Route 27 in Wartburg, Tennessee. It would then turn south and extend to TVA's Plant in Kingston, Tennessee. The Project will extend through 8 central and eastern Tennessee counties, including Trousdale, Smith, Jackson, Putnam, Overton, Fentress, Morgan, and Roane. Each of these counties along with the pipeline length (km), number of mist net sites, number of acoustic sites and number of no survey sections are listed in Table 1 below and the locations are shown on the figures in Attachment A.

Table 1. Proposed effort and locations by counties for the Ridgeline Expansion Project

Project Linear KM	County	Proposed # of Mist Net Sites	Proposed # of Net Nights of Effort	Proposed # of Acoustic Sites	Proposed # of Detector Nights of Effort	Proposed # of KM's with no Habitat (No Surveys)	Map Grid #'s
1 - 18	Trousdale	12	48	5	20	1	1 - 7
19 - 42	Smith	18	72	4	16	2	7 - 20
43 - 74	Jackson	27	108	3	12	2	20 - 35
75 - 97	Putnam	16	64	7	28	0	36 - 48
98 - 116	Overton	17	68	1	4	1	48 - 58
117 - 135	Fentress	10	40	6	24	2	59 - 67
136 - 185	Morgan	42	168	5	20	3	68 - 93
185 - 198	Roane	9	36	4	16	0	94 - 100
Totals		**151**	**604**	**35**	**140**	**11**	

Stantec Consulting Services Inc. (Stantec) was contracted by Enbridge to complete a variety of engineering and environmental services for the Project. A portion of the services involve completing Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) presence/probable absence surveys for this Project. The objectives of this survey will be:

- Determine presence or probable absence of summer maternity colonies of the endangered Indiana bat and threatened northern long-eared bat in the Project area;
- Determine if summer colonies of the endangered gray bat (*Myotis grisescens*), little brown bat (*Myotis lucifugus*) and tricolored bat (*Perimyotis subflavus*) occur within the Project area;
- Establish baseline data on bat species composition within the Project area; and
- Document habitat type and usage by listed bats in the Project area.

This study plan has been developed as part of the endangered species survey planning process for this Project. As required by conditions G and E in Stantec's Federal Permits (listed in Table 2 and presented in Attachment B), written concurrence of this survey plan is needed prior to initiating field surveys for endangered species. We ask that you provide your written concurrence and/or comments back at your earliest convenience, so surveys can be initiated on 15 May 2022. Table 2 contains the Federal permits and associated biologists that will initiate the survey work. Additional biologists with Federal permits will likely be added to this Project throughout the summer, and Stantec will provide permits to the Service as soon as they become known.

Table 2. Federal Recovery Permits and Associated Biologists Proposed to Conduct Bat Surveys

Permit #	Permitted Biologists Covered for Bats under Permit
TE38821A-4	James Kiser, Wes Cunningham, Lynda Mills, and Doug Stephens
ES15027A	Kimberly Carter, Jody Nicholson, Angela Sjollema, Hannah Stoffs, and Matt Denzler.
TE91733B-0	Joshua Adams
TE13580D-1	Julia Wilson
TE28573D-0	Adam Rusk
TE98673B-0	Jason Thomas (JT) Layne
ESPER0003405	Crystal Griffin
TE99058B-0	Joshua Flinn

2 INDIANA BAT & NORTHERN LONG-EARED BAT SURVEYING

2.1 Survey Site Selection

The U.S. Fish and Wildlife Service's (USFWS's) 2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines, dated March 2022, was used to assist in determining which of the proposed Project's 198 km sections contained potential Indiana and northern long-eared bat summer habitat. The most updated Project corridor along with each km marker shapefile was overlaid onto aerial imaging (Google Earth dated December 2020) to determine if each km length of corridor contained forested habitat. Project km markers started at KM-0 on the western end of the Project corridor and continued eastward to KM-198 inside TVA's Kingston Plant facility.

Kilometer sections of the Project corridor containing only scattered trees (<10), or no forest was considered non habitat, thus determined to not need any type of survey. Stantec identified a total of 11 km's of the Project corridor requiring no survey effort.

For km sections of the Project corridor containing limited amounts of forest habitat and where no apparent mist net survey site could be identified from aerial photography within the Project area then Stantec identified these sections as acoustical survey sites. Stantec identified a total of 35 km's of the Project corridor where acoustic surveys would be completed. If acoustic data determines listed bat species are present at any of these sites, then additional attempts will be made to locate sites nearby where bats could be captured for radio-tracking purposes.

The remaining 151 km's of corridor will be surveyed for bats using mist netting techniques. Table 1 shows the number of sites each survey method will be used for in each of the counties.

2.2 Mist Net Guidelines

Summer mist net surveys will follow methods outlined by the USFWS's 2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines, dated March 2022. As such, mist-netting will be conducted between 15 May and 15 August, 2022. In accordance with this protocol, the survey effort will require 186 survey stations (sites), of which Stantec is proposing to conduct mist net surveys at 151 of these and acoustic surveys at the remaining 35 sites. Mist net surveys conducted at the 151 sites will result in 604 net nights of effort for the Project (Table 1). As previously mentioned, the amount of effort for the Project area is based on aerial photography and the length of project having forested habitat. Stantec proposes to conduct mist net surveys at a total of 151 sites, as presented in Table 1. This Project is located outside of the Appalachian Recovery Unit and will be surveyed with at least two net sets on two different nights, resulting in at least 4 net nights of effort per site.

As specified in the USFWS's 2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines, dated March 2022, each netting site will consist of at least two net sets per night. Mist-netting will begin at sunset and continue for five hours following sunset. Potential disturbance in the form of lights and sounds will be kept to a minimum during the survey period. Mist-netting equipment will consist of various sizes of the lowest visibility mesh nets commercially available, which are 75 denier, 2 ply (75/2) with a mesh size of 1 ½ inch (38 mm), support poles and rebar, pulley ropes, and stabilizing ropes. Nets will be checked at regular 10-minute intervals and all bats will be promptly removed, as this decreases stress on the animals and decreases chances of escapes[1]. Due to concerns over White Nose Syndrome (WNS), equipment will be decontaminated following the National White-nose Syndrome Decontamination Protocol dated October 2020[2]. Stantec will also monitor WNS disinfectant updates posted to the White-nose Syndrome Response Team's web page to ensure the most up to date methods are implemented.

In addition to following WNS decontamination guidelines, Stantec biologists will also be following numerous recommended actions to reduce the risk of humans transmitting SARS-CoV-2 to bats, or coronavirus transmitted from bats to humans. These actions include but are not limited to wearing proper Personal Protective Equipment (PPE) and the monitoring of health of biologists completing field investigations. As recommended in the USFWS memo dated June 12, 2020 and reiterated in the USFWS's *Indiana Bat and Northern Long-eared Bat Summer Survey Guidelines Frequently Asked Questions* (Revised 03/22/2022), COVID-specific PPE will be added to the mitigating equipment already used for reducing the spread of WNS in bats. These items will include disposable gloves, disposable clothing or clothing dedicated to single sites, face masks, and safety glasses. The overall wellness of biologists will be determined daily by completing a health questionnaire. This information will be recorded on the daily RMS forms currently required by Stantec. If biologists knowingly come in contact with someone who has tested positive for COVID-19 then current Federal, State, Local, and Stantec COVID 19 policies will be followed.

2.2.1 MIST NET SITE SELECTION

A desktop analysis of the Project area was undertaken to determine if potential bat habitat occurs within the Project corridor. Based on the initial desktop analysis 151 mist net sites are proposed for the project. These efforts along with the acoustic survey sites will effectively cover all the project corridor spatially. Qualified biologists will conduct field investigations prior to netting to make final selection of mist net location at the sites to be surveyed based on a combination of factors including: their proximity to other mist net sites, presence of key habitat characters, and their proximity to the proposed Project. Site selection will be based on a

[1] MacCarthy, K.A., T.C. Carter, B.J. Steffen, and G.A. Feldhamer. 2006. Efficacy of the mist-net protocol for Indiana bats: A video analysis. Northeastern Naturalist 13:25-28.

[2] https://www.whitenosesyndrome.org/mmedia-education/national-wns-decontamination-protocol-u-s

number of factors including: canopy cover, presence of non-obstructed flyways, and forest condition[3]. Net sites will be recorded and mapped using a handheld GPS unit. Digital photographs that illustrate selection criteria will be obtained at each net site. A map and sketch of each site will be included in the final report that illustrates the location of each net relative to topographic features and the Project as a whole.

2.2.2 BAT PROCESSING PROTOCOLS

Bats will be live-caught in mist nets, removed, processed (collect and record data), and released unharmed at the capture site. If provided by TWRA, wing bands with unique numbers used to identify individual bats will be placed on the forearms of captured bats prior to release. Captured bats will be identified to species level and the sex, age class (i.e., juvenile, adult), and reproductive condition of each bat will be determined. The mass and right forearm length of each individual bat will be recorded. Age will be determined by examining the epiphyseal diaphyseal fusion of long bones in the wing. Reproductive condition of female bats will be recorded as pregnant (based on gentle abdominal palpation), lactating, post-lactating, or non-reproductive. Documentation photos will be taken for all species encountered on site. If needed, photographs will be taken of the first 10 individuals of each species of *Myotis* captured.

If an Indiana bat, gray bat, and/or northern long-eared bat is captured during mist netting surveys, the USFWS will be informed within 48 hours as specified by permit conditions. The appropriate Enbridge representative will be contacted prior to contacting the agencies; however, if the representative is not able to be reached, the surveyor is bound by permit conditions to inform the agencies.

Weather conditions will be monitored each night of the survey. Conditions recorded will include temperature (°F), wind speed and direction, percent cloud cover, and moon phase (if visible). A digital thermometer will be used to record temperature. Wind speed will be estimated and based on the Beaufort wind scale, and cloud cover will be visually estimated.

2.3 Radio Telemetry

Radio transmitters will be attached to the first 10 individuals of each of the following species, Indiana, northern long-eared, tricolored, and little brown bats. No more than two (2) individual of each species will be fitted with radio transmitters at each site. A federally permitted biologist will carefully remove a small area of fur between the scapulae of bats selected for transmitter attachment to provide a good bonding surface for transmitter attachment. An activated transmitter will be attached to bare skin between the scapulae using surgical cement. Once transmitters are attached, the bats will be retained for approximately15 minutes in holding bags to allow cement to fully dry. To ensure the transmitter is functioning properly before bats are released, a biologist will use a receiver to monitor for its signal on the corresponding frequency. Stantec will use the smallest commercially available transmitter, and the biologists will ensure that total transmitter weight (including bonding cement) will equal less than five percent (5%) of the bat's body mass. Transmitters will have a whip antenna and an expected battery life of 10 – 14 days.

Each bat fitted with a radio transmitter will be tracked the following day in an attempt to locate its day roost. Stantec will use TRX1000s receivers (Wildlife Materials, Inc., Carbondale, Illinois) and hand-held yagi antennas during tracking activities. Telemetry will continue for seven days or until transmitter failure or detachment, whichever occurs first. Once roost sites are located, each roost will be flagged, and data will be collected. Field data collected will include type of roost (e.g. trees, buildings, bridges), identification of the bat using the roost (transmitter frequency and/or band number), tree species (if a tree roost), diameter at breast height (DBH) of tree, percent bark cover, percent canopy cover at roost location, aspect of roost, and

[3] Kiser, J.D. and J.R. MacGregor. 2005. Indiana bat (*Myotis sodalis*) mist net surveys for coal mining activities. Pp. 169-172 *in* K.C. Vories and A. Harrington (eds.), The Proceedings of the Indiana bat and coal mining: a technical interactive forum Office of Surface Mining, U.S.

proximity to water. Roost site locations will be recorded using a handheld GPS unit. Digital photographs that illustrate roosting conditions will be obtained at each roost site. Upon acquiring landowner permission, a path from the nearest road or trail will be flagged to each roost site providing a safe and easy access route for biologists conducting follow-up work at the roost sites (e.g., emergence counts, roost data collection).

Once a roost site is located, biologists will conduct emergence counts at each roost for at least two (2) days to determine colony size. The biologist(s) will position themselves near the roost where visibility of the potential exit point is least cluttered. Emergence counts will start 30 minutes before sunset and will end 30 minutes after sunset, or once no bat activity is observed around the tree for 30 minutes. Bats exiting the tree will be counted in five-minute intervals. This will allow biologists to determine peak emergence time after sunset.

2.4 Acoustic Surveys

The General Checklist for Acoustic Surveys of Indiana and/or Northern Long-eared Bats found in Appendix C of the USFWS's 2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines, dated March 2022, will be followed for acoustic surveys.

2.4.1 SITE SELECTION

A desktop analysis of the Project area was undertaken to determine if potential habitat occurred within the Project corridor. Based on the initial desktop analysis 186 km's of the Project corridor contained potential summer habitat. Of the 186 km's of Project containing potential bat habitat, 35 of these 1-km sections didn't provide locations that could be surveyed using mist nets, therefore it was determined the best surveying option would be acoustic surveys. The proposed acoustical survey efforts along with the previously proposed mist net surveys will effectively cover all the project corridor spatially. Qualified biologists will conduct field investigations prior to setting up acoustical detectors to make final selection of actual detector location at the sites. Acoustical survey sites will require open canopy sites where bats are expected to forage, or travel. Acoustic survey sites will be recorded and mapped using a handheld GPS unit. Digital photographs that illustrate selection criteria will be obtained at each site. As with mist net survey sites, a map and sketch of each site will be included in the final report that illustrates the location of each acoustic detector in regard to topographic features and the Project as a whole.

2.4.2 ACOUSTIC GUIDELINES

Acoustic bat surveys will follow methods outlined by the USFWS's 2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines, dated March 2022, and be conducted during the summer maternity season, which is defined by the USFWS as May 15 to August 15. According to the USFWS Guidelines for acoustic surveys of linear projects (in the Midwest Recovery Unit which includes the Project portion of Tennessee), a minimum of 140 detector nights is sufficient effort per the 35 km's of Project corridor containing forested habitat that is unsuitable for mist net surveys. A detector night is defined as 1 detector set to record bats from sunset to sunrise over 1 calendar night.

The acoustic survey will begin at 30 minutes before sunset and continue until 30 minutes after sunrise. Acoustic survey equipment will consist of the Wildlife Acoustics SM4BAT-FS Ultrasonic Recorder and associated SMM-U2 Ultrasonic Microphone. The following outlines the USFWS guidelines for acoustic surveys (USFWS 2022).

USFWS Acoustic Survey Guidelines

1. **Acoustic Survey Season**: 15 May to 15 August, when Indiana bats and northern long-eared bats occupy summer habitat
2. **Equipment**:
   - Full-spectrum and/or zero-crossing detectors
   - Directional, hemispherical, or omnidirectional microphones
3. **Acoustic Detector Placement**:
   - At least 3 meters (m; 10 feet [ft]) in any direction from vegetation or other obstructions
   - In areas without vegetation or with minimal vegetation within 10 m (33 ft) in front of microphone
   - Parallel to woodlands
   - At least 15 m (49 ft) from known or suitable roosts (e.g., trees/snags, buildings, bridges, bat houses, caves, or mine portals)
   - Forest canopy openings
   - Near water sources
   - Wooded fence lines, adjacent to large openings or connecting two larger blocks of suitable habitat
   - Blocks of recently logged forest where some potential roost trees remain
   - Road or stream corridors with open tree canopies or canopy height more than 10 m (33 ft)
   - Woodland edges
4. **Acoustic Detector Spacing**: Acoustic sites should be a minimum of 200 m (656 ft) apart.
5. **Minimum Level of Effort**:
   - Linear projects – a minimum of 4 detector nights per 0.62 mile (1 kilometer) of suitable summer habitat
   - Acoustic sampling period begins at sunset and ends at sunrise
   - Four (4) detector nights must consist of at least 4 calendar nights
6. **Weather Conditions** – Keep acoustic data only if the following weather conditions are met for the first 5 hours after sunset:
   - No more than 30 consecutive or cumulative minutes of precipitation
   - Temperature $\geq$ 10°C (50°F)
   - No strong winds, maximum of 9 miles per hour (mph; 4 meters per second [m/s] or 3 on Beaufort scale for up to 30 minutes)
   - Nightly weather observations, addressing precipitation, temperature, and wind, must be recorded from the nearest NOAA Weather Service Station and summarized in report
7. **Orientation of Acoustic Detector**: Directional and omnidirectional microphones should be oriented towards the majority of the flight path, while hemispherical microphones should be oriented vertically.
8. **Weatherproofing Acoustic Detector**: If necessary, detectors should be placed within weatherproof containers. Wildlife Acoustics SM4BAT acoustic detectors and SMM-U2 acoustic microphones are both weatherproof, requiring no after-market alterations.

Stantec will conduct an acoustic bat survey at 35 sites in suitable habitat where conditions don't allow for mist net surveys as presented in the figures in Appendix A. One detector will be deployed for four calendar nights at each acoustic site. The detectors will be deployed for at least 4 calendar nights (2 detector nights) from 30 minutes prior to sunset to 30 minutes after sunrise each night of sampling and will follow the guidelines described above from the USFWS.

2.4.3 DATA PROCESSING PROTOCOLS

Analysis methods (quantitative and qualitative) will follow the USFWS Guidelines. Acoustic data will be analyzed to assess whether Indiana, northern long-eared, little brown, and tricolored bats occur within the Project. Each data file will be processed to screen out noise files. The quantitative analysis will include processing all recorded files through Kaleidoscope Pro 5.4.0 (using the "Balanced-Neutral" setting [0], per USFWS Guidelines), an automated acoustic bat identification software program approved by the USFWS. The classifier is version 5.4.0 (Wildlife Acoustics). Default signal parameters were used, including a minimum of 2 pulses per call and advanced signal processing. Analysis will be conducted only for species known to occur within the Project area, including:

- Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)
- Big brown bat (*Eptesicus fuscus*)
- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)
- Seminole bat (*Lasiurus seminolus*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Gray bat (*Myotis grisescens*)
- Eastern small-footed bat (*Myotis leibii*)
- Little brown bat (*Myotis lucifugus*)
- Northern long-eared bat (*Myotis septentrionalis*)
- Indiana bat (*Myotis sodalis*)
- Evening bat (*Nycticeius humeralis*)
- Tri-colored bat (*Perimyotis subflavus*)

The automated program assigns a species identification to individual echolocation calls, and then uses a Maximum Likelihood Estimate (MLE) for each site and each night and assigns a p-value for presence. A low MLE value indicates that a species is likely present at a site. The USFWS Guidelines state that a MLE value < 0.05 for a species recorded during a given detector night represents a probable presence for a species with a high level of certainty, though qualitative analysis will also be conducted as described below.

If a detector night at a site has a MLE value of < 0.05 for the Indiana bat, northern long-eared bat, little brown bat, and tricolored bat files recorded at the site will be visually analyzed in zero crossing format by a qualified bat biologist using AnalookW software (Windows version 4.2 or newer). This will involve visually analyzing each call recorded from the detector on the night the species was detected, starting with the first call on the night and continuing until the species is either confirmed present, or until all calls from that night have been visually assessed and probable absence can be assumed. The visual review will involve comparing echolocation call structures of files in question to characteristics (e.g., frequency, slope, duration) from a known call library by a qualified bat biologist with experience acoustically identifying the species within the Project area. The results will be used to determine bat species presence and activity levels at each site.

3 REPORTING AND DOCUMENTATION

3.1 Scientific Report

Upon completion of the endangered species surveys, a scientifically defensible report will be submitted which will include a description of methods and site locations, summarized data, and a discussion and conclusion section describing the results. If any federally listed species are captured the discussion will provide detail on site specific uses in the Project area. Any telemetry results will be included in the report to demonstrate where those species were roosting and/or foraging (as appropriate). Tables of survey data and data sheets will be included as appendices in the report. Maps, representative species photographs and site locations, and illustrations will be included as appropriate. This report will be used for consultation with the USFWS.

4 STAFFING TO COMPLETE SURVEYS

Stantec will use federally permitted biologists to complete the bat surveys for the Project. For the purposes of these proposed bat surveys, Joshua Adams, James Kiser, and Julia Wilson will be responsible for overseeing the successful completion of surveys with properly permitted biologists. Stantec may use any combination of the biologists listed in Table 2 to complete the survey efforts. In addition, Stantec may need to contract some of the survey efforts to other companies. If other companies are contracted, then Stantec along with those companies will contact the USFWS for amending the survey plan.

5 CONCLUSIONS

As part of Enbridge's pre-construction and environmental due diligence, Stantec has prepared this study plan for the proposed Project in central and eastern Tennessee. It describes the Indiana bat, northern long-eared bat, little brown bat, and tricolored bat presence/probable absence studies, methods, and data analyses to be completed prior to development to provide a "path forward" for biological studies and risk assessment for the Project. Stantec requests the USFWS provide written concurrence for this study plan.

ATTACHMENT A

Maps

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1-A

2-A

Trousdale

Rocky Creek

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 1-A & 2-A

March 2022

Grid 1 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

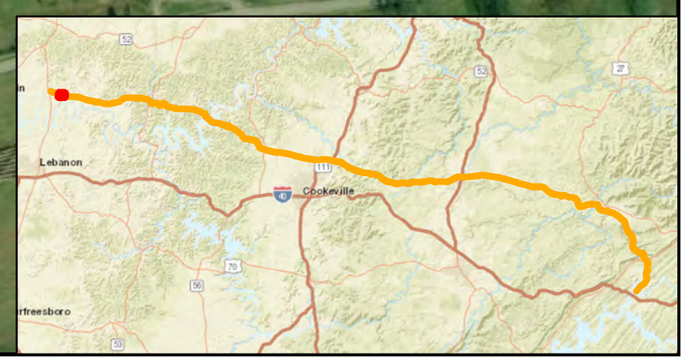
1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

3-N

4-N

Trousdale



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Proposed Bat Survey Sites - 3-N & 4-N

March 2022

Grid 2 of 100

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N

0 150 300 Feet

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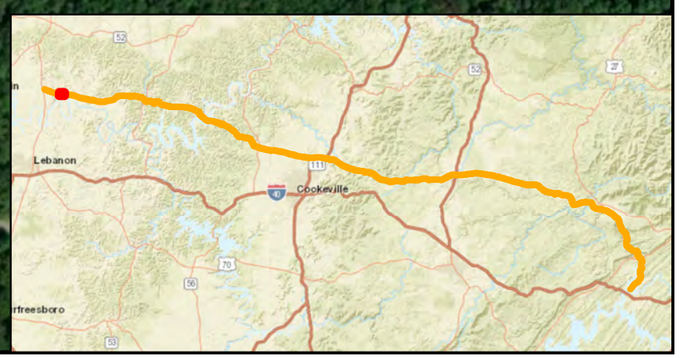
Independent Review by:	X.X.X	MM/DD/YY

5-N

6-N

Second Creek

Trousdale



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 5-N & 6-N

March 2022

Grid 3 of 100

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N

0 150 300 Feet

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Independent Review by: X.X.X MM/DD/YY

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7-N

8-N

Trousdale

Lebanon

Cookeville

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 7-N & 8-N

March 2022

Grid 4 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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9-A

10-A

Trousdale

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Proposed Bat Survey Sites - 9-A & 10-A

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Grid 5 of 100

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N

0 150 300 Feet

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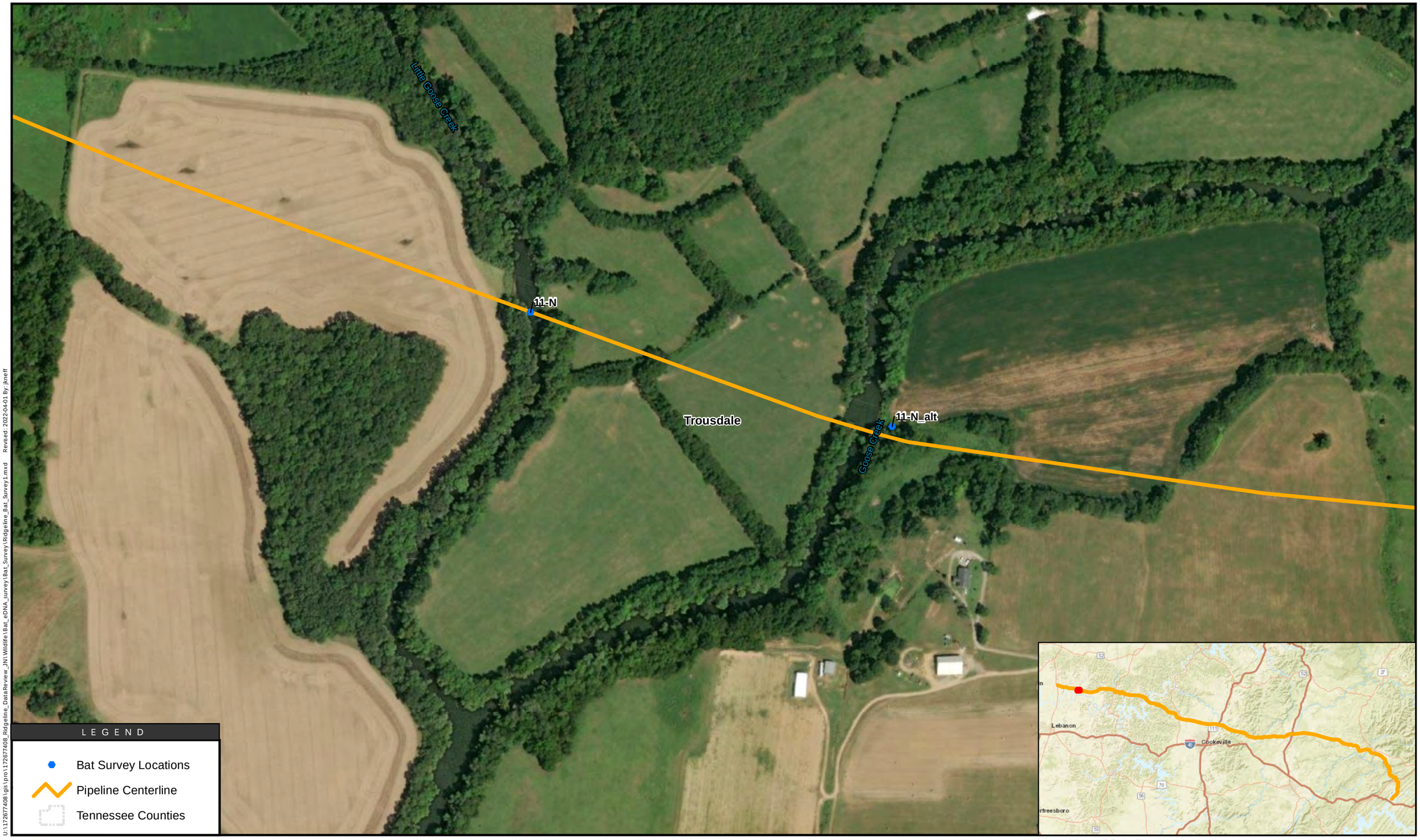
Independent Review by:	X.X.X	MM/DD/YY



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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

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Proposed Bat Survey Sites - 11-N & 11-N_alt

March 2022

Grid 6 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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Glasgow Branch

Trousdale

19-N

18-N

Lick Creek

Smith

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 18-N & 19-N

March 2022

Grid 7 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

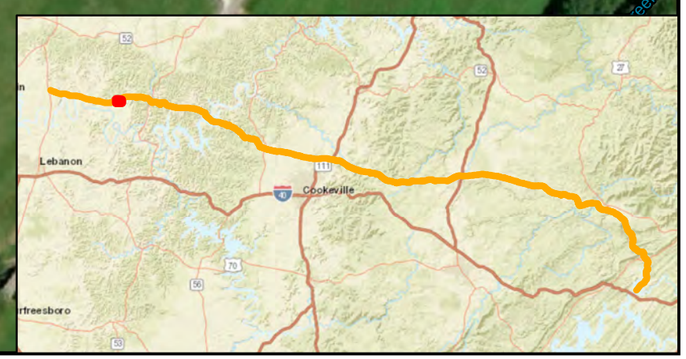
Trousdale

20-A

Smith

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties



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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 20-A

March 2022

Grid 8 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

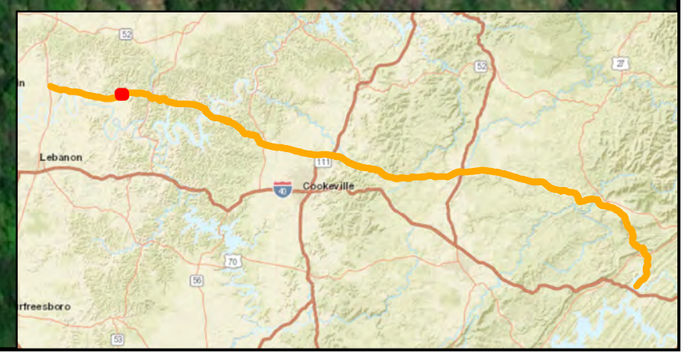
Trousdale

Dixon Creek

Young Branch

21-N

Smith



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 21-N

March 2022

Grid 9 of 100

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N

0 150 300 Feet

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22-A

23-N

Smith

Young Branch

South Fork Young Branch

Lebanon

Cookeville

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 22-A & 23-N

March 2022

Grid 10 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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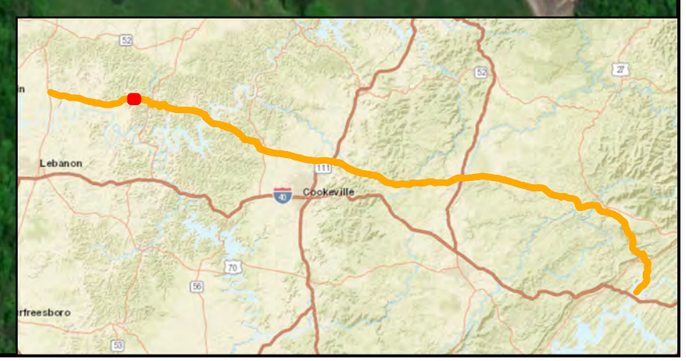
Independent Review by: X.X.X MM/DD/YY

24-N

Young Branch

Smith

25-N



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 24-N & 25-N

March 2022

Grid 11 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 26-N & 27-N

March 2022

Grid 12 of 100

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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

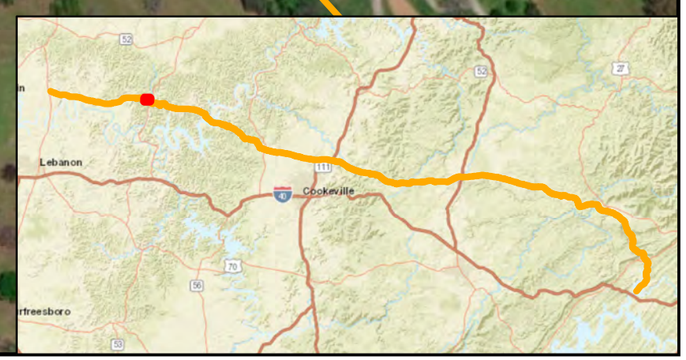
Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

Dickinson Branch

28-N_alt

28-N

Smith



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 28-N & 28-N_alt

March 2022

Grid 13 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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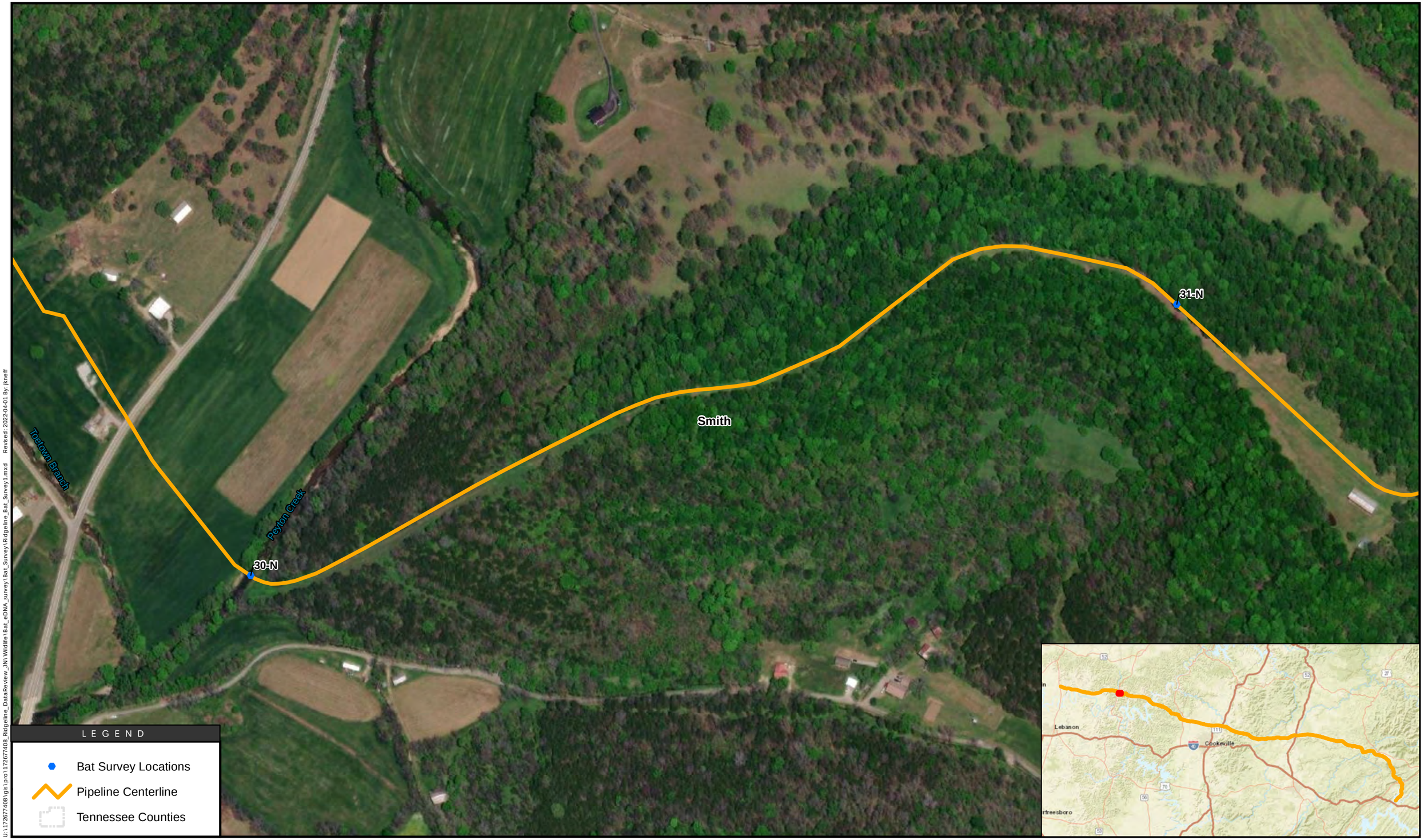
Independent Review by: X.X.X MM/DD/YY



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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 30-N & 31-N

March 2022

Grid 14 of 100

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N

0 150 300 Feet

1 inch = 300 feet

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Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

32-N

Smith

32-N_alt

33-N

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 32-N & 32-N_alt & 33-N

March 2022

Grid 15 of 100

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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 34-N & 35-N

March 2022

Grid 16 of 100

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Nashville, TN 37211
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N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

36-A

37-N

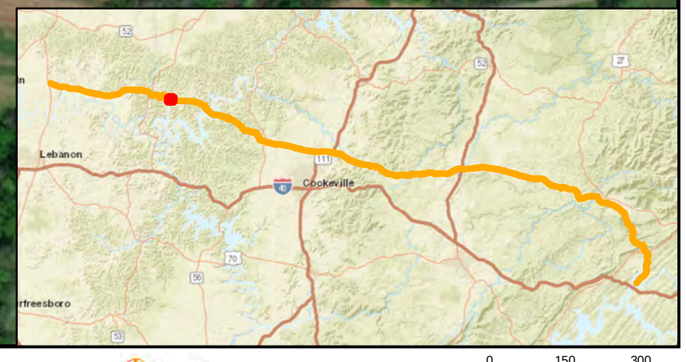
Dillehay Branch

Defeated Creek

Smith

Kempville Branch

Cordell Hull Reservoir



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 36-A & 37-N

March 2022

Grid 17 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

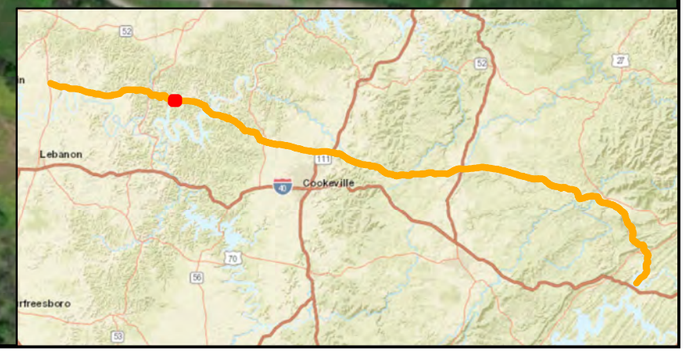
1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

38-A

Smith

Kempville Branch



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 38-A

March 2022

Grid 18 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by:	X.X.X	MM/DD/YY

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 40-N & 41-N

March 2022

Grid 19 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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42-A

43-N

44-A

Jackson

Smith

Little Salt Lick Creek

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 42-A & 43-N & 44-A

March 2022

Grid 20 of 100

Stantec
Stantec Consulting Services Inc.
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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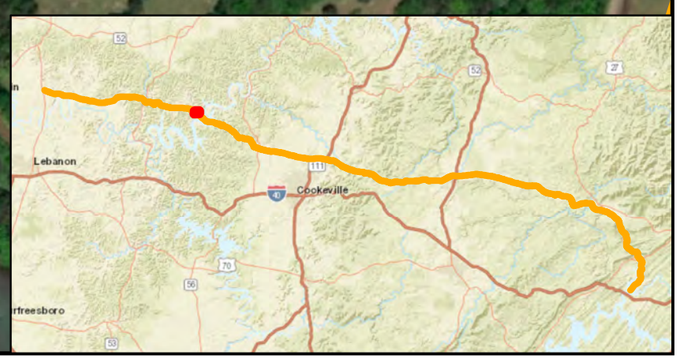
Independent Review by: X.X.X MM/DD/YY

45-N

46-N

Jackson

Salt Lick Creek



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 45-N & 46-N

March 2022

Grid 21 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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48-A

49-N

Salt Lick Creek

Cordell Hull Reservoir

Jackson

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 48-A & 49-N

March 2022

Grid 22 of 100

Stantec
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Nashville, TN 37211
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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by:	X.X.X	MM/DD/YY

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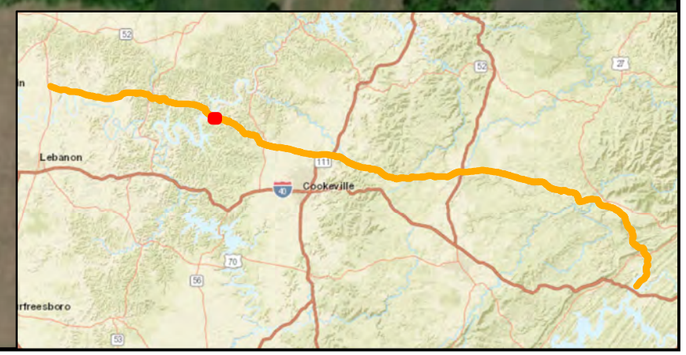
50-N

51-N

Jackson



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 50-N & 51-N

March 2022

Grid 23 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

52-N

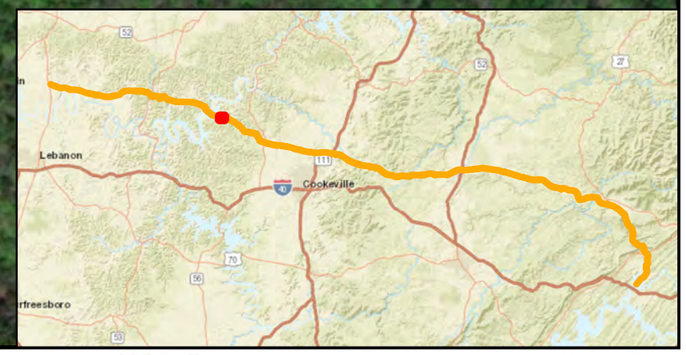
Cumberland River

Cordell Hull Reservoir

Jackson

Big Branch

53-N



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 52-N & 53-N

March 2022

Grid 24 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 54-N & 55-N

March 2022

Grid 25 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

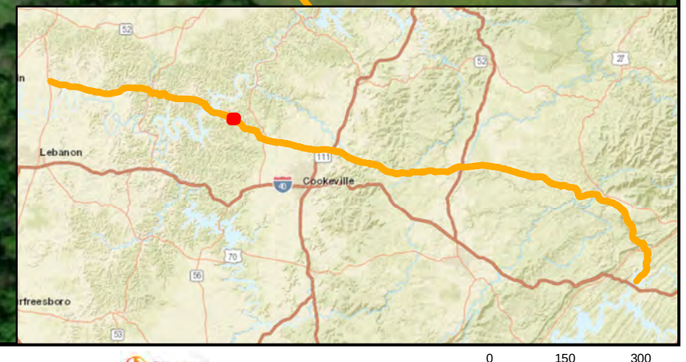
Prepared by: JKN	04/01/22
Technical Review by: X.X.X	MM/DD/YY
Independent Review by: X.X.X	MM/DD/YY

56-N

57-N

Jackson

Dry Fork



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 56-N & 57-N

March 2022

Grid 26 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

59-N

Jackson

Flynn Creek

Lebanon

Cookeville

Murfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 59-N

March 2022

Grid 27 of 100

Stantec

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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

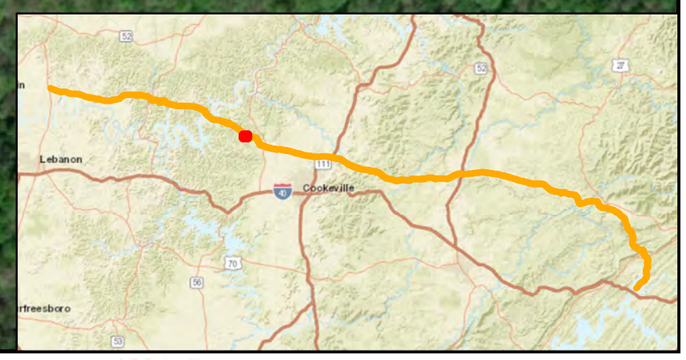
Flynn Creek

Flynn Creek

60-N

61-N

Jackson



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 60-N & 61-N

March 2022

Grid 28 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Technical Review by: X.X.X MM/DD/YY
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62-N

63-N

Flynn Creek

Jackson

Rush Fork

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 62-N & 63-N

March 2022

Grid 29 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

64-N

65-N

Jackson

Flynn Creek

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 64-N & 65-N

March 2022

Grid 30 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

66-N

Jackson

67-N

Flynn Creek

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 66-N & 67-N

March 2022

Grid 31 of 100

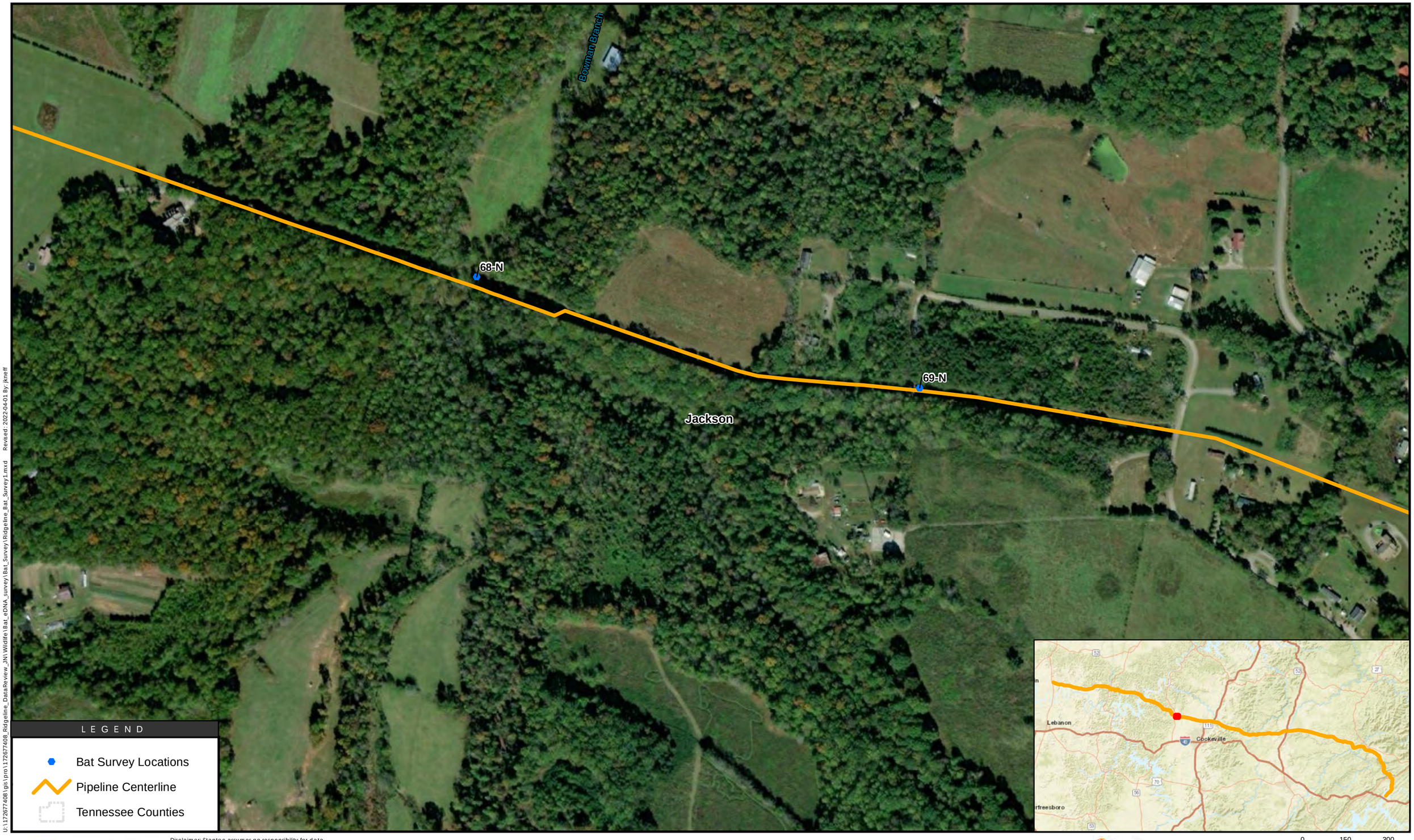
Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 68-N & 69-N

March 2022

Grid 32 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

70-N

71-A

Jackson

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 70-N & 71-A

March 2022

Grid 33 of 100

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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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Independent Review by: X.X.X MM/DD/YY

Blackburn Fork

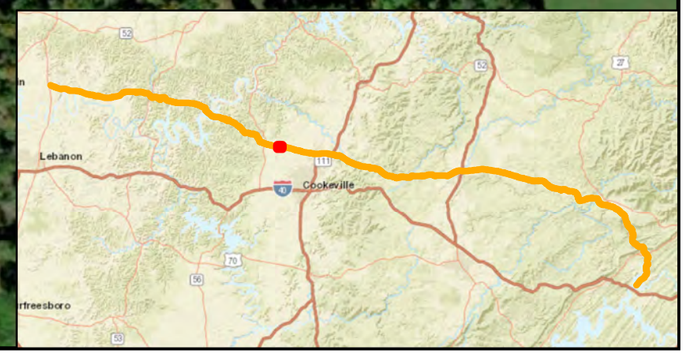
Blackburn Fork

72-N

Jackson

West Blackburn Fork

East Blackburn Fork



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 72-N

March 2022

Grid 34 of 100

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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 73-N & 74-N

March 2022

Grid 35 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 75-A & 76-N

March 2022

Grid 36 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

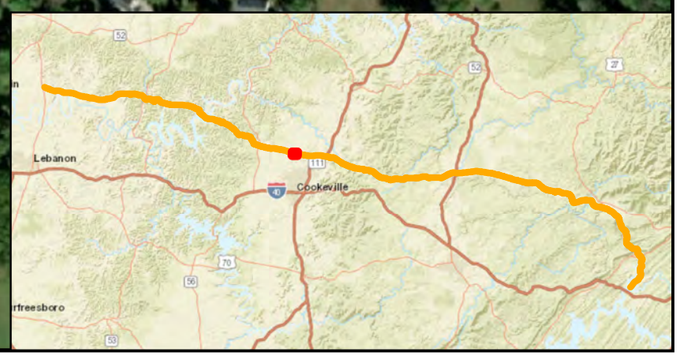
1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

77-A

Putnam

78-N



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 77-A & 78-N

March 2022

Grid 37 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

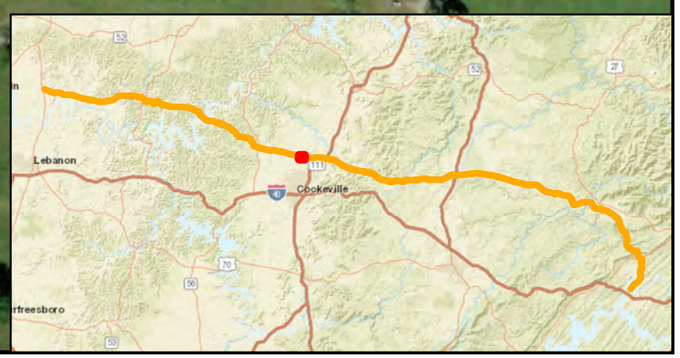
1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

79-N

80-N

Putnam



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 79-N & 80-N

March 2022

Grid 38 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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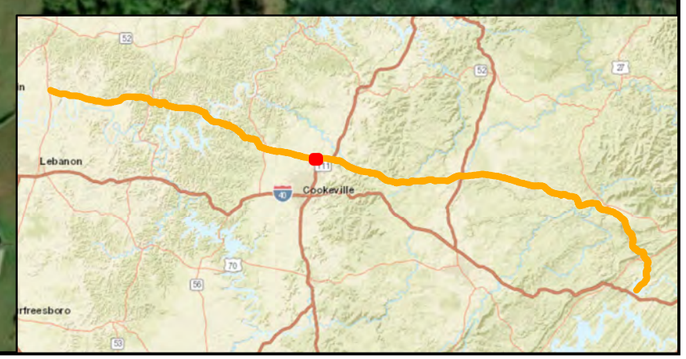
81-A

82-N

Putnam



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 81-A

March 2022

Grid 39 of 100

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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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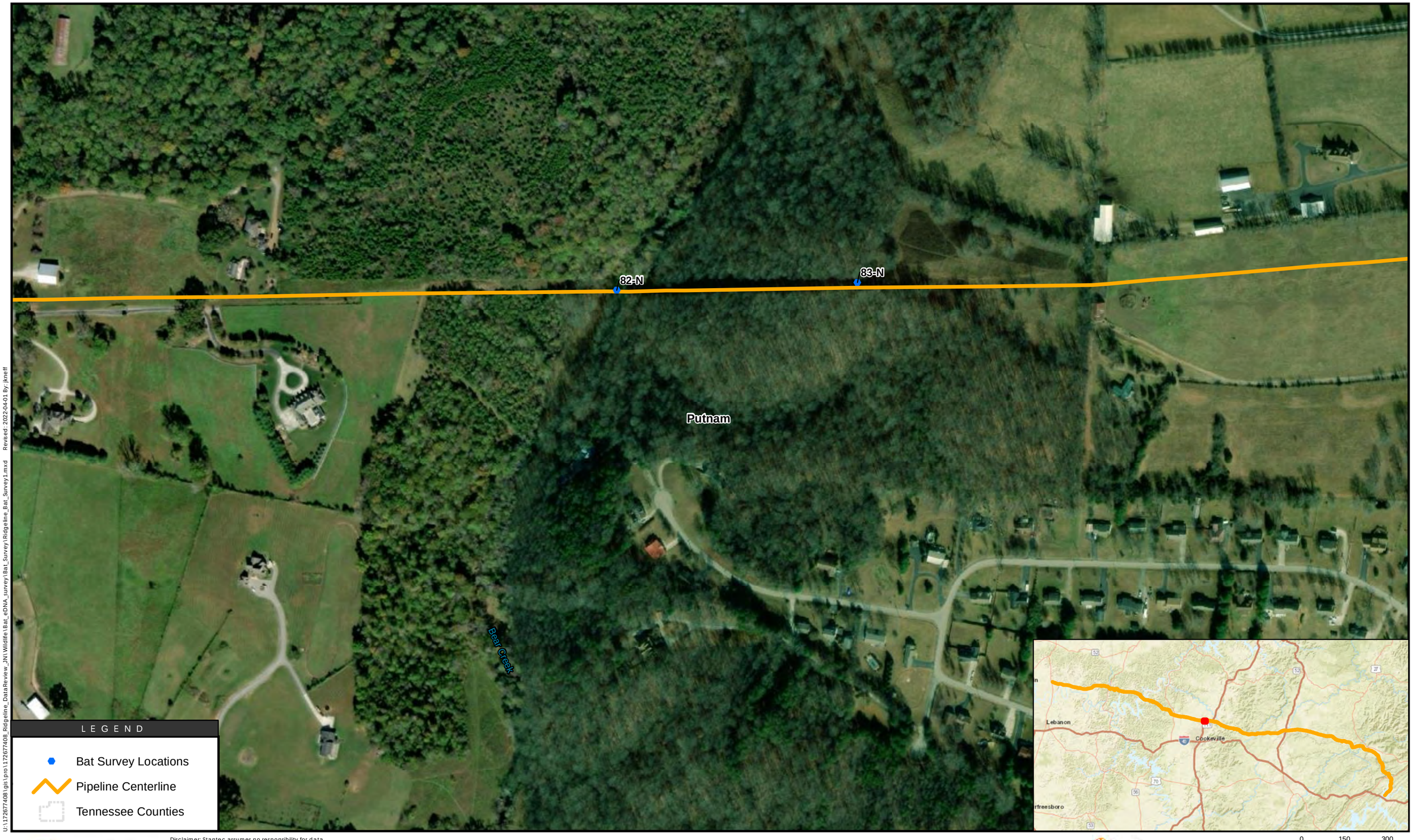

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 82-N & 83-N

March 2022

Grid 40 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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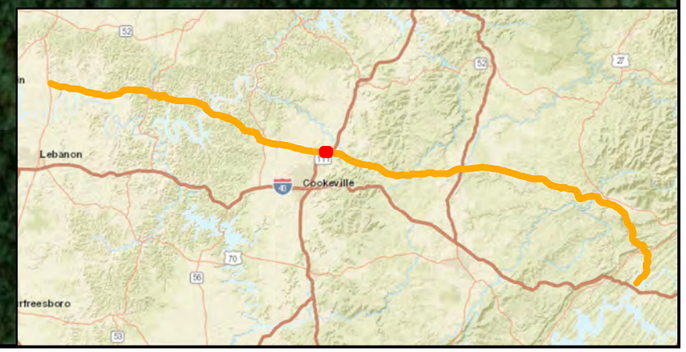
Independent Review by:	X.X.X	MM/DD/YY

84-N

85-N

Putnam



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 84-N & 85-N

March 2022

Grid 41 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 86-N & 87-N

March 2022

Grid 42 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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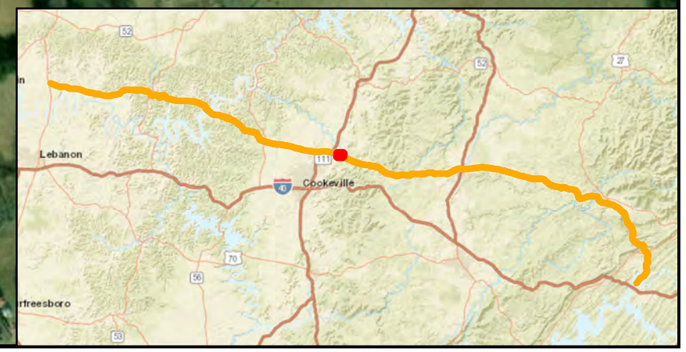
Independent Review by: X.X.X MM/DD/YY

Puckett Pond

88-A

Putnam

Spring Creek



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 88-A & 89-N

March 2022

Grid 43 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
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90-N

Putnam

91-N

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 90-N & 91-N

March 2022

Grid 44 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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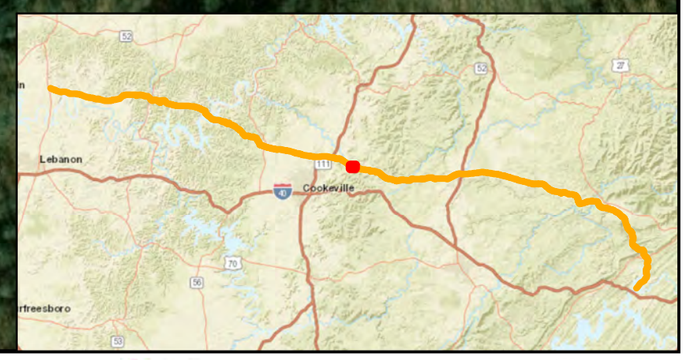
92-N

93-N

Putnam

Spring Creek



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 92-N & 93-N

March 2022

Grid 45 of 100

Stantec
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N

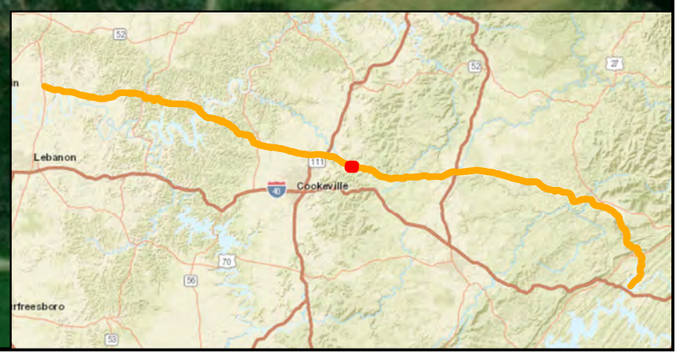
0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

94-N

Putnam



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 94-N

March 2022

Grid 46 of 100

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N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 95-A & 96-A

March 2022

Grid 47 of 100

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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

97-A

98-N

Overton

Putnam

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 97-A & 98-N

March 2022

Grid 48 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

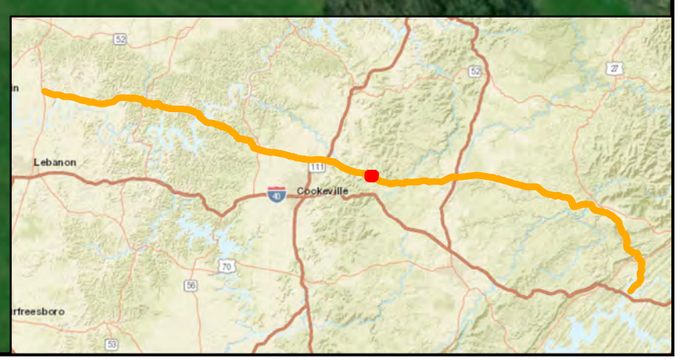
Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

99-N

Overton

100-N

Putnam



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 99-N & 100-N

March 2022

Grid 49 of 100

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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

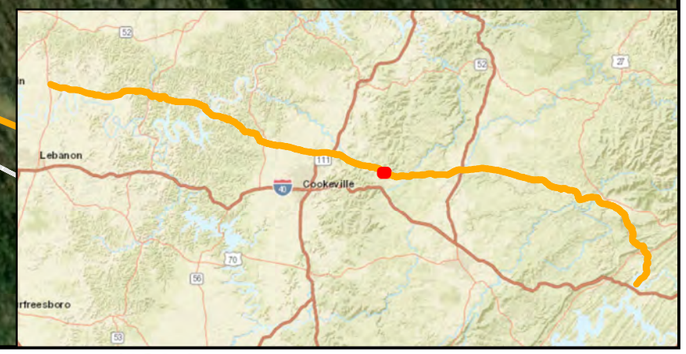
Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

101-N

Overton

102-N

Putnam



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 101-N & 102-N

March 2022

Grid 50 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 103-N & 104-N

March 2022

Grid 51 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

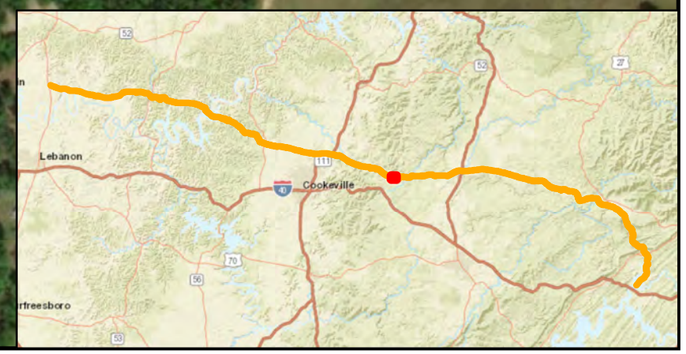
1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

105-N

Overton

Yellow Branch



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 105-N

March 2022

Grid 52 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 107-A

March 2022

Grid 53 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 108-N & 109-N

March 2022

Grid 54 of 100

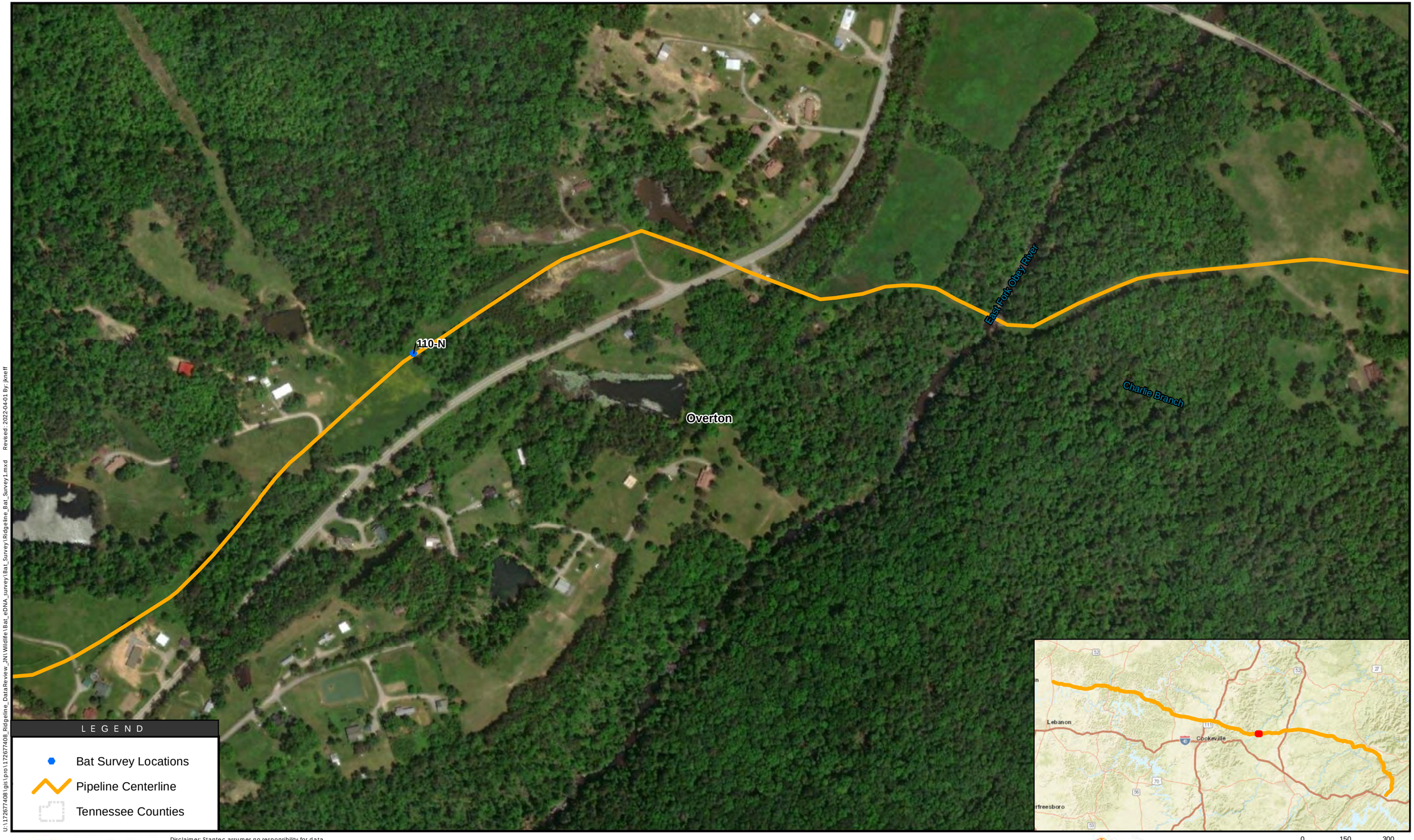
Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 110-N & 111-N

March 2022

Grid 55 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

112-N

113-N

Overton

Fond Branch

Lebanon

Cookeville

Murfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

Revised: 2022-04-01 By: jkneff

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 112-N & 113-N

March 2022

Grid 56 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 114-N

March 2022

Grid 57 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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Independent Review by: X.X.X MM/DD/YY

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 115-N & 116-N

March 2022

Grid 58 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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Independent Review by: X.X.X MM/DD/YY

Overton

Fentress

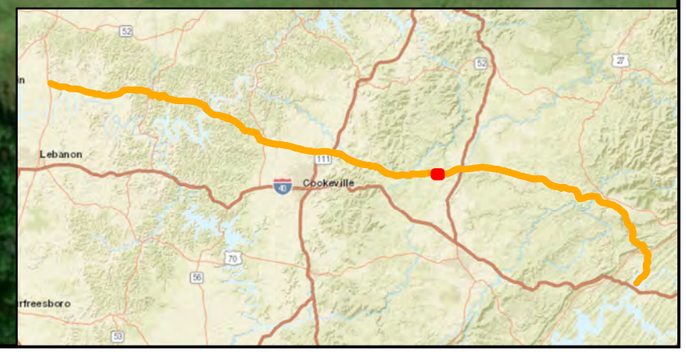
Hurricane Creek

117-N

118-N

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties



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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 117-N & 118-N

March 2022

Grid 59 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 119-N & 120-N

March 2022

Grid 60 of 100

Stantec
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N

0 150 300 Feet

1 inch = 300 feet

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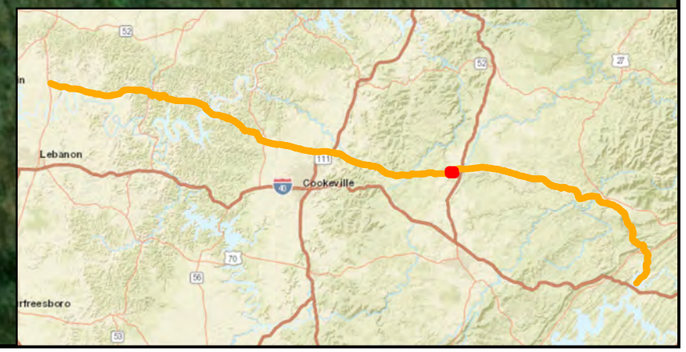
Independent Review by: X.X.X MM/DD/YY

122-N

Fentress

121-A



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 121-A & 122-N

March 2022

Grid 61 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 124-N & 125-A

March 2022

Grid 62 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

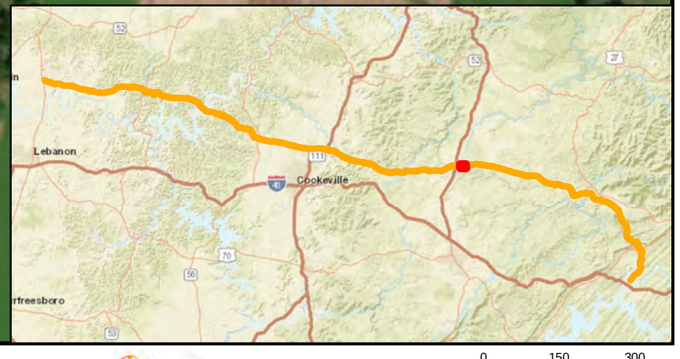
126-A

127-A

Peter Branch

Big Branch

Fentress



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 126-A & 127-A

March 2022

Grid 63 of 100

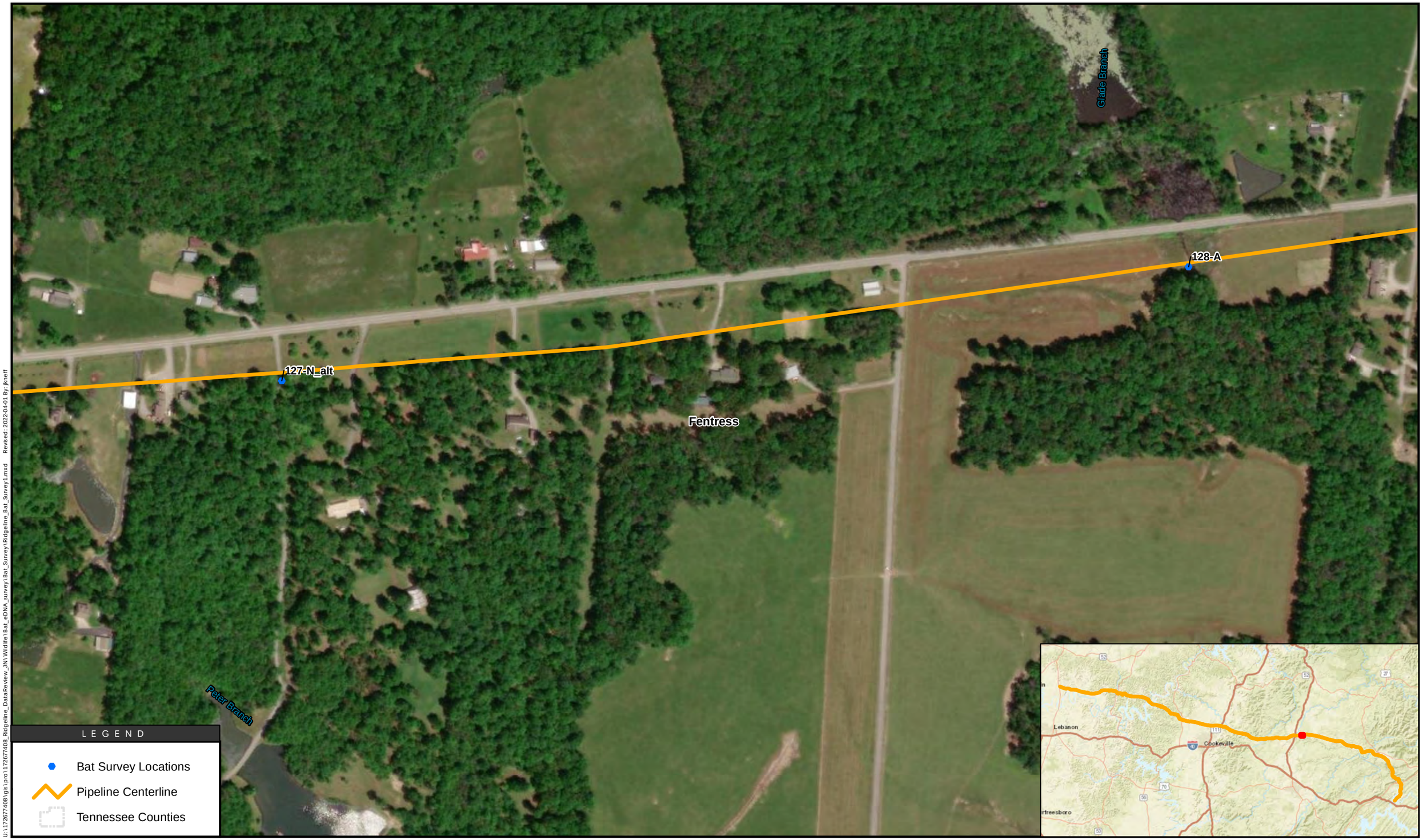
Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY



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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 127-N_alt & 128-A

March 2022

Grid 64 of 100

Stantec
Stantec Consulting Services Inc.
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 129-N & 130-N

March 2022

Grid 65 of 100

Stantec
Stantec Consulting Services Inc.
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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Independent Review by: X.X.X MM/DD/YY

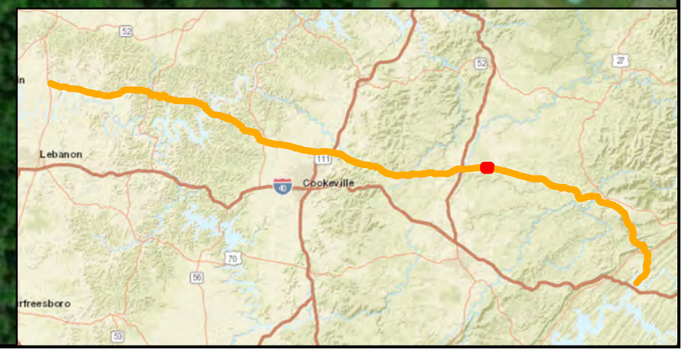
131-N

Fentress

Big Branch

132-N

Shepherd Branch



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 131-N & 132-N

March 2022

Grid 66 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

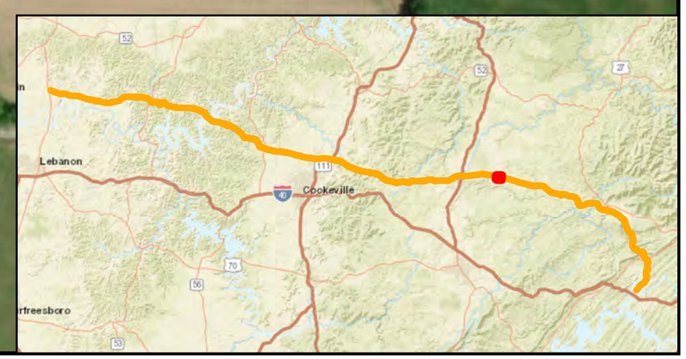
Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

134-A

135-A

Morgan

Fentress



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 134-A & 135-A

March 2022

Grid 67 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 137-N & 138-N

March 2022

Grid 68 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 139-N & 140-N

March 2022

Grid 69 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

141-N

142-N

Morgan

Little Creek

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 141-N & 142-N

March 2022

Grid 70 of 100

Stantec
Stantec Consulting Services Inc.
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

143-N

144-A

Little Creek

Little Creek

Morgan

Carden Branch

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 143-N & 144-A

March 2022

Grid 71 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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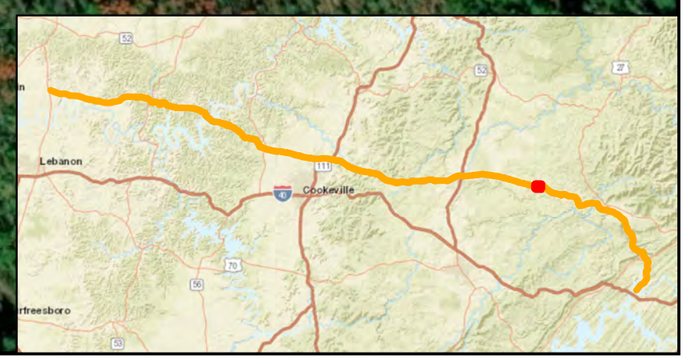
145-N

146-N

White Creek

Morgan

Green Branch



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 145-N & 146-N

March 2022

Grid 72 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

147-N

148-N

Morgan

Green Branch

Douglas Branch

Green Branch

Green Branch

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

U:\172677408\gis\pro\172677408_RidgelineExpansion_DataReview_JN\Wildlife\Bat_eDNA_survey\Bat_Survey\RidgelineExpansion_Bat_Survey1.mxd Revised: 2022-04-01 By: jkneff

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 147-N & 148-N & 148-N_altt

March 2022

Grid 73 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

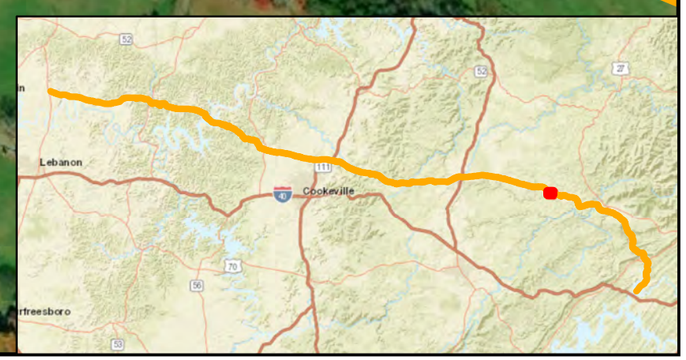
Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

149-N

150-N

Morgan

Mill Creek Branch



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 149-N & 150-N

March 2022

Grid 74 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 151-N & 152-N

March 2022

Grid 75 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

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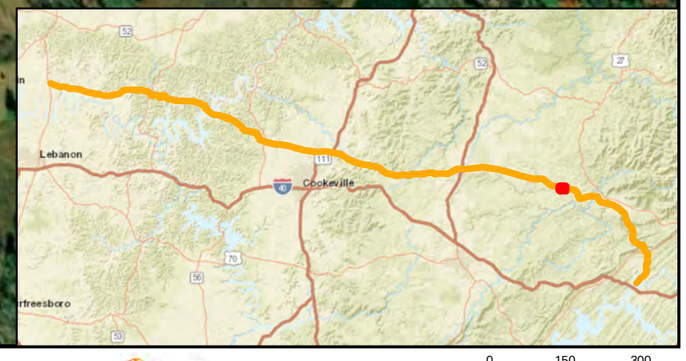
Langley Branch

153-N

Morgan

Little Clear Creek



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 153-N

March 2022

Grid 76 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

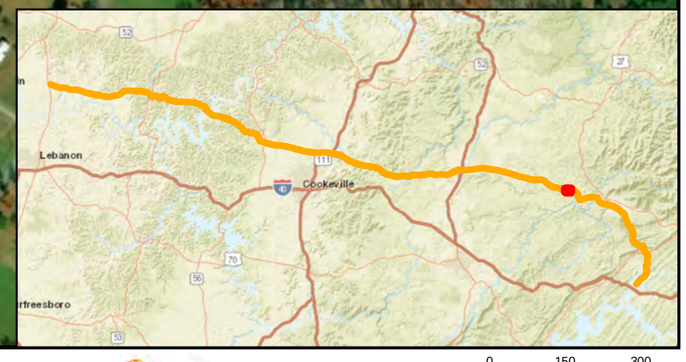
Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

154-N

155-N

Morgan

Cut Branch



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 154-N & 155-N

March 2022

Grid 77 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 156-A & 157-A

March 2022

Grid 78 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

159-N

160-N

160-N_alt

Morgan

Lebanon

Cookeville

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 159-N & 160-N & 160-N_alt

March 2022

Grid 79 of 100

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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

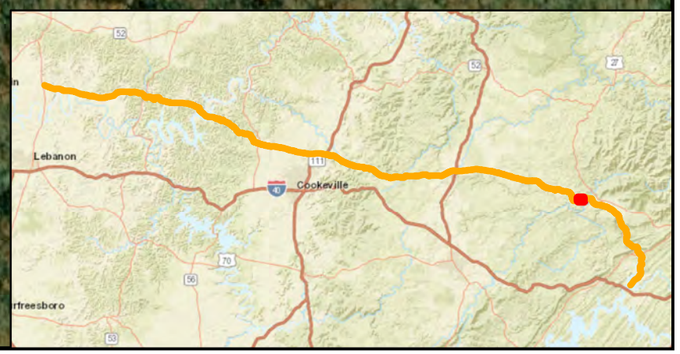
Price Branch

Campground Creek

Morgan

161-N

162-N



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 161-N & 162-N

March 2022

Grid 80 of 100

Stantec
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Independent Review by: X.X.X MM/DD/YY

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 162-N_alt & 163-N

March 2022

Grid 81 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
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Independent Review by: X.X.X MM/DD/YY

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3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 164-N & 165-N

March 2022

Grid 82 of 100

Stantec
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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

166-N

167-N

Morgan

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 166-N & 167-N

March 2022

Grid 83 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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169-N

170-N

171-N

Morgan

Crooked Fork

Breedlove Branch

Knight Bra

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

U:\172677408\gis\pro\172677408_Ridgeline_DataReview_JN\Wildlife\Bat_eDNA_survey\Bat_Survey\Ridgeline_Bat_Survey1.mxd Revised: 2022-04-01 By: jkneff

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 169-N & 170-N & 171-N

March 2022

Grid 84 of 100

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tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

172-N

173-N

Morgan

Crooked Fork

Lebanon

Cookeville

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

U:\172677408\gis\pro\172677408_Ridgeline_DataReview_JN\Wildlife\Bat_eDNA_survey\Bat_Survey1\Ridgeline_Bat_Survey1.mxd Revised: 2022-04-01 By: jkneff

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 172-N & 173-N

March 2022

Grid 85 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

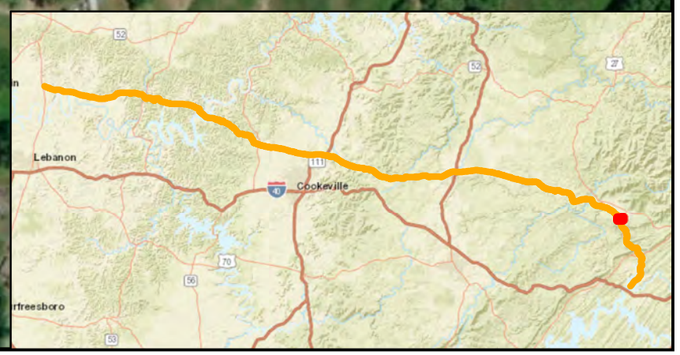
1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

174-N

Morgan

175-A



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 174-N & 175-A

March 2022

Grid 86 of 100

Stantec
Stantec Consulting Services Inc.
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Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

176-N

Bitter Creek

Morgan

177-A

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 176-N & 177-A

March 2022

Grid 87 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
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Independent Review by:	X.X.X	MM/DD/YY

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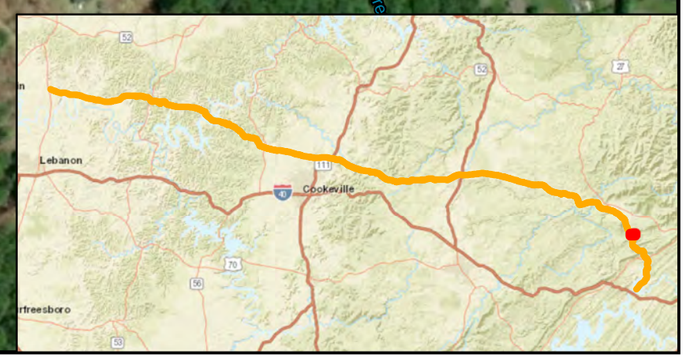
178-N

Morgan

Forked Creek



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 178-N

March 2022

Grid 88 of 100

Stantec
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601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

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Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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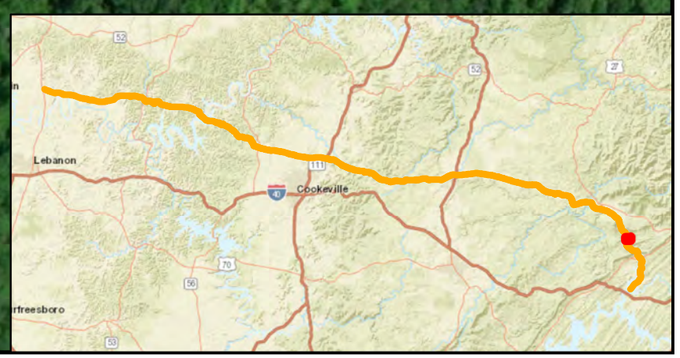
179-N

Morgan

180-N

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties



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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 179-N & 180-N

March 2022

Grid 89 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by:	JKN	04/01/22
Technical Review by:	X.X.X	MM/DD/YY
Independent Review by:	X.X.X	MM/DD/YY

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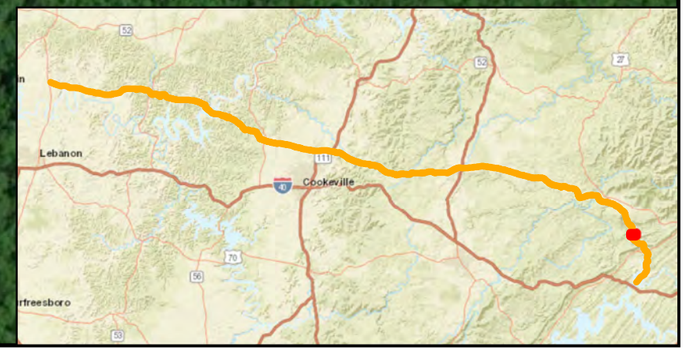
180-N_alt

Morgan

Forked Creek



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 180-N_alt

March 2022

Grid 90 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

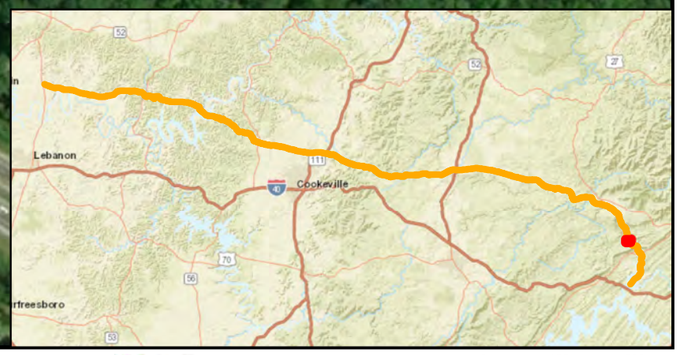
Bitter Creek

181-N

Forked Creek

Morgan

182-N



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 181-N & 182-N

March 2022

Grid 91 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

183-N

Morgan

184-N

Bitter Creek

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 183-N & 184-N

March 2022

Grid 92 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

185-N

Bitter Creek

Morgan

185-N_alt

Little Emory River

Roane

Lebanon

Cookeville

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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Notes:
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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 185-N & 185-N_alt

March 2022

Grid 93 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

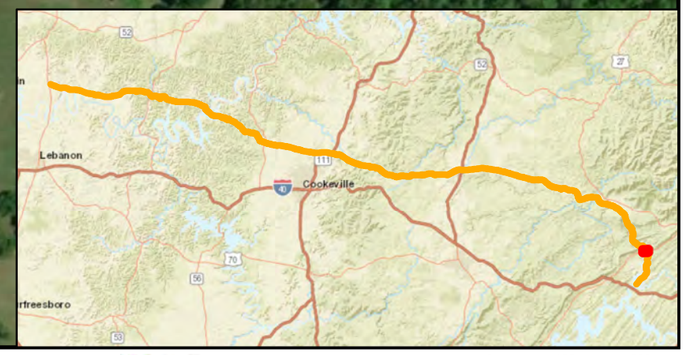
Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

186-N

187-N

Roane

Little Emory River



LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 186-N & 187-N

March 2022

Grid 94 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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Little Emory River

Elverton Branch

188-N

189-N

Roane

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 188-N & 189-N

March 2022

Grid 95 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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190-N

Roane

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 190-N

March 2022

Grid 96 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 191-A & 192-A

March 2022

Grid 97 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

193-N

194-N

Kings Creek

Roane

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

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3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 193-N & 194-N

March 2022

Grid 98 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

195-N

Roane

196-A

Lebanon

Cookeville

rfreesboro

LEGEND

- Bat Survey Locations
- Pipeline Centerline
- Tennessee Counties

ENBRIDGE

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 195-N & 196-A

March 2022

Grid 99 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

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Notes:
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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

Proposed Bat Survey Sites - 197-A & 198-N

March 2022

Grid 100 of 100

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 04/01/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

ATTACHMENT B

Federal & State Permits

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE38821A-4

Effective: 07/02/2019 Expires: 12/31/2021

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov

For
CHIEF - ENDANGERED SPECIES

Permittee:

STANTEC CONSULTING SERVICES
10509 TIMBERWOOD CIRCLE
SUITE 100
LOUISVILLE, KY 40223-2177
U.S.A.

Name and Title of Principal Officer:
GEORGE ATHANASAKES - ECOSYSTEM RESTORATION SERVICES LEADER

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:
ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:
ANNUAL REPORT DUE: 01/31
See permit conditions for reporting requirements

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other federal law. Necessary state and/or local permits where applicable, must also be acquired and observed; this permit is invalid without such permits.

C. Valid for use by those identified on the List of Authorized Individuals.

C.1. Authorized Individuals:

Only individuals on the attached List of Authorized Individuals (LAI) are authorized to conduct activities pursuant to this permit. The LAI, printed on U.S. Fish and Wildlife Service (USFWS) letterhead, and signed and dated by the Region 3 permit issuing office or a Region 3 lead species Field Office, may identify special

Conditions or circumstances under which individuals can conduct authorized activities and it must be retained with these Authorizations and Conditions. Each named individual shall be responsible for compliance with the Authorizations and Conditions of this permit.

Trained assistants not named on the attached LAI may work on permitted activities under the direct and on-site supervision of the individuals named on the LAI. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. Trained assistants may not work independently at a site.

Permittee shall replace outdated LAIs and attach the subsequent current updated version of the LAI to this recovery permit upon receipt. **This permit will be considered invalid without a current attached LAI.**

C.2. To request changes to the LAI, the Permittee (Principal Officer for business permits) shall submit written requests to the Service's Midwest Region (Region 3) Permit Coordinator identified in Condition J.1. The request shall be submitted at least 30 days prior to the desired effective date. The Permittee shall submit a $50.00 processing fee unless fee exempt [see 50 CFR 13.11 (d)], the request should include a desired effective date, shall be signed and dated by the Permittee, and shall include the following information:

C.2.a. The name of each individual (first name, middle initial, last name) to be appended to the LAI, confirmation that the individual is not permitted under another business or individual Federal recovery permit, and indicate the species they will be working with and the activities they will be conducting;

C.2.b. The resume/qualifications of each person, including specific information on previous professional experience working with the species/activity affected by the request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate numbers of each species the applicant has worked with at each site (i.e., indicate the number specimens at specific sites or specific activities); names, dates, and location of areas surveyed; and experience with similar species;

C.2.c. For each individual: the names, titles, organizations, emails, and telephone numbers of a minimum of two references who can verify experience with the species (reference letters are preferred and always appreciated); and

C.2.d. The names of any individuals to be deleted from the LAI.

Note: This procedure is **only** for personnel changes to the LAI. For requests to renew/amend this permit, a complete application and appropriate application processing fee must be submitted to the Region 3 Recovery Permits Coordinator. The application Form 3-200-55 may be obtained at www.fws.gov/endangered/permits/how-to-apply.html.

D. Acceptance of this permit serves as evidence that the Permittee and its authorized agents understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations, Parts 13 and 17, pertinent to issued permits (https://www.fws.gov/permits/ltr/ltr.html). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.

A request for permit renewal using Application Form 3-200-55 and the $100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit (subject to compliance with reporting requirements), while your application request is being processed. When this requirement is not met, this permit becomes invalid on the expiration date. Unless otherwise instructed within the Authorizations and Conditions, **annual reports are due by January 31** following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions, as appropriate. The following website link provides the permit application Form 3-200-55 and the mailing address to this office: http://www.fws.gov/endangered/permits/how-to-apply.html.

E. Permittee (as described in condition C. above) is authorized to take Indiana bat (*Myotis sodalis*), gray bat (*M. grisescens*), northern long-eared bat (*M. septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), Virginia big-eared bat (*C. t. virginianus*), listed mussel and fish species identified in Attachment 1, copperbelly water snake (*Nerodia erythrogaster neglecta*), and big sandy crayfish (*Cambarus callianus*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and evaluate potential impacts as described herein. This permit does not authorize the collection of voucher specimens.

F. Presence/absence surveys and studies to document habitat use are authorized at the following locations:

F.1. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.2. Locations within Region 4 of the USFWS: Alabama, Arkansas, Georgia, Louisiana, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 5 of the USFWS: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.4. Locations within Region 6 of the USFWS: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.5. Location within Region 2 of the USFWS: Texas and Oklahoma, upon receipt of written concurrence from Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to 1) surveys of caves known to be used by federally-listed bats, and 2) examinations of caves suspected of containing federally-listed bats species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Biologist), as outlined in Condition G.

G. For all locations specified in Condition F., Permittee shall notify and request site-specific approval from the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Your notification must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A description of the activities (i.e., surveys, radio-telemetry studies, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

G.7. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

H. Permittee shall adhere to following conditions involving capture and handling of bats:

H.1. Activities may be conducted by Stantec Consulting Services personnel as described in Condition C.

H.2. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>. Note: Permittee must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.3. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. Harp traps must be continually monitored. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

At least one Permittee must remain present at each mist-net and harp trap site while it is being operated.

H.4. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.5. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured

bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.6. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. ***Although not required as a condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome (WNS) zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G.***

H.7. No trapping activities shall occur within 20 meters of a known or potential summer or winter maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activities are proposed to occur.

H.8. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys should not be repeated more often than once every other year in any given hibernaculum that is occupied by endangered or threatened bats. Where hibernacula area and safety conditions allow, individuals entering caves are recommended to utilize night vision goggles or red-filtered light and to remain in the cave no more than 90 minutes to complete the work.

H.9. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: www.whitenosesyndrome.org/topics/decontamination.

H.10. For the Ozark big-eared bat (*Corynorhinus townsendii ingens*) and Virginia big-eared bat (*C. townsendii virginianus*), the USFWS acknowledges that incidental (unintentional) capture of these co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. Permittees not authorized to handle Ozark big-eared bats and Virginia big-eared bats shall be observant and cautious to eliminate or minimize "take" of co-occurring listed species to the maximum extent practicable. In the event of incidental (unintentional) capture of Ozark or Virginia big-eared bat, you shall document the capture with a photograph and immediately release at the capture site. Within 48 hours, you must notify the USFWS in the state in which you are working of the incidental capture (see www.fws.gov/midwest/endangered/permits/index.html).

I. Permittee is authorized to take (only in the context of harass by survey) mussel species identified in Attachment 1 for scientific research aimed at recovery of the species. Permittee shall adhere to the following conditions involving presence/absence surveys for mussel species:

I.1. Presence/absence studies and surveys to monitor mussel communities shall be conducted by personnel identified in Condition C.

I.2. Permittee may take (remove from the substrate for identification, data collection and return) mussels by hand via wading, snorkeling, or using divers.

I.3. Permittee may temporarily hold specimens in mesh bags, either suspended in the water or held in a container containing river water, while awaiting identification and data collection. Specimens may be held for up to 3 hours if they are held in the water in bags that allow free movement of water the mussels were taken from or held in large containers of river water that is replaced every hour [every half-hour when air temperatures are at or above 80° Fahrenheit (F)] with water freshly taken from the water where the mussels were collected. When practicable, specimens held in containers must remain in the shade. Specimens must be returned to the locality from which they were taken. Live specimens that cannot be identified at the site must be photographed for identification purposes.

I.4. Collection of live mussel specimens must be done only when the air temperature is above 32° F and the water temperature is above 40° F. No collection activities may be conducted when air temperature is above 90° F. Specimens shall be returned to the substrate as follows:

I.4.a. For surveys at water temperatures at or above 50° F, mussels may be dropped back into the water after identification.

I.4.b. For surveys conducted at water temperatures between 40° and 50° F, mussels must be returned to the substrate, by divers if necessary. Divers must return the specimen to the substrate by hand, placing them on their side and allowing them to burrow on their own. Where the substrate is very compacted cobble, a hole just large enough to receive the animal to a depth of 3/4 its length should be excavated and the mussel placed into it with the siphon (posterior) end up and pointing upstream.

I.5. All live mussels will be measured (length and height) and, if possible, sexed and aged. No intrusive activities are permitted. Data collected will include descriptions of external morphometry and reproductive status. All specimens of federally listed species - or a representative sample for each species - must be photographed prior to release.

I.6. No live specimens may be removed from the survey sites, except for specimens encountered in circumstances, which would reasonably be expected to result in stranding due to low or receding water. Such specimens may be moved into deeper water at the survey site, to a suitable location near the survey site, or to an alternative location coordinated with and approved by the appropriate U.S. Fish and Wildlife Field Office in Condition R.

I.7. The shells of all live specimens collected or captured temporarily must be thoroughly inspected for the presence of zebra mussels (*Dreissena polymorpha*). Unionids with zebra mussels attached must be cleaned by scrubbing prior to returning to the substrate. Document the incidence of zebra mussels and Asiatic clams (*Corbicula fluminea*) at project sites.

J. Permittee is authorized to take (only in the context of harass by survey) fish species identified in Attachment 1 for

scientific research aimed at recovery of the species. Permittee shall adhere to the following conditions involving presence/absence surveys for fish species:

J.1. Presence/absence studies and surveys to monitor fish communities shall be conducted conducted by personnel identified in Condition C.

J.2. Permittee may hold specimens for a maximum of 15 minutes for photographic documentation and non-intrusive data collection, and release unharmed at the point of capture.

J.3. Electrofishing surveys are only authorized by written concurrence of the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activity is proposed.

K. Permittee shall adhere to the following conditions involving surveys for copperbelly water snake:

K.1. Activities may be conducted by personnel identified in Condition C., and only by visual searches of habitat to assess habitat quality and to determine presence or absence of copperbelly water snake.

K.2. Time searches shall be based on protocol developed and discussed by Bruce Kingsbury (Attachment 2).

K.3. Drift fences may also be employed for more quantifiable population estimates.

L. Upon determination that endangered or threatened species are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the U.S. Fish and Wildlife Service Region 3 Office (Condition P.1.), and the USFWS Field Office within the geographic location of study areas (Condition R.).

M. No injury or mortality is anticipated or allowed as a result of copperbelly water snake surveys. In the event that injury or mortality occurs, all activities must cease. The circumstances of any injury or mortality must be reported in writing within 48 hours to the office listed in Condition P.1., the USFWS Michigan Ecological Services Field Office (Condition R.), and the nearest USFWS Law Enforcement, Special Agent Office (http://www.fws.gov/offices). Before you reinitiate studies authorized by this permit, you must receive written authorization from the USFWS Michigan Ecological Services Field Office (Condition R.). Dead or moribund specimens may be retained for further study only with the written permission of the USFWS East Lansing, Michigan Field Office. Any specimens that are not authorized for retention are to be chilled and promptly transferred to the USFWS for potential necropsy and/or contaminants analysis (Condition R.).

N. Accidental injury and/or mortality of bats, mussels or fish may not exceed two specimens. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must immediately report any bat, mussel, or fish mortality or serious injury to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: www.fws.gov/midwest/endangered/permits/index.html). Written notification must also be made within 24 hours to the Midwest Regional Permits Coordinator (see Condition P.1.), the Species Recovery Lead (Condition Q., if applicable), and the applicable USFWS Field Office in the state in which the incident occurred (Condition R.). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of

any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

O. An annual report of activities conducted under the authority of this permit is due by January 31 each year the permit is in effect. In addition, copies of all reports and publications resulting from data obtained under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report must include:

O.1. The date, time, and geographic locations (including datum and projection information), of all specimens encountered as well as all data collected on the individuals (i.e., age, sex, and weight).

O.1.a. A completed data collection sheet as found on the Range-wide Indiana Bat Summer Survey Guidelines website page, cited in Condition H.2., and band numbers of all bats banded.

O.1.b. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.2., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

O.2. A description of locations surveyed for threatened/endangered species where no specimens were encountered.

O.3. Location and characteristics of bat roost trees and bat colonies.

O.4. Information on any injuries and/or mortalities and disposition of specimens.

O.5. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

O.6. Copies of all site-specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

P. Copies of your reports shall be sent to **all applicable offices** indicated below. Your transmittal letter (or email) must cite your Federal permit number. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office **(thumb drives/flash drives cannot be accepted)**.

P.1. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990

Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

P.2. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6788)
permitsR2ES@fws.gov

P.3. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

P.4. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

P.5. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

Q. Additionally, based on species, reports and publications shall be submitted to the following:

Q.1. ***For studies involving gray bat:***
Shauna Marquardt
U.S. Fish and Wildlife Service
Missouri Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)

Q.2. ***For studies involving Indiana bat:***

Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261; fax 812/334-4273)

Q.3. ***For studies involving northern long-eared bat:***
Jill Utrup
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4101 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

Q.4. ***For studies involving Ozark big-eared bat:***
Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

Q.5. ***For studies involving Virginia big-eared bat:***
Barbara Douglas
U.S. Fish and Wildlife Service
Ecological Services Field Office
90 Vance Drive
Elkins, West Virginia 26241
(304/636-6586 x19; fax 304/636-7824)

R. Additionally, based on geographic area, **reports and publications shall be submitted to** the applicable offices under "For Fish and Wildlife Permit Holders" at: www.fws.gov/midwest/endangered/permits/index.html.

cc: FWS/Regions 2, 4, 5, and 6 (Attn: Recovery Permits Coordinator)
FWS, TE Coordinators for IL, IN, IA, MI, MN, MO, OH, and WI
DNR/DOC, TE Administrator/Coordinators for IL, IN, IA, MI, MN, MO, OH, and WI

END

United States Department of the Interior

FISH AND WILDLIFE SERVICE

5600 American Boulevard West, Suite 990
Bloomington, Minnesota 55437-1458

IN REPLY REFER TO:

FWS/AES-TE

LIST OF AUTHORIZED INDIVIDUALS
TE38821A-4
George Athanasakes (Principal Officer)

July 9, 2019

C.1. Individuals authorized to independently conduct activities under this permit:

- The following individuals are authorized for all activities described for Indiana bat (*Myotis sodalis*), gray bat (*M. grisecens*), northern long-eared bat (*M. septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), and Virginia big-eared bat (*C. t. virginianus*): David Saugey, Joseph Johnson, Lindsay Wight

- The following individuals are authorized for all activities described for gray bat, Indiana bat, and northern long-eared bat only: Wes Cunningham and Lynda Mills

- Cody Fleece is authorized to conduct all activities described for listed mussels and fish species, with the exception of Kentucky arrow darter (*Etheostoma spilotum*).

- Daniel Symonds is authorized to conduct all activities described for listed mussels.

- James Kiser is authorized to conduct all activities described for listed bats, fish, mussels, copperbelly water snake (*Nerodia erythrogaster neglecta*) and big sandy crayfish (*Cambarus callainus*).

- Douglas Stephens is authorized to conduct all activities described for listed bats, fish, and mussels.

Unnamed trained assistants may conduct activities pursuant to this permit only under the direct and on-site supervision of an above-named individual. "On-site supervision" is defined as having the permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. **At least one named permittee must remain present at each mist-net site while it is being operated.**

Acting For Jonathan Jenkins
Chief, Division of Endangered Species

7/9/2019
Date

This List of Authorized Individuals (LAI) is valid only when it is dated on or after the permit issuance date. Federal Permit TE38821A-4 will be considered invalid without this LAI.

Attachment 1: TE38821A-4 (Stantec Consulting Services)
Fish and Freshwater Mussel Species Covered by Permit

Fish Species	
Scientific Name	Common Name
Etheostoma chienense	Relict darter
Etheostoma percnurum	Duskytail darter
Etheostoma spilotum	Kentucky arrow darter
Notropis albizonatus	Palezone shiner
Phoxinus cumberlandensis	Blackside dace
Scaphirhynchus albus	Pallid sturgeon

Freshwater Mussel Species	
Scientific Name	Common Name
Alasmidonta atropurpurea	Cumberland elktoe
Conradilla caelata	Birdwing pearlymussel
Cumberlandia monodonta	Spectaclecase
Cyprogenia stegaria	Fanshell
Dromus dromas	Dromedary parlymussel
Epioblasma brevidens	Cumberland combshell
Epioblasma capsaeformis	Oyster mussel
Epioblasma florentina walkeri	Tan riffleshell
Epioblasma obliquata obliquata	Purple catspaw
Epioblasma torulosa rangiana	Northern riffleshell
Epioblasma triquetra	Snuffbox
Fusconaia cuneolus	Finerayed pigtoe
Fusconaia cor	Shiny pigtoe
Hemistena lata	Cracking pearlymussel
Lampsilis abrupta	Pink mucket
Lampsilis higginsii	Higgins eye
Obovaria retusa	Ring pink
Pegias fibula	Littlewing pearlymussel
Plethobasus cicatricosus	White wartyback pearlymussel
Plethobasus cyphyus	Sheepnose
Pleurobema clava	Clubshell
Pleurobema plenum	Rough pigtoe
Pleuronaia dolabelloides	Slabside pearlymussel
Potamilus capax	Fat pocketbook
Ptychobranchus subtentum	Fluted kidneyshell
Quadrula cylindrica cylindrica	Rabbitsfoot
Quadrula cylindrica strigillata	Rough rabbitsfoot
Villosa fabalis	Rayed bean
Villosa perpurpurea	Purple bean
Villosa trabilis	Cumberland bean

PROTOCOL FOR COPPERBELLY SURVEYORS

The following guidelines are being distributed to all those working on the surveys for the Copperbelly Water Snake Conservation Agreement, or who are conducting other surveys and wish to follow the same protocol. If there are questions regarding any aspect of this protocol, contact Bruce Kingsbury, Department of Biology, Indiana-Purdue University, Fort Wayne, IN 46805-1499, 219-481-5755 (W), 219-486-6300 (H), (219) 437-6876 (M), kingsbur@ipfw.edu.

Replicate surveys. You have been assigned a set of survey sites, and an approximate order in which to survey them. You must conduct the surveys in the assigned order: other surveyors will be visiting the same sites at other times. Sites that have already been visited will have the general path of the survey determined. However, if you are the first one on the site, you will have the responsibility of defining the path and length of the transect. Check your maps and directions to determine what you need to do. When delineating a transect, keep the following points in mind. The goal for survey duration is two hours, although the survey does not have to be exactly that. Care should be taken to avoid overlapping the same transect line (i.e., going around a wetland and crossing over where you've already been) or flushing snakes, thus risking the potential of counting the same snakes twice. Once a new transect has been delineated, details should immediately be relayed to Bruce Kingsbury for transmittal to other surveyors.

Presence/Absence surveys. P/A surveys are opportunistic in nature, and have no formal structure. Potential areas for these surveys are indicated on some of your maps, but you will very likely see other areas of interest. The main goal of these surveys is to establish if copperbellies or other *Nerodia* (!) are present. We are also particularly curious about other species such as mud snakes (*Farancia*) and cottonmouths (*Agkistrodon*), as these are unusual finds. Scouting out areas and searching under things such as trash or boards can be informative. If you are at a good chunk of habitat and can do a replicate-style survey, use the data form for those surveys. A brief examination of a site does not require strict adherence to filling out all of the details on the data sheet- but if you plan to survey the site for an extended time, the additional information would be useful. If you think that you have found a future replicate survey site, please communicate this right away to Bruce Kingsbury. You should also report opportunistic surveys that produced no copperbellies, as negative information is also useful. Also, please be sensitive to concerns about trespassing.

Surveys will be conducted by traveling the survey path (transect) and counting the snakes seen over a known time and estimated distance. Surveyors should move slowly and cautiously with frequent stops (pauses) of one or more minutes to scan both sides of the transect for snakes. The duration of pauses is left to the discretion of the surveyor, but should be long enough to allow careful examination of the field of view before moving on. An initial suggestion for distance to move between pauses is 10 paces. Transect length will be approximated as accurately as possible using the

corresponding topo map. The time will be recorded at the beginning and end of the transect, as well as each time the habitat type, as defined by the habitat classification below, changes. Habitat classification should default to the more open habitat when a decision must be made between two types. If you are walking along a shrub/scrub vs. palustrine forest boundary, you are surveying shrub/scrub. To minimize the impact of inclement weather, surveys will only be conducted on partly sunny days of at least 70 F, or sunny days between 65-90 F, to maximize chance of seeing the snakes out basking and traveling. Also, as the weather turns hot, observations will be made in early morning and late afternoon to avoid hot temperatures that drive the snakes to cooler microhabitats.

Copperbellies are very mobile and can be found in all sorts of habitat. However, empirical evidence shows that copperbellies prefer 1) the edge habitat between open canopy areas, such as shrub-scrub wetlands, and forest, to bask and rest, and 2) extremely shallow waters (<15 cm (6")), to forage. They do not spend much time in open, deep water (>30 cm), or fast moving water. However, they commonly seen basking on platforms over deep water, and will not hesitate to swim across open water. They are not as easily found in forest, but sometimes can be found at pools of water. Surveyors are most likely to find stationary snakes basking on horizontal surfaces just above the water, such as on nearly sunken logs or branches, or a little higher on living branches of bushes such as buttonbush (*Cephalanthus occidentalis*). Foraging snakes may be seen cruising shorelines. Ripples on the water's surface may also indicate the presence of a foraging or traveling snake, and should be investigated.

Equipment. Surveyors should always bring binoculars and use them. They are vital for examining complex habitats such as brush, and for properly identifying snakes to species. A watch is needed for timing transects. If you are marking a new transect, you will need flagging tape and markers. A compass is also handy, especially for the directionally challenged. A thermometer is needed as well, and we can provide one for you if needed. Surveyors will need to consider footwear. Hip or chest waders may keep you dry, but are tiring to wear for any length of time, and can get hot. Pull-on farm boots work okay unless there is any flooding. Once the water has warmed, I just go ahead and get wet, wearing "Army" boots to protect my feet. Use pencil to keep your notes- pen will smear and run if it gets wet, erasing your data. Ziplock bags are good for keeping things dry.

Data Sheet Explanation

At the top of the data sheet, *Date*, *Site ID Code & Name* (provided for you), *Surveyors*, and *Weather Summary (Beg.)* comments are filled out prior to beginning the survey. *Start* time is entered when the survey actually begins. *Finish* time is entered when the survey is suspended. Times should be recorded in military time (1200 is 12 noon, 1400 is 2PM). *Weather Summary (End)* is for indicating what things are like when you stop.

Initial and final temperatures should be taken in the sun, shade, and water. The sun (in nearest opening in canopy) and shade (under nearest canopy) temperatures should be taken at waist height with no direct light hitting the instrument (use your body or hand to block light from striking the thermometer bulb). Water temperatures should be taken approximately 5 cm below the surface. Keep in mind that a wet bulb will give a cooler temperature than a dry bulb. Substantive changes in the weather should be indicated on data rows between observations.

Transect length is the best estimate of the transect length based on your route and the scale on your map. Length should be recorded in kilometers. *Travel method* would be foot or boat. Additionally, a line is provided to *summarize* your observations: number of each species observed.

Data: The codes for data entries are described in the survey code descriptions provided below. The last column (*Comm*) is for a reference number for additional comments in the space at the bottom of the page. Additional comments could also be made on the back. Surveyor comments will be used to help establish habitat extent and quality throughout the range of the snake, so surveyors are encouraged to make note of their surroundings (including apparent condition of water). You might also comment on directions to the site. Weather comments would include cloud cover, wind, etc. In the field, comments can also be inserted on the data row(s) beneath the relevant observation. If habitat changes during the length of the transect, times and lengths of subtransects should be recorded by habitat. *Time* is when you start a new habitat classification, *elapsed time* is the total time surveying that habitat. *Species* of snake is coded: at least all *Nerodia* should be included. *Age* is the apparent age class of the snake. *Behavior* is the activity of the snake at time of observation.

Three distances are recorded: *Trans* is the distance from the transect line to the snake (perpendicular distance to you). *Shore* is the distance the snake is from shore (distance to shore will be negative for terrestrial observations). A range-finder is useful here, and we can provide you with one if you request it. Since the transect line may be the shore in a shoreline survey, *Trans* and *Shore* may be the same value. *Vertical* is the distance above the substrate. All measurements should be in meters, not yards.

*Hab*itat and *Micro*habitat are coded as indicated in the attached habitat classification (based on a simplification of Cowardin et al.'s wetland classification system). Code should be strictly adhered to, and deviation from the code should be well-documented with comments. *In sun* asks whether or not the snake is in direct sunlight (Y/N).

Final comments: pursuit of individual snakes may not only be illegal for some surveyors, but will also disrupt the continuity of the survey. Snakes should be approached only to the extent that species identification is certain. Lastly, if you have any suggestions for improvement of the survey, feel free to let me know.

SURVEY CODE DESCRIPTIONS

Habitats

This classification was designed to be suitable for studying habitat use by the copperbelly water snake. It is intended to be relatively compatible with the National Wetlands Inventory (NWI) classification developed by Cowardin et al. (1979). Habitat is a large-scale measure: if a habitat area cannot be mapped discretely on a topographic map, it should be incorporated into a neighboring habitat type.

SYSTEM	SUBSYSTEM	CODE	DESCRIPTION
Aquatic Habitats			
Palustrine- shallow (0<2m) water wetlands without extensive open water: vegetated with some trees, shrubs, or emergent vegetation			
	Forested	PF	-floodplain forest, with greater than 30% canopy cover by trees
	Scrub-shrub	PS	-shrub-scrub cover exceeds 30%, but tree cover does not
	Emergent	PE	-emergent vegetation present (cats, etc.) but not enough shrubs to be PS
	Open water	PO	-open water of palustrine system
Note: moist soil units should be commented as such, but would be classified as PE or PO.			
Lacustrine- deep water (>2m) wetlands such as large ponds and lakes, lacking emergent vegetation except near shore. The limnetic (deep water) portion of a lacustrine system is termed as LD, while the littoral zone (shoreline zone) will follow the palustrine subsystem, substituting L for P: LF, LS, LE, LO.			
Riverine- flowing water all or part of the year. Pooled water in partially dried river is still riverine.			
	Lower perennial	RL	- slow moving stream- muddy or silty bottom, water usually present
	Upper perennial	RU	- faster flowing stream- rocky or cobbly bottom, water usually present
	Intermittent	RI	- only temporarily running
Upland Classification			
Just in case you find yourself with dry feet...			
Forest-		UF	- greater than 30% canopy cover by trees, elevated above any potential flooding by sloping topography
Scrub-Shrub		US	-not forest, but >30% cover by shrubs such as berry bushes, willows, crab-apples and hawthorns.
Oldfield		OF	-fallow fields well-covered with herbaceous or grassy cover. CRP lands would often be included here.

Agricultural-is highly disturbed, and includes activities such as farming, substantial grazing, and repeatedly mowed areas

Crops	AC	-farm fields, croplands
Grazed	AG	-grazed or mowed areas
Residential	RS	-all space used for living by people

Microhabitat Classification

Microhabitat classification is somewhat similar to habitat, but on a smaller scale. Its use as a category allows the specific position (substrate) of the animal to vary to some degree from its general surroundings.

Shrub	-up in a bush
Tree	-up in a tree
Grass	-in a patch of grass
Rock	-on a rock or rocks
Log	-on a log
Herbaceous	-in a patch of herbs
Water	-in the water
Barren (soil)	-on bare soil
Island	-on a small hummock
Detritus	-on leafy debris, such as leaves

Behavioral Classification

Basking	-at rest in sunny location
Resting	-resting in non-basking position
Courting	-male pursuing female, female, being pursued by male
Mating	-actually copulating (much less likely than courting)
Foraging	-moving slowly and methodically through shallow water or on shore
Traveling	-moving continuously in linear path, with little investigative behavior along the way
Unknown	-behavior ambiguous or snake disturbed before behavior observed: *something that happens all the time!*

Miscellaneous

Species- **N**- copperbelly (*N.e. neglecta*), **D**- diamondback (*N. rhombifera*) , **M**- midland *(N. sipedon*), **Y**- yellowbelly water snake (*N. e. flavigaster*), **F**- mud snake (*Farancia abacura*), **A**- cottonmouth (Agkistrodon piscivorus), U-unknown

Canopy- Tree and shrub canopy cover in the general vicinity of the snake (ca. within 10 m radius) should be characterized as:
1=sparse: little or no cover,
2=moderate: forest margin or broken canopy as at treefall or in select cut woods,
3=complete: complete or nearly complete.

Age- Three categories:
Y=juvenile: young of the year, retaining juvenile striped color pattern;
S=subadult: adult coloration, or nearly so, but not yet having attained lg. adult body size;
A=adult: large-bodied, classic copperbelly coloration.

NATIVE ENDANGERED & THREATENED SP. RECOVERY

Permit Number: ES15027A

Version Number: 7

Effective: 2021-06-16 **Expires:** 2026-12-31

Issuing Office:

Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, Minnesota 55437-1458
permitsR3ES@fws.gov

Digitally signed by

FWS T&E Chief

Permittee:

STANTEC CONSULTING SERVICES, INC.
1500 LAKE SHORE DRIVE SUITE 100
COLUMBUS, OH 43204
US

Authority: Statutes and Regulations: 16 U.S.C. 1539a, 16 U.S.C. 1533d 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13

Location where authorized activity may be conducted:

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:

See permit conditions for reporting requirements

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific Conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable Conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other Federal law.

C. Valid for use by those identified in the List of Authorized Individuals.

C.1. Authorized Individuals:

Only individuals on the attached List of Authorized Individuals (LAI) are authorized to conduct activities pursuant to this permit. The LAI, printed on U.S. Fish and Wildlife Service (USFWS) letterhead, and signed and dated by the Region 3 permit issuing office or a Region 3 lead species Field Office, may identify special Conditions or circumstances under which individuals can conduct authorized activities and it must be retained with these Authorizations and Conditions. Each named individual shall be responsible for compliance with the Authorizations and Conditions of this permit.

Trained assistants not named on the attached LAI may work on permitted activities under the direct and on-site supervision of the individuals named on the LAI. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. Trained assistants may not work independently at a site.

Permittee shall replace outdated LAIs and attach the subsequent current updated version of the LAI to this recovery permit upon receipt. **This permit will be considered invalid without a current attached LAI.**

C.2. The Permittee (Principal Officer for business permits) shall submit written requests to the Service's Midwest Region (Region 3) Permit Coordinator identified in Condition L. The request shall be submitted at least 30 days prior to the desired effective date. The Permittee shall submit a $50.00 processing fee unless fee exempt [see 50 CFR 13.11 (d)], the request should include a desired effective date, shall be signed and dated by the Permittee, and shall include the following information:

a. The name of each individual (first name, middle initial, last name) to be appended to the LAI and indicate the species they will be working with and the activities they will be conducting;

b. The resume/qualifications of each person, including specific information on previous professional experience working with the species/activity affected by the request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate numbers of each species the applicant has worked with at each site (i.e., indicate the number specimens at specific sites or specific activities); names, dates, and location of areas surveyed; and experience with similar species;

c. For each individual: the names, titles, organizations, emails, and telephone numbers of a minimum of two references who can verify experience with the species (reference letters are preferred and always appreciated); and

d. The names of any individuals to be deleted from the LAI.

Note: This procedure is **only** for personnel changes to the LAI. For requests to renew/amend this permit, a complete application and appropriate application processing fee must be submitted to the Region 3 Recovery Permits Coordinator. The application Form 3-200-55 may be obtained at: https://www.fws.gov/endangered/permits/how-to-apply.html.

D. Acceptance of this permit serves as evidence that the Permittee and its authorized agents understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations, Parts 13 and 17, pertinent to issued permits (https://www.fws.gov/permits/ltr/ltr.html). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.

A request for permit renewal and the $100 application processing fee **must be received at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit while your application is being processed (subject to compliance with 50 CFR, Parts 13.21 and 13.22). Please use https://fwsepermits.servicenowservices.com/fws to obtain specific information regarding the new ePermitting process to apply for and submit your digital recovery permit application and application processing fee. When these requirements are not met, this permit becomes invalid on the expiration date. *Unless otherwise instructed within the Authorizations and Conditions*, **annual reports are due by January 31** following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions.

E. Permittee is authorized to take (capture with mist-nets, harp trap, handle, identify, radio-tag, band, collect non-intrusive measurements, enter hibernacula or maternity roost caves, and release) Indiana bat (*Myotis sodalis*), gray bat (*M. grisescens*), and northern long-eared bat (*M. septentrionalis*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Location within Region 2 of the U.S. Fish and Wildlife Service (USFWS): Oklahoma upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to 1) surveys of caves known to be used by federally-listed bats, and 2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a USFWS Biologist), and as outlined in Condition G.

F.2. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 4 of the USFWS: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Locations within Region 5 of the USFWS: Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Locations within Region 6 of the USFWS: Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify the USFWS Field Supervisor in the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/midwest/endangered/permits/index.html. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site (legal description and lat/long), county, and state.

G.3. The purpose and a description of the proposed activities (e.g., surveys, radio telemetry studies, etc.). If the purpose includes harp trapping or hibernacula or roost cave surveys, a copy of the specific study proposal must be included.

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

G.7. You may proceed with activities only upon receipt of written concurrence from the USFWS Field Supervisor. ***Your concurrence letter must be carried with this permit to authorize site-specific activities.***

H. Permittee shall adhere to the following Conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. Note: Permittee must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.2. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. Harp traps must be continually monitored. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

At least one named Permittee must remain present at each mist-net and harp trap site while it is being operated.

H.3. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.4. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (forearm band, transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. ***Although not required as a Condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G***.

H.6. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activities are proposed to occur.

H.7. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys should not be repeated more often than once every other year in any given hibernaculum that is occupied by endangered or threatened bats. Where hibernacula area and safety conditions allow, individuals entering caves are recommended to utilize night vision goggles or red-filtered light and to remain in the cave no more than 90 minutes to complete the work.

H.8. Permittee is not authorized to take Ozark big-eared bat (*Corynorhinus townsendii ingens*) and Virginia big-eared bat (*C. t. virginianus*). the USFWS acknowledges that incidental (unintentional) capture of these co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. Should incidental/accidental capture of Ozark or Virginia big-eared bats occur, you must document the capture and collect data (weight, sex, and age) on the captured animal. Permittee must also document the discovery with a photograph. Ozark and Virginia big-eared bats must be released

immediately following the data collection. Captured bats may be held for a maximum of 30 minutes, unless injured. Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity, where they can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Ozark and Virginia big-eared bats shall not be held in paper bags. Within 48 hours, you must notify the USFWS in the state in which you are working of the accidental capture (see https://www.fws.gov/midwest/endangered/permits/index.html).

H.9. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

H.10. When carrying out mist-netting and handling of bats under this permit, Permittee must use COVID-specific Personal Protective Equipment (PPE) in addition to the PPE already identified by the USFWS and states for mitigating the risk of spread of the fungus that causes white-nose syndrome, which includes the use of disposable gloves, disposable or site-dedicated clothing, and adherence to decontamination procedures. COVID-specific PPE is a non-vented N95 respirator (no exhalation valve) or any respirator or mask that provides a similar level of protection filtering exhaled air (https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest3.html#half).

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the USFWS Region 3 Recovery Permit Coordinator (Condition L.), the Species Recovery Lead (Condition M.), and the USFWS Field Office within the geographic location of study areas (https://www.fws.gov/midwest/endangered/permits/index.html).

J. Accidental injury or mortality may not exceed two (2) specimens. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must report any bat mortality or serious injury within 24 hours to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: https://www.fws.gov/midwest/endangered/permits/index.html). Written notification must also be made within 24 hours to the Midwest Regional Permits Coordinator (see Condition L.), the Species Recovery Lead (Condition M.), and the applicable USFWS Field Office in the state in which the incident occurred (Condition N.). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

K. This permit is non-transferable.

L. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. Note that this permit is limited to the above activities and identified species.

M. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

N. Upon locating a dead, injured, or sick federally listed species, under circumstances not addressed in this authorization, initial notification must be made immediately to the USFWS Field Office in the State in which the specimen is found (https://www.fws.gov/midwest/endangered/permits/index.html). Notification should also be made by the next business day to the USFWS' Regional Minnesota Office Recovery Permit Coordinator identified below. Those offices will confer with the USFWS' Division of Law Enforcement as appropriate and determine next steps. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured endangered or threatened species, and the preservation of biological materials from a dead individual, the finder should take responsible steps to ensure that the site is not unnecessarily disturbed.

O. An Annual Report of all activities conducted under the authority of this permit is due by January 31 following **each year** this permit is in effect. When assisting with netting, the permit number of the individual responsible for each capture should be recorded on the data collection form. Reports shall be sent electronically and your transmittal email must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line (***Note: thumb drives/flash drives and links to documents cannot be accepted***). In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

O.1. The "Bat Reporting Spreadsheet" is required for reporting data and can be found on the FWS Midwest Permits website (https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html). Prior to reporting, check the permits website to ensure you are using the most up to date form. Using the reporting form will help standardize data collection and increase efficiency in reporting.

O.2. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

O.3. A description of locations surveyed where no bats were encountered.

O.4. Band numbers of all bats banded.

O.5. Information on any injuries and/or mortalities and disposition of specimens.

O.6. Location and characteristics of roost trees and bat colonies.

O.7. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

O.8. A completed data collection form as found in the Summer Survey Guidelines, Appendix B, cited in Condition H.1.

O.9. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.1., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

O.10. Copies of all site-specific authorization letters required under Condition G.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

P. **Copies of your reports shall be sent to <u>all offices</u> listed below.** Your transmittal letter (or email) must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives and links to documents cannot be accepted)**.

P.1. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

P.2. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Division of Classification & Recovery Permits
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6788)
permitsR2ES@fws.gov

P.3. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

P.4. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

P.5. ESA Assistant Recovery Coordinator & Permit Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303-236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

Q. Additionally, based on species, reports and publications shall be submitted to the following:

Q.1. ***For studies involving Indiana bat:***
Lori Pruitt
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

Q.2. ***For studies involving northern long-eared bat:***
Jill Utrup
U.S. Fish and Wildlife Service
Ecological Services Field Office
4104 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

Q.3. ***For studies involving gray bat:***
Vona Kuczynska
U.S. Fish and Wildlife Service
Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)

R. Additionally, based on geographic areas, reports and publications shall be submitted to the applicable offices under “For Fish and Wildlife Permit Holders” at: https://www.fws.gov/midwest/endangered/permits/index.html.

cc: FWS/Region 2, 4, 5, and 6 (Attn: Regional Recovery Permits Coordinator)
FWS, TE Coordinator: Illinois/Iowa, Indiana, Michigan, Minnesota/Wisconsin, Missouri, Ohio
DNR/DOC, TE Coordinator: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

END

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE91733B-0

Effective: 10/17/2017 Expires: 10/31/2022

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Ecological Services Permit Office
1875 Century Boulevard
Atlanta, GA 30345
permitsR4ES@fws.gov

ACTING CHIEF, DIVISION OF ENVIRONMENTAL REVIEW

Permittee:

JOSHUA J. ADAMS
3601 MISTY MORNING CIRCLE
LEXINGTON, KY 40509
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:
See Condition C.1. below.

Reporting requirements:

Annual Reports are due by January 31 following each year that this permit is in effect.

Authorizations and Conditions:

A. General conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accordance with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local tribal, or other federal law.

C.1. Location of Permitted Activities: **Bats**: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin; **Blackside Dace**: Kentucky and Tennessee; **Kentucky Arrow Darter**: Kentucky.

C.2. The following individual is authorized to conduct activities as authorized by this permit: Joshua J. Adams.

Trained assistants not named on this permit may work on permitted activities under the direct and on-site supervision of the individual named above. However, trained assistants may not work independently at a site. All site

investigators that will handle fish and bats shall be trained in their identification and handling techniques, advised on the laws and restrictions related to listed species, and apprised of permit conditions. The number of site investigators at any site shall be of an appropriate, manageable, size so that the permittee shall observe actions and prevent or limit harm to listed species and their habitats.

D. Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the terms of this permit and all sections of title 50 Code of Federal Regulations, Parts 13 and 17, pertinent to issued permits. Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with the permit conditions. In addition, the permittee shall have all other applicable Federal, Tribal, State, and/or local government permits prior to the commencement of activities authorized in this permit.

E. The permitted activities described herein require prior, site-specific approval from the U.S. Fish and Wildlife Service (USFWS) Field Supervisor in the State(s) where the project will occur. Permittee shall notify the USFWS Field Supervisor for the State in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is in Condition N., below. Your request for this site-specific approval must be in writing and must indicate:

1. The purpose and a description of the activities proposed (e.g., surveys, radio telemetry studies, etc.).

2. Location of proposed activities, including project site (legal description and lat/long), county, and state.

3. Dates when the project is proposed to take place.

4. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

This permit is not valid without applicable concurrence letter(s) for activities and any required State permits.

F. Permittee is authorized to take (capture with mist nets, handle, band, radio-tag, and release) gray bats (*Myotis grisescens*), Indiana bats (*Myotis sodalis*), northern long-eared bats (*Myotis septentrionalis*), Ozark big-eared bat *(Corynorhinus townsendii ingens)*, and Virginia big-eared bats *(Corynorhinus townsendii virginianus*) and take (capture via seining, netting, or electroshocking, handle, identify, and release) blackside dace *(Phoxinus cumberlandensis*) and Kentucky arrow darter (*Etheostoma spilotum*) while conducting presence/absence surveys, as specified in permittee's February 26, 2016, application and supplementary information provided on May 25, 2017, and as conditioned below:

1. **Bats**:

a. The federally listed bats specified above may be captured following the protocol(s) provided by the USFWS, when available. Permittees must contact the USFWS FO in the State(s) in which activities are proposed to ensure correct protocol(s) are used. For example, the current Range-wide Indiana Bat Summer Survey Guidelines are available at: http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. The monitoring interval for mist nets is once every 10 minutes. Harp traps must be continually monitored.

b. Captured bats may be held for a maximum of 30 minutes, unless injured. If an exception is required to this

prohibition, permittee must receive prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

c. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data form provided by the USFWS (e.g., USFWS Bat Reporting Form available at: http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The permittee may be requested to provide individual photographs after submittal of annual reporting data.

d. If bands are applied, they must be lipped metal bands having a unique identifier. Bands should be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

e. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least five days, or until the transmitter falls off, whichever occurs first. **** Although not required as a condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome (WNS) zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition E (above).***

f. No capture activities shall occur within 20 meters of a known or potential summer or winter roost site, either natural or artificial, of a federally listed bat. If an exception is required to this prohibition, permittee must receive prior written approval from the USFWS Field Supervisor for the State in which the activities are proposed to occur.

g. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: <http://whitenosesyndrome.org/>.
j. Upon determination that endangered bats are present, permittee shall immediately notify (not to exceed 1 business day) the USFWS Field Office within the geographic location of study areas (Condition N.).

2. **Blackside Dace and Kentucky Arrow Darter**:

a. Freshwater fishes may be captured by hand seining, netting, or electro-fishing (except where prohibited) and

observed via wading, snorkeling, scuba diving.

b. Electrofishing may be employed only as a last resort measure if the conditions are appropriate for the presence of the species and if no individuals are located through seining or visual methods.

c. Electrofishing, when used, shall be at minimum levels to elicit taxis or immobilization (narcosis) and used in combination with a seine or downstream nets. Efforts should be made to minimize any individual fish's exposure to periods of tetanus that can result in paralysis and mortality or direct contact with electrodes.

d. No endangered or threatened fish may be retained as voucher specimens.

e. Before any site investigations, the permittee shall ensure that conditions are favorable for observation and sampling of all suitable in-stream habitats and the acquisition of a representative sample of the aquatic community.

f. If collected fishes must be held temporarily during survey efforts, they must be kept in containers with flowing water (i.e., aerated holding buckets, submerged seine). If an aerated bucket is used, the bucket shall be kept cool (out of direct sun) and clean (e.g., did not previously contain formalin or other preservatives or toxins) and shall not contain other species (e.g., crayfish or other fish species). Holding shall be limited to 30 minutes.

g. Captured fish shall be released as close as possible to the point of capture. They shall be released by hand at the substrate level to avoid higher risk of predation and allowed to swim under their own power from the hand to the substrate.

h. If a federally listed fish species that is not included in this permit is found in the action area or outside of its currently known range, the permittee shall promptly notify the appropriate USFWS office identified in Condition N., below.

G. No injury or mortality is expected to occur to federally listed species covered under this permit. If any injury or mortality does occur, the permittee shall immediately notify the appropriate USFWS Field Office noted in Condition N., below. Notification shall also be made within 24 hours to the Region4 Permit Coordinator at the address and telephone number noted in Condition M.1., below. Based on consultation between these offices, a decision will be made as to whether any of the authorized activities can continue. Decisions will also be made concerning the disposition of any dead or injured specimens within 5 working days of an injury or mortality. The permittee shall provide a written statement to the Service offices noted in Conditions M. and N., below, which documents the cause of the injury or mortality, and identifies the remedial measures employed by the permittee to eliminate future mortality or injury events. The final decision on remedial measures rests with the Service.

H. Permittee must carry a copy of this permit at all times when conducting the authorized activities.

I. This permit is non-transferable.

J. Issuance of this permit does not constitute permission to conduct these activities on national wildlife refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

K. Upon locating a dead, injured, or sick federally listed species, under circumstances not addressed in this

authorization, initial notification must be made immediately to the USFWS Field Office in the state in which the specimen is found, identified in Condition N., below. Notification should also be made by the next work day to the USFWS' Region 4 Permit Coordinator identified in Condition M.1., below. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured endangered or threatened species, and the preservation of biological materials from a dead animal, the finder should take responsible steps to ensure that the site is not unnecessarily disturbed.

L. Reports are due on January 31 following each year this permit is in effect and must be submitted to the offices identified in Conditions M, N, and O (below). When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office. At a minimum, the report shall include:

For All Species:
1. The name(s) and organization affiliation of all members of the survey crew.
2. The project(s) for which the survey(s) was/were conducted and the target species.
3. The date(s) of the survey(s).
4. Locations of the survey sites. Locations shall be noted using figures, maps, and by referencing a common coordinate system (e.g., latitude longitude, universal transverse mercator system, etc.).
5. Survey methods used and a map showing the survey location, with state and county designations, along with a description of the area sampled, noting biotic and abiotic features that might influence sample composition.
6. Species abundance and richness at each sample event, including parameters describing sampling effort.
7. The results of the sampling, with discussions and interpretations of the data in context to recovery of the species.
8. A description of any mortality, injuries, deformities, or other abnormalities observed and disposition of specimens.
9. Copies of all published data and reports.
10. Copies of all site-specific authorization letters required under Condition E.

For Bats:
10. All locations surveyed (regardless of whether federally listed bats were captured/observed).
11. Band numbers of all bats banded and all bats recovered/observed.
12. Location and characteristics of roost trees and bat colonies.
13. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data submission document provided by the USFWS (e.g., USFWS Bat Reporting spreadsheet available at: http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html). Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The permittee may be requested to provide individual photographs after submittal of annual reporting data.

For Fish:
14. The length of each survey reach and the latitude/longitude of the start and end location of each stream reach
15. Water quality data, including velocity, visibility, temperature, DO, pH, turbidity, and conductivity
16. A narrative describing stream substrate, riparian vegetation, instream vegetation, and other notable site characteristics
17. A list of fish collected in each sample reach, the number collected per species in each sample reach, and whether each collected fish was released live, retained in captivity, injured, or killed.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE

SUBMITTED AS AN ANNUAL REPORT.

M. For purposes of monitoring compliance and administration of the terms and conditions of this permit, the contact office of the U.S. Fish and Wildlife Service is:

M.1.
U.S. Fish and Wildlife Service (Region 4)
Attn: Permit Coordinator
1875 Century Boulevard
Atlanta, Georgia 30345 3301
Telephone: 404/679 7097
Facsimile: 404/679 7081
PermitsR4ES@fws.gov

In addition, copies of annual reports must be submitted to the Regional Offices listed below:

M.2.
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
500 Gold Ave., SW
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6665; fax 505/248-6788)
permitsR2ES@fws.gov

M.3.
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

M.4.
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(703/358-2402; fax 413/253-8482)
permitsR5ES@fws.gov

M.5.
Regional Recovery Permits Coordinator & Assistant Regional Recovery Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits Office

Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4212; fax 303/236-0027)
permitsR6ES@fws.gov

N. Additionally, based on geographic area, reports and publications shall be submitted to the following:

N.1. For studies conducted in Alabama:

Field Supervisor
Alabama Ecological Services Field Office
1208-B Main Street
Daphne, Alabama 36526-4419
(251) 441-5181

N.2. For studies conducted in Arkansas:

Field Supervisor
Arkansas Field Office
110 South Amity Road
Suite 300
Conway, Arkansas 72032-8975
(501) 513-4470

N.3. For studies conducted in Connecticut:

Field Supervisor
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

N.4. For studies conducted in Delaware:

Field Supervisor
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 573-4573

N.5. For studies conducted in Georgia:

Field Supervisor
Georgia Field Office
105 Westpark Drive, Suite D
Athens, GA 30606-3175
(706) 613-9493; fax 706/613-6059

N.6. For studies conducted in Illinois:

N.6.a.
Kristen Lundh
Endangered Species Coordinator for Illinois/Iowa
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Ave.
Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

N.6.b.
Joe Kath
Endangered Species Coordinator
Illinois Department of Natural Resources
Division of Natural Heritage
One Natural Resource Way
Springfield, Illinois 62702-1271
(217/785-8764; fax 217/785-2438)

N.7. For studies conducted in Indiana:

N.7.a.
Lori Pruitt
Endangered Species Coordinator for Indiana
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

N.7.b.
Scott Johnson
Indiana Department of Natural Resources
5596 East State Road 46
Bloomington, Indiana 47401
(812/334-1137, ext. 3400)

N.8. For studies conducted in Iowa:

N.8.a.
Kristen Lundh
Endangered Species Coordinator for Illinois/Iowa
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Ave.

Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

N.8.b.
Kelly Poole
Endangered Species Coordinator
Iowa Department of Natural Resources
Parks, Recreation, and Preserves
Wallace State Office Building
East 9th and Grand Avenue
Des Moines, Iowa 50319-0034
(515/281-8524)

N.9. For studies conducted in Kansas:

Field Supervisor
Kansas Field Office
2609 Anderson Avenue
Manhattan, Kansas 68502
785/539-3474; fax 785/539-8567

N.10. For studies conducted in Kentucky:

Field Supervisor
Frankfort Field Office
J C Watts Federal Bldg., Rm 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

N.11. For studies conducted in Louisiana:

Field Supervisor
Louisiana Ecological Services
646 Cajundome Blvd., Suite 400
Lafayette, La. 70506
Phone 337.291.3100
Fax 337.291.3139

N.12. For studies conducted in Maine:

Field Supervisor
Maine Field Office
U.S. Fish and Wildlife Service
17 Godfrey Drive, Suite 2
Orono, ME 04473
Phone: 207-866-3344

N.13. For studies conducted in Maryland:

Field Supervisor
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 573-4573

N.14. For studies conducted in Massachusetts:

Field Supervisor
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

N.15. For studies conducted in Michigan:

N.15.a.
Barbara Hosler
Endangered Species Coordinator for Michigan
U.S. Fish and Wildlife Service
2651 Coolidge Road
East Lansing, Michigan 48823
(517/351-6326; fax 517/351-1443)

N.15.b.
Dan Kennedy
Endangered Species Coordinator
Michigan Department of Natural Resources
Wildlife Division
P.O. Box 30444
Lansing, Michigan 48909-7444
(517) 284-6194; fax 517/373-6705

N.16. For studies conducted in Minnesota:

N.16.a.
Endangered Species Coordinator for Minnesota and Wisconsin
U.S. Fish and Wildlife Service
Ecological Services Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425
(612/725-3548 x2206; fax 612/725-3609)

N.16.b.

Richard Baker
Minnesota Endangered Species Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Rd., Box 25
St. Paul, MN 55155
Phone: 651/259-5073
richard.baker@state.mn.us

N.17. For studies conducted in Mississippi:

Field Supervisor
Mississippi Field Office
6578 Dogwood View Pkwy, Suite A
Jackson, MS 39213-7856
(601) 321-1122

N.18. For studies conducted in Missouri:

N.18.a.
Field Supervisor
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-2132
(573/234-2132; fax 573/234-2181)

N.18.b.
Scientific Collecting Permit Coordinator
Missouri Department of Conservation
Endangered Species and Natural History Division
2901 W. Truman Blvd., P.O. Box 180
Jefferson City, Missouri 65102-0180
(573/522-4115 ext. 3322; fax 573/751-4864)

N.19. For studies conducted in Montana:

Project Leader
585 Shepard Way
Helena, Montana 59601
Telephone: 406-449-5225
Fax: 406-449-5339

N.20. For studies conducted in Nebraska:

Assistant Field Supervisor
9325 South Alda Road

Wood River, NE 68883
Fax:(308) 384-8835
Phone: (308) 382-6468

N.21. For studies conducted in New Hampshire:

Field Supervisor
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

N.22. For studies conducted in New Jersey:

Field Supervisor
New Jersey Field Office
927 N. Main Street, Building D
Pleasantville, NJ 08232-1454
(609) 646-9310

N.23. For studies conducted in New York:

Field Supervisor
New York Field Office
3817 Luker Road
Cortland, NY 13045
(607) 753-9334

N.24. For studies conducted in North Carolina:

Field Supervisor
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

N.25. For studies conducted in North Dakota:

North Dakota Field Office
3425 Miriam Avenue
Bismarck, North Dakota 58501-7926
Phone: (701) 250-4481
Fax: (701) 355-8513

N.26. For studies conducted in Ohio:

N.26.a.

Endangered Species Coordinator for Ohio
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614/416-8993, x22; fax 614/416-8994)

N.26.b.
Endangered Species Coordinator
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Road, Building G
Columbus, Ohio 43229-6693
(614-265-6329; fax 614/262-1143)

N.27. For studies conducted in Oklahoma:

N.27.a.
Field Supervisor
Oklahoma Field Office
U.S. Fish and Wildlife Service
9014 E. 21st St.
Tulsa, Oklahoma 74129-1428
(918) 382-4501

N.27.b.
Todd Fagin
Oklahoma Natural Heritage Inventory
111 E. Chesapeake St.
Norman, OK 73019
405 325-4700 (Direct Line)
405 325-4042 (Oklahoma Biological Survey main office)
405 325-7702 (Fax)
tfagin@ou.edu

N.27.c.
Oklahoma Department of Wildlife Conservation
Wildlife Division
1801 N. Lincoln Blvd.
Oklahoma City, Oklahoma 73105
405/990-7259; fax 405/521-4706

N.28. For studies conducted in Pennsylvania:

Field Supervisor
Pennsylvania Field Office
315 So. Allen Street, Suite 322

State College, PA 16801-4850
(814) 234-4090

N.29. For studies conducted in Rhode Island:

Field Supervisor
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

N.30. For studies conducted in South Carolina:

N.30.a.
Field Supervisor
U.S. Fish and Wildlife Service
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707 x227

N.30.b.
Jennifer Kindel
Biologist/Preserve Manager
South Carolina Department of Natural Resources
311 Natural Resources Drive
Clemson, SC 29631
(864) 654-6738 x15
Fax: (864) 654-9168

N.31. For studies conducted in South Dakota:

South Dakota Ecological Services Field Office
420 S. Garfield Avenue,
Suite 400
Pierre, SD 57501-5408
Phone (605) 224-8693
FAX 605-224-9974

N.32. For studies conducted in Tennessee:

N.32.a.
Field Supervisor
Cookeville Field Office
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

N.32.b.
Josh Campbell
Bat Coordinator
Tennessee Wildlife Resources Agency
P.O. Box 40747
Nashville, TN 37204
(615) 781-6569

N.33. For studies conducted in Vermont:

Field Supervisor
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

N.34. For studies conducted in Virginia:

Field Supervisor
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061
(804) 693-6694

N.35. For studies conducted in West Virginia:

Field Supervisor
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241
(304) 636-6586

N.36. For studies conducted in Wisconsin:

N.36.a.
Endangered Species Coordinator for Minnesota and Wisconsin
U.S. Fish and Wildlife Service
Ecological Services Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425
(612/725-3548 x2206; fax 612/725-3609)

N.36.b.
Owen Boyle
Wisconsin Department of Natural Resources
101 S. Webster Street

Madison, Wisconsin 53707-7921
(608/266-5244)
Owen.Boyle@wisconsin.gov

O. Additionally, based on the species involved, reports and publications shall be submitted to the following Recovery Leads:

O.1. For Surveys involving Indiana Bats:

Lori Pruitt, Recovery Lead
U.S. Fish and Wildlife Service
Indiana Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

O.2. For Surveys involving Gray Bats:

Shauna Marquardt, Recovery Lead
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park De Ville Drive, Suite A
Columbia, Missouri 65203
(573/234-2132 x174; fax 573/234-2181)

O.3. For Surveys involving Northern Long-eared Bats:

Jill Utrup, Recovery Lead
U.S. Fish and Wildlife Service
Twin Cities Ecological Services Field Office
4104 American Blvd. E
Bloomington, Minnesota 55425
(612/725-3548 x207; fax 612/725-3609)

O.4. For Surveys involving Virginia Big-eared Bats:

Barbara Douglas
U.S. Fish and Wildlife Service
West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, West Virginia 26241
(304/636-6586 x19; fax 304/636-7824)

O.5. For Surveys involving Ozark Big-eared Bats:

Richard Stark
U.S. Fish and Wildlife Service

Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

O.6. For Surveys involving Blackside Dace and Kentucky Arrow Darter:

Mike Floyd
U.S. Fish and Wildlife Service
Frankfort Field Office
J C Watts Federal Bldg., Rm 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

END

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE13580D-1

Effective: 12/22/2020 Expires: 12/31/2023

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov

Chief - Endangered Species

Permittee:

JULIA R. WILSON
3720 W WOODYARD RD
BLOOMINGTON, IN 47401
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:

Alabama, Arkansas, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, Virginia, Wisconsin, and Wyoming.

Reporting requirements:

ANNUAL REPORT DUE: 01/31
See permit conditions for reporting requirements

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific Conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable Conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other Federal law.

C. Valid for use by Julia R. Wilson.

C.1. Unnamed trained assistants may work on permitted activities under the direct and on-site supervision of Julia Wilson. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. **Julia Wilson must remain present at each mist-net site while it is being operated.**

D. Acceptance of this permit serves as evidence that the Permittee and its authorized agents understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations, Parts 13 and

17, pertinent to issued permits (https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=a1d34199d1ab36c8b78ecd06a7fa5180&tpl=/ecfrbrowse/Title50/50cfr13_main_02.tpl) and https://www.ecfr.gov/cgi-bin/text-idx?node=50:2.0.1.1.1&rgn=div5). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit Conditions.

A request for permit renewal and the $100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit while your application is being processed (subject to compliance with 50 CFR, Parts 13.21 and 13.22). Please use https://fwsepermits.servicenowservices.com/fws to obtain specific information regarding the new ePermitting process to apply for, and submit your digital recovery permit application and application processing fee. When these requirements are not met, this permit becomes invalid on the expiration date. *Unless otherwise instructed within the Authorizations and Conditions*, **annual reports** are due by January 31 following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions.

E. Permittee is authorized to take (capture with mist-nets, handle, identify, band, attach radio-transmitters, collect non-intrusive measurements, and release) gray bat (*Myotis grisescens*), Indiana bat (*M. sodalis)*, and northern long-eared bat (*M. septentrionalis*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Within the U.S. Fish and Wildlife Service (USFWS) Regional New Mexico office State: Oklahoma upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to 1) surveys of caves known to be used by federally-listed bats, and 2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a USFWS Biologist), and as outlined in Condition G.

F.2. Within the USFWS Regional Minnesota office States: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Within the USFWS Regional Georgia office States: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, and South Carolina upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Within the USFWS Regional Massachusetts office States: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Within the USFWS Regional Colorado office States: Kansas, Nebraska, North Dakota, South Dakota, and Wyoming upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify and request approval from the USFWS Field Supervisor at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/midwest/endangered/permits/index.html. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A complete description of activities (i.e., proposed project plan, including purpose and need, surveys, methods, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

You may proceed with only the activities described in your written concurrence letter, upon receipt from the applicable USFWS Field Supervisor. ***Your concurrence letter must be carried with this permit to authorize site-specific activities*.**

H. Permittee shall adhere to the following Conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. Note: You must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

Julia Wilson must remain present at each mist-net site while it is being operated.

H.2. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.3. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.4. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. ***Although not required as a Condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that***

the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G.

H.5. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.6. When carrying out mist-netting and handling of bats under this permit, Permittee must use COVID-specific Personal Protective Equipment (PPE) in addition to the PPE already identified by the USFWS and states for mitigating the risk of spread of the fungus that causes white-nose syndrome, which includes the use of disposable gloves, disposable or site-dedicated clothing, and adherence to decontamination procedures. COVID-specific PPE is a non-vented N95 respirator (no exhalation valve) or any respirator or mask that provides a similar level of protection filtering exhaled air (https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest3.html#half).

H.7. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

H.8. For Ozark big-eared bat (*Corynorhinus townsendii ingens*) and Virginia big-eared bat (*C. t. virginianus*), the USFWS acknowledges that incidental (unintentional) capture of these co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. This permit **does not authorize** any activities for the specific purpose of capture of Ozark or Virginia big-eared bats. Permittee shall be observant and cautious to eliminate or minimize "take" of co-occurring listed species to the maximum extent practicable. In the event of incidental (unintentional) capture of Ozark big-eared bat or Virginia big-eared bat, Permittee shall immediately remove the bat(s) from the net/trap after capture, document with a photograph and release at the capture site. ***Do not put these bat species in holding cages, bags, or containers*.** Within 48 hours, you must notify the USFWS in the state in which you are working of the incidental capture (see https://www.fws.gov/midwest/endangered/permits/index.html).

H.9. Permittee must carry a copy of this permit at all times when conducting the authorized activities. NOTE: This permit is limited to the above activities and identified species.

H.10. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following within 48 hours: the USFWS Regional Minnesota office Recovery Permit Coordinator (Condition L.), the Species Recovery Lead (Condition M.), and the USFWS Field Office within the geographic location of study areas (https://www.fws.gov/midwest/endangered/permits/index.html).

J. Accidental injury or mortality may not exceed two (2) specimens. In the event of any accidental injury or mortality, all activities must immediately cease. The Permittee shall immediately report (in writing) any bat mortality or serious injury to the applicable USFWS Field Supervisor in the state in which the incident occurred (contact information provided at: https://www.fws.gov/midwest/endangered/permits/index.html. Written

notification shall also be made within 48 hours to the Regional Minnesota office Recovery Permit Coordinator (see Condition L.) and the Species Recovery Lead (Condition M.). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

K. An Annual Report of all activities conducted under the authority of this permit is due by January 31 following **each year** this permit is in effect. When assisting with netting, the permit number of the individual responsible for each capture should be recorded on the data collection form. In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

K.1. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

K.2. A description of locations surveyed where no bats were encountered.

K.3. Band numbers of all bats banded.

K.4. Information on any injuries and/or mortalities and disposition of specimens.

K.5. Location and characteristics of roost trees and bat colonies.

K.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

K.7. A completed data collection form as found in the Summer Survey Guidelines, Appendix B, cited in Condition H.1.

K.8. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.1., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

K.9. Copies of all site-specific authorization letters required under Condition G.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

L. Copies of your reports shall be sent electronically to **all offices** indicated below and your transmittal email must cite your Federal permit number. Electronic copies shall be submitted in MS Word, Portable Document Format,

Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives and links to documents cannot be accepted**).

L.1. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

L.2. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Division of Classification & Recovery Permits
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6922)
permitsR2ES@fws.gov

L.3. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Permits
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

L.4. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

L.5. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Permits
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

M. Additionally, based on species, reports and publications shall be submitted to the following:

M.1. ***For studies involving gray bat:***
Iwona Kuczynska
U.S. Fish and Wildlife Service
Missouri Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007

(573/234-2132; fax 573/234-2181)

M.2. ***For studies involving Indiana bat:***
Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x213; fax 812/334-4273)

M.3. ***For studies involving northern long-eared bat:***
Jill Utrup
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4104 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

M.4. ***For studies involving Ozark big-eared bat:***
Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

M.5. ***For studies involving Virginia big-eared bat:***
Field Supervisor
U.S. Fish and Wildlife Service
West Virginia Field Office
6263 Appalachian Highway
Davis, West Virginia 26260
jennifer_l_norris@fws.gov
FW5_WVFO@fws.gov

N. Additionally, based on geographic areas, reports and publications shall be submitted to the applicable offices under "For Fish and Wildlife Permit Holders" at: https://www.fws.gov/midwest/endangered/permits/index.html.

cc: FWS/Regional Offices - Colorado, Georgia, Massachusetts, and New Mexico (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinator: Illinois/Iowa, Indiana, Michigan, Minnesota/Wisconsin, Missouri, Ohio
DNR/DOC, TE Coordinator: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

END

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE28573D-0

Effective: 05/14/2019 Expires: 12/31/2023

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov

Chief - Endangered Species

Permittee:

ADAM R. RUSK
2420 W 76TH ST.
PRAIRIE VILLAGE, KS 66208
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:
ON LANDS SPECIFIED IN THE AUTHORIZATIONS AND CONDITIONS

Reporting requirements:
ANNUAL REPORT DUE: 01/31
See permit conditions for reporting requirements

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific Conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable Conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other Federal law.

C. Valid for use by Adam R. Rusk.
   C.1. Unnamed assistants may work on permitted activities under the direct and on-site supervision of Adam Rusk. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. **Adam Rusk must remain present at each mist-net site while it is being operated.**

D. Acceptance of this permit serves as evidence that the Permittee and its authorized agents understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations, Parts 13 and 17, pertinent to issued permits (https://www.fws.gov/permits/ltr/ltr.html). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit Conditions.

A request for permit renewal using Application Form 3-200-55 and the $100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit while your application is being processed (subject to compliance with 50 CFR, Parts 13.21 and 13.22: https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=a1d34199d1ab36c8b78ecd06a7fa5180&tpl=/ecfrbrowse/Title50/50cfr13_main_02.tpl). When these requirements are not met, this permit becomes invalid on the expiration date. *Unless otherwise instructed within the Authorizations and Conditions*, **annual reports** are due by January 31 following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions, as appropriate. The following website link provides the permit application Form 3-200-55 and the mailing address to the Midwest Region (Region 3), U.S. Fish and Wildlife Service, Endangered Species Permit Office: https://www.fws.gov/endangered/permits/how-to-apply.html.

E. Permittee is authorized to take (capture with mist nets, handle, identify, band, attach radio-transmitters, collect non-intrusive measurements, and release) Indiana bat (*Myotis sodalis*), gray bat (*M. grisescens*), northern long-eared bat (*M. septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), and Virginia big-eared bat (*C. t. virginianus*), for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Location within Region 2 of the U.S. Fish and Wildlife Service (USFWS): Oklahoma upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to 1) surveys of caves known to be used by federally-listed bats, and 2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a USFWS Biologist), and as outlined in Condition G.

F.2. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 4 of the USFWS: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Locations within Region 5 of the USFWS: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Locations within Region 6 of the USFWS: Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify and request approval from the USFWS Field Supervisor in the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/midwest/endangered/permits/index.html. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A description of the activities (i.e., surveys, radio-telemetry studies, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

You may proceed with activities only upon receipt of written concurrence from the USFWS Field Supervisor. ***Your concurrence letter must be carried with this permit to authorize site-specific activities.***

H. Permittee shall adhere to the following Conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. Note: You must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.
Adam Rusk must remain present at each mist-net site while it is being operated.

H.2. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.3. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. ***Although not required as a Condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G.***

H.4. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.5. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear

such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the USFWS Region 3 Office (Condition L.), the Species Recovery Lead (Condition M.), and the USFWS Field Office within the geographic location of study areas (https://www.fws.gov/midwest/endangered/permits/index.html).

J. Accidental injury or mortality may not exceed two (2) specimens. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must immediately report any bat mortality or serious injury to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: https://www.fws.gov/midwest/endangered/permits/index.html). Written notification must also be made within 24 hours to the Midwest Regional Permits Coordinator (see Condition L.), the Species Recovery Lead (Condition M.), and the applicable USFWS Field Office in the state in which the incident occurred (Condition N.). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

K. An Annual Report of all activities conducted under the authority of this permit is due by January 31 following each year this permit is in effect. In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

K.1. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

K.2. A description of locations surveyed where no bats were encountered.

K.3. Band numbers of all bats banded.

K.4. Information on any injuries and/or mortalities and disposition of specimens.

K.5. Location and characteristics of roost trees and bat colonies.

K.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

K.7. A completed data collection form as found in the Summer Survey Guidelines, Appendix B, cited in Condition H.1.

K.8. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.1., or

other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

K.9. Copies of all site-specific authorization letters required under Condition G.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

L. Copies of your reports shall be sent to **all applicable offices** indicated below. Your transmittal letter (or email) must cite your Federal permit number. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives cannot be accepted**).

L.1. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

L.2. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Division of Classification & Recovery Permits
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6922)
permitsR2ES@fws.gov

L.3. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

L.4. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

L.5. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits
Denver Federal Center, P.O. Box 25486

Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

M. Additionally, based on species, reports and publications shall be submitted to the following:

M.1. ***For studies involving Indiana bat:***
Lori Pruitt
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

M.2. ***For studies involving northern long-eared bat:***
Jill Utrup
U.S. Fish and Wildlife Service
Ecological Services Field Office
4104 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

M.3. ***For studies involving gray bat:***
Shauna Marquardt
U.S. Fish and Wildlife Service
Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)

M.4. ***For studies involving Ozark big-eared bat:***
Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

M.5. ***For studies involving Virginia big-eared bat:***
Barbara Douglas
U.S. Fish and Wildlife Service
Ecological Services Field Office
90 Vance Drive
Elkins, West Virginia 26241
(304/636-6586 x19; fax 304/636-7824)

N. Additionally, based on geographic areas, reports and publications shall be submitted to the applicable offices under "For Fish and Wildlife Permit Holders" at: https://www.fws.gov/midwest/endangered/permits/index.html.

cc: FWS/Region 2, 4, 5, and 6 (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinator: Illinois/Iowa, Indiana, Michigan, Minnesota/Wisconsin, Missouri, Ohio
DNR/DOC, TE Coordinator: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

END

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE98673B-0

Effective: 10/31/2016 Expires: 12/31/2021

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov

Alisa Shull

CHIEF - ENDANGERED SPECIES

Permittee:

JASON THOMAS LAYNE
20440 APPLERIDGE LAND
SPRING HILL, KS 66083
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:
ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:
ANNUAL REPORT DUE: 01/31
See permit conditions for reporting requirements

Conditions and Authorizations:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED ABOVE ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INDLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

C.1. VALID FOR USE BY PERMITTEE NAMED ABOVE AND FOR USE BY JASON LAYNE. UNNAMED ASSISTANTS MAY WORK ON PERMITTED ACTIVITES ONLY UNDER THE DIRECT AND ON-SITE SUPERVISION OF NAMED PERMITTEE. **At least one named permittee must remain present at each mist-net site while it is being operated.**

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE AND ITS AUTHORIZED AGENTS UNDERSTAND AND AGREE TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS (http://www.fws.gov/permits/ltr/ltr.html). SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

E. Permittee is authorized to take (capture with mist nets, handle, identify, radio-tag, band and release) Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*) Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and Ozark big-eared bat (*Corynorhinus townsendii ingens*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Location within Region 2 of the USFWS: Oklahoma, upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to (1) surveys of caves known to be used by federally-listed bats, and (2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Biologist), and as outlined in Condition G.

F.2. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 4 of the USFWS: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Locations within Region 5 of the USFWS: Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Locations within Region 6 of the USFWS: Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/midwest/endangered/permits/index.html. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A description of the activities (i.e., surveys, radio-telemetry studies, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

G.7. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

H. Permittee shall adhere to the following conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. Note that you must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.2. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.3. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.4. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first.

H.5. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activities are proposed to occur.

H.6. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the U.S. Fish and Wildlife Service Region 3 Office (Condition L.), and the U.S. Fish and Wildlife Service Field Office within the geographic location of study areas (https://www.fws.gov/midwest/endangered/permits/index.html).

J. Accidental mortality may not exceed two specimens. In the event that this number is met, all activities must cease. Any bat mortality or serious injury must be reported within 5 calendar days to the applicable U.S. Fish and Wildlife Service office based on location of mortality event and to the nearest U.S. Fish and Wildlife Service Law Enforcement, Special Agent Office (http://www.fws.gov/offices). Dead or moribund bats may be retained for further study only with the written permission of the U.S. Fish and Wildlife Service. Any bats that are not authorized for retention are to be chilled and promptly transferred to the U.S. Fish and Wildlife Service for potential necropsy and/or contaminants analysis (Condition L.6.).

K. An annual report of all activities conducted under the authority of this permit is due by January 31 following each year this permit is in effect. In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

K.1. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

K.2. A description of locations surveyed where no bats were encountered.

K.3. Band numbers of all bats banded.

K.4. Information on any injuries and/or mortalities and disposition of specimens.

K.5. Location and characteristics of roost trees and bat colonies.

K.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

K.7. A completed data collection sheet as found on the Range-wide Indiana Bat Summer Survey Guidelines website page, cited in Condition H.1.

K.8. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.1., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

K.9. Copies of all site specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

L. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office.

L.1. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

L.2. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6649; fax 505/248-6788)
permitsR2ES@fws.gov

L.3. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd., Suite 200
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

L.4. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(703/358-2402; fax 413/253-8482)
permitsR5ES@fws.gov

L.5. ESA Assistant Recovery Coordinator & Permit Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489

(719/628-2670; fax 303/236-0027)
permitsR6ES@fws.gov

L.6. Lori Pruitt
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

M. Additionally, based on geographic area, reports and publications shall be submitted to the offices listed under Field Office Contact Information at: https://www.fws.gov/midwest/endangered/permits/index.html

cc: FWS/Region 2, 4, 5, and 6 (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinators: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin
DNR/DOC, TE Coordinators: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin

END

NATIVE ENDANGERED & THREATENED SP. RECOVERY

Permit Number: ESPER0003405

Version Number: 0

Effective: 2021-07-23 **Expires:** 2026-12-31

Issuing Office:

Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

ES Bloomington Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, Minnesota 55437-1458
permitsR3ES@fws.gov

Digitally signed by

FWS T&E Chief

Permittee:

Crystal A Griffin
9509 W 118th Terrace, Apt. 1
Overland Park, Kansas 66210
United States

Authority: Statutes and Regulations: 16 U.S.C. 1539a, 16 U.S.C. 1533d 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13

Location where authorized activity may be conducted:

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:

ANNUAL REPORTS DUE: 01/31
See permit conditions for reporting requirements

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific Conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable Conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other Federal law.

C. Valid for use by named Permittee (Crystal A. Griffin).

C.1. Unnamed assistants may work on permitted activities only under the direct and on-site supervision of Crystal A. Griffin. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. **Named Permittee must remain present at each mist-net [harp trap] site while it is being operated.**

D. Acceptance of this permit serves as evidence that the Permittee understands and agrees to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations (CFR), Parts 13 and 17, pertinent to issued permits (https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=a1d34199d1ab36c8b78ecd06a7fa5180&tpl=/ecfrbrowse/Title50/50cfr13_main_02.tpl and https://www.ecfr.gov/cgi-bin/text-idx?node=50:2.0.1.1.1&rgn=div5). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.

A request for permit renewal and the $100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit while your application is being processed (subject to compliance with 50 CFR, Parts 13.21 and 13.22). Please use https://fwsepermits.servicenowservices.com/fws to obtain specific information regarding the new ePermitting process to apply for and submit your digital recovery permit application and application processing fee. When these requirements are not met, this permit becomes invalid on the expiration date. *Unless otherwise instructed within the Authorizations and Conditions*, **annual reports** are due by January 31 following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions.

E. Permittee is authorized to take (capture with mist nets or harp traps, handle, identify, radio-tag, band, collect non-intrusive measurements, and release) Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*), and Ozark big-eared bat (*Corynorhinus townsendii ingens*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Within the U.S. Fish and Wildlife Service (USFWS) Regional New Mexico office State: Oklahoma, upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to (1) surveys of caves known to be used by federally-listed bats, and (2) examinations of caves suspected of

containing federally-listed bat species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Service Biologist), and as outlined in Condition G.

F.2. Within the USFWS Midwest Region 3 States: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Within the USFWS Regional Georgia office States: Alabama, Arkansas, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Within the USFWS Regional Massachusetts office States: Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Within the USFWS Regional Colorado office States: Kansas, Nebraska, North Dakota, and South Dakota, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify and request approval from the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/midwest/endangered/permits/index.html. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A complete description of activities (i.e., proposed project plan, including purpose and need, surveys, methods, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

You may proceed with only the activities described in your written concurrence letter, upon receipt from the applicable USFWS Field Supervisor. ***Your concurrence letter must be carried with this permit to authorize site-specific activities.***

H. Permittee shall adhere to the following conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. Note: Permittee must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.2. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. **Harp traps must be continually monitored.** Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

Named Permittee must remain present at each mist-net and harp trap site while it is being operated.

H.3. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.4. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (forearm band, transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first.

H.6. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.7. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

H.8. Ozark big-eared bats (*Corynorhinus townsendii ingens*) shall be immediately removed from the net/trap after capture, then processed and released. When there are multiple bats in the net, Ozark big-eared bats (OZBB) shall be removed first and processed as quickly as possible. If this is not possible, the species shall be placed into a **HOLDING CAGE** and held no longer than 10 minutes. Place the cage in a dark, quiet location, and process all as soon as possible. **Do not put these bat species in holding bags, nor in an individual holding bag or container** (*C. t. ingens* are highly social and being held individually in a bag increases stress and can lead to mortality). Holding cage options include small rubber/plastic/vinyl coated soft-sided (mesh) pet carriers or modified standard minnow traps with rubber coated mesh where the top of the trap is either a plastic bucket or flower pot with a hole in the center (contact the OZBB Lead Recovery Biologist for further information on acceptable enclosures -- see Condition Q.4. for contact information). A holding cage shall contain only multiple OZBBs (avoid overcrowding). Do not place other species/subspecies in either cage(s). Holding cages shall be decontaminated using the most current White-nose Syndrome decontamination guidance after a night of use (https://www.whitenosesyndrome.org/topics/decontamination). Do not decontaminate holding cages within a single net night.

When an OZBB appears to be going into shock (i.e., becomes limp and unresponsive), place the bat in a dark, quiet location either on a rock or other flat surface considered the safest option for the bat in that situation to recover (removed from capture activities and predators) and monitor it periodically. **Do not continue to handle the bat, nor place it in a holding cage or in a holding cage with other OZBBs**. If the stressed bat recovers, release it immediately without an attempt to gather additional data, collect samples, apply a band or a transmitter, etc.

H.9. Permittee is not authorized to take Virginia big-eared bat (*C. t. virginianus*). The USFWS acknowledges that incidental (unintentional) capture of this co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. This permit **does not authorize** any activities for the specific purpose of capture of Virginia big-eared bats. Permittee shall be observant and cautious to eliminate or minimize “take” of co-occurring listed species to the maximum extent practicable. In the event of incidental (unintentional) capture of Virginia big-eared bat, Permittee shall immediately remove the bat(s) from the net/trap after

capture, document with a photograph and release at the capture site. ***Do not put these bat species in holding cages, bags, or containers*.** Within 48 hours, you must notify the USFWS Field Office in the state in which you are working of the incidental capture (see https://www.fws.gov/midwest/endangered/permits/index.html).

H.10. When carrying out mist-netting and handling of bats under this permit, Permittee must use COVID-specific Personal Protective Equipment (PPE) in addition to the PPE already identified by the USFWS and states for mitigating the risk of spread of the fungus that causes white-nose syndrome, which includes the use of disposable gloves, disposable or site-dedicated clothing, and adherence to decontamination procedures. COVID-specific PPE is a non-vented N95 respirator (no exhalation valve) or any respirator or mask that provides a similar level of protection filtering exhaled air (https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest3.html#half).

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following within 48 hours: the USFWS Midwest Region 3 Recovery Permit Coordinator, the Species Recovery Lead (see below), and the USFWS Field Office within the geographic location of study areas (https://www.fws.gov/midwest/endangered/permits/index.html).

J. Accidental injury or mortality may not exceed two (2) specimens. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must report any bat mortality or serious injury within 24 hours to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: https://www.fws.gov/midwest/endangered/permits/index.html). Written notification must also be made within 48 hours to the Midwest Region 3 Regional Recovery Permit Coordinator and the Species Recovery Lead (see below). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

K. This permit is non-transferable.

L. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. Note that this permit is limited to the above activities and identified species.

M. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

N. Upon locating a dead, injured, or sick federally listed species, under circumstances not addressed in this authorization, initial notification must be made immediately to the USFWS Field Office in the state in which the specimen is found (https://www.fws.gov/midwest/endangered/permits/index.html (https://www.fws.gov/midwest/endangered/permits/index.html)). Notification should also be made by the next business day to the USFWS' Midwest Region 3 Recovery Permit Coordinator identified below. Those offices will confer with the USFWS' Division of Law Enforcement as appropriate and determine next steps. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured endangered or threatened species, and the preservation of biological materials from a dead individual, the finder should take responsible steps to ensure that the site is not unnecessarily disturbed.

O. An Annual Report of all activities conducted under the authority of this permit is due by January 31 following **each year** this permit is in effect. When assisting with netting, the permit number of the individual responsible for each capture should be recorded on the data collection form. Reports shall be sent electronically and your transmittal email must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line (***Note: thumb drives/flash drives and links to documents cannot be accepted***). In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

O.1. The "Bat Reporting Spreadsheet" is required for reporting data and can be found on the FWS Midwest Permits website (https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html). Prior to reporting, check the permits website to ensure you are using the most up to date form. Using the reporting form will help standardize data collection and increase efficiency in reporting.

O.2. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

O.3. A description of locations surveyed where no bats were encountered.

O.4. Band numbers of all bats banded.

O.5. Information on any injuries and/or mortalities and disposition of specimens.

O.6. Location and characteristics of roost trees and bat colonies.

O.7. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

O.8. A completed data collection sheet as found in the Survey Guidelines, cited in Condition H.1.

O.9. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the reporting spreadsheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website cited in Condition H.1., or other species-specific data sheets). Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

O.10. Copies of all site-specific authorization letters required under Condition G.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

P. Copies of your reports shall be sent to **all offices** indicated below**.** Your transmittal letter (or email) must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives and links to documents cannot be accepted**).

P.1. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Ecological Services – Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

P.2. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6788)
permitsR2ES@fws.gov

P.3. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Permits Office
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

P.4. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

P.5. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

Q. Additionally, based on species, reports and publications shall be submitted to the following:

Q.1. ***For studies involving gray bat:***
Vona Kuczynska
U.S. Fish and Wildlife Service
Missouri Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)

Q.2. ***For studies involving Indiana bat:***
Lori Pruitt

U.S. Fish and Wildlife Service
Indiana Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261; fax 812/334-4273)

Q.3. ***For studies involving northern long-eared bat:***

Jill Utrup
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4101 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

Q.4. ***For studies involving Ozark big-eared bat:***

Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

R. Additionally, based on geographic area, **reports and publications shall be submitted to** the applicable offices under "For Fish and Wildlife Permit Holders" at: https://www.fws.gov/midwest/endangered/permits/index.html.

cc: FWS/Regional Offices – New Mexico, Georgia, Massachusetts, Colorado (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinator: Illinois-Iowa, Indiana, Michigan, Minnesota-Wisconsin, Missouri, Ohio
DNR/DOC, TE Coordinator: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

END

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE99058B-0

Effective: 10/31/2016 Expires: 12/31/2021

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov

CHIEF - ENDANGERED SPECIES

Permittee:

JOSHUA R FLINN
12504 E. 34TH TER S
INDEPENDENCE, MO 64055
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:
ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:
ANNUAL REPORT DUE: 01/31
See permit conditions for reporting requirements

Conditions and Authorizations:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED ABOVE ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INDLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

C.1. VALID FOR USE BY PERMITTEE NAMED ABOVE AND FOR USE BY JOSHUA FLINN. UNNAMED ASSISTANTS MAY WORK ON PERMITTED ACTIVITES ONLY UNDER THE DIRECT AND ON-SITE SUPERVISION OF NAMED PERMITTEE. **At least one named permittee must remain present at each mist-net site while it is being operated.**

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE AND ITS AUTHORIZED AGENTS UNDERSTAND AND AGREE TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS (http://www.fws.gov/permits/ltr/ltr.html). SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

E. Permittee is authorized to take (capture with mist nets, handle, identify, radio-tag, band and release) Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*) Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and Ozark big-eared bat (*Corynorhinus townsendii ingens*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Location within Region 2 of the USFWS: Oklahoma, upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to (1) surveys of caves known to be used by federally-listed bats, and (2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Biologist), and as outlined in Condition G.

F.2. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 4 of the USFWS: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Locations within Region 5 of the USFWS: Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Locations within Region 6 of the USFWS: Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/midwest/endangered/permits/index.html. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A description of the activities (i.e., surveys, radio-telemetry studies, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

G.7. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

H. Permittee shall adhere to the following conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. Note that you must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.2. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.3. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.4. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first.

H.5. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activities are proposed to occur.

H.6. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the U.S. Fish and Wildlife Service Region 3 Office (Condition L.), and the U.S. Fish and Wildlife Service Field Office within the geographic location of study areas (https://www.fws.gov/midwest/endangered/permits/index.html).

J. Accidental mortality may not exceed two specimens. In the event that this number is met, all activities must cease. Any bat mortality or serious injury must be reported within 5 calendar days to the applicable U.S. Fish and Wildlife Service office based on location of mortality event and to the nearest U.S. Fish and Wildlife Service Law Enforcement, Special Agent Office (http://www.fws.gov/offices). Dead or moribund bats may be retained for further study only with the written permission of the U.S. Fish and Wildlife Service. Any bats that are not authorized for retention are to be chilled and promptly transferred to the U.S. Fish and Wildlife Service for potential necropsy and/or contaminants analysis (Condition L.6.).

K. An annual report of all activities conducted under the authority of this permit is due by January 31 following each year this permit is in effect. In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

K.1. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

K.2. A description of locations surveyed where no bats were encountered.

K.3. Band numbers of all bats banded.

K.4. Information on any injuries and/or mortalities and disposition of specimens.

K.5. Location and characteristics of roost trees and bat colonies.

K.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

K.7. A completed data collection sheet as found on the Range-wide Indiana Bat Summer Survey Guidelines website page, cited in Condition H.1.

K.8. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.1., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

K.9. Copies of all site specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

L. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office.

L.1. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws gov

L.2. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6649; fax 505/248-6788)
permitsR2ES@fws.gov

L.3. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd., Suite 200
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

L.4. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(703/358-2402; fax 413/253-8482)
permitsR5ES@fws.gov

L.5. ESA Assistant Recovery Coordinator & Permit Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489

(719/628-2670; fax 303/236-0027)
permitsR6ES@fws.gov

L.6. Lori Pruitt
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

M. Additionally, based on geographic area, reports and publications shall be submitted to the offices listed under Field Office Contact Information at: https://www.fws.gov/midwest/endangered/permits/index.html

cc: FWS/Region 2, 4, 5, and 6 (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinators: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin
DNR/DOC, TE Coordinators: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin

END

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit : 1491 **Issue date:** 5/17/2021 **Expiration date:** 5/17/2022

Pursuant to authority of T.C.A. 70-2-213: James D. Kiser

and the following additional permittees:
James D. Kiser, David Saugey, Lynda Mills, Lynda Wight, Kim Carter, Doug Stephens, Wes Cunningham, Angela Sjollema, Jody Nicholson, Hannah Stoffs, Josh Adams, and Julia Wilson

are granted permission to take the following species:

All species of bats native to Tennessee, including the endangered Indiana bat (Myotis sodalis), endangered gray bat (Myotis grisescens), endangered Virginia big-eared bat (Corynorhinus townsendii virginianus), threatened northern long-eared bat (Myotis septentrionalis), and non-federally listed species such as the little brown bat (Myotis lucifugus), southeastern bat (Myotis austroriparius), eastern small-footed bat (Myotis leibii), tri-colored bat (Perimyotis subflavus), evening bat (Nycticeius humeralis), big brown bat (Eptesicus fuscus), silver-haired bat (Lasionycteris noctivigans), eastern red bat (Lasiurus borealis), hoary bat (Lasiurus cinereus), Seminole bat (Lasiurus seminolus), Rafinesque's big-eared bat (Corynorhinus rafinesquii), and Brazilian free-tailed bat (Tadarida brasiliensis). All though not a target species, the southern flying squirrel (Glaucomys volans), is often captured during mist net surveys for bats. The number of individuals captured for each species in mist nets are unknown, but all animals will be removed from nets, identified to species, weighed and measured, photographed, and released immediately at the capture site within 30 minutes of capture. If an Indiana and/or northern long-eared bat is captured, up to five animals per site might be fitted with a radio-transmitter and tracked to day roost sites. Bats will also be fitted with uniquely numbered arm bands as issued by TWRA. See attached file entitled "TDOT-Region-1_2020-Bat-Survey-Plan.pdf" for normal survey activities.

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and the following additional permittees:

James D. Kiser, David Saugey, Lynda Mills, Lynda Wight, Kim Carter, Doug Stephens, Wes Cunningham, Angela Sjollema, Jody Nicholson, Hannah Stoffs, Josh Adams, and Julia Wilson

Restricted to the following locations:

Statewide - Depending on contracts received and notification of TWRA Regional Offices. Bat survey plans are prepared and must also receive approval from the U.S. Fish and Wildlife Service - Cookeville Field Office.

TENNESSEE WILDLIFE RESOURCES AGENCY

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Scientific Collection Permit: 1491 **Issue date:** 5/17/2021 **Expiration date:** 5/17/2022

Pursuant to authority of T.C.A. 70-2-213:
James D. Kiser

and the following additional permittees:
James D. Kiser, David Saugey, Lynda Mills, Lynda Wight, Kim Carter, Doug Stephens, Wes Cunningham, Angela Sjollema, Jody Nicholson, Hannah Stoffs, Josh Adams, and Julia Wilson

Restricted to the following collection methods:

Summer mist net surveys will follow methods outlined by USFWS's 2020 Range-wide Indiana bat Summer Survey Guidelines, and outlined in TDOT's request for man-hour estimates. Surveys will be completed between 15 May - 15 August. Mist nets and harp traps will be used to capture bats. Radio-transmitters appropriate for each bats body mass will be used to track to roost sites.

Subject to the following rules:

Wildlife may not be held longer than 24 hours without prior approval. All containers and equipment utilized in the collection of amphibians and reptiles shall be decontaminated and disinfected for ranavirus and other pathogens. This permit is invalid unless accompanied by all applicable federal permits.

No species listed by TWRA as endangered, threatened, in need of management, or of greatest conservation need may be taken without approval; release these species immediately. Report the occurance of endangered or threatened species to TWRA within five days.

Prior to collecting in the field, you are required to notify the TWRA Regional Dispatcher with the name(s) of person(s) doing the collecting, where, when and what species you will be collecting. Contact information is attached.

Ed Carter

Executive Director, Tennessee Wildlife Resources Agency

5/17/2021
Date

The State of Tennessee

AN EQUAL OPPORTUNITY EMPLOYER

Crask, Amanda J

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Tuesday, April 12, 2022 1:43 PM
To: Pelren, David
Subject: [EXTERNAL] Ridgeline Bat Studyplan Submittal

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Dave,

I am getting ready to send you the bat survey plan for the Ridgeline pipeline project. With the maps its is ~50mb. Do you all have access to sharepoint if I sent you a link?

Hope all is well!

Josh Adams
Natural Resource Team Lead, Terrestrial Wildlife Technical Lead, Principal

Direct: 502 212-5011
Mobile: 502-718-9512
Fax: 502 212-5055
Joshua.Adams@stantec.com

Stantec
9200 Shelbyville Road Suite 800
Louisville KY 40222-5136

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RIDGELINE EXPANSION PROJECT EDNA SAMPLING PLAN FOR LISTED MUSSEL SPECIES

April 26, 2022

Prepared for:
Enbridge Inc.

Prepared by:
Nathaniel Marshall

Project Number:
172677408

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1 Introduction and Background

The use of environmental DNA (eDNA), which is genetic material released from urine, waste, mucus, or sloughed cells, is increasingly common in natural resource surveys designed to detect special status species (Beng & Corlett 2020, Deiner et al. 2021, Rojahn et al. 2021). Analysis of eDNA using single-species quantitative polymerase chain reaction (qPCR) methodology has been developed for a number of freshwater mussel species (Cho et al. 2016, Sansom & Sassoubre 2017, Currier et al. 2018, Gasparini et al. 2020, Lor et al. 2020). Additionally, eDNA metabarcoding has been used to detect and describe entire freshwater mussel assemblages in river systems (Prié et al. 2020, Coghlan et al. 2021, Klymus et al. 2021, Marshall et al. In Press). Considering traditional mussel surveys can be difficult to conduct and require considerable expertise, eDNA surveys provide a complementary sampling method to assess the presence of freshwater mussels within a system.

This scope of work proposes to use eDNA to screen streams for those containing freshwater mussels and will not be the final presence/probable absence survey as required to assess affects from the proposed Ridgeline Expansion Project (Project) to species listed under the Endangered Species Act. Although some species may be identified using eDNA sampling, Stantec will conduct traditional surveys for those streams positively identified to contain freshwater mussels with eDNA.

2 Scope of Work

The scope of work is to provide eDNA planning, sampling, analysis, interpretation, and reporting to document potential evidence for the presence of unionid freshwater mussels across the entire 197-km-long Project in Tennessee. Desktop analysis identified 36 sites along the Project where eDNA sampling is proposed (Table 1). This work will be completed during summer of 2022 with eDNA water samples collected during low flow periods in the region.

This document outlines a sampling strategy for eDNA collection and analysis across the 36 potentially impacted stream sites associated with the Project.

Table 1 Ridgeline Expansion Project Streams Proposed for eDNA Sampling

Line Kilometer	Stream Name	Approximate Width	County
5	Old Hickory Lake (Second Creek embayment)	1,542	Trousdale
6	Old Hickory Lake (Second Creek embayment)	170	Trousdale
11	Little Goose Creek	112	Trousdale
11a	Big Goose Creek	145	Trousdale
18	Glasgow Branch	27	Trousdale
19	Lick Creek	27	Smith
21	Dixon Creek	39	Smith
30	Peyton Creek	28	Smith
37	Defeated Creek	45	Smith
45	Salt Lick Creek	33	Jackson
48	Cumberland River Embayment	512	Jackson
52	Cumberland River	600	Jackson
56	Flynn Creek	55	Jackson
59	Flynn Creek	38	Jackson
60	Flynn Creek	46	Jackson
62	Rush Fork	25	Jackson
72	Blackburn Fork	62	Jackson
82	Bear Creek	26	Putnam
89	Spring Creek	25	Putnam
111	East Fork Obey River	66	Overton
116	Little Hurricane Creek	25	Overton
118	Hurricane Creek	36	Fentress
146	White Creek	50	Morgan
153	Little Clear Creek	28	Morgan
162	Campground Creek	26	Morgan
165	Emory River	81	Morgan
169	Crooked Fork	64	Morgan
170	Crooked Fork (Crossing)	48	Morgan
182	Bitter Creek	48	Morgan
183	Bitter Creek (up)	31	Morgan
183	Bitter Creek (middle)	35	Morgan
183	Bitter Creek (down)	36	Morgan
185	Little Emory River	56	Morgan
188	Watts Bar Lake (Elverton Branch) Embayment	418	Roane
193	Kings Creek	28	Roane
197	Watts Bar Lake (Emory River)	828	Roane

3 Proposed Approach

Environmental DNA will be analyzed with two different approaches:

(1) A “targeted” qPCR methodology, typically designed to detect one species or group of interest, and

(2) A “passive” DNA metabarcoding approach, used as a broader assessment of biodiversity or for describing community assemblage.

The evaluation of both methods and their use for freshwater mussels within the Project area are described below.

3.1 eDNA Analysis: qPCR

While several freshwater mussel species have been the focus of eDNA qPCR analysis (Cho et al. 2016, Sansom & Sassoubre 2017, Currier et al. 2018, Gasparini et al. 2020, Lor et al. 2020), developing new qPCR assays for detection of all potential mussel species within the Project area is not feasible (potentially 76 mussel species, Appendix A). Instead, a single qPCR assay can be implemented to target the presence of ANY freshwater mussel species. Thus, this qPCR assay will be able to detect eDNA of any of the 76 mussel species that may be present within the Project. This design will allow for high assay efficiency across samples, even if community composition differs across sites. With this approach, we will have the ability to detect freshwater mussel eDNA within a sample, however, we will not be able to distinguish between which species may be present. Therefore, this approach provides only a presence/probable absence of freshwater mussel eDNA within a sample at a particular location on the stream.

There are currently four assays that target community-wide freshwater mussel eDNA for metabarcoding analysis (targeting the 16S, COI, and ND1 gene regions). With our laboratory partner (Cramer Fish Science Genidaqs – https://genidaqs.com), Stantec can validate and implement one of these existing community-wide freshwater mussel assays for qPCR analysis. This laboratory validation ensures that the assay is properly detecting a variety of freshwater mussels, while not presenting a false positive signal from DNA of co-occurring animals (such as Asian clams). Once validated by Genidaqs this assay can be utilized for eDNA analysis. An estimated 145 total samples will be processed for qPCR analysis (124 water samples, 6 positive control site samples, 6 negative control site samples, and 9 negative field control samples).

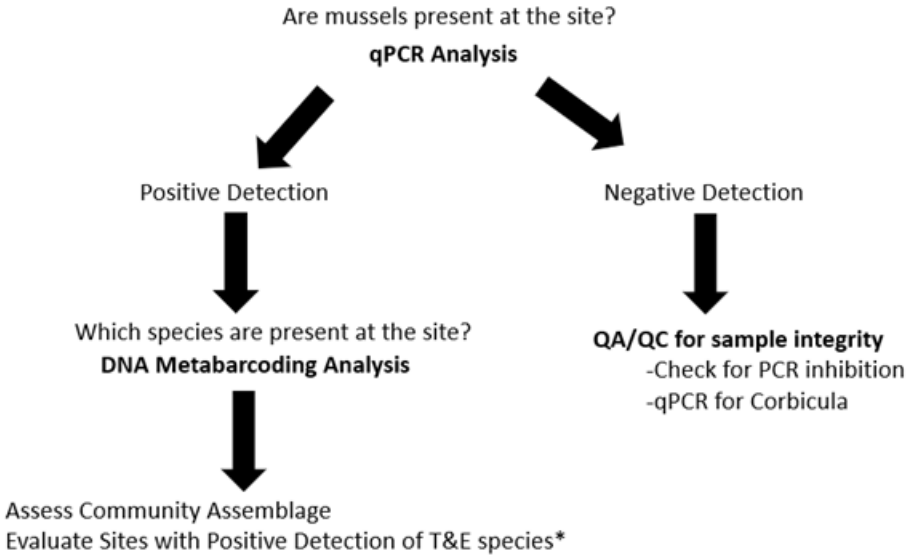
3.2 eDNA Analysis: Metabarcoding

By incorporating DNA metabarcoding, which employs amplicon-based high-throughput sequencing (HTS) to simultaneously identify and distinguish multiple taxa within samples (Marshall & Stepien 2020, Coghlan et al. 2021, Marshall et al. In Press), Stantec has the potential to identify entire mussel assemblages, including threatened and endangered species. Therefore, samples that test positive for mussel eDNA will

be further assessed for mussel composition with metabarcoding analysis (see flow chart in Figure 1). Using the unionid-specific metabarcoding 16S gene assay from Prié et al. (2020), Stantec has been able to describe freshwater mussel composition (Marshall et al. In Press). This same approach will be applied for this Project, to inform the traditional surveys regarding any potential threatened and endangered species present within the streams. If listed species are detected within a stream, Stantec's future traditional mussel surveys may focus additional efforts within these streams.

Of the 76 mussel species potentially present within the region (Appendix A), 18 species have no publicly available genetic data for the 16S gene region. Therefore, these species cannot be accurately identified from the dataset if present. Stantec will attempt to collect tissue plugs (~300-500mg in size) or mucus swabs from up to two individuals (contingent upon USFWS approval) of the 18 species that are lacking genetic data (Appendix A). Samples will be placed into 2mL collection tubes and stored in 95% ethyl alcohol in the field. All collection tubes will be sent to Genidaqs for genetic processing and Sanger sequencing of a ~700bp region of the mitochondrial 16S gene (Plaumbi et al. 1991). This will improve taxonomic classification and avoid issues from genetic misidentification with a limited database.

Figure 1 Mussel Laboratory Analysis Flowchart



*Note absence of a species in eDNA metabarcoding does not equate to true absence.

Figure 1 presents a flowchart of laboratory analysis for assessment of freshwater mussel eDNA within each sample. First, the sample analyzed with qPCR for the detection of any mussel eDNA. If the sample displays a positive detection, it can further be processed with DNA metabarcoding to assess mussel community assemblage. If the sample displays a negative detection, further analysis is completed as a QA/QC evaluation to ensure sample quality and integrity is intact.

4 Sample Design

Water samples will be collected at three locations from each of the 30 stream sites having widths of less than 150 feet, resulting in 90 water samples analyzed from wadeable streams. An additional 6 waterbodies having a width greater than 150 feet will also be sampled from a boat (Table 1). These locations will require a sample site every 150 feet across the channel resulting in the number of samples ranging from 3 to 10 per water body. The sampling of these lentic systems will require an additional 34 water samples. Sample effort for the entire Project will require 124 eDNA water samples. Samples on wadeable streams (< 150 feet wide) will consist of sampling upstream of impact site, at the impact site, and downstream of impact site. Samples on non-wadeable, impounded sections of streams will only be collected every 150 feet across the channel. The collection and filtering of water samples will be conducted by two scientists.

Water will be collected using a peristaltic pump (Masterflex L/S Easy Load Pump Head or similar) from ~10cm above the substrate. A clean segment of Masterflex L/S Pump Tubing or similar will be used to collect water for each sampling cell, with tubing cleaned after every collection by running 10% bleach solution for ~1 minute, followed by ~1 minute of distilled water. River water will be pumped through tubing for ~1 minute before sample collection. Samples will be collected across the entire width of the stream at each sampling location. Approximately 12L of water is pumped into a bleach-rinsed 18.9L (5-gallon) bucket, from which a 500mL water samples will be collected in a clean Nalgene bottle, stored in the dark on wet ice and returned to shore for subsequent filtration for eDNA within five hours. The water is filtered from each 500mL sample using a 47-mm-diameter glass microfiber filter GF/C (nominal pore size 1.2µm; GE Healthcare Life Science, MA, USA). After vacuum-pumping, filters will be placed into separate sterile Whirl-pak bags, which are then placed in Ziploc bags with silicone desiccant beads. All filters will be shipped on ice to Genidaqs for DNA extraction and eDNA analysis.

5 QAQC

5.1 Field Sampling

Stantec's quality assurance and quality control procedures include collecting all samples in sterile containers and documenting all acquired samples with their source information. Additionally, a negative field control sample is collected during each sampling event to monitor potential contamination between sampling sites, which could result in a false positive. For this field negative control, a sterile container of distilled water is taken into the field and filtered following the same protocol as the field collected samples. Standardized sample collection, filtration, handling, and shipment procedures will be implemented by Stantec field staff to protect the integrity of eDNA collected and avoid degradation. Nitrile gloves will be worn during field sample collection and the filtering process and changed for new sterile gloves between samples. All samples, including the negative control samples, will be submitted as blind samples to Genidaqs to avoid potential bias.

As part of the sampling design for this study, Stantec will incorporate additional collection of eDNA samples from 2-3 stream sites known to have freshwater mussels and 2-3 stream sites known to be absent of freshwater mussels. These samples will represent positive and negative control sites to provide additional validation to the eDNA dataset.

5.2 Laboratory Analysis

Stantec engages the services of a commercial eDNA laboratory, Genidaqs, which has a strong track record of eDNA assay development according to the Minimum Information for Publication of Quantitative Real-Time PCR Experiments (MIQE) standards (Bustin et al. 2009) and produces reliable results for qPCR and metabarcoding analysis. Quality assurance and quality control aspects are built into the laboratory services and are used during interpretation of eDNA results.

In the case no mussel eDNA is detected within a sampling site following qPCR analysis, a QA/QC check will be implemented to ensure sample integrity. This QA/QC assesses that eDNA was successfully collected, and that it has not severely degraded within the sample. If the eDNA is improperly collected or becomes heavily degraded within the sample, a false negative detection may occur. Therefore, non-detect samples for mussel eDNA will be further assessed with a qPCR for the detection of Asian clam (*Corbicula fluminea*) eDNA (Curtis et al. 2020), which if present may be indicative of suitable site for mussels (see flow chart in Figure 1). A sample with a negative detection for Asian clam eDNA will be considered likely unsuitable for all freshwater mussels, as Asian clams are hardier to environmental conditions compared to freshwater mussels, and they also can be found in smaller streams. The absence of Asian clams will be considered further evidence that the stream is void of bivalves. A pre-developed qPCR assay targeting Asian clam can be adopted for use in this study.

Additionally, PCR inhibitors may be present within an environmental sample from humic, phytic, and tannic acids, leaf litter, algae, and sediments. These compounds reduce the efficiency and accuracy of qPCR (Lance & Guan 2020). Gendiaqs performs standard laboratory sample procedures to remove inhibitors (e.g., Zymo Research One Step PCR Inhibitor Removal kit), to avoid associated issues with analysis. However, non-detect samples for Asian clam eDNA may be further evaluated for the presence of PCR inhibitors.

6 Reporting

Data analysis will include interpretation of sites with either positive or negative detections for freshwater mussels, evaluation of positive and negative controls, as well as QA/QC assessment of the Asian clam qPCR. Analysis of metabarcoding data will be completed on positive samples to evaluate potential community composition and relative abundances.

Stantec will prepare a report summarizing the results from each stream site. For streams with positive detection with qPCR, this report will additionally include a breakdown of the mussel species detected with metabarcoding analysis. All species detections will be rated based on a Taxonomy Credibility Criteria, to display an easy-to-understand assessment of probability of true taxonomic assignment. A species list and

species richness curves will be generated for each stream site, to help inform the traditional survey plan. While absolute mussel abundance cannot be assessed with results from eDNA metabarcoding, the relative eDNA abundance for each species will be assessed to estimate the mussel composition within each stream site. These relative mussel abundances can help inform which species are expected to be found at low abundances during the traditional survey.

7 References

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APPENDIX

Appendix A Mussel Species with the Potential to Occur within the Project Area

Scientific Name	Common Name	Fed Listed	State Listed	Genetic Data
Actinonaias ligamentina	Mucket	No	No	1
Actinonaias pectorosa	Pheasantshell	No	No	1
Alasmidonta atropurpurea	Cumberland Elktoe	Yes	Yes	0
Alasmidonta marginata	Elktoe	No	No	2
Alasmidonta viridis	Slippershell Mussel	No	No	0
Amblema plicata	Threeridge	No	No	4
Anodonta suborbiculata	Flat Floater	No	No	0
Anodontoides denigratus	Cumberland Papershell	No	No	2
Anodontoides ferussacianus	Cylindrical Papershell	No	No	0
Cumberlandia monodonta	Spectaclecase	Yes	Yes	7
Cyclonaias tuberculata	Purple Wartyback	No	No	2
Cyprogenia stegaria	Fanshell	Yes	Yes	0
Dromus dromas	Dromedary Pearlymussel	Yes	Yes	1
Ellipsaria lineolata	Butterfly	No	No	1
Elliptio crassidens	Elephantear	No	No	5
Elliptio dilatata	Spike	No	No	3
Epioblasma brevidens	Cumberlandian Combshell	Yes	Yes	2
Epioblasma capsaeformis	Oyster Mussel	Yes	Yes	21
Epioblasma florentina walkeri	Tan Riffleshell	Yes	Yes	16
Epioblasma obliquata	Catspaw	Yes	Yes	In-house
Epioblasma torulosa	Tubercled Blossom	Yes - Possibly Extinct	Yes	6
Epioblasma triquetra	Snuffbox	Yes	Yes	2
Fusconaia barnesiana	Tennessee Pigtoe	No	No	2
Fusconaia cuneolus	Finerayed Pigtoe	Yes	Yes	0
Fusconaia ebena	Ebonyshell	No	No	2
Fusconaia flava	Wabash Pigtoe	No	No	24
Fusconaia subrotunda	Longsolid	Yes	Yes	2
Hemistena lata	Cracking Pearlymussel	Yes	Yes	1
Lampsilis abrupta	Pink Mucket	Yes	Yes	0
Lampsilis cardium	Plain Pocketbook	No	No	4
Lampsilis fasciola	Wavyrayed Lampmussel	No	No	2
Lampsilis ovata	Pocketbook	No	No	4
Lampsilis teres	Yellow Sandshell	No	No	5
Lampsilis virescens	Alabama Lampmussel	Yes	Yes	0
Lasmigona complanata	White Heelsplitter	No	No	1
Lasmigona costata	Flutedshell	No	No	4
Lasmigona holstonia	Tennessee Heelsplitter	No	No	0
Leptodea fragilis	Fragile Papershell	No	No	2
Ligumia recta	Black Sandshell	No	No	4
Medionidus conradicus	Cumberland Moccasinshell	No	No	2

Scientific Name	Common Name	Fed Listed	State Listed	Genetic Data
Megalonaias nervosa	Washboard	No	No	4
Obliquaria reflexa	Threehorn Wartyback	No	No	3
Obovaria olivaria	Hickorynut	No	No	1
Obovaria retusa	Ringpink	Yes	Yes	0
Obovaria subrotunda	Round Hickorynut	Yes	Yes	1
Pegias fabula	Littlewing Pearlymussel	Yes	Yes	0
Plethobasus cicatricosus	White Wartyback	Yes	Yes	0
Plethobasus cooperianus	Orangefoot Pimpleback	Yes	Yes	0
Plethobasus cyphyus	Sheepnose	Yes	Yes	1
Pleurobema clava	Clubshell	Yes	Yes	1
Pleurobema cordatum	Ohio Pigtoe	No	No	1
Pleurobema gibberum	Cumberland Pigtoe	Yes	Yes	1
Pleurobema oviforme	Tennessee Clubshell	No	No	6
Pleurobema plenum	Rough Pigtoe	Yes	Yes	1
Pleurobema rubrum	Pyramid Pigtoe	No	No	0
Pleurobema sintoxia	Round Pigtoe	No	No	1
Potamilus alatus	Pink Heelsplitter	No	No	4
Potamilus ohiensis	Pink Papershell	No	No	0
Ptychobranchus fasciolaris	Kidneyshell	No	No	12
Ptychobranchus subtentum	Fluted Kidneyshell	Yes	Yes	7
Pyganodon grandis	Giant Floater	No	No	6
Quadrula cylindrica	Rabbitsfoot	Yes	Yes	In-house
Quadrula metanevra	Monkeyface	No	No	1
Quadrula pustulosa	Pimpleback	No	No	In-house
Strophitus undulatus	Creeper	No	No	2
Toxolasma lividus	Purple Lilliput	No	No	0
Toxolasma parvus	Lilliput	No	No	1
Tritogonia verrucosa	Pistolgrip	No	No	2
Truncilla donaciformis	Fawnsfoot	No	No	0
Truncilla truncata	Deertoe	No	No	2
Utterbackia imbecillis	Paper Pondshell	No	No	18
Villosa iris	Rainbow	No	No	2
Villosa perpurpurea	Purple Bean	Yes	Yes	0
Villosa taeniata	Painted Creekshell	No	No	2
Villosa trabalis	Cumberland Bean	Yes	Yes	1
Villosa vanuxemensis	Mountain Creekshell	No	No	6

Crask, Amanda J

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Tuesday, April 26, 2022 9:54 AM
To: Pelren, David; Sikula, Nicole R
Cc: Gus McLachlan; Casey, Justin; Benefiel, Jeffrey; Kiser, James; Marshall, Nathaniel
Subject: [EXTERNAL] eDNA Mussel Survey Plan for the Ridgeline Project
Attachments: Ridgeline Expansion Project eDNA Sampling Plan for Listed Mussels Species.pdf

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good morning Dave and Nicole,

I hope you are doing well, I want to thank both of you for meeting with us last week, I think it was extremely helpful.

I wanted to reach out and check in with the status of the bat survey plan approval, as well as submit our proposed survey plan for the mussel eDNA work for your review(attached).

Please take a look and let us know if you have any questions.

Talk soon

Josh Adams
Natural Resource Team Lead, Terrestrial Wildlife Technical Lead, Principal

Direct: 502 212-5011
Mobile: 502-718-9512
Fax: 502 212-5055
Joshua.Adams@stantec.com

Stantec
9200 Shelbyville Road Suite 800
Louisville KY 40222-5136

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Crask, Amanda J

From: Pelren, David
Sent: Friday, May 6, 2022 8:46 AM
To: Adams, Joshua
Cc: Gus McLachlan; Casey, Justin; Benefiel, Jeffrey; Kiser, James; Marshall, Nathaniel; Sikula, Nicole R; Ford, Anthony; Steve Samoray; Haider, Jessica
Subject: RE: [EXTERNAL] eDNA Mussel Survey Plan for the Ridgeline Project

Yes. I see that the permit for Leslie Meade is active now and extends beyond this summer. I also saw applications for renewal of Mark Gumbert and Steve Samoray's permits in conjunction with the Marlowe message about permits remaining active during the period in which applications are being processed. So, unless indications to the contrary become evident during the application review process, these permits are valid through the 2022 survey season.

Thanks for checking, and enjoy this pre-summer weather.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
mobile phone: 931-261-5844

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From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Wednesday, May 4, 2022 3:04 PM
To: Pelren, David <david_pelren@fws.gov>
Cc: Gus McLachlan <gus.mclachlan@enbridge.com>; Casey, Justin <Justin.Casey@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Kiser, James <James.Kiser@stantec.com>; Marshall, Nathaniel <Nathaniel.Marshall@stantec.com>; Sikula, Nicole R <nicole_sikula@fws.gov>; Tennessee ES, FWS <tennesseeES@fws.gov>; Ford, Anthony <anthony_ford@fws.gov>; Steve Samoray <ssamoray@copperheadconsulting.com>; Haider, Jessica <Jess.Haider@stantec.com>
Subject: RE: [EXTERNAL] eDNA Mussel Survey Plan for the Ridgeline Project

Dave,

Thanks for getting back to us, I wanted to let you know that we have contracted with Copperhead Consulting to help with some of the bat work on this project. I have attached their permits. Let me know if this is sufficient for getting them authorization to work under the approved survey plan.

Thanks

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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From: Pelren, David <david_pelren@fws.gov>
Sent: Friday, April 29, 2022 11:29 AM
To: Adams, Joshua <Joshua.Adams@stantec.com>
Cc: Gus McLachlan <gus.mclachlan@enbridge.com>; Casey, Justin <Justin.Casey@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Kiser, James <James.Kiser@stantec.com>; Marshall, Nathaniel <Nathaniel.Marshall@stantec.com>; Sikula, Nicole R <nicole_sikula@fws.gov>; Tennessee ES, FWS <tennesseeES@fws.gov>; Ford, Anthony <anthony_ford@fws.gov>
Subject: RE: [EXTERNAL] eDNA Mussel Survey Plan for the Ridgeline Project

Josh -

Thank you for the opportunity to review your eDNA mussel survey plan and the bat survey plan for the Ridgeline project. The bat survey plan is adequate for the purpose of determining presence/likely absence for listed bats, including the Indiana bat and northern long-eared bat. We appreciate your diligence in development of the plan.

We've discussed the eDNA survey plan here in the office, and we concur with the plan in general. This should be an excellent screening tool for detection of mussel presence in the project area, and we look forward to a report of the results. We see a possible need for physical confirmation surveys as a follow-up in some situations because of the limitations of eDNA in its lack of ability in definitively detecting species' presence. Also - as Andy Ford (our office's malacology recovery lead biologist) indicated, there are several captive propagation efforts underway that might be helpful in providing genetic material for your library. Among those, you might be familiar with the efforts of Jess Jones at Virginia Tech, Tim Lane with Virginia Department of Wildlife Resources, Monte MacGregor at Kentucky's facility in Frankfort, Hua Dan's Cumberland River Aquatic Center, and Paul Johnson's Alabama Department of Conservation's Aquatic Biodiversity Center. Andy has contact information for any of the folks that you might be missing.

Feel free to contact me with any questions.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
mobile phone: 931-261-5844

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From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Tuesday, April 26, 2022 8:54 AM
To: Pelren, David <david_pelren@fws.gov>; Sikula, Nicole R <nicole_sikula@fws.gov>
Cc: Gus McLachlan <gus.mclachlan@enbridge.com>; Casey, Justin <Justin.Casey@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Kiser, James <James.Kiser@stantec.com>; Marshall, Nathaniel <Nathaniel.Marshall@stantec.com>
Subject: [EXTERNAL] eDNA Mussel Survey Plan for the Ridgeline Project

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Good morning Dave and Nicole,

I hope you are doing well, I want to thank both of you for meeting with us last week, I think it was extremely helpful.

I wanted to reach out and check in with the status of the bat survey plan approval, as well as submit our proposed survey plan for the mussel eDNA work for your review(attached).

Please take a look and let us know if you have any questions.

Talk soon

Josh Adams
Natural Resource Team Lead, Terrestrial Wildlife Technical Lead, Principal

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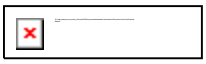

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Crask, Amanda J

From: Stiles, Warren J
Sent: Friday, May 13, 2022 8:33 AM
To: Adams, Joshua; Pelren, David
Cc: Sykes, Robbie; Haider, Jessica; Casey, Justin; Call, Geoff
Subject: Re: [EXTERNAL] RE: spotfin chub survey timing

I don't know where your crossings are, but if you send me the coordinates, I can take a quick look.

Warren Stiles
Listing and Recovery Biologist
Tennessee Ecological Services Field Office
446 Neal St.
Cookeville, TN
931-525-4977

For the time being, I will be teleworking everyday
Telework Schedule
Week 1: Tuesday and Friday
Week 2: Tuesday and Thursday

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Thursday, May 12, 2022 4:08 PM
To: Stiles, Warren J <warren_stiles@fws.gov>; Pelren, David <david_pelren@fws.gov>
Cc: Sykes, Robbie <robbie_sykes@fws.gov>; Haider, Jessica <Jess.Haider@stantec.com>; Casey, Justin <Justin.Casey@stantec.com>
Subject: RE: [EXTERNAL] RE: spotfin chub survey timing

Thanks Warren, while we will definitely make sure to check out the proposed crossings, do you all know if there are any known spawning locations near our project? This would be extremely helpful in project planning.

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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From: Stiles, Warren J <warren_stiles@fws.gov>
Sent: Thursday, May 12, 2022 3:49 PM
To: Adams, Joshua <Joshua.Adams@stantec.com>; Pelren, David <david_pelren@fws.gov>
Cc: Sykes, Robbie <robbie_sykes@fws.gov>
Subject: Re: [EXTERNAL] RE: spotfin chub survey timing

Hi Josh,
Just to clarify my point about visual surveys, to be thorough, snorkel transects in the right habitat would be more appropriate than walking the bank, though in some of the places the Emory, you can see the spawning congregations from the bank. They are crevice spawners, so they tend to congregate around fractured bedrock and boulders in runs

less than a meter deep. The juveniles will often be in sand habitat downstream of this spawning habitat, and they and the females can look a lot like small *Cyprinella* shiners or *Phenacobius* minnows . It would be good to see them underwater before trying to do a survey because of the similarity.
Regards,
Warren

Warren Stiles
Listing and Recovery Biologist
Tennessee Ecological Services Field Office
446 Neal St.
Cookeville, TN
931-525-4977

For the time being, I will be teleworking everyday
Telework Schedule
Week 1: Tuesday and Friday
Week 2: Tuesday and Thursday

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Thursday, May 12, 2022 2:28 PM
To: Pelren, David <david_pelren@fws.gov>
Cc: Sykes, Robbie <robbie_sykes@fws.gov>; Stiles, Warren J <warren_stiles@fws.gov>
Subject: [EXTERNAL] RE: spotfin chub survey timing

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Thanks Dave! This is very helpful

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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From: Pelren, David <david_pelren@fws.gov>
Sent: Thursday, May 12, 2022 3:25 PM
To: Adams, Joshua <Joshua.Adams@stantec.com>
Cc: Sykes, Robbie <robbie_sykes@fws.gov>; Stiles, Warren J <warren_stiles@fws.gov>
Subject: spotfin chub survey timing

Josh –

You asked about the best timeframe for spotfin chub surveys. I tend to think in terms of conducting surveys during the season/s in which the species is not spawning in order to avoid disturbance of spawning activities. It spawns about late

May through early July. So avoidance of the period of May 15 through July 15 would be a good estimate for that strategy.

In speaking with Warren Stiles (our resident biologist that has those spawning seasons dedicated to memory better than me – and copied on this message), he mentioned that spotfin chubs congregate for spawning and then disperse during the rest of the year across habitat (thereby making them much more difficult to find). So Warren highlighted the point that the spawning season can be targeted for visual surveys from the riverbank if your goal would be to locate spawning areas where the species tends to congregate.

Feel free to contact me for more discussion on this.

David Pelren
Fish and Wildlife Biologist
Ecological Services
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446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
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Stantec Consulting Services Inc.
601 Grassmere Park, Suite 22
Nashville, Tennessee 37211

June 10, 2022

Project/File: 172677408

Dave Pelren
USFWS Cookeville Field Office
446 Neal St.
Cookeville, TN 38501
Dear Mr. Pelren,

Reference: In-water Geotechnical Borings for the Ridgeline Expansion Project HDD Planning

As discussed in our meeting on April 19,2022, Stantec is in the process of coordinating exploratory geotechnical borings for East Tennessee Natural Gas at seven in-water locations along the proposed pipeline route (Attachment 1). The purpose of these borings is to aid in the planning and design of the horizontal directional drill (HDD) bores that will likely be necessary to install the new pipeline under these larger waterbody crossings. This request is only pertaining to the geotechnical borings being conducted as part of the preliminary survey and planning work and not the actual HDD construction of the pipeline.

An Information for Planning and Coordination (IPaC) database search of the locations indicated that protected species may be present in these waterbodies. A USACE Section 404 permit is required for the proposed borings, and therefore, we are requesting technical assistance from your office regarding potential impacts to federally listed species. Table 1 lists the locations of the proposed borings, and Attachment 1 presents the locations of the borings.

Table 1. Location and USFWS IPaC Number of Proposed In-water Borings.

Boring ID	USFWS IPaC Number	Latitude	Longitude
WB-1	2022-0036436	36.3824602	-86.20961
WB-2	2022-0036441	36.3258145	-85.784417
WB-3	2022-0036456	36.319075	-85.747745
WB-4	2022-0036467	36.313205	-85.745272
WB-5	2022-0036473	36.96864	-84.468908
WB-6	2022-0036478	35.966763	-84.4673061
WB-7	2022-0036481	35.902607	-84.495318

Reference: In-water Geotechnical Borings for Ridgeline Expansion Project HDD Planning

In-water activities at each of these sites will include a self-powered spud barge anchored to the stream bed using two six-inch diameter drill casings. A separate four-inch casing will be used to advance the soil boring. Boring depths will be determined by the soil stratas encountered during the advancements; however, the geotechnical contractor estimates the boring depths to be approximately 160 feet below the river bottom. No additional stream bed or in-water disturbance is proposed.

The proposed geotechnical borings will be conducted in accordance with applicable federal and state regulations, including but not limited to the Clean Water Act, Endangered Species Act, and National Historic Preservation Act. Disturbance of the waterbody substrate will be limited to the extent practicable to execute the borings to minimize any potential, localized turbidity. Any localized increase in turbidity would be temporary, minimal, and dissipate rapidly once drilling is completed.

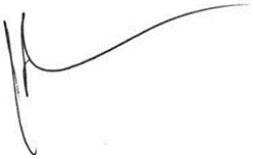
Drilling crews will implement best management practices (BMPs) to minimize the potential for environmental impacts including any potential impacts to federally listed species. The BMPs include practices to contain fuels and lubricants and methods to respond to an accidental release. Fuel and lubricant storage will have secondary containment such as metal or plastic-lined containment structures. Drilling crews will implement methods to minimize the accumulation of fuels and lubricants on the barge decks and will implement measures to keep rainwater separated from contact with stored fuels and lubricants. Methods and devices will be implemented to separate fuels and lubricants from bilge water. All vessels will have spill containment kits that include absorbent towels and absorbent booms. Should a release occur, drilling crews and support vessels will deploy necessary materials from onboard spill kits to contain any release. Reporting guidelines for a petroleum release will be followed, and necessary notifications to U.S. Coast Guard and the National Response Center will occur in a timely manner. Barge deck loading will be limited to the safe capacity of the barge. Loads will be secured and holdbacks or rings will be provided to secure loose equipment during rough weather and transport. This will help minimize the potential for any releases from the drilling barges.

All proposed work will occur within the stream channels, so no effects are anticipated to any listed terrestrial species. In addition, in-water impacts will be limited to small areas, and the drilling contractor will implement the BMPs above. It is our opinion that potential impacts to listed aquatic species are minimal, and therefore, we are requesting your concurrence with our determination that the boring activities at these locations may affect but are not likely to adversely affect listed aquatic species.

If you have any questions or need additional information, please do not hesitate to reach out to me.

Sincerely,

STANTEC CONSULTING SERVICES INC.



Joshua Adams
Principal
Mobile: 502-718-9512

Attachment: Attachment 1 Boring Location Maps

HANKINS RD

OLDHAM RD

Second Creek

WB-1

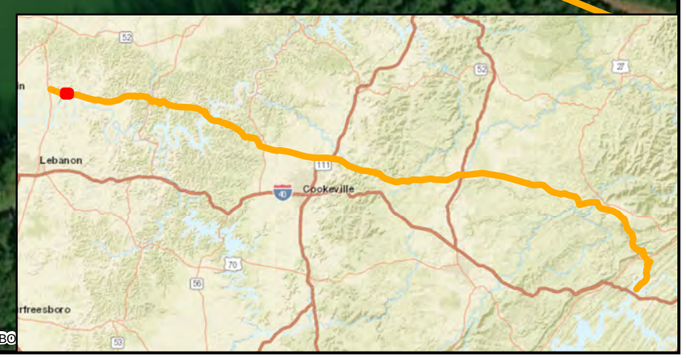
Trousdale

CLAIBORNE LN

SECOND CREEK LN

GULF LN

BO



LEGEND

Boring Location

PipelineCenterline

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ENBRIDGE

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

In Water Boring Locations - May 2022

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 05/02/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

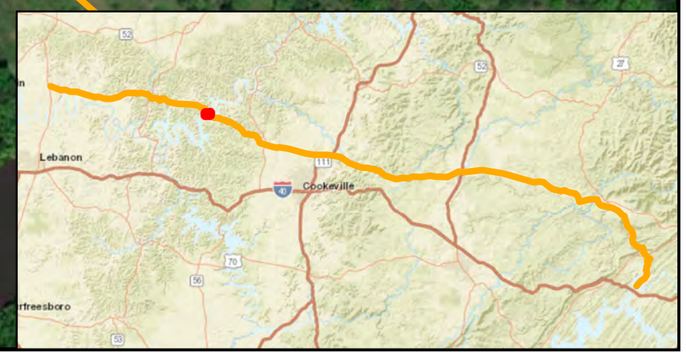
Jackson

WB-2

Cordell Hull Reservoir

Salt Lick Creek

SMITH BEND LN



LEGEND

- Boring Location
- PipelineCenterline

U:\172677408\gis\pro\172677408_Ridgeline_DataReview_JN\Water_Boring\Ridgeline_Water_Boring.mxd Revised: 2022-05-02 By: jkneff

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI imagery

Ridgeline Expansion Pipeline Project

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May 2022

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Nashville, TN 37211
tel 615.885-1144

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0 150 300 Feet
1 inch = 300 feet

Prepared by: JKN 05/02/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

LEGEND

- Boring Location
- PipelineCenterline

U:\172677408\gis\pro\172677408_Ridgeline_DataReview_JN\Water_Boring\Ridgeline_Water_Boring.mxd Revised: 2022-05-02 By: jknelf

ENBRIDGE

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

In Water Boring Locations -
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601 Grassmere Park Road, Suite 22
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N

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1 inch = 300 feet

Prepared by: JKN 05/02/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

HARRIMAN HWY

WB-5

WB-6

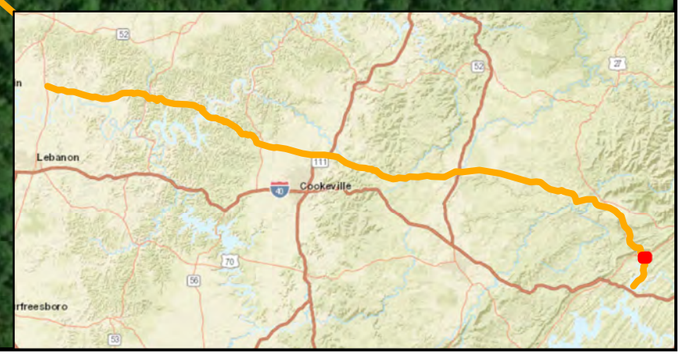
Everton Branch

Roane

Little Emory River

LAKE VIEW DR

OLD ELVERTON RD



LEGEND

Boring Location

PipelineCenterline

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

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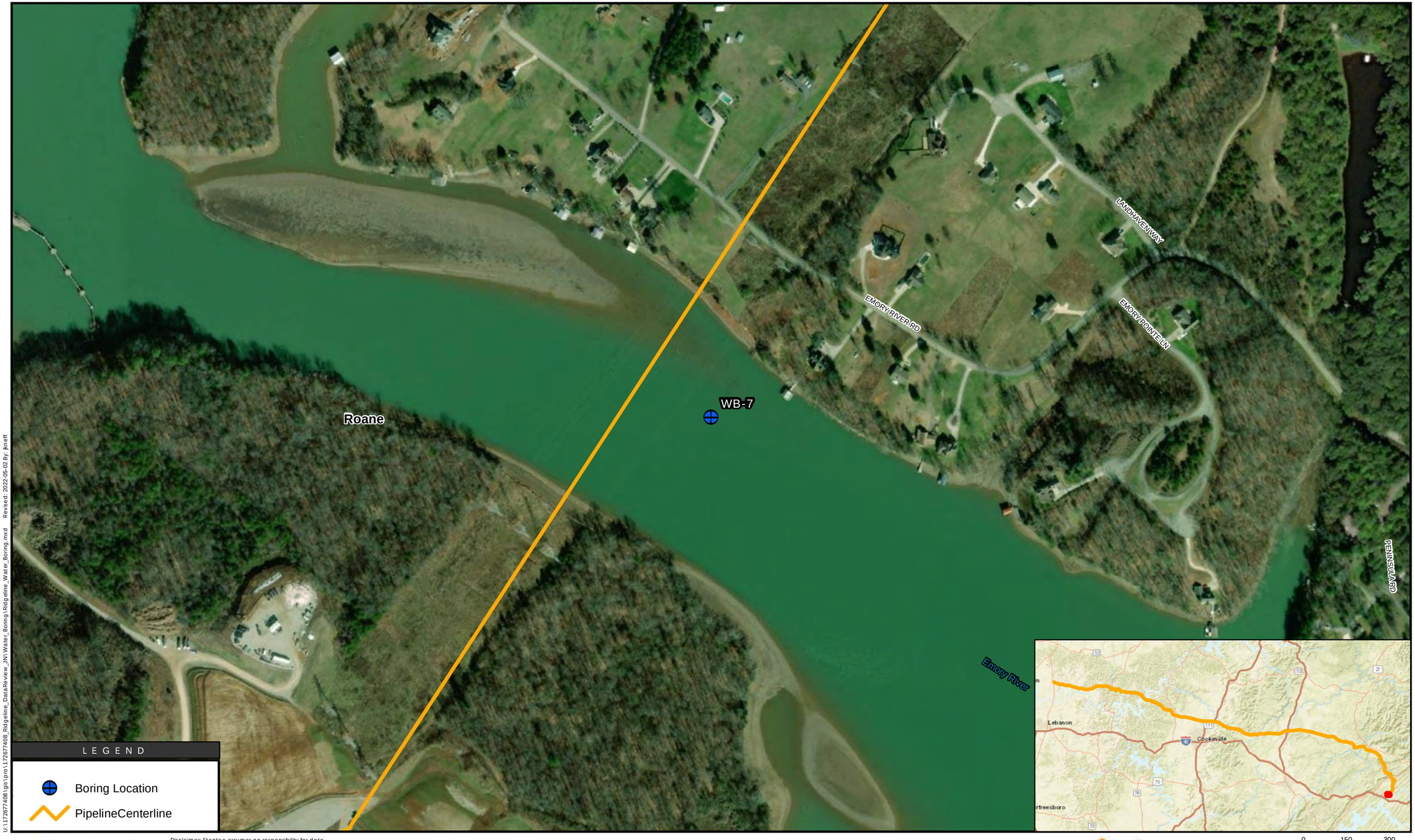
1 inch = 300 feet

Prepared by: JKN 05/02/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY



LEGEND

- Boring Location
- PipelineCenterline

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

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2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

In Water Boring Locations - May 2022

Stantec
Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
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Prepared by: JKN 05/02/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

U:\172677408\gis\pro\172677408_RidgelineExpansion_DataReview_JN\Water_Boring\Ridgeline_Water_Boring.mxd Revised: 2022-05-02 By: jkneff

Crask, Amanda J

From: Pelren, David
Sent: Wednesday, July 13, 2022 1:30 PM
To: Adams, Joshua
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Thanks, man. Looks like you're moving along, even with some rain. Yep, life's good – got to Bellamy last evening with Cory Holliday and crew for Motus transmittering of 41 grays. That's a fun emergence to see. Do good.

-Dave

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Wednesday, July 13, 2022 11:34 AM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; Gus McLachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com; Steve Samoray <ssamoray@copperheadconsulting.com>; Knabel, Chris <Chris.Knabel@stantec.com>; Stoffs, Hannah <Hannah.Stoffs@stantec.com>; Zack Baer <zbaer@copperheadconsulting.com>; Layne, JT <JT.Layne@stantec.com>; Sjollema, Angela <Angela.Sjollema@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

See below for recent gray bat captures.

Capture Date	GPS Coordinates		Permitted Bio	Bats	Tag #
28-Jun	36.172548	-85.113577	Ian Burns	1 MYGR(F/NR)	MYGR-TWRA 08596
28-Jun	36.17234	-85.119319	Julia Wilson	1 MYGR (M/NR)	MYGR- TWRA 10601
30-Jun	36.181101	-85.027344	Ian Burns	1 MYGR (M/NR)	MYGR-TWRA 08597
11-Jul	36.183668	-84.968916	Josh Adams	1 MYGR (M/NR)	MYGR-TWRA 106548

Hope all is well!

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Wednesday, June 29, 2022 9:53 AM

To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com; Steve Samoray <ssamoray@copperheadconsulting.com>; Knabel, Chris <Chris.Knabel@stantec.com>; Stoffs, Hannah <Hannah.Stoffs@stantec.com>; Zack Baer <zbaer@copperheadconsulting.com>; Layne, JT <JT.Layne@stantec.com>; Sjollema, Angela <Angela.Sjollema@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Please see below for last weeks gray bat captures. Hope you are doing well!

Capture Date	GPS Coordinates		Permitted Biologist	Captures	Tag Numbers
21-Jun	36.20404	-85.356465	Julia Wilson	1 MYGR (F/NR)	NONE
21-Jun	36.20597	-85.36168	James Kiser	3 MYGR (1 M/NR, 2 F/L)	MYGR - TWRA-10135, 10136,
22-Jun	36.18541	-85.27014	Les Meade	1 MYGR (M/NR)	TWRA 19245

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Tuesday, June 21, 2022 2:32 PM
To: 'Pelren, David' <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; 'gus.mclachlan' <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; 'iburns@copperheadconsulting.com' <iburns@copperheadconsulting.com>; Steve Samoray <ssamoray@copperheadconsulting.com>; Knabel, Chris <Chris.Knabel@stantec.com>; Stoffs, Hannah <Hannah.Stoffs@stantec.com>; Zack Baer <zbaer@copperheadconsulting.com>; Layne, JT <JT.Layne@stantec.com>; Sjollema, Angela <Angela.Sjollema@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

See below for Grey bat captures on ridgeline through Jun 20 2022

Date Captured	**GPS Coordiantes**		**Permitted Biologist**	**Species**
11-Jun	36.305745	-85.725271	JT Layne	2 MYGR (1Recap F/P, 1 F/L)
12-Jun	36.302525	-85.709892	Angela Sjollema	2 MYGR (F/L)
12-Jun	36.273853	-85.654763	Zack Baer	1 MYGR (A/M/NR)
12-Jun	36.29671	-85.699905	Julia Wilson	2 MYGR (A/M/NR; F/L)
13-Jun	36.27808	-85.67474	Angela Sjollema	4 MYGR (2 A/M/NR, 2 F/L)

15-Jun	36.24812	-85.60584	Angela Sjollema	5 MYGR (5 F/L)
15-Jun	36.242587	-85.569139	Theresa Wetzel	3 MYGR (3 F/P)
16-Jun	36.242587	-85.569139	Theresa Wetzel	4 MYGR (3 F/PL, 1 F NR)
16-Jun	36.24812	-85.60584	Josh Adams	3 MYGR F/(2L, 1NR)
17-Jun	36.22537	-85.4524	Les Meade	12 MYGR, 1 M, 11F/(3 P, 8 L)
17-Jun	36.2255	-85.44907	Josh Adams	2 F L MYGR
18-Jun	36.22537	-85.4524	Les Meade	9 MYGR, 1 M, 8 F (1NR, 1P, 6L)
18-Jun	36.22745	-85.4818	Wes Cunningham	1 MYGR (F/L)
18-Jun	36.2255	-85.44907	Josh Adams	1 F/L MYGR
19-Jun	36.223134	-85.40906	Josh Adams	6 F MYGR
19-Jun	36.22167	-85.40321	James Kiser	1 F/L MYGR
20-Jun	36.223134	-85.40906	Josh Adams	3 F/L MYGR

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Monday, June 13, 2022 11:59 AM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com; Steve Samoray <ssamoray@copperheadconsulting.com>; Knabel, Chris <Chris.Knabel@stantec.com>; Stoffs, Hannah <Hannah.Stoffs@stantec.com>; Zack Baer <zbaer@copperheadconsulting.com>; Layne, JT <JT.Layne@stantec.com>; Sjollema, Angela <Angela.Sjollema@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

See below for gray bat captures through Jun 11.

Date Captured	Coordinates		Permitted Biologist	Listed Captures	Band N
5-Jun	36.31635	85.766068	Zack Baer	1 MYGR (M/NR)	TWRA-
5-Jun	36.313842	85.755694	Malachia Evans	1 MYGR (M/NR)	TWRA-
8-Jun	36.315234	-85.750927	JT Layne	3 MYGR (F/L)	TWRA- TWRA-

9-Jun	36.241757	-85.551869	Julia Wilson	16 MYGR (11 F/P; 4 F/L; 1 M/NR)	TWRA-10114, 07280, 07284,
10-Jun	36.241757	-85.551869	Julia Wilson	13 MYGR (7 F/L; 5 F/P)	TWRA-07289, 07268,
11-Jun	36.302525	-85.709892	Angela Sjollema	3 MYGR (2 M/NR, 1 F/L)	TWRA-
11-Jun	36.273853	-85.654763	Zack Baer	2 MYGR (1 M/NR; 1 F/L)	TWRA-
11-Jun	36.29671	-85.699905	Julia Wilson	4 MYGR (2 M/NR; 1 F/NR; 1 F/L)	TWRA-08587 -85.654
11-Jun	36.2898	-85.687675	Malachia Evans	2 MYGR (2 A/M/NR)	TWRA-

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Monday, June 6, 2022 1:27 PM
To: 'Pelren, David' <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; 'gus.mclachlan' <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; 'iburns@copperheadconsulting.com' <iburns@copperheadconsulting.com>; Steve Samoray <ssamoray@copperheadconsulting.com>; Knabel, Chris <Chris.Knabel@stantec.com>; Stoffs, Hannah <Hannah.Stoffs@stantec.com>; Zack Baer <zbaer@copperheadconsulting.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

See table below for non reported Gray bat captures through Jun 4. Will send an update email every Monday with captures from the previous week going forward.

Date	Permitted Biologist	Listed Captures	Latitude	Longitude
30-May	Josh Adams	1 Male NR MYGR	36.36307	-85.9403
31-May	Josh Adams	2 Pregnant, 1 Female NR, 1 Male NR MYGR	36.35351	-85.8928
	James Kiser	2 Pregnant MYGR	36.33702	-85.7925
1-Jun	Hannah Stoffs	3 Pregnant MYGR	36.35351	-85.8928
	James Kiser	2 Pregnant MYGR	36.33702	-85.7925
4-Jun	Hannah Stoffs	3 MYGR	36.32292	-85.779

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Wednesday, June 1, 2022 5:00 AM
To: 'Pelren, David' <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; 'gus.mclachlan' <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; 'iburns@copperheadconsulting.com' <iburns@copperheadconsulting.com>; Steve Samoray <ssamoray@copperheadconsulting.com>; Knabel, Chris <Chris.Knabel@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Per your suggestion I will start reporting Gray bat captures once per week. I will send each week's gray bat captures in table format. Thanks

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Tuesday, May 31, 2022 3:06 AM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com; Steve Samoray <ssamoray@copperheadconsulting.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Good Morning Dave,

One more gray bat capture to report.

Josh Adams captured an adult male at 36.362979 -85.939683

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Monday, May 30, 2022 1:05 PM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com; Steve Samoray <ssamoray@copperheadconsulting.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Happy Memorial Day,

3 more gray bat captures last night

Ian Burns captured 2, a pregnant female and a male at 36.36024 -85.93241

Josh Adams captured a pregnant female at 36.362979 -85.939683

Thanks

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Sunday, May 29, 2022 1:30 PM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Happy Sunday!

Just wanted to let you know about 3 more pregnant female gray bats captured by Ian Burns of Copperhead Consulting tonight at this location 36.339988 -85.801794.

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Saturday, May 28, 2022 2:51 AM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Just wanted to let you know about 2 more pregnant female gray bats captured by Ian Burns of Copperhead Consulting tonight at this location 36.339988 -85.801794. Hope you have a wonderful holiday weekend

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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Please consider the environment before printing this email.

From: Adams, Joshua
Sent: Friday, May 27, 2022 3:01 AM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; iburns@copperheadconsulting.com
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Thanks for calling the rain off for us!

Ian Burns from Copperhead captured a pregnant female gray bat at 36.37777 -85.98943

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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From: Adams, Joshua
Sent: Wednesday, May 25, 2022 1:13 PM
To: 'Pelren, David' <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; 'gus.mclachlan' <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

Just a heads up James Kiser Captured 3 more MYGR captures on the night of May 23rd

2 adult males and a pregnant female

36.373749 -85.96732

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512

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From: Adams, Joshua
Sent: Monday, May 23, 2022 5:21 PM
To: Pelren, David <david_pelren@fws.gov>
Cc: Casey, Justin <Justin.Casey@stantec.com>; gus.mclachlan <gus.mclachlan@enbridge.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Dave,

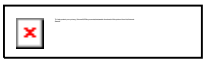
4 More MYGR Last night

Location: 36.375295 -86.043083

2 Pregnant Female MYGR
2 NR Male MYGR

Josh Adams

Direct: 502 212-5011
Mobile: 502-718-9512



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Please consider the environment before printing this email.

From: Pelren, David <david_pelren@fws.gov>
Sent: Monday, May 23, 2022 11:23 AM
To: Adams, Joshua <Joshua.Adams@stantec.com>
Subject: RE: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

Good deal, Josh. Thanks for the note.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.

Cookeville, TN 38501
office phone: 931-525-4974
mobile phone: 931-261-5844

NOTE: This email correspondence and any attachments to and from this sender are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Sunday, May 22, 2022 6:52 PM
To: Pelren, David <david_pelren@fws.gov>
Cc: gus.mclachlan <gus.mclachlan@enbridge.com>; Casey, Justin <Justin.Casey@stantec.com>; Benefiel, Jeffrey <Jeff.Benefiel@stantec.com>; Haider, Jessica <Jess.Haider@stantec.com>; Kiser, James <James.Kiser@stantec.com>; Wilson, Julia <Julia.Wilson@stantec.com>; Steve Samoray <ssamoray@copperheadconsulting.com>; Zack Baer <zbaer@copperheadconsulting.com>
Subject: [EXTERNAL] Gray Bat Captures on the Ridgeline Project

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Dave,

This email is to notify you of multiple gray bat captures on the ridgeline project on the night of May 20. Gray bats were captured at the following locations

36.366548, -86.070252- 2 males
36.375049, -86.042747- 6 MYGR Captures

Please let us know if you have any questions or need additional information.

Thanks

Josh Adams
Natural Resource Team Lead, Terrestrial Wildlife Technical Lead, Principal

Direct: 502 212-5011
Mobile: 502-718-9512
Fax: 502 212-5055
Joshua.Adams@stantec.com

Stantec
9200 Shelbyville Road Suite 800
Louisville KY 40222-5136

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Please consider the environment before printing this email.

Crask, Amanda J

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Friday, June 10, 2022 8:31 AM
To: Pelren, David; Sikula, Nicole R
Cc: Gus McLachlan; Casey, Justin; Benefiel, Jeffrey; Haider, Jessica; Grissom, Lindsay
Subject: [EXTERNAL] Ridgeline In-Water Geotechnical Boring Technical Assistance Requested
Attachments: Ridgeline InWater Geotech Boring Locations.kmz; 20220610_USFWS_Inwaterboring_Ridgeline.pdf

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good morning Dave,

As we discussed in our last meeting in Cookeville, there is a need to conduct some small geotechnical boring in 7 water crossings. This limited work is for planning purposed. I have attached a kmz of the boring locations as well as a letter with more information requesting USFWS technical assistance for these sites. Please don't hesitate to reach out if you have any questions.

Hope you have a great weekend.

Josh Adams
Natural Resource Team Lead, Terrestrial Wildlife Technical Lead, Principal

Direct: 502 212-5011
Mobile: 502-718-9512
Fax: 502 212-5055
Joshua.Adams@stantec.com

Stantec
9200 Shelbyville Road Suite 800
Louisville KY 40222-5136

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Please consider the environment before printing this email.

Stantec Consulting Services Inc.
601 Grassmere Park, Suite 22
Nashville, Tennessee 37211

July 13, 2022

Project/File: 172677408

Dave Pelren
USFWS Cookeville Field Office
446 Neal St.
Cookeville, TN 38501

Dear Mr. Pelren,

Reference: In-water Geotechnical Borings for the Ridgeline Expansion Project HDD Planning

As discussed in a meeting on April 19,2022, Stantec is in the process of coordinating exploratory geotechnical borings for East Tennessee Natural Gas at multiple in-water locations along the proposed pipeline route (Attachment 1). Seven geotechnical borings were initially discussed and were the subject of a consultation letter previously sent on June 10, 2022. This letter is regarding two additional boring locations, WB-9 and WB-10. As previously stated, the purpose of these borings is to aid in the planning and design of the horizontal directional drill (HDD) bores that will likely be necessary to install the new pipeline under these larger waterbody crossings. This request is only pertaining to the geotechnical borings being conducted as part of the preliminary survey and planning work and not the actual HDD construction of the pipeline.

An Information for Planning and Coordination (IPaC) database search of the two additional locations indicated that protected species may be present in these waterbodies. A USACE Section 404 permit is required for the proposed borings, and therefore, we are requesting technical assistance from your office regarding potential impacts to federally listed species. Table 1 lists the locations of the proposed borings, and Attachment 1 presents the locations of the borings.

Table 1. Location and USFWS IPaC Number of Proposed In-water Borings.

Boring ID	USFWS IPaC Number	Latitude	Longitude
WB-9	2022-0056141	36.333203	-85.794138
WB-10	2022-0057462	36.383630	-86.211760

In-water activities at each of these sites will include a self-powered spud barge anchored to the stream bed using two six-inch diameter drill casings. A separate four-inch casing will be used to advance the soil boring. Boring depths will be determined by the soil stratas encountered during the advancements; however, the geotechnical contractor estimates the boring depths to be approximately 160 feet below the river bottom. No additional stream bed or in-water disturbance is proposed.

The proposed geotechnical borings will be conducted in accordance with applicable federal and state regulations, including but not limited to the Clean Water Act, Endangered Species Act, and National Historic Preservation Act. Disturbance of the waterbody substrate will be limited to the extent

Reference: In-water Geotechnical Borings for Ridgeline Expansion Project HDD Planning

practicable to execute the borings to minimize any potential, localized turbidity. Any localized increase in turbidity would be temporary, minimal, and dissipate rapidly once drilling is completed.

Drilling crews will implement best management practices (BMPs) to minimize the potential for environmental impacts including any potential impacts to federally listed species. The BMPs include practices to contain fuels and lubricants and methods to respond to an accidental release. Fuel and lubricant storage will have secondary containment such as metal or plastic-lined containment structures. Drilling crews will implement methods to minimize the accumulation of fuels and lubricants on the barge decks and will implement measures to keep rainwater separated from contact with stored fuels and lubricants. Methods and devices will be implemented to separate fuels and lubricants from bilge water. All vessels will have spill containment kits that include absorbent towels and absorbent booms. Should a release occur, drilling crews and support vessels will deploy necessary materials from onboard spill kits to contain any release. Reporting guidelines for a petroleum release will be followed, and necessary notifications to U.S. Coast Guard and the National Response Center will occur in a timely manner. Barge deck loading will be limited to the safe capacity of the barge. Loads will be secured and holdbacks or rings will be provided to secure loose equipment during rough weather and transport. This will help minimize the potential for any releases from the drilling barges.

All proposed work will occur within the stream channels, so no effects are anticipated to any listed terrestrial species. In addition, in-water impacts will be limited to small areas, and the drilling contractor will implement the BMPs above. It is our opinion that potential impacts to listed aquatic species are minimal, and therefore, we are requesting your concurrence with our determination that the boring activities at these locations may affect but are not likely to adversely affect listed aquatic species.

If you have any questions or need additional information, please do not hesitate to reach out to me.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Joshua Adams
Principal
Phone: 502-212-5011
Mobile: 502-718-9512
joshua.adams@stantec.com

Attachment: Attachment 1 Boring Location Map

TAYLOR HOLLOW LN

JERRY SAWYER LN

Jackson

WB-9

SMITH BEND LN

SALT LICK PARK LN

RARICK LN

Cordell Hull Reservoir

SPALDING BELL LN

LEGEND

Boring Location

PipelineCenterline

U:\172677408\gis\pro\172677408_Ridgeline_DataReview_JNN\Water_Boring\Ridgeline_Water_Boring.mxd Revised: 2022-06-24 By: jkneff

ENBRIDGE

East Tennessee Natural Gas, LLC

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Notes:
1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
2. Source data: TN Assessor, Stantec
3. Imagery: ESRI Imagery

Ridgeline Expansion Pipeline Project

In-water Boring Locations

July 2022

Stantec

Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 06/24/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

HANKINS RD

OLDHAM RD

WB-10

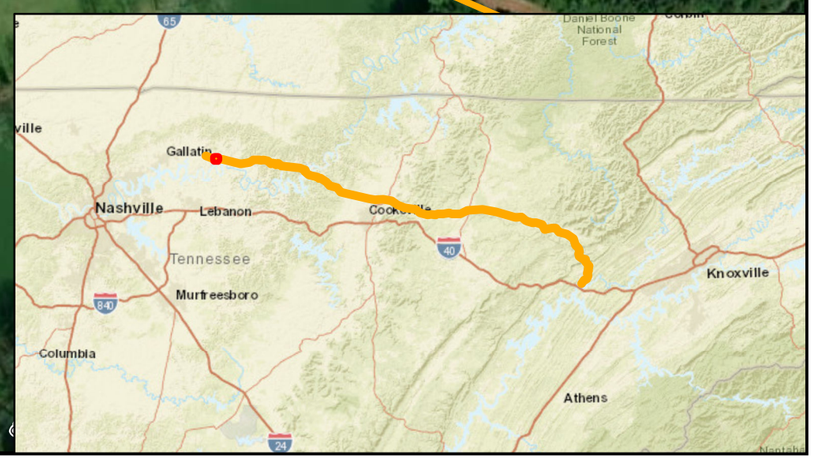
Second Creek

WB-1

CLAIBORNE LN

Trousdale

SECOND CREEK LN



LEGEND

- Boring Location
- PipelineCenterline

ENBRIDGE

East Tennessee Natural Gas, LLC

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Notes:
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Ridgeline Expansion Pipeline Project

In-water Boring Locations

July 2022

Stantec

Stantec Consulting Services Inc.
601 Grassmere Park Road, Suite 22
Nashville, TN 37211
tel 615.885-1144

N

0 150 300 Feet

1 inch = 300 feet

Prepared by: JKN 06/24/22
Technical Review by: X.X.X MM/DD/YY
Independent Review by: X.X.X MM/DD/YY

U:\172677408\gis\pro\172677408_Ridgeline_DataReview_JKN\Water_Boring\Ridgeline_Water_Boring.mxd Revised: 2022-06-24 By: jknelf

Tennessee Ecological Services Field Office

FWS Log No: 2022-0036436 - 81

The Service concurs with your effect determination(s) for resources protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). This finding fulfills the requirements of the Act. If project design changes are made or new information becomes available, please submit new plans for review.

Field Supervisor Date

Stantec Consulting Services Inc.
601 Grassmere Park, Suite 22
Nashville, Tennessee 37211

July 13, 2022

Project/File: 172677408

Dave Pelren
USFWS Cookeville Field Office
446 Neal St.
Cookeville, TN 38501

Dear Mr. Pelren,

Reference: In-water Geotechnical Borings for the Ridgeline Expansion Project HDD Planning

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Reference: In-water Geotechnical Borings for Ridgeline Expansion Project HDD Planning

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All proposed work will occur within the stream channels, so no effects are anticipated to any listed terrestrial species. In addition, in-water impacts will be limited to small areas, and the drilling contractor will implement the BMPs above. It is our opinion that potential impacts to listed aquatic species are minimal, and therefore, we are requesting your concurrence with our determination that the boring activities at these locations may affect but are not likely to adversely affect listed aquatic species.

If you have any questions or need additional information, please do not hesitate to reach out to me.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Joshua Adams
Principal
Phone: 502-212-5011
Mobile: 502-718-9512
joshua.adams@stantec.com

Attachment: Attachment 1 Boring Location Map

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To:
Project Code: 2022-0076035
Project Name: Ridgeline Expansion Project WB-13

August 17, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

Project Summary

Project Code: 2022-0076035
Project Name: Ridgeline Expansion Project WB-13
Project Type: Pipeline - Onshore - New Constr - Below Ground
Project Description: Geotechnical boring to support horizontal directional drill design
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.33415585,-85.79594435,14z

Counties: Jackson County, Tennessee

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Clams

NAME	STATUS
Dromedary Pearlymussel *Dromus dromas* Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6377	Endangered
Spectaclecase (mussel) *Cumberlandia monodonta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7867	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

Flowering Plants

NAME	STATUS
Short's Bladderpod *Physaria globosa*	Endangered

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/7206

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25

NAME	BREEDING SEASON
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Field Sparrow *Spizella pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Aug 15
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12

(0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

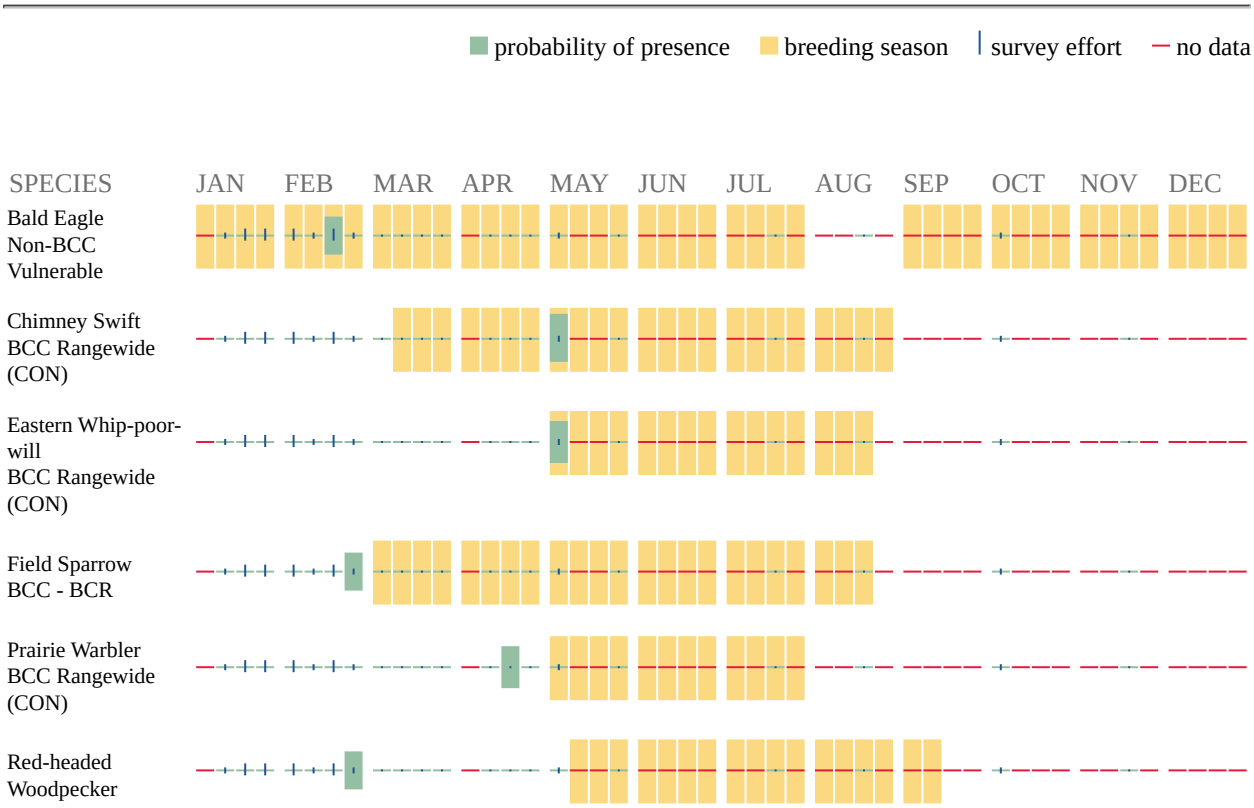
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



BCC Rangewide (CON)

Wood Thrush
BCC Rangewide (CON)

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPaC User Contact Information

Agency:	Army Corps of Engineers
Name:	Madison Blanchard
Address:	1110 Montlimar Dr
Address Line 2:	Suite 160
City:	Mobile
State:	AL
Zip:	36609
Email	madison.blanchard@stantec.com
Phone:	2516206935

Lead Agency Contact Information

Lead Agency:	Army Corps of Engineers
Name:	Aurora Scott
Email:	Aurora.C.Scott@usace.army.mil
Phone:	6153697520

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Tennessee Gas Pipeline Company, L.L.C. Docket Nos. CP22-493-000
PF22-2-000

NOTICE OF APPLICATION AND ESTABLISHING INTERVENTION DEADLINE

(July 29, 2022)

Take notice that on July 22, 2022 Tennessee Gas Pipeline Company, L.L.C. (TGP or Applicant), 569 Brookwood Village, Suite 749, Birmingham, AL 35209 filed an application under sections 7(c) of the Natural Gas Act (NGA), and Part 157, of the Commission's regulations authorizing TGP to construct, install, modify, operate, and maintain certain pipeline lateral and appurtenant facilities located in Dickson, Houston and Stewart Counties, Tennessee all as more fully set forth in the application which is on file with the Commission and open for public inspection.

Specifically, TGP is requesting approval to: (1) Construct approximately 32 miles of a new 30-inch-diameter pipeline lateral, connecting to TGP's existing Lines 100-3 and 100-4 and extending to a delivery point in Stewart County, Tennessee (Cumberland Pipeline) ; (2) install new bi-directional back pressure regulation facilities near TGP's Lines 100-3 and 100-4 ("Pressure Regulation Station"), located at the origin of the proposed Cumberland Pipeline in Dickson County, Tennessee; (3) install a new meter station ("Cumberland Meter Station"), located at the terminus of the proposed Cumberland Pipeline on TVA property in Stewart County, Tennessee; and (4) install appurtenant facilities, including in-line inspection traps at each end of the proposed Cumberland Pipeline and three new mainline valves. The total estimated cost of this project is approximately $184.8 million.

In addition to publishing the full text of this document in the Federal Register, the Commission provides all interested persons an opportunity to view and/or print the contents of this document via the internet through the Commission's Home Page (http://ferc.gov) using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. At this time, the Commission has suspended access to the Commission's Public Reference Room, due to the proclamation declaring a National Emergency concerning the Novel Coronavirus Disease (COVID-19), issued by the President on March 13, 2020. For assistance, contact the Federal Energy Regulatory Commission at FERCOnlineSupport@ferc.gov or call toll-free, (886) 208-3676 or TYY, (202) 502-8659.

Any questions regarding the proposed project should be directed to Tina S. Hardy, Director, Regulatory Affairs, Tennessee Gas Pipeline Company, L.L.C., 569 Brookwood Village, Suite 749, Birmingham, AL 35209 by phone at (205) 325-3668 or by email to tina_hardy@kindermorgan.com.

On November 5, 2021 the Commission granted the Applicant's request to utilize the National Environmental Policy Act (NEPA) Pre-Filing Process and assigned Docket No. PF22-2-000 to staff activities involved in the Project. Now, as of the filing of the July 22, 2022 application, the Pre-Filing Process for this project has ended. From this time forward, this proceeding will be conducted in Docket No. CP22-493-000 as noted in the caption of this Notice.

Also, Applicant stated that a water quality certificate under section 401 of the Clean Water Act is required for the project from the Tennessee Department of Environmental Conservation. The request for certification must be submitted to the certifying agency and to the Commission concurrently. Proof of the certifying agency's receipt date must be filed no later than five (5) days after the request is submitted to the certifying agency.

Pursuant to Section 157.9 of the Commission's Rules of Practice and Procedure,[1] within 90 days of this Notice the Commission staff will either: complete its environmental review and place it into the Commission's public record (eLibrary) for this proceeding; or issue a Notice of Schedule for Environmental Review. If a Notice of Schedule for Environmental Review is issued, it will indicate, among other milestones, the anticipated date for the Commission staff's issuance of the final environmental impact statement (FEIS) or environmental assessment (EA) for this proposal. The filing of an EA in the Commission's public record for this proceeding or the issuance of a Notice of Schedule for Environmental Review will serve to notify federal and state agencies of the timing for the completion of all necessary reviews, and the subsequent need to complete all federal authorizations within 90 days of the date of issuance of the Commission staff's FEIS or EA.

PUBLIC PARTICIPATION

There are two ways to become involved in the Commission's review of this project: you can file comments on the project, and you can file a motion to intervene in the proceeding. There is no fee or cost for filing comments or intervening. The deadline for filing a motion to intervene is 5:00 p.m. Eastern Time on **August 19, 2022**.

Comments

[1] 18 C.F.R. (Code of Federal Regulations) §157.9.

Any person wishing to comment on the project may do so. Comments may include statements of support or objections to the project as a whole or specific aspects of the project. The more specific your comments, the more useful they will be. To ensure that your comments are timely and properly recorded, please submit your comments on or before **August 19, 2022**.

There are three methods you can use to submit your comments to the Commission. In all instances, please reference the Project docket number **CP22-493-000** in your submission.

(1) You may file your comments electronically by using the eComment feature, which is located on the Commission's website at www.ferc.gov under the link to Documents and Filings. Using eComment is an easy method for interested persons to submit brief, text-only comments on a project;

(2) You may file your comments electronically by using the eFiling feature, which is located on the Commission's website (www.ferc.gov) under the link to Documents and Filings. With eFiling, you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on "eRegister." You will be asked to select the type of filing you are making; first select "General" and then select "Comment on a Filing"; or

(3) You may file a paper copy of your comments by mailing them to the following address below[2]. Your written comments must reference the Project docket number (**CP22-493-000**).

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

The Commission encourages electronic filing of comments (options 1 and 2 above) and has eFiling staff available to assist you at (202) 502-8258 or FercOnlineSupport@ferc.gov.

Persons who comment on the environmental review of this project will be placed on the Commission's environmental mailing list and will receive notification when the

[2] Hand delivered submissions in docketed proceedings should be delivered to Health and Human Services, 12225 Wilkins Avenue, Rockville, Maryland 20852.

environmental documents (EA or EIS) are issued for this project and will be notified of meetings associated with the Commission's environmental review process.

The Commission considers all comments received about the project in determining the appropriate action to be taken. **However, the filing of a comment alone will not serve to make the filer a party to the proceeding.** To become a party, you must intervene in the proceeding. For instructions on how to intervene, see below.

Interventions

Any person, which includes individuals, organizations, businesses, municipalities, and other entities,[3] has the option to file a motion to intervene in this proceeding. Only intervenors have the right to request rehearing of Commission orders issued in this proceeding and to subsequently challenge the Commission's orders in the U.S. Circuit Courts of Appeal.

To intervene, you must submit a motion to intervene to the Commission in accordance with Rule 214 of the Commission's Rules of Practice and Procedure[4] and the regulations under the NGA[5] by the intervention deadline for the project, which is **August 19, 2022**. As described further in Rule 214, your motion to intervene must state, to the extent known, your position regarding the proceeding, as well as your interest in the proceeding. For an individual, this could include your status as a landowner, ratepayer, resident of an impacted community, or recreationist. You do not need to have property directly impacted by the project in order to intervene. For more information about motions to intervene, refer to the FERC website at https://www.ferc.gov/resources/guides/how-to/intervene.asp.

There are two ways to submit your motion to intervene. In both instances, please reference the Project docket number **CP22-493-000** in your submission.

(1) You may file your motion to intervene by using the Commission's eFiling feature, which is located on the Commission's website (www.ferc.gov) under the link to Documents and Filings. New eFiling users must first create an account by clicking on "eRegister." You will be asked to select the type of filing you are making; first select "General" and then select

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[3] 18 C.F.R. § 385.102(d).

[4] 18 C.F.R. § 385.214.

[5] 18 C.F.R. § 157.10.

"Intervention." The eFiling feature includes a document-less intervention option; for more information, visit https://www.ferc.gov/docs-filing/efiling/document-less-intervention.pdf.; or

(2) You can file a paper copy of your motion to intervene, along with three copies, by mailing the documents to the address below[6]. Your motion to intervene must reference the Project docket number **CP22-493-000**.

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

The Commission encourages electronic filing of motions to intervene (option 1 above) and has eFiling staff available to assist you at (202) 502-8258 or FercOnlineSupport@ferc.gov.

Motions to intervene must be served on the applicant either by mail or email at: Tina S. Hardy, Director, Regulatory Affairs, Tennessee Gas Pipeline Company, L.L.C. 569 Brookwood Village, Suite 749, Birmingham, AL 35209 or by email at tina_hardy@kindermorgan.com. Any subsequent submissions by an intervenor must be served on the applicant and all other parties to the proceeding. Contact information for parties can be downloaded from the service list at the eService link on FERC Online. Service can be via email with a link to the document.

All timely, unopposed[7] motions to intervene are automatically granted by operation of Rule 214(c)(1).[8] Motions to intervene that are filed after the intervention deadline are untimely and may be denied. Any late-filed motion to intervene must show good cause for being late and must explain why the time limitation should be waived and provide justification by reference to factors set forth in Rule 214(d) of the Commission's Rules and Regulations.[9] A person obtaining party status will be placed on the service list maintained by the Secretary of the Commission and will receive copies (paper or electronic) of all documents filed by the applicant and by all other parties.

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[6]Hand delivered submissions in docketed proceedings should be delivered to Health and Human Services, 12225 Wilkins Avenue, Rockville, Maryland 20852.

[7] The applicant has 15 days from the submittal of a motion to intervene to file a written objection to the intervention.

[8] 18 C.F.R. § 385.214(c)(1).

[9] 18 C.F.R. § 385.214(b)(3) and (d).

TRACKING THE PROCEEDING

Throughout the proceeding, additional information about the project will be available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website at http://www.ferc.gov using the "eLibrary" link as described above. The eLibrary link also provides access to the texts of all formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. For more information and to register, go to www.ferc.gov/docs-filing/esubscription.asp.

Intervention Deadline: 5:00 pm Eastern Time on August 19, 2022.

Kimberly D. Bose,
Secretary.

DENALI

3308 Bernice Avenue
Russellville, Arkansas 72802
479-498-0500

US Fish and Wildlife Service
TN Ecological Field Office
446 Neal Street
Cookeville, TN 38501

AUG 29 REC'D

RE: Endangered Species Map Review for Site: WC-1 Grundy County

To Whom It May Concern:

Denali Water Solutions is submitting a permit application to the Solid Waste Branch of the Tennessee Department of Environment and Conservation (TDEC) to land apply food processing residuals to farmland as a beneficial fertilizer. We need to determine if the farm field in the permit application is adjacent to any defined endangered species area with a map review of the WC-1 field area.

I have attached the land site list, flood plain maps, buffer setback maps, and topographic map of the proposed farm field for your review. Can your department compare these maps to any you have on file for endangered species in Grundy County for the identified WC-1 field and determine if the field identified is adjacent to any defined endangered species areas? There is a buffer setback of 100 feet for any surface water feature and the food processing residuals are incorporated into the soil to prevent runoff from the field site. Surface water features will not be impacted by the spreading of the organic fertilizer material and normal farming equipment is utilized to apply the liquid material to the field.

Please contact me with any questions at: (479) 312-2094 or porchia.hernandez@denaliwater.com.

Thank you,

Porchia Hernandez

Porchia Hernandez
Environmental Specialist

Alexander, Steven

From: Pelren, David
Sent: Tuesday, August 30, 2022 9:03 AM
To: Adams, Joshua
Cc: Tennessee ES, FWS; Sikula, Nicole R; Ford, Anthony; Alexander, Steven
Subject: RE: [EXTERNAL] Mussels Around the Kingston Plant

Josh –

As I indicated earlier, your question about the need for a mussel survey at the Kingston crossing site is a good one. We might assume that a large part (if not all) of the substrate at the proposed gasline crossing site of the Clinch River at Kingston was covered with ash during the spill. However, a degree of ash cleanup was conducted in this general area, and there is potential for mussels to have re-colonized the crossing site since the cleanup effort. Therefore, in due diligence to address potential mussel impacts, a survey of the site should be conducted; and a phased approach would be appropriate.

First, substrate conditions across the entirety of the river's width should be evaluated. We suggest use of a method such as dredge/ponar sampling in order to describe substrate surface condition and the composition of substrate approximately three to six inches below the surface. A level of effort on the order of approximately ten 0.25-meter quadrats would be appropriate for this site. For example – if a petite ponar were used, 10 grab samples would equal one 0.25-meter quadrat sample.

This method would provide an opportunity to search for juvenile native mussels and Corbicula. The presence of mussels with a substrate composition to support them would likely warrant additional survey effort to search for federally listed mussels, while a dominant substrate of silt and lack of any mussels might not warrant such effort. We would work with you to determine the most appropriate steps after this initial survey effort.

We request that you provide an overview of methods that would be used at the Kingston crossing site with a "phased approach". I'll be glad to talk with you further in discussion of the particulars of this issue.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
mobile phone: 931-261-5844

NOTE: This email correspondence and any attachments to and from this sender are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

From: Adams, Joshua <Joshua.Adams@stantec.com>
Sent: Wednesday, August 24, 2022 7:11 AM
To: Pelren, David <david_pelren@fws.gov>
Subject: [EXTERNAL] Mussels Around the Kingston Plant

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Dave,

I seem to remember in the first meeting we had about the Ridgeline Project, TVA mentioned that the Kingston Ash Spill pretty much destroyed the river around the plant. Is there any need to do mussel surveys at the crossing going into the plant?

Thanks

Josh Adams
Natural Resource Team Lead, Terrestrial Wildlife Technical Lead, Principal

Direct: 502 212-5011
Mobile: 502-718-9512
Fax: 502 212-5055
Joshua.Adams@stantec.com

Stantec
9200 Shelbyville Road Suite 800
Louisville KY 40222-5136

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Please consider the environment before printing this email.

RIDGELINE EXPANSION PROJECT EDNA SAMPLING PLAN FOR LISTED MUSSEL SPECIES

April 26, 2022

Prepared for:
Enbridge Inc.

Prepared by:
Nathaniel Marshall

Project Number:
172677408

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Appendix A Mussel Species with the Potential to Occur within the Project Area

1 Introduction and Background

The use of environmental DNA (eDNA), which is genetic material released from urine, waste, mucus, or sloughed cells, is increasingly common in natural resource surveys designed to detect special status species (Beng & Corlett 2020, Deiner et al. 2021, Rojahn et al. 2021). Analysis of eDNA using single-species quantitative polymerase chain reaction (qPCR) methodology has been developed for a number of freshwater mussel species (Cho et al. 2016, Sansom & Sassoubre 2017, Currier et al. 2018, Gasparini et al. 2020, Lor et al. 2020). Additionally, eDNA metabarcoding has been used to detect and describe entire freshwater mussel assemblages in river systems (Prié et al. 2020, Coghlan et al. 2021, Klymus et al. 2021, Marshall et al. In Press). Considering traditional mussel surveys can be difficult to conduct and require considerable expertise, eDNA surveys provide a complementary sampling method to assess the presence of freshwater mussels within a system.

This scope of work proposes to use eDNA to screen streams for those containing freshwater mussels and will not be the final presence/probable absence survey as required to assess affects from the proposed Ridgeline Expansion Project (Project) to species listed under the Endangered Species Act. Although some species may be identified using eDNA sampling, Stantec will conduct traditional surveys for those streams positively identified to contain freshwater mussels with eDNA.

2 Scope of Work

The scope of work is to provide eDNA planning, sampling, analysis, interpretation, and reporting to document potential evidence for the presence of unionid freshwater mussels across the entire 197-km-long Project in Tennessee. Desktop analysis identified 36 sites along the Project where eDNA sampling is proposed (Table 1). This work will be completed during summer of 2022 with eDNA water samples collected during low flow periods in the region.

This document outlines a sampling strategy for eDNA collection and analysis across the 36 potentially impacted stream sites associated with the Project.

Table 1 Ridgeline Expansion Project Streams Proposed for eDNA Sampling

Line Kilometer	Stream Name	Approximate Width	County
5	Old Hickory Lake (Second Creek embayment)	1,542	Trousdale
6	Old Hickory Lake (Second Creek embayment)	170	Trousdale
11	Little Goose Creek	112	Trousdale
11a	Big Goose Creek	145	Trousdale
18	Glasgow Branch	27	Trousdale
19	Lick Creek	27	Smith
21	Dixon Creek	39	Smith
30	Peyton Creek	28	Smith
37	Defeated Creek	45	Smith
45	Salt Lick Creek	33	Jackson
48	Cumberland River Embayment	512	Jackson
52	Cumberland River	600	Jackson
56	Flynn Creek	55	Jackson
59	Flynn Creek	38	Jackson
60	Flynn Creek	46	Jackson
62	Rush Fork	25	Jackson
72	Blackburn Fork	62	Jackson
82	Bear Creek	26	Putnam
89	Spring Creek	25	Putnam
111	East Fork Obey River	66	Overton
116	Little Hurricane Creek	25	Overton
118	Hurricane Creek	36	Fentress
146	White Creek	50	Morgan
153	Little Clear Creek	28	Morgan
162	Campground Creek	26	Morgan
165	Emory River	81	Morgan
169	Crooked Fork	64	Morgan
170	Crooked Fork (Crossing)	48	Morgan
182	Bitter Creek	48	Morgan
183	Bitter Creek (up)	31	Morgan
183	Bitter Creek (middle)	35	Morgan
183	Bitter Creek (down)	36	Morgan
185	Little Emory River	56	Morgan
188	Watts Bar Lake (Elverton Branch) Embayment	418	Roane
193	Kings Creek	28	Roane
197	Watts Bar Lake (Emory River)	828	Roane

3 Proposed Approach

Environmental DNA will be analyzed with two different approaches:

(1) A “targeted” qPCR methodology, typically designed to detect one species or group of interest, and

(2) A “passive” DNA metabarcoding approach, used as a broader assessment of biodiversity or for describing community assemblage.

The evaluation of both methods and their use for freshwater mussels within the Project area are described below.

3.1 eDNA Analysis: qPCR

While several freshwater mussel species have been the focus of eDNA qPCR analysis (Cho et al. 2016, Sansom & Sassoubre 2017, Currier et al. 2018, Gasparini et al. 2020, Lor et al. 2020), developing new qPCR assays for detection of all potential mussel species within the Project area is not feasible (potentially 76 mussel species, Appendix A). Instead, a single qPCR assay can be implemented to target the presence of ANY freshwater mussel species. Thus, this qPCR assay will be able to detect eDNA of any of the 76 mussel species that may be present within the Project. This design will allow for high assay efficiency across samples, even if community composition differs across sites. With this approach, we will have the ability to detect freshwater mussel eDNA within a sample, however, we will not be able to distinguish between which species may be present. Therefore, this approach provides only a presence/probable absence of freshwater mussel eDNA within a sample at a particular location on the stream.

There are currently four assays that target community-wide freshwater mussel eDNA for metabarcoding analysis (targeting the 16S, COI, and ND1 gene regions). With our laboratory partner (Cramer Fish Science Genidaqs – https://genidaqs.com), Stantec can validate and implement one of these existing community-wide freshwater mussel assays for qPCR analysis. This laboratory validation ensures that the assay is properly detecting a variety of freshwater mussels, while not presenting a false positive signal from DNA of co-occurring animals (such as Asian clams). Once validated by Genidaqs this assay can be utilized for eDNA analysis. An estimated 145 total samples will be processed for qPCR analysis (124 water samples, 6 positive control site samples, 6 negative control site samples, and 9 negative field control samples).

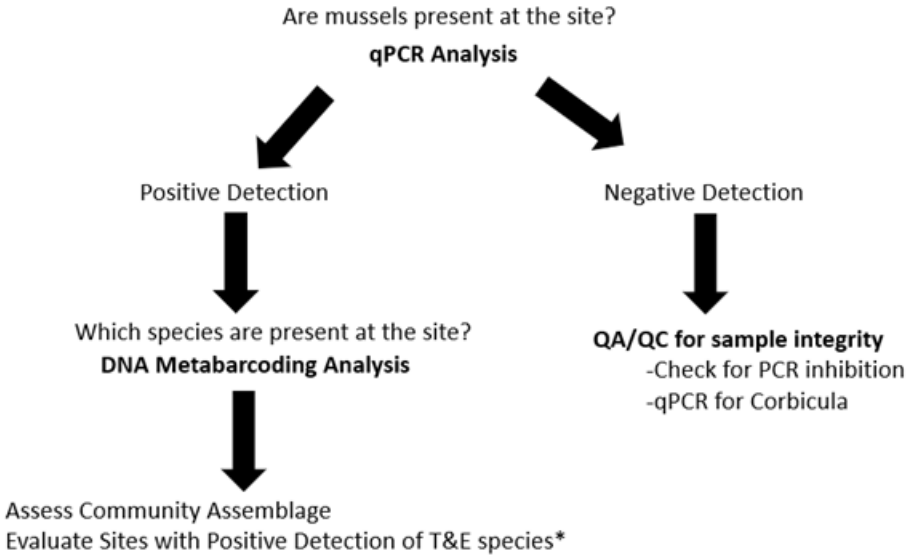
3.2 eDNA Analysis: Metabarcoding

By incorporating DNA metabarcoding, which employs amplicon-based high-throughput sequencing (HTS) to simultaneously identify and distinguish multiple taxa within samples (Marshall & Stepien 2020, Coghlan et al. 2021, Marshall et al. In Press), Stantec has the potential to identify entire mussel assemblages, including threatened and endangered species. Therefore, samples that test positive for mussel eDNA will

be further assessed for mussel composition with metabarcoding analysis (see flow chart in Figure 1). Using the unionid-specific metabarcoding 16S gene assay from Prié et al. (2020), Stantec has been able to describe freshwater mussel composition (Marshall et al. In Press). This same approach will be applied for this Project, to inform the traditional surveys regarding any potential threatened and endangered species present within the streams. If listed species are detected within a stream, Stantec's future traditional mussel surveys may focus additional efforts within these streams.

Of the 76 mussel species potentially present within the region (Appendix A), 18 species have no publicly available genetic data for the 16S gene region. Therefore, these species cannot be accurately identified from the dataset if present. Stantec will attempt to collect tissue plugs (~300-500mg in size) or mucus swabs from up to two individuals (contingent upon USFWS approval) of the 18 species that are lacking genetic data (Appendix A). Samples will be placed into 2mL collection tubes and stored in 95% ethyl alcohol in the field. All collection tubes will be sent to Genidaqs for genetic processing and Sanger sequencing of a ~700bp region of the mitochondrial 16S gene (Plaumbi et al. 1991). This will improve taxonomic classification and avoid issues from genetic misidentification with a limited database.

Figure 1 Mussel Laboratory Analysis Flowchart



*Note absence of a species in eDNA metabarcoding does not equate to true absence.

Figure 1 presents a flowchart of laboratory analysis for assessment of freshwater mussel eDNA within each sample. First, the sample analyzed with qPCR for the detection of any mussel eDNA. If the sample displays a positive detection, it can further be processed with DNA metabarcoding to assess mussel community assemblage. If the sample displays a negative detection, further analysis is completed as a QA/QC evaluation to ensure sample quality and integrity is intact.

4 Sample Design

Water samples will be collected at three locations from each of the 30 stream sites having widths of less than 150 feet, resulting in 90 water samples analyzed from wadeable streams. An additional 6 waterbodies having a width greater than 150 feet will also be sampled from a boat (Table 1). These locations will require a sample site every 150 feet across the channel resulting in the number of samples ranging from 3 to 10 per water body. The sampling of these lentic systems will require an additional 34 water samples. Sample effort for the entire Project will require 124 eDNA water samples. Samples on wadeable streams (< 150 feet wide) will consist of sampling upstream of impact site, at the impact site, and downstream of impact site. Samples on non-wadeable, impounded sections of streams will only be collected every 150 feet across the channel. The collection and filtering of water samples will be conducted by two scientists.

Water will be collected using a peristaltic pump (Masterflex L/S Easy Load Pump Head or similar) from ~10cm above the substrate. A clean segment of Masterflex L/S Pump Tubing or similar will be used to collect water for each sampling cell, with tubing cleaned after every collection by running 10% bleach solution for ~1 minute, followed by ~1 minute of distilled water. River water will be pumped through tubing for ~1 minute before sample collection. Samples will be collected across the entire width of the stream at each sampling location. Approximately 12L of water is pumped into a bleach-rinsed 18.9L (5-gallon) bucket, from which a 500mL water samples will be collected in a clean Nalgene bottle, stored in the dark on wet ice and returned to shore for subsequent filtration for eDNA within five hours. The water is filtered from each 500mL sample using a 47-mm-diameter glass microfiber filter GF/C (nominal pore size 1.2µm; GE Healthcare Life Science, MA, USA). After vacuum-pumping, filters will be placed into separate sterile Whirl-pak bags, which are then placed in Ziploc bags with silicone desiccant beads. All filters will be shipped on ice to Genidaqs for DNA extraction and eDNA analysis.

5 QAQC

5.1 Field Sampling

Stantec's quality assurance and quality control procedures include collecting all samples in sterile containers and documenting all acquired samples with their source information. Additionally, a negative field control sample is collected during each sampling event to monitor potential contamination between sampling sites, which could result in a false positive. For this field negative control, a sterile container of distilled water is taken into the field and filtered following the same protocol as the field collected samples. Standardized sample collection, filtration, handling, and shipment procedures will be implemented by Stantec field staff to protect the integrity of eDNA collected and avoid degradation. Nitrile gloves will be worn during field sample collection and the filtering process and changed for new sterile gloves between samples. All samples, including the negative control samples, will be submitted as blind samples to Genidaqs to avoid potential bias.

As part of the sampling design for this study, Stantec will incorporate additional collection of eDNA samples from 2-3 stream sites known to have freshwater mussels and 2-3 stream sites known to be absent of freshwater mussels. These samples will represent positive and negative control sites to provide additional validation to the eDNA dataset.

5.2 Laboratory Analysis

Stantec engages the services of a commercial eDNA laboratory, Genidaqs, which has a strong track record of eDNA assay development according to the Minimum Information for Publication of Quantitative Real-Time PCR Experiments (MIQE) standards (Bustin et al. 2009) and produces reliable results for qPCR and metabarcoding analysis. Quality assurance and quality control aspects are built into the laboratory services and are used during interpretation of eDNA results.

In the case no mussel eDNA is detected within a sampling site following qPCR analysis, a QA/QC check will be implemented to ensure sample integrity. This QA/QC assesses that eDNA was successfully collected, and that it has not severely degraded within the sample. If the eDNA is improperly collected or becomes heavily degraded within the sample, a false negative detection may occur. Therefore, non-detect samples for mussel eDNA will be further assessed with a qPCR for the detection of Asian clam (*Corbicula fluminea*) eDNA (Curtis et al. 2020), which if present may be indicative of suitable site for mussels (see flow chart in Figure 1). A sample with a negative detection for Asian clam eDNA will be considered likely unsuitable for all freshwater mussels, as Asian clams are hardier to environmental conditions compared to freshwater mussels, and they also can be found in smaller streams. The absence of Asian clams will be considered further evidence that the stream is void of bivalves. A pre-developed qPCR assay targeting Asian clam can be adopted for use in this study.

Additionally, PCR inhibitors may be present within an environmental sample from humic, phytic, and tannic acids, leaf litter, algae, and sediments. These compounds reduce the efficiency and accuracy of qPCR (Lance & Guan 2020). Gendiaqs performs standard laboratory sample procedures to remove inhibitors (e.g., Zymo Research One Step PCR Inhibitor Removal kit), to avoid associated issues with analysis. However, non-detect samples for Asian clam eDNA may be further evaluated for the presence of PCR inhibitors.

6 Reporting

Data analysis will include interpretation of sites with either positive or negative detections for freshwater mussels, evaluation of positive and negative controls, as well as QA/QC assessment of the Asian clam qPCR. Analysis of metabarcoding data will be completed on positive samples to evaluate potential community composition and relative abundances.

Stantec will prepare a report summarizing the results from each stream site. For streams with positive detection with qPCR, this report will additionally include a breakdown of the mussel species detected with metabarcoding analysis. All species detections will be rated based on a Taxonomy Credibility Criteria, to display an easy-to-understand assessment of probability of true taxonomic assignment. A species list and

species richness curves will be generated for each stream site, to help inform the traditional survey plan. While absolute mussel abundance cannot be assessed with results from eDNA metabarcoding, the relative eDNA abundance for each species will be assessed to estimate the mussel composition within each stream site. These relative mussel abundances can help inform which species are expected to be found at low abundances during the traditional survey.

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APPENDIX

Appendix A Mussel Species with the Potential to Occur within the Project Area

Scientific Name	Common Name	Fed Listed	State Listed	Genetic Data
Actinonaias ligamentina	Mucket	No	No	1
Actinonaias pectorosa	Pheasantshell	No	No	1
Alasmidonta atropurpurea	Cumberland Elktoe	Yes	Yes	0
Alasmidonta marginata	Elktoe	No	No	2
Alasmidonta viridis	Slippershell Mussel	No	No	0
Amblema plicata	Threeridge	No	No	4
Anodonta suborbiculata	Flat Floater	No	No	0
Anodontoides denigratus	Cumberland Papershell	No	No	2
Anodontoides ferussacianus	Cylindrical Papershell	No	No	0
Cumberlandia monodonta	Spectaclecase	Yes	Yes	7
Cyclonaias tuberculata	Purple Wartyback	No	No	2
Cyprogenia stegaria	Fanshell	Yes	Yes	0
Dromus dromas	Dromedary Pearlymussel	Yes	Yes	1
Ellipsaria lineolata	Butterfly	No	No	1
Elliptio crassidens	Elephantear	No	No	5
Elliptio dilatata	Spike	No	No	3
Epioblasma brevidens	Cumberlandian Combshell	Yes	Yes	2
Epioblasma capsaeformis	Oyster Mussel	Yes	Yes	21
Epioblasma florentina walkeri	Tan Riffleshell	Yes	Yes	16
Epioblasma obliquata	Catspaw	Yes	Yes	In-house
Epioblasma torulosa	Tubercled Blossom	Yes - Possibly Extinct	Yes	6
Epioblasma triquetra	Snuffbox	Yes	Yes	2
Fusconaia barnesiana	Tennessee Pigtoe	No	No	2
Fusconaia cuneolus	Finerayed Pigtoe	Yes	Yes	0
Fusconaia ebena	Ebonyshell	No	No	2
Fusconaia flava	Wabash Pigtoe	No	No	24
Fusconaia subrotunda	Longsolid	Yes	Yes	2
Hemistena lata	Cracking Pearlymussel	Yes	Yes	1
Lampsilis abrupta	Pink Mucket	Yes	Yes	0
Lampsilis cardium	Plain Pocketbook	No	No	4
Lampsilis fasciola	Wavyrayed Lampmussel	No	No	2
Lampsilis ovata	Pocketbook	No	No	4
Lampsilis teres	Yellow Sandshell	No	No	5
Lampsilis virescens	Alabama Lampmussel	Yes	Yes	0
Lasmigona complanata	White Heelsplitter	No	No	1
Lasmigona costata	Flutedshell	No	No	4
Lasmigona holstonia	Tennessee Heelsplitter	No	No	0
Leptodea fragilis	Fragile Papershell	No	No	2
Ligumia recta	Black Sandshell	No	No	4
Medionidus conradicus	Cumberland Moccasinshell	No	No	2

Scientific Name	Common Name	Fed Listed	State Listed	Genetic Data
Megalonaias nervosa	Washboard	No	No	4
Obliquaria reflexa	Threehorn Wartyback	No	No	3
Obovaria olivaria	Hickorynut	No	No	1
Obovaria retusa	Ringpink	Yes	Yes	0
Obovaria subrotunda	Round Hickorynut	Yes	Yes	1
Pegias fabula	Littlewing Pearlymussel	Yes	Yes	0
Plethobasus cicatricosus	White Wartyback	Yes	Yes	0
Plethobasus cooperianus	Orangefoot Pimpleback	Yes	Yes	0
Plethobasus cyphyus	Sheepnose	Yes	Yes	1
Pleurobema clava	Clubshell	Yes	Yes	1
Pleurobema cordatum	Ohio Pigtoe	No	No	1
Pleurobema gibberum	Cumberland Pigtoe	Yes	Yes	1
Pleurobema oviforme	Tennessee Clubshell	No	No	6
Pleurobema plenum	Rough Pigtoe	Yes	Yes	1
Pleurobema rubrum	Pyramid Pigtoe	No	No	0
Pleurobema sintoxia	Round Pigtoe	No	No	1
Potamilus alatus	Pink Heelsplitter	No	No	4
Potamilus ohiensis	Pink Papershell	No	No	0
Ptychobranchus fasciolaris	Kidneyshell	No	No	12
Ptychobranchus subtentum	Fluted Kidneyshell	Yes	Yes	7
Pyganodon grandis	Giant Floater	No	No	6
Quadrula cylindrica	Rabbitsfoot	Yes	Yes	In-house
Quadrula metanevra	Monkeyface	No	No	1
Quadrula pustulosa	Pimpleback	No	No	In-house
Strophitus undulatus	Creeper	No	No	2
Toxolasma lividus	Purple Lilliput	No	No	0
Toxolasma parvus	Lilliput	No	No	1
Tritogonia verrucosa	Pistolgrip	No	No	2
Truncilla donaciformis	Fawnsfoot	No	No	0
Truncilla truncata	Deertoe	No	No	2
Utterbackia imbecillis	Paper Pondshell	No	No	18
Villosa iris	Rainbow	No	No	2
Villosa perpurpurea	Purple Bean	Yes	Yes	0
Villosa taeniata	Painted Creekshell	No	No	2
Villosa trabalis	Cumberland Bean	Yes	Yes	1
Villosa vanuxemensis	Mountain Creekshell	No	No	6