

The contractor will need to CC: KYTC DEA on any coordination with USFWS for this project and reference the consultation code (FWS 2013-B-0544).

Revised Conservation Strategy for Forest Dwelling Bats:

<https://www.fws.gov/frankfort/pdf/20160601%20Revised%20FDBatConservStrategy.pdf>



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Kentucky Ecological Services Field Office  
330 West Broadway, Suite 265  
Frankfort, Kentucky 40601  
(502) 695-0468

January 23, 2017

Mr. David Waldner  
Division of Environmental Analysis  
Kentucky Transportation Cabinet  
200 Mero Street  
Frankfort, Kentucky 40601

RE: FWS 2013-B-0544; KYTC Item No. 10-158, Addition of Excess Material Sites Associated with KY 15 Reconstruction in Perry County, Kentucky

Dear Mr. Waldner:

Thank you for your letter and Biological Assessment (BA) Addendum dated November 7, 2016, evaluating the potential effects of the subject project proposal on the federally-listed gray bat, Indiana bat, and northern long-eared bat (NLEB). The U.S. Fish and Wildlife Service (Service) has reviewed the document and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

The original project proposal, reconstruction of KY 15, was coordinated with our office and received Service concurrence in July 2016. According to your letter, the original roadway impacts have not changed. However, three additional excess material sites that were not considered in the original BA have been deemed necessary for the reconstruction of KY 15. These three excess material sites are the subject of the aforementioned BA Addendum and this letter.

Habitat assessments of these excess material sites identified five portal features with potential to be impacted by the proposed project. These features were surveyed in the fall of 2016 according to the April 27, 2016 Supplemental Indiana Bat Survey Guidance for Kentucky and no federally-listed bat species were detected. Survey results did identify multiple tri-colored bats, a species of concern, using four of the portals that are to be impacted. As a voluntary conservation measure, the Kentucky Transportation Cabinet (KYTC) has proposed to reduce potential impacts to tri-colored bats in the project area by permanently closing these portals during construction activities. Prior to closure, KYTC would initiate discussions with our office to ensure proper timing and methods are used to avoid effects to this species.

#### **Gray Bats**

Although other species of bats are known to utilize portals as summer roosting and/or winter habitat, the Service does not have any positive survey records of gray bats utilizing abandon mine portals in Kentucky. For this reason, we believe that the proposed project modification's potential impacts to

the five portal features are not likely to result in negative impacts to summer roosting and/or winter habitat for gray bats.

Gray bats eat a variety of flying aquatic and terrestrial insects present along streams, rivers, and lakes. Perennial and strongly intermittent streams produce an abundance of insects, and are especially valuable to the gray bat as foraging habitat. The stream(s) and/or other water bodies on the proposed project site may be used by gray bats for foraging. KYTC has committed to sediment and erosion control measures in the original BA that will be used to minimize potential adverse effects on gray bat foraging habitat. In view of this, we concur with KYTC's determination that the proposed action may affect, but is not likely to adversely affect the gray bat.

#### **Indiana Bat and Northern Long-eared Bat**

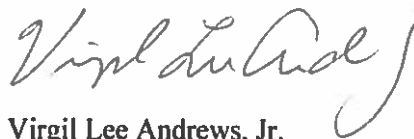
The Service finds the fall portal survey and results to be adequate and support KYTC's analysis that the proposed project modification's potential impacts to the five portal features are not likely to result in negative impacts to winter habitat for Indiana bats or northern long-eared bats.

The proposed project modification also requires additional removal of approximately 13.6 acres of "Potential" forested summer roosting habitat for the Indiana bat and NLEB. In lieu of a presence/absence survey, KYTC is assuming presence of these species in the forested habitat and has determined that the action "may affect, is likely to adversely affect" the Indiana bat and NLEB. KYTC proposes to account for these adverse effects to the Indiana bat and NLEB habitat through the processes identified in the 2015 Interim Programmatic Agreement for Forest Dwelling bats between the Federal Highway Administration (FHWA), KYTC, and the Service's Kentucky Field Office. The Service concurs with KYTC's effects determination for the Indiana bat and NLEB, and agrees with the proposed ESA compliance process.

In view of these findings we believe that the requirements of section 7 of the Endangered Species Act have been fulfilled for this project. Your obligations under section 7 must be reconsidered, however, if: (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Phil DeGarmo at (502) 695-0468 extension 110 or [Phil\\_DeGarmo@fws.gov](mailto:Phil_DeGarmo@fws.gov).

Sincerely,



Virgil Lee Andrews, Jr.  
Field Supervisor

## BIOLOGICAL ASSESSMENT ADDENDUM

for the

**Indiana Bat (*Myotis sodalis*), Gray Bat (*Myotis grisescens*),  
and Northern Long-eared Bat (*Myotis septentrionalis*)**

**Additional Excess Material Sites needed for the  
Improvements to KY 15 from Boone Ridge Road  
to KY 15 Bypass, Perry County, Kentucky  
KYTC Item No. 10-158.00**



Prepared for  
Kentucky Transportation Cabinet  
Division of Environmental Analysis  
and  
Department of Highways District 10

**November 2016**



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## 1.0 Project Background & Description

This Biological Assessment (BA) Addendum is for the addition of three (3) excess material sites needed to conduct the reconstruction of KY 15 in Perry County, Kentucky. The original BA was submitted in March 2016 with U.S. Fish and Wildlife Service – Kentucky Field Office (USFWS-KFO) concurrence in July 2016. This project was given the USFWS number FWS 2013-B-0544. The original BA covered the road construction aspect of the project and accounted for 36 acres of potential summer maternity and foraging habitat. This addendum will increase the potential summer maternity and foraging habitat to 49.6 acres, an increase of 13.6 acres of tree removal.

A total of 11 fall portal surveys for winter roosting habitat/hibernacula have been completed over the past two years for the KY 15 project (10-158.00); six (6) in 2015 and five (5) in 2016. These surveys resulted in a total capture of 21 tri-colored bats (*Perimyotis subflavus*). No federally listed bat species were captured during these surveys. In 2015, Portals 37, 38, 39, A2, and A4 captured five (5) tri-colored bats and Portal 121 captured five (5) tri-colored bats. In 2016, Portal 1 captured two (2) tri-colored bats, Portal 3 captured four (4) tri-colored bats, and Portal 5 captured one (1) tri-colored bat. Portals 1, 2, 3, and 121 will be permanently closed due to construction; the remaining portals will remain intact (Exhibits 1 and 2).

This project, KYTC 10-158.00, is directly south of KYTC 10-269.01, which is currently under construction. These two projects have approximately 1,200 feet of overlap starting at approximately 1,100 feet north of Morton Boulevard and extending to approximately 400 feet south of Crawford Mountain Road in order to ensure proper roadway geometrics. The BA from KYTC 10-269.01 and the original BA for project KYTC 10-158.00 has 5.2 acres of potential summer maternity and foraging habitat overlap (Exhibit 3). The removal of these 5.2 acres of trees was previously accounted for by the 10-269.01 mitigation payment to the imperiled Bat Conservation Fund via the 2015 Conservation Strategy for Forest-Dwelling Bats.

This document is an addendum to the original Biological Assessment (BA) **Improvements to KY 15 from Boone Ridge Road to KY 15 Bypass, Perry County, Kentucky KYTC Item No.10-158.00**. The original BA was submitted in March 2016 with U.S. Fish and Wildlife Service – Kentucky Field Office (USFWS-KFO) concurrence in July 2016. This project was given the USFWS number FWS 2013-B-0544. The original BA covered the road construction aspect of the project but since then three additional excess material sites have been deemed necessary to the project; therefore, the purpose of this addendum is to identify sites to permanently store excess material generated from the construction of improvements to KY 15 in Perry County (KYTC 10-158.00).

Three excess material sites have been identified for this project (Exhibit 1). These sites are located along the existing KY 15 in narrow valleys surrounded by steep hillsides and rugged terrain. The hillsides are heavily forested. These forests have experienced timber harvesting in the past which is evident by the younger, even aged stands of trees.

The construction of this road project will generate millions of cubic yards of rock and fill material. To dispose of this material in a cost effective manner, excess material site locations must be in close proximity to the construction areas to minimize the cost of transporting the material. Three

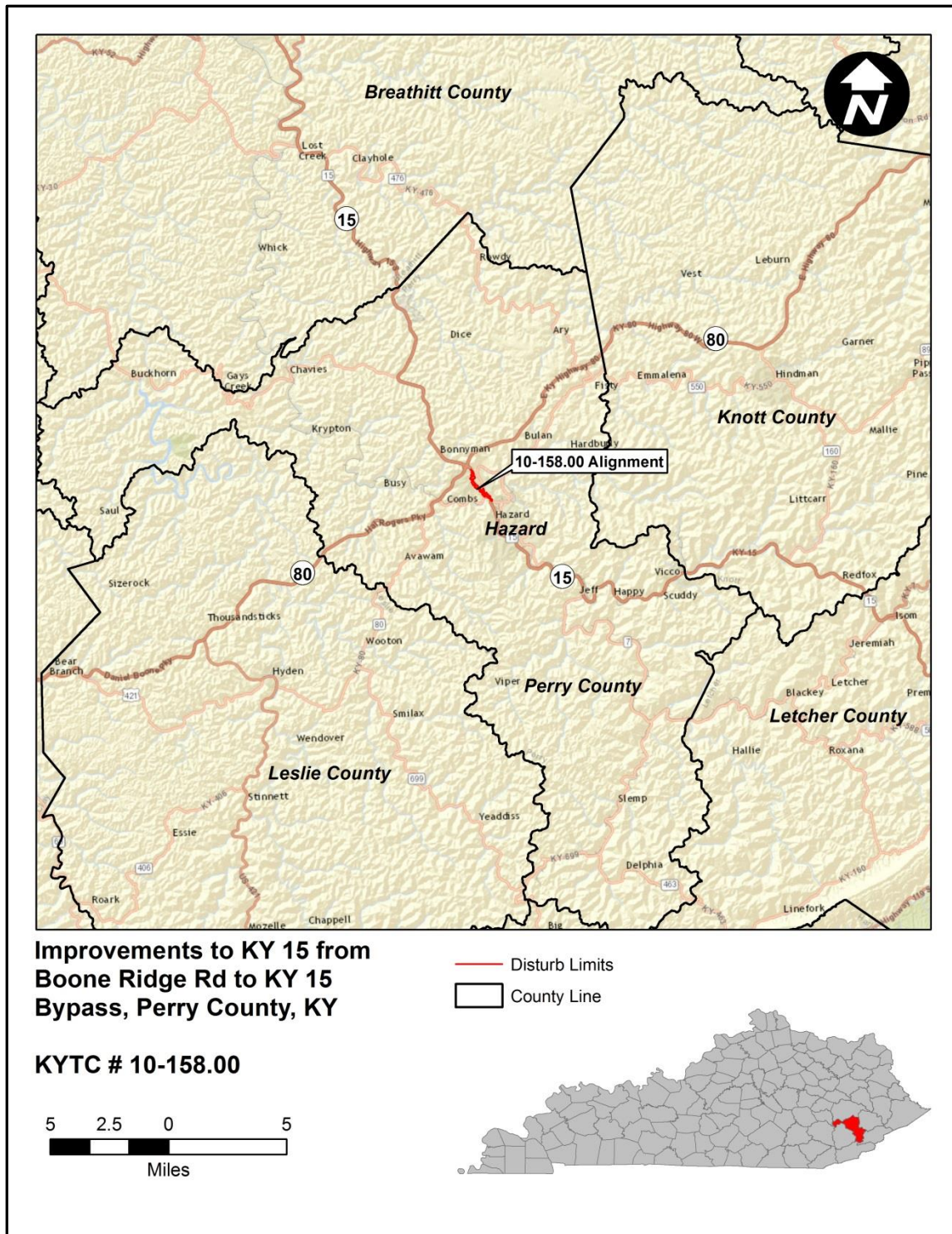
locations were chosen based on the distance from the project, the number of residents to be displaced, and the potential environmental impact. These sites, considered most practicable for KYTC, appear to be in the most cost effective locations, involve no relocations and have the least amount of environmental impacts.

Excess material site A is located northwest of the KY 15 and KY 550 interchange and is approximately six (6) acres in size. This excess material site will be accessed by a 1,800-foot haul road built along the west side of KY 15 with 1,000 feet of it occurring within the disturb limits of construction and an additional 800 feet created across new terrain to access the excess material site. Excess material site A will store approximately 493,000 cubic yards (cy) of excess earth and rock fill.

Excess material site B is located northeast of KY 15 and north of Boone Ridge Road and is approximately four (4) acres in size. This excess material site will be accessed directly from the KY 15 construction limits. Excess material site B will store approximately 152,000 cy of excess earth and rock fill.

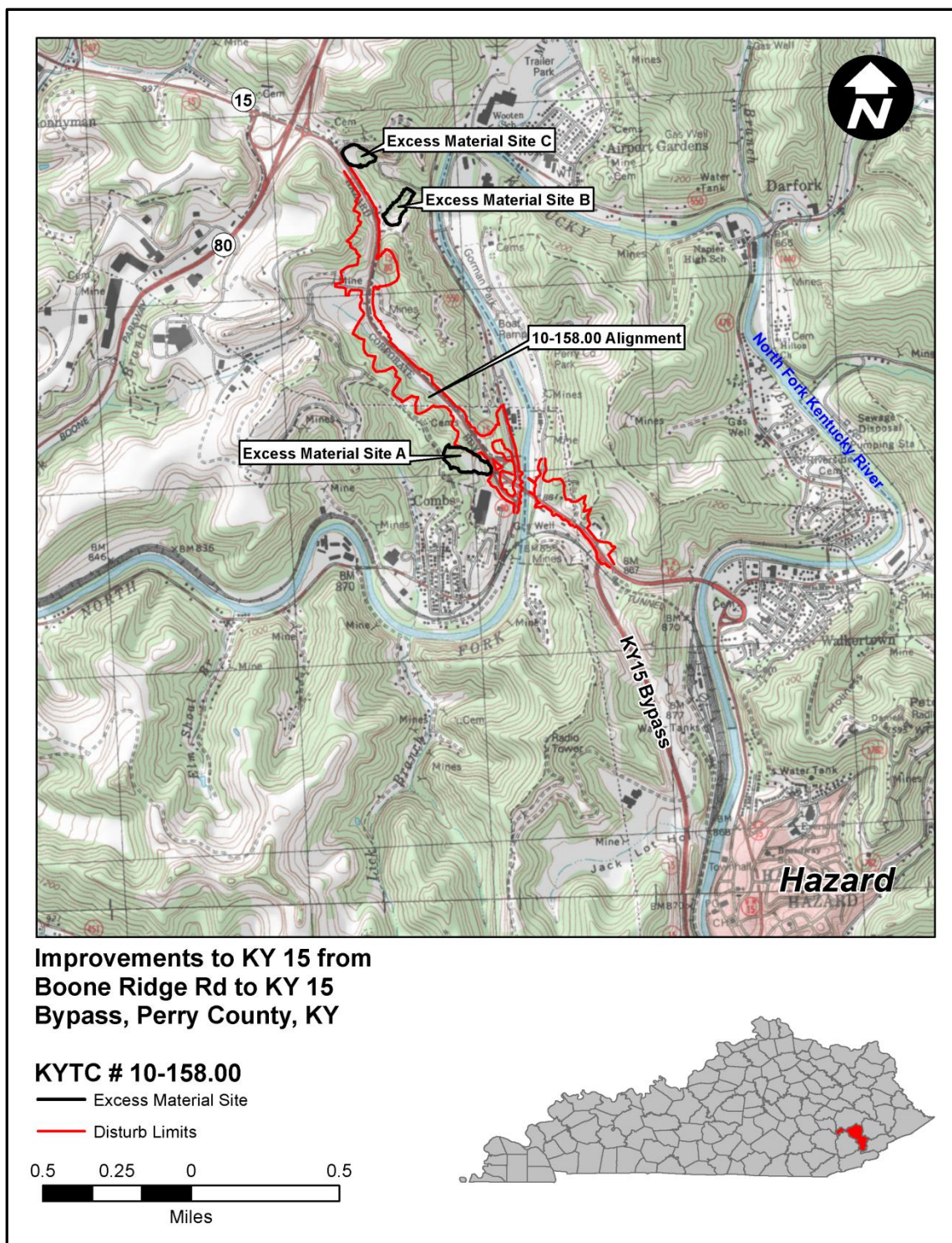
Excess material site C is located northeast of KY 15 and south of Crawford Mountain Road and is approximately four (4) acres in size. This excess material site will be accessed directly from the KY 15 construction limits. Excess material site C will store approximately 131,000 cy of excess earth and rock fill.

For complete project background information related to the KY-15 roadway reconstruction refer to the original 10-158.00 BA dated March 2016 (FWS 2013-B-0544).



*Figure 1: Project vicinity map showing project location within the surrounding area*





*Figure 2: Project location map*

## 2.0 Identification of Listed Species

The identification of listed species for this biological assessment (BA) addendum was based on coordination with the United States Fish and Wildlife Service (USFWS), the Kentucky State Nature Preserves Commission (KSNPC), and the Kentucky Department of Fish and Wildlife Resources (KDFWR). Since this BA is an addendum to the original BA only those federally listed species that could be affected by the additional excess material sites are being considered. The species being considered are the Indiana bat (*Myotis sodalis*), the northern long-eared bat (*Myotis septentrionalis*), and the gray bat (*Myotis grisescens*). No habitat for the Kentucky arrow darter (*Etheostoma spilotum*) is present within the designed excess material sites.

*Table 1: USFWS Listed Species within Perry County*

Group	Common Name	Scientific Name	Legal Status
Mammals	Indiana bat	<i>Myotis sodalis</i>	Endangered
	Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened
	Gray bat	<i>Myotis grisescens</i>	Endangered
Fish	Kentucky arrow darter	<i>Etheostoma spilotum</i>	Candidate

### 2.1 Species Statuses

For species statuses please refer to the original 10-158.00 BA (FWS-2013-B-0544).

## 3.0 Survey Methods

### 3.1 Bat Habitat Assessment

Normal in-office assessments conducted during the original BA process did not reveal any additional potential hibernacula/winter roosting sites within the excess material sites but during the Section 404/401 permitting process two additional mine portals (Portals 1 & 2) were discovered in excess material site A and a third (Portal 3) was identified within the project disturbance limits. While Redwing Ecological Services, Inc. (Redwing) was performing phase I habitat assessments on these locations a fourth portal (Portal 4) located near Portal 3 was discovered. The fifth portal (Portal 5) was originally identified by Third Rock Consultants, LLC (Third Rock) in March 2015 while conducting a BA on the northern segment of the KY 15 reconstruction project (KYTC 10-269.01). Third Rock originally identified this portal as #3 but for confusion purposes, a portal #3 was already established for this project, therefore Third Rock's #3 was renamed in this report as Portal 5.

Since Palmer, the prime consultant, does not possess a USFWS Recovery Permit for federally-listed bats in Kentucky, Redwing was contacted to provide the Phase 1 Bat Habitat Assessment and Phase 2 portal surveys for this project.



### 3.2 Phase 1 Habitat Assessment Methodology

The Phase 1 Habitat Assessments were completed by Redwing between July and September 2016. The Phase 1 Habitat Assessments were conducted by a qualified biologist [an individual holding a U.S. Fish and Wildlife Service (USFWS) Recovery Permit for federally-listed bats in Kentucky and authorized by the Kentucky Department of Fish and Wildlife Resources (KDFWR) to survey for bats] per the survey protocols for identifying potential hibernacula listed in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2016), developed by the USFWS Kentucky Field Office (KFO) and the KDFWR (USFWS KFO and KDFWR 2016). Please refer to Appendix B for Redwing's complete description of the Phase 1 Habitat Assessment methodology.

### 3.3 Phase 1 Habitat Assessment Results

During the Phase 1 Habitat Assessment, Redwing determined all five portals met the criteria for potential winter roosting habitat/hibernacula for the three federally listed bat species under the 2016 survey guidance. Please refer to Appendix B for a complete analysis of the Phase 1 Habitat Assessment results.

Portals 1 and 2 are located within Excess Material Site A, and Portal 3 is located within the proposed disturbance limits for the project (Figure 2). Portals 4 and 5 are located approximately 100 feet and 500 feet, respectively, from the proposed disturbance limits. Information for the mines associated with Portals 4 and 5 could not be found during a review of available mine mapping; therefore, the exact location and extent of these mines is unknown. As a result, these mines could extend into the proposed disturbance limits. Based on this information, the project will result in impacts to Portals 1, 2, and 3, and may result in impacts to Portals 4 and 5.

### 3.4 Fall Portal Survey

Prior to conducting the fall portal survey, Redwing submitted a Project Proposal Form to both the USFWS KFO and KDFWR August 29, 2016 to perform harp trapping surveys on all five portals. Both agencies concurred with the project proposal.

Fall portal surveys were first conducted from September 12 to 14 and again from September 26 to 29, 2016. No federally-listed bat species were captured during the fall portal survey. A total of seven non-listed bats, all tri-colored bats (*Perimyotis subflavus*), were captured during the fall survey. Please refer to Appendix B for a detailed description of fall portal survey methods and results. The following table lists the overall total number of bats captured at each portal.

Species	Common Name	Portal 1	Portal 2	Portal 3	Portal 4	Portal 5	Total
<i>Perimyotis subflavus</i>	Tri-colored bat	2	0	4	0	1	7

## 4.0 Effects Analysis

### 4.1 Indiana / Northern Long-eared Bat

#### 4.1.1 Direct / Indirect and Cumulative Effects

Potential direct and indirect effects to Indiana and northern long-eared bats that could occur as a result of this project include the loss or modification of winter roosting habitat/hibernacula (portal locations) and a reduction of summer roosting habitat through the removal of forested habitat. The closest critical habitat for Indiana bats is Carter Cave in Carter County, Kentucky; however, this habitat is approximately 75 miles from the most northern section of the project area and will not be affected by the proposed project. Northern long-eared bats do not have any critical habitat listed at this time. None of the five mine portals surveyed for bat presence during the fall portal period (September 1 through October 31) showed evidence of usage by Indiana or northern long-eared bats and no other suitable roosting habitat was identified during the Phase 1 Habitat Assessment. As a result, no suitable winter roosting habitat/hibernacula for Indiana or northern long-eared bats is present in the project disturbance limits or excess material sites; therefore, direct effects to the Indiana and/or northern long-eared bats are not anticipated as a result of the project.

The proposed project will require the clearing of an additional 13.6 acres of “Potential” summer habitat for the Indiana and northern long-eared bats, which may occur when this habitat is considered occupied by these species. Direct, indirect, and cumulative effects to the Indiana and northern long-eared bats related to the removal of summer habitat will be addressed with the 2016 Conservation Strategy for Forest-Dwelling Bats CMOU process prepared by USFWS-KFO (USFWS 2015b). As a result, an analysis of effects to the Indiana and northern long-eared bats from the removal of summer habitat associated with the proposed project is not included in this assessment. The table below lists the additional acreage of tree removal associated with each individual excess material site.

Site	Acreage
Excess material site A	6.0
Excess material site A Haul Road	1
Excess material site B	3.2
Excess material site C	3.4
<b>Total</b>	<b>13.6</b>

The ESA regulations define cumulative effects as “those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the Federal action subject to consultation.” The additional excess material sites are not

anticipated to contribute any additional cumulative effects to the Indiana bat or northern long-eared bat, especially since few streams are present and no roadway will be established in this area.

Sediment and/or pollutants deposition in area waterways could potentially reduce the amount of available forage for Indiana and northern long-eared bats. However, the KYTC has committed to site-specific erosion control measures and BMP's that will prevent any adverse impacts to bat foraging supply. Minimization and mitigation measures for sediment and erosion control best management practices discussed in the original March 2016 BA will also be followed in these additional areas. Efforts to develop a portal closure plan with USFWS-KFO to reduce impacts to all bat species in the area (i.e. *P. subflavus*) will also be initiated.

## **4.2 Gray Bat**

### **4.2.1 Direct/Indirect and Cumulative Effects**

Gray bats are presumed to be actively foraging along the North Fork Kentucky River corridor. A potential indirect effect to these bats is a disruption in foraging patterns in excess material sites B and C are the only two areas containing water courses which could potentially be used as foraging corridors. Excess material site B contains one ephemeral channel whereas excess material site C contains one intermittent stream and one ephemeral channel. This indirect effect is considered unlikely since the KSNPC reported only one gray bat record known from Perry County, which was over five miles from the project area, and the KDFWR database does not list this species as occurring in Perry County.

The ESA regulations define cumulative effects as "those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action areas of the Federal action subject to consultation." The additional excess material sites are not anticipated to contribute any additional cumulative effects to the gray bat, especially since few streams are present and no roadway will be established in this area.

Sediment and/or pollutants deposition in area waterways could potentially reduce the amount of available forage for gray bats. However, the KYTC has committed to site-specific erosion control measures and BMP's that will prevent any adverse impacts to gray bat foraging supply. Minimization and mitigation measures involving sediment and erosion control best management practices discussed in the original March 2016 BA will also be followed in these additional excess material areas.

## **5.0 Effects Determination and Conclusion**

The effects determination for each species is presented below is for the waste areas only.

### **5.1 Indiana bat**

The removal of 13.6 acres of "potential" summer maternity and foraging habitat will be mitigated through the Conservation Strategy for Forest Dwelling Bats in Kentucky (USFWS-KFO 2016) to account for loss of Indiana bat summer habitat. This CMOU payment will cover all direct, indirect and cumulative effects to summer roosting habitat. No impacts to winter habitat are

anticipated because there are no caves or portals being impacted that could serve as hibernacula for this species. Therefore, the formal effects determination for this species is “**may affect, likely to adversely affect.**”

## **5.2 Northern long-eared bat**

The removal of 13.6 acres of potential summer maternity and foraging habitat will be mitigated through the Conservation Strategy for Forest Dwelling Bats in Kentucky (USFWS-KFO 2016) to account for loss of northern long-eared bat summer habitat. This CMOU payment will cover all direct, indirect, and cumulative effects to summer roosting habitat. No impacts to winter habitat are anticipated because there are no caves or portals being impacted that could serve as hibernacula for this species. Therefore, the formal effects determination for this species is “**may affect, likely to adversely affect.**”

## **5.3 Gray bat**

Direct impacts to gray bats are not anticipated since no roosting habitat is located within the project area or within proximity to the proposed project. Potential indirect effects to this species as a result of the proposed project include temporary impacts to forage supply due to stream alterations. Sediment and/or pollutants deposition in area waterways could potentially reduce the amount of available forage for gray bats. However, the KYTC has committed to site-specific erosion control measures and BMPs that will prevent any adverse impacts to gray bat foraging supply. Therefore, the formal effects determination for this species is “**may affect, not likely to adversely affect.**”

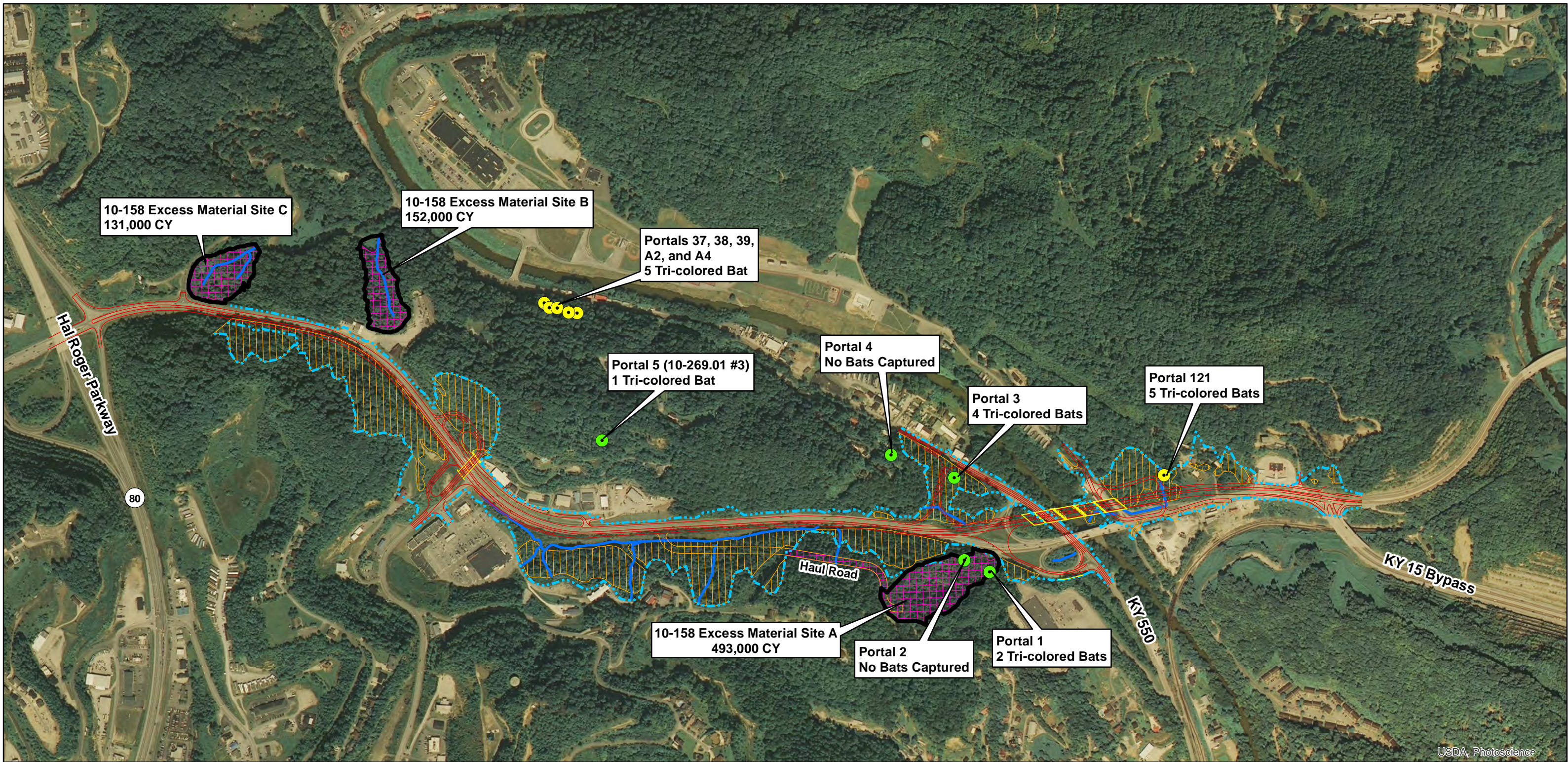
## **6.0 Literature Cited**

United States Fish and Wildlife Service (USFWS). 2015b. Biological Opinion: Kentucky Field Office's Participation in Conservation Memoranda of Agreement for the Indiana Bat and/or Northern Long-eared Bat. FWS Log #04E00000-2015-F-0005. <https://www.fws.gov/frankfort/pdf/2015%20KY%20CMOA%20Bio%20Op.pdf>

## **Appendix A**

### **Exhibits**





## Exhibit 1

**Perry County, Kentucky**  
**KYTC Item #10-158.00**  
**BA Addendum to**  
**Improvements to KY 15 from**  
**KY 15 Bypass to Boone**  
**Ridge Road**

**US Topo Map: North Hazard**

### Portal Locations

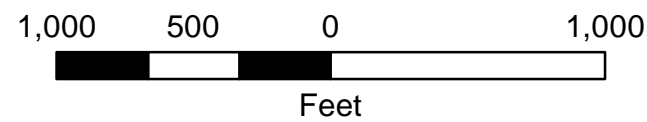
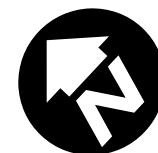
- 2015 Field Survey
- 2016 Field Survey

### Forest Impacts

- Waste Areas 13.5 ac
- March 2016 BA 36 ac
- Streams

### KY 15 Proposed 10-158.00

- KY 15
- Bridge
- Entrance
- Proposed Waste Area
- Disturb Limits









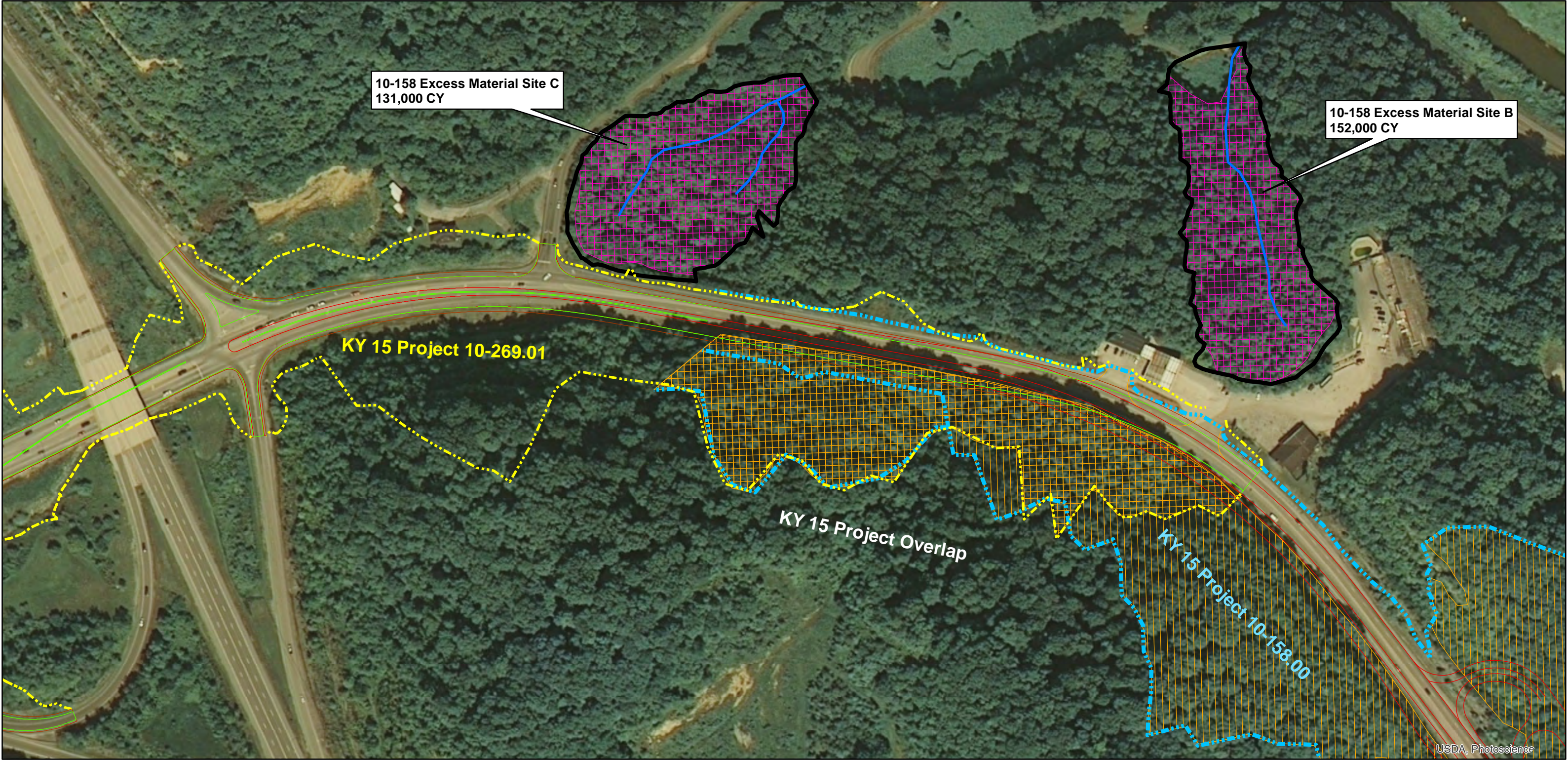


Exhibit 3

Perry County, Kentucky  
KYTC Item #10-158.00  
BA Addendum to  
Improvements to KY 15 from  
KY 15 Bypass to Boone  
Ridge Road

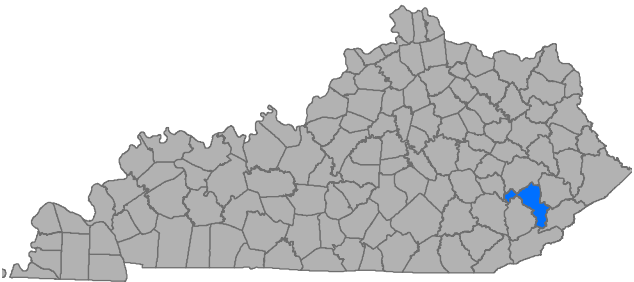
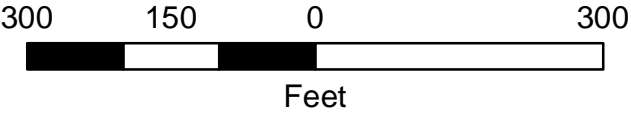
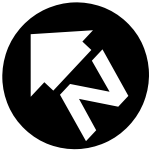
US Topo Map: North Hazard

KY 15 Proposed

- KY 15
- Bridge
- Entrance
- Proposed Waste Area
- Disturb Limits
- Streams

Forest Impacts

- 10-269.01 BA 5.2 ac
- Waste Areas 13.5 ac
- March 2016 BA 36 ac





## **Appendix B**

### **Phase I Habitat Assessment and Fall Portal Survey Report**



1139 South Fourth Street • Louisville, KY 40203 • Phone 502.625.3009 • Fax 502.625.3077

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**VIA EMAIL**

October 14, 2016

Ms. Lee Carolan  
Palmer Engineering, Inc.  
400 Shoppers Drive  
Winchester, Kentucky 40392  
lcarolan@palmernet.com

Subject: **Phase 1 Habitat Assessment and Fall Portal Survey Report  
KY 15 Widening and Reconstruction Project  
Perry County, Kentucky  
KYTC Item No.: 10-158.00  
Redwing Project No.: 12-093**

Dear Ms. Carolan:

Redwing Ecological Services, Inc. (Redwing) is pleased to submit this report to Palmer Engineering, Inc. (Palmer) regarding Phase 1 Habitat Assessments and fall portal surveys for the proposed Kentucky Highway (KY) 15 Widening and Reconstruction project in Perry County, Kentucky. The proposed project is located along KY 15 in Hazard, Kentucky, beginning at the KY 15 bypass and ending approximately 1,900 feet north of Morton Boulevard. The purpose of the Phase 1 Habitat Assessments and fall portal surveys is to determine if potential hibernacula and/or roosting habitat for the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), or northern long-eared bat (*Myotis septentrionalis*) will be impacted by the proposed project. The Phase 1 Habitat Assessments and fall portal surveys are described below in terms of methodology, results, and effects analysis.

**METHODOLOGY**

The Phase 1 Habitat Assessments and fall portal surveys were conducted by Redwing to identify potential hibernacula and roosting habitat for the gray, Indiana, and northern long-eared bats, and evaluate potential impacts to these species from the proposed project. The methodologies for the Phase 1 Habitat Assessments and fall portal surveys are presented below.

## PHASE 1 HABITAT ASSESSMENTS

During a field assessment for the proposed project in the summer of 2016, Palmer identified two abandoned mine portals (Portals 1 and 2) within a proposed excess material site for the project (Figure 1). A third abandoned mine portal (Portal 3) was later identified within the project disturbance limits from digital elevation mapping. During a site visit by Redwing on August 19, 2016 to perform a Phase 1 Habitat Assessment of the third mine portal, a fourth abandoned mine portal (Portal 4) was identified near Portal 3. A fifth mine portal (Portal 5) was also identified within the vicinity of the proposed project by Third Rock Consultants, LLC (Third Rock) in March 2015. The portal was discovered by Third Rock during a biological assessment for a separate KYTC project (Item 10-269.01) north of the proposed project. These five abandoned mine portals were examined through Phase 1 Habitat Assessments to determine their potential as hibernacula and roosting habitat for the gray, Indiana, and northern long-eared bats. The Phase 1 Habitat Assessments were conducted by a qualified biologist [an individual holding a U.S. Fish and Wildlife Service (USFWS) Recovery Permit for federally-listed bats in Kentucky and authorized by the Kentucky Department of Fish and Wildlife Resources (KDFWR) to survey for bats] per the survey protocols for identifying potential hibernacula listed in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2016), developed by the USFWS Kentucky Field Office (KFO) and the KDFWR (USFWS KFO and KDFWR 2016). Due to similarities in hibernacula used by the gray, Indiana, and northern long-eared bats, these survey protocols were utilized to identify potential hibernacula for all three species. Identified features were also assessed as suitable summer roosting habitat for the gray and northern long-eared bats, based on known habitat preferences for each species.

### **Field Assessment Methodology**

During the Phase 1 Habitat Assessments, the characteristics of each abandoned mine portal were recorded on a Phase 1 Habitat Assessment data sheet. Photographs of each mine portal were taken, and the location of each portal was recorded using a sub-meter accurate GPS unit. The mine portals were considered to be potential hibernacula/roosting habitat for the identified bat species if they exhibited the following characteristics: 1) a horizontal opening larger than six inches in diameter; 2) a vertical opening larger than one foot in diameter; 3) passage(s) that extends more than 50 feet from the entrance; 4) no evidence of flooding or collapse; and 5) an opening that did not occur within the past 12 months (USFWS KFO and KDFWR 2016). Features lacking one or more of these characteristics were determined to be unsuitable as hibernacula and roosting habitat. Other characteristics used to evaluate the features included airflow, temperature, bat presence, and evidence of bat use (i.e. guano, ceiling staining).

## **Impact Identification Methodology**

Features identified as potential bat habitat were evaluated to determine potential impacts as a result of the project, including damage or loss of the features, microclimate alterations, and the loss of forested habitat around the features.

Damage or Loss: Features located near the proposed project could be damaged or lost during construction through fill, capping, or blasting. Potential direct impacts from these construction activities to the five portals were examined.

Microclimate Impacts: The proposed project could impact the microclimates of underground features in a variety of ways, including direct impacts such as filling, capping, or blasting, and indirect impacts from the removal of adjacent forested habitat or redirection of airflow. As a result, potential microclimate impacts were evaluated for the five portals.

Forested Habitat Impacts: Loss of suitable roosting, foraging, commuting, and swarming habitat from tree clearing and separation of forested blocks (fragmentation) could impact the use of features by bats. These potential indirect impacts were reviewed for the five portals.

## **FALL PORTAL SURVEYS**

Portals identified as potential roosting habitat/hibernacula for the three bat species during the Phase 1 Habitat Assessments that could be impacted by the proposed project were evaluated through fall portal surveys to document potential use by these species. The surveys followed the protocols listed in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2016) and was led by permitted bat biologists Seth Bishop and Benjamin Deetsch. The surveys were conducted on two nights during the fall sampling period (September 1 and October 31), and each night of sampling was separated by at least two weeks.

During the surveys, a harp trap was installed at the entrance of each feature, and tarps were used to block the remainder of the entrance and funnel bats into the trap. The survey period began at sunset and continued for five hours. All bats captured during the portal surveys were identified by Mr. Bishop or Mr. Deetsch and released at the site of capture. Data recorded for each captured bat included species, sex, age, reproductive condition, forearm length, and weight. A wing-damage score was also noted for each bat, based on the Reichard Wing-Damage Index used to characterize the wing condition of bats affected by White-Nose Syndrome (WNS). A unique mark for each survey night was also applied to each captured bat to allow for the identification of recaptured individuals.



Decontamination procedures outlined in the *National White-Nose Syndrome Decontamination Protocol - Version 04.12.2016* were followed to help minimize the potential transmission of WNS between captured bats. Individuals were also noted as flying in or out of the portal, if discernable, and baffle bars were attached to the harp traps to aid in this determination. Photographs were taken of each species, and are included in the photographic log attached to this report.

## RESULTS

The results of the Phase 1 Habitat Assessments and fall portal surveys are discussed below.

### PHASE 1 HABITAT ASSESSMENTS

The Phase 1 Habitat Assessments were performed at each portal on the following dates: Portals 1 and 2 on July 26, 2016; Portals 3 and 4 on August 19, 2016; and Portal 5 on September 13, 2016. During the assessments, all five portals were determined to meet the criteria for potential roosting habitat/hibernacula for the three bat species under the 2016 survey guidance. The results of the Phase 1 Habitat Assessments are summarized in Table 1. Recorded data and photographs for each portal can be found on the Phase 1 Habitat Assessment Data Sheets in Appendix A.

As previously discussed, Portals 1 and 2 are located within a proposed excess material site, and Portal 3 is located within the proposed disturbance limits for the project (Figure 1). Portals 4 and 5 are located approximately 100 feet and 500 feet, respectively, from the proposed disturbance limits. Information for the mines associated with Portals 4 and 5 could not be found during a review of available mine mapping; therefore, the exact location and extent of these mines is unknown. As a result, these mines could extend into the proposed disturbance limits. Based on this information, the project will result in impacts to Portals 1, 2, and 3, and may result in impacts to Portals 4 and 5. These impacts could affect federally-listed bats using these features as roosting habitat and/or hibernacula. To document potential use of these features by the three bat species, a survey was conducted at each feature. Due to safety concerns associated with entering abandoned mine portals, direct surveys of these features could not be performed; therefore, a harp trap survey was conducted at each portal to evaluate use by the three bat species. The results of these surveys are discussed in the following section.

## FALL PORTAL SURVEYS

Prior to the fall portal surveys, a project proposal was submitted to the USFWS KFO and KDFWR on August 29, 2016 proposing harp trap surveys at Portals 1 through 5. The USFWS KFO concurred with the project proposal on September 12, 2016, and the KDFWR acknowledged receipt of the proposal on August 30, 2016. Copies of the project proposal and agency correspondence are included as Appendix B.

Fall portal surveys were conducted at each portal on the following dates: Portals 1 and 2 on September 12 and September 26, 2016; Portals 3 and 4 on September 13 and September 27, 2016; and Portal 5 on September 14 and September 28, 2016. Photographs of each surveyed portal are included in the photographic log attached to this report.

No federally-listed bat species were captured during the fall portal surveys. Non-listed bats captured during the surveys included: two tri-colored bats (*Perimyotis subflavus*) at Portal 1; four tri-colored bats at Portal 3; and one tri-colored bat at Portal 5. The tri-colored bat at Portal 5 was recaptured on the same survey night; however, no bats were recaptured on different survey nights. The tri-colored bat at Portal 5 also appeared to exhibit damage from WNS. A large portion of the bat's right plagiopatagium was receding, starting at the posterior edge and continuing towards the forearm. Based on this damage, this bat was given a score of three on the Reichard Wing-Damage Index. Another tri-colored bat captured at Portal 3 may have also had damage from WNS. This bat had a hole approximately 0.5 centimeter (cm) in size in the left uropatagium, as well as a smaller hole (less than 0.5 cm) in the left chiropatagium. These holes were located entirely within the interior of the membrane and were not receding from the edge, and may have been the result of punctures to the membrane while flying. The bat at Portal 3 did not show any other evidence of damage from WNS, such as visible scarring or necrotic tissue on the membranes, or flaking or discoloration of skin on the forearms (Reichard and Kunz 2009). Based on these observations, the bat was given a score of one on the Reichard Wing-Damage Index. Photographs of these two tri-colored bats are included in the photographic log attached to this report. The remaining bats captured during the surveys received a wing score of zero. The results of the fall portal surveys are summarized in the following table. A summary of data recorded for each captured bat is included in Table 2, and on the portal survey data sheets in Appendix C.

Species	Common Name	Portal 1	Portal 2	Portal 3	Portal 4	Portal 5	Total
<i>Perimyotis subflavus</i>	tri-colored bat	2	0	4	0	1	7


Weather conditions during the fall portal surveys were within the allowable ranges listed in the 2016 survey guidance. Temperatures did not fall below 10° Celsius (C) [50° Fahrenheit (F)] during the surveys, and average starting and ending temperatures were 25° C (77° F) and 18° C (64° F), respectively. Wind speeds were between zero and three miles per hour (0 to 1 on Beaufort scale) during the surveys, and cloud cover ranged from clear to cloudy/overcast. One rain event occurred on September 28 that lasted for less than 30 minutes (23:12 to 23:32), and did not require the survey night to be suspended or repeated, per the survey guidance. The survey night was extended for 20 minutes to complete the five-hour survey period. The moon phase during the surveys ranged from waxing gibbous (82% illuminated) on September 12 to waning crescent (3% illuminated) on September 28. The weather conditions recorded for each survey night are included on the portal survey data sheets in Appendix C.


### EFFECTS ANALYSIS

Based on the results of the Phase 1 Habitat Assessments and portal surveys performed by Redwing, Portals 1, 2, 3, 4, and 5 are not used as hibernacula or roosting habitat by the gray bat, Indiana bat, or northern long-eared bat. As a result, no direct, indirect, or cumulative effects to hibernating individuals of these species or their hibernacula/roosting habitat are anticipated as a result of the proposed project.

We appreciate the opportunity to assist you on this important project. Please call Seth Bishop or Richard Clausen at (502) 625-3009 with any questions on this report or the overall project.

Sincerely,

  
Seth R. Bishop  
Project Ecologist

  
Richard S. Clausen  
Principal  
Senior Ecologist

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Attachments:   References  
                      Tables  
                      Figure  
                      Photographs  
                      Appendix A – Phase 1 Habitat Assessment Data Sheets  
                      Appendix B – USFWS Project Proposal and Agency Correspondence  
                      Appendix C – Fall Portal Survey Data Sheet

## **REFERENCES**

Reichard, J.D., and T.H. Kunz. 2009. White-nose syndrome inflicts lasting injuries to the wings of little brown myotis (*Myotis lucifugus*). *Acta Chiropterologica* 11: 457-464.

United States Fish and Wildlife Service Kentucky Ecological Services Field Office (USFWS KFO) and Kentucky Department of Fish and Wildlife Resources (KDFWR). 2016. Supplemental Indiana Bat Survey Guidance for Kentucky. United States Fish and Wildlife Service Kentucky Ecological Services Field Office and the Kentucky Department of Fish and Wildlife Resources. Frankfort, KY 14 pp.



**TABLES**



**Table 1: Phase 1 Habitat Assessment Summary**  
**KY 15 Widening & Reconstruction Project**  
**Perry County, Kentucky**  
**KYTC Item No. 10-158.00**

<b>Characteristic</b>	<b>Portal 1</b>	<b>Portal 2</b>	<b>Portal 3</b>	<b>Portal 4</b>	<b>Portal 5</b>
Feature type	Mine portal	Mine portal	Mine portal	Mine portal	Mine portal
Orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Habitat type	Forest	Forest	Forest	Forest	Forest
% canopy cover	100	100	95	60	95
Entrance size (ft.)	12 W x 3 H	3 W x 1.5 H	6 W x 1 H	10 W x 1.5 H	4 W x 1 H
Entrance stable	Yes	No	No	Yes	No
Interior dimensions (ft)	12 W x 4 H	15 W x 3 H	10 W x 2 H	10 W x 2 H	10 W x 4 H
Observed depth of feature (ft)	75+	24+	6+	50+	30+
Floor slope	Flat	Down	Flat	-	Up
Ceiling condition	Flat, wet	Flat, wet	Flat	Flat, dry	-
Evidence of ceiling collapse	Yes	No	Yes	Yes	Yes
Direction of airflow	Out	Out	Out	In	-
Amount of airflow	Moderate	Slight	Slight	Slight	-
Internal temperature (°F)	63	60	64	68	-
Water flow	None	None	None	None	None
Evidence of flooding	None	None	None	None	None
Nearest water source (ft)	~700	~900	~400	~400	~400
Bats present	No	No	No	No	No
Evidence of use by bats	None	None	None	None	None
Evidence of human/wildlife use	None	Trash	None	Trash	None
<b>Potential bat habitat</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

Note: Phase 1 Habitat Assessments performed on July 26, August 19, and September 13, 2016.

**Table 2: Fall Portal Survey Captured Bat Data**  
**KY 15 Widening & Reconstruction Project**  
**Perry County, Kentucky**  
**KYTC Item No. 10-158.00**

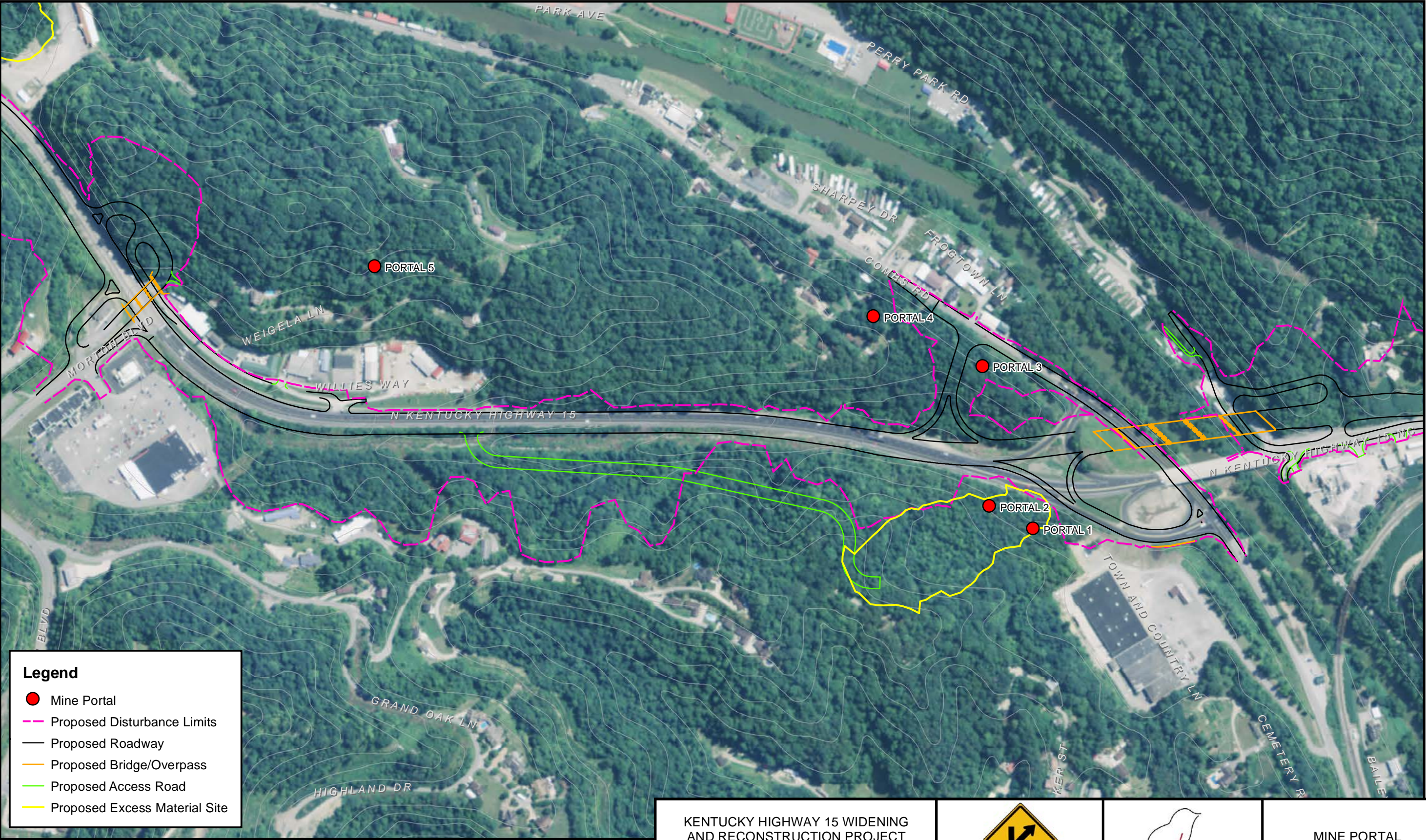
Portal	Date	Time	Species	Sex	Age	Reproductive Condition	Forearm (mm)	Weight (g)	Wing Score	Trap	Flight In/Out	Notes
1	8/26/2016	23:40	<i>Perimyotis subflavus</i>	F	A	PL	34	7.2	0	1	In	
1	8/26/2016	00:05	<i>Perimyotis subflavus</i>	F	A	PL	35	8.6	0	1	In	
3	9/27/2016	20:21	<i>Perimyotis subflavus</i>	M	A	TD	32	6.0	1	1	Out	Holes in tail and left wing membrane.
3	9/27/2016	20:48	<i>Perimyotis subflavus</i>	F	A	NR	33	7.4	0	1	Out	
3	9/27/2016	21:11	<i>Perimyotis subflavus</i>	F	A	PL	34	6.6	0	1	Out	
3	9/27/2016	22:04	<i>Perimyotis subflavus</i>	M	A	TD	34	6.7	0	1	Out	
5	9/28/2016	20:40	<i>Perimyotis subflavus</i>	F	A	PL	34	8.1	3	1	Out	Large portion of right wing receded.
5	9/28/2016	23:53	<i>Perimyotis subflavus</i>	-	-	-	-	-	-	1	In	Recapture of bat caught at 20:40.

A = Adult; M = Male; F = Female; PL = Post-lactating; TD = Testes Descended; NR = Non-Reproductive

## FIGURE



Source: World Imagery - Esri and the GIS User Community (2014); Project design provided by Palmer Engineering.



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**Legend**

- Mine Portal
- Proposed Disturbance Limits
- Proposed Roadway
- Proposed Bridge/Overpass
- Proposed Access Road
- Proposed Excess Material Site

0 200 400 800 1,200 1,600 Feet

NOTE: ALL PORTAL SURVEYS WERE PERFORMED BY REDWING ECOLOGICAL SERVICES, INC. BETWEEN SEPTEMBER 12 AND 28, 2016.



KENTUCKY HIGHWAY 15 WIDENING  
AND RECONSTRUCTION PROJECT  
PERRY COUNTY, KENTUCKY  
KYTC ITEM NO.10-158.00

REVISED DATE: 10-14-16 | DRAWN BY: BJD/SRB



MINE PORTAL  
LOCATION MAP

FIGURE 1



## **PHOTOGRAPHS**





Photograph 1: View of the harp trap at Portal 1. This portal was surveyed on September 12 and 26, 2016. September 12, 2016.



Photograph 2: View of the harp trap at Portal 2. This portal was surveyed on September 12 and 26, 2016. September 12, 2016.





Photograph 3: View of the harp trap at Portal 3. This portal was surveyed on September 13 and 27, 2016. September 13, 2016.



Photograph 4: View of the harp trap at Portal 4. This portal was surveyed on September 13 and 27, 2016. September 13, 2016.

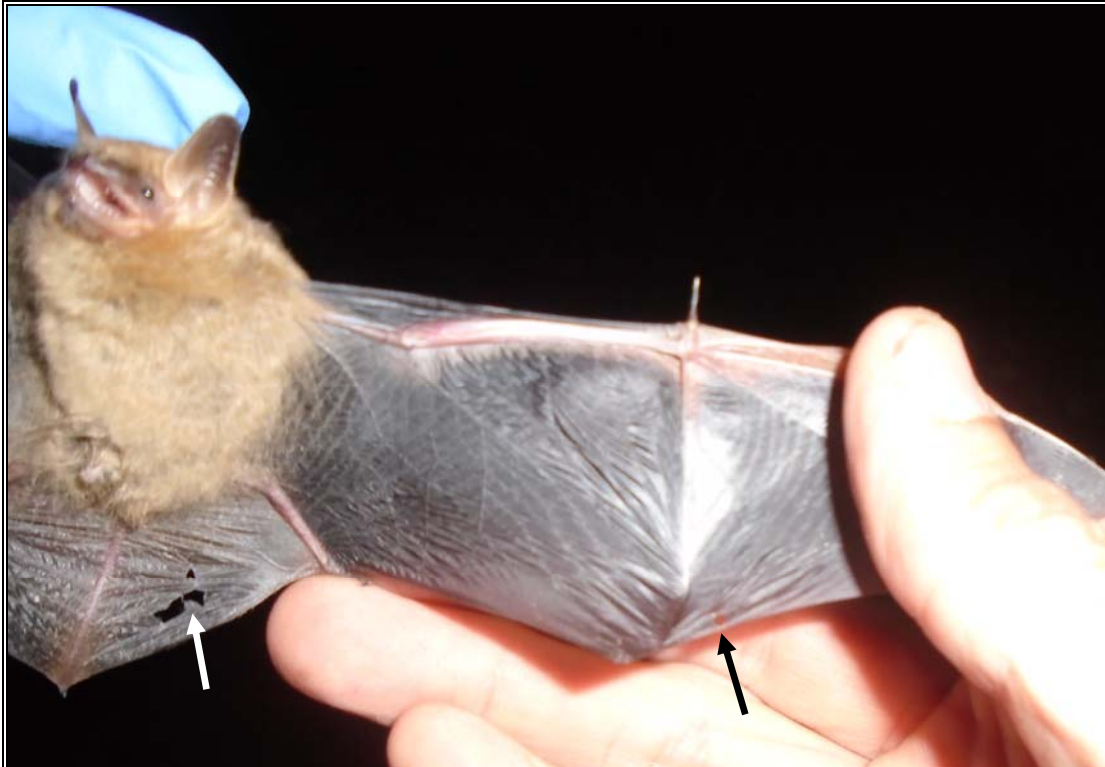




Photograph 5: View of the harp trap at Portal 5. This portal was surveyed on September 14 and 28, 2016. September 14, 2016.



Photograph 6: A tri-colored bat captured during the fall portal surveys. This was the only species captured during the surveys. September 26, 2016.



Photograph 7: View of the holes in the left uropatagium (white arrow) and chiropatagium (black arrow) of the tri-colored bat captured at Portal 3. September 27, 2016.



Photograph 8: View of the receded right plagiopatagium (black arrow) of the tri-colored bat captured at Portal 5. September 28, 2016.




# **APPENDIX A**

## **PHASE 1 HABITAT ASSESSMENT DATA SHEETS**



# PHASE 1 HABITAT ASSESSMENT DATA SHEET

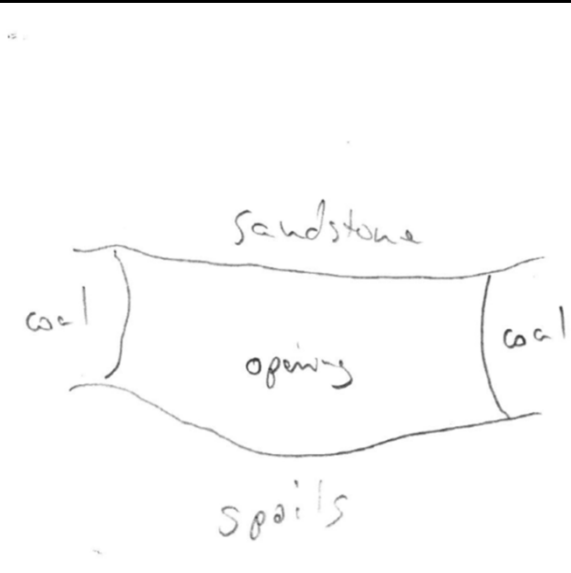

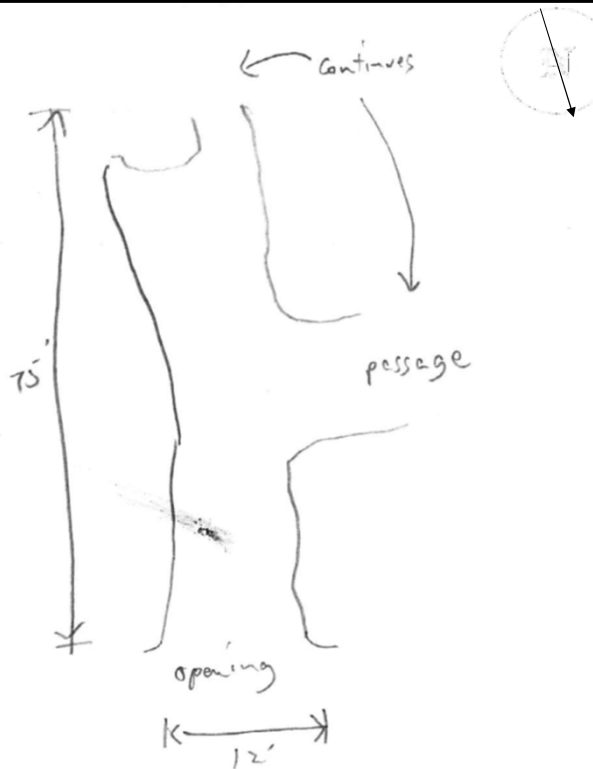
<b>Feature Name/#:</b> <u>Portal 1</u> <b>Date:</b> <u>7/26/2016</u> <b>Project:</b> <u>Kentucky Highway 15 Widening</u> <b>Project #:</b> <u>12-093</u> <b>Surveyors:</b> <u>B. Deetsch, S. Brower</u> <b>Signature:</b> _____	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.278976</u> <b>W</b> <u>-83.209733</u> <b>Camera/Photo #s:</b> <u>212-14</u>	<b>TERRESTRIAL HABITAT</b> <b>Habitat Type:</b> <u>Forest</u> <b>Canopy Cover:</b> <u>100</u> % <b>Dominant Tree/Shrub Species:</b> <u>American beech, green ash, tulip poplar</u> <b>Dominant Tree Diameter Range (inches):</b> <u>4-8</u> <b>Prime Maternity Trees Visible:</b> <u>Yes</u> <u>X</u> No	
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**OPENING CAN BE DISMISSED IF:**

- Horizontal opening that is less than six inches in diameter
- Vertical opening that is less than one foot in diameter
- Passage terminates less than 50 feet from entrance with no areas beyond that are accessible to bats
- Opening is prone to flooding, collapsed shut and completely sealed, or otherwise inaccessible to bats
- Opening has occurred within the past 12 months due to creation or subsidence


<b>OPENING</b> <b>Type:</b> <u>      </u> Cave <u>      </u> X <u>      </u> Mine Portal <u>      </u> Rock Shelter <u>      </u> Sinkhole <u>      </u> Other: _____ <b>Orientation:</b> <u>      </u> Vertical <u>      </u> X <u>      </u> Horizontal <b>Entrance Dimensions (feet):</b> <u>12</u> Width <u>3</u> Height <b>Entrance Stable:</b> <u>      </u> X <u>      </u> Yes <u>      </u> No <b>Outside Temperature (°F):</b> <u>80</u>	<b>INTERIOR CONDITIONS</b> <b>Interior Dimensions (feet):</b> <u>12</u> Width <u>4</u> Height <u>75+</u> Depth <b>Floor Slope:</b> <u>      </u> Up <u>      </u> Down <u>      </u> X <u>      </u> Flat <b>Temperature (°F):</b> <u>63</u> <b>Humidity (%):</b> <u>n/a</u> <b>Ceiling Conditions:</b> <u>      </u> Sloping <u>      </u> X <u>      </u> Flat <u>      </u> X <u>      </u> Wet <u>      </u> Dry <b>Evidence of Ceiling Collapse:</b> <u>      </u> X <u>      </u> Yes <u>      </u> No	<b>AIRFLOW</b> <u>      </u> In <u>      </u> X <u>      </u> Out <u>      </u> None <u>      </u> Slight <u>      </u> X <u>      </u> Moderate <u>      </u> Heavy <u>      </u> None  <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>      </u> X <u>      </u> None <b>Flooding:</b> <u>      </u> X <u>      </u> None <u>      </u> Flooded <u>      </u> Rack Line <b>Distance to nearest water (feet):</b> <u>approx. 700 (N Fork KY River)</u>
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<b>EVIDENCE OF USE</b> <u>      </u> X <u>      </u> None <b>Bat:</b> <u>      </u> Guano <u>      </u> Staining <u>      </u> Other: _____ <b>Human:</b> <u>      </u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor <b>Other Wildlife:</b> <u>      </u> Scat <u>      </u> Tracks <u>      </u> Other: _____	<b>BATS PRESENT</b> <u>      </u> X <u>      </u> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table>	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> 
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Additional Info (directions to site, fauna observed, local contacts)

# PHASE 1 HABITAT ASSESSMENT DATA SHEET

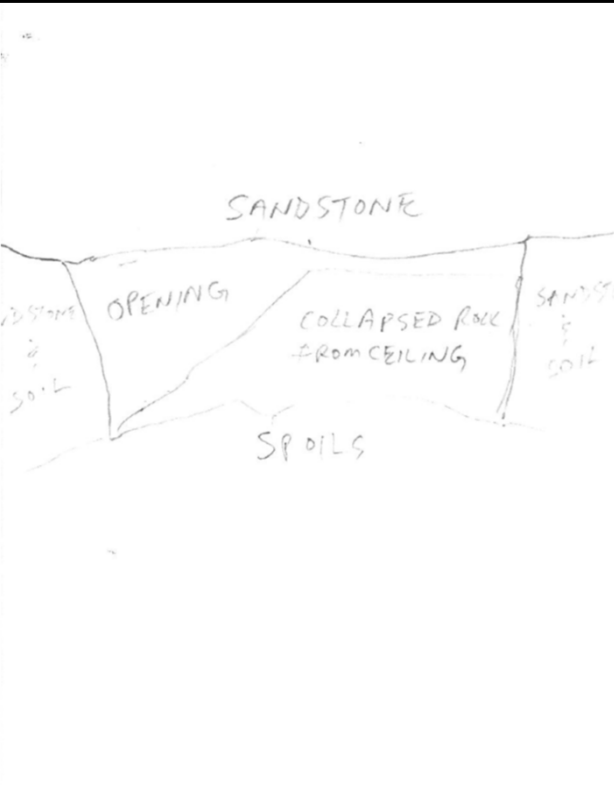
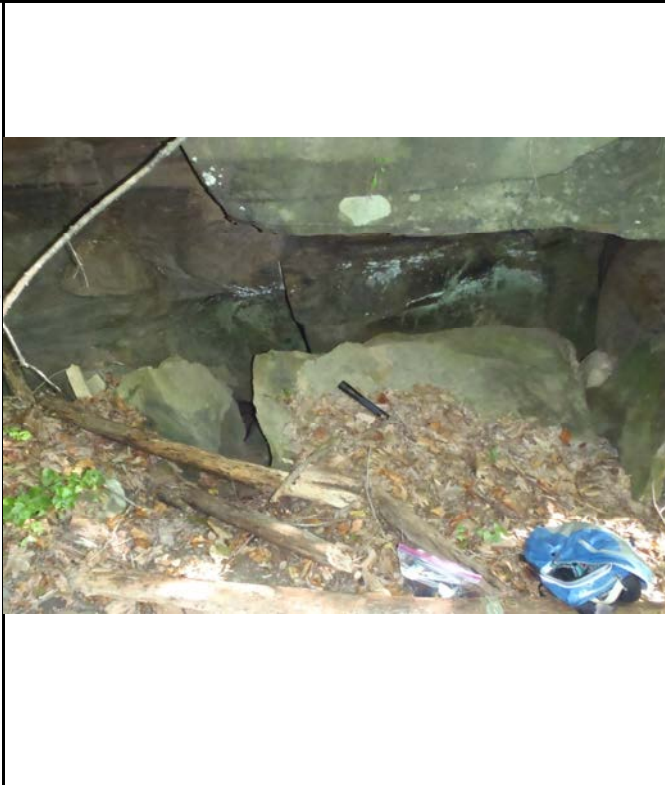

<b>Feature Name/#:</b> <u>Portal 2</u> <b>Date:</b> <u>7/26/2016</u> <b>Project:</b> <u>Kentucky Highway 15 Widening</u> <b>Project #:</b> <u>12-093</u> <b>Surveyors:</b> <u>B. Deetsch, S. Brower</u> <b>Signature:</b> _____	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.27151</u> <b>W</b> <u>-83.209951</u> <b>Camera/Photo #s:</b> <u>215-20</u>	<b>TERRESTRIAL HABITAT</b> <b>Habitat Type:</b> <u>Forest</u> <b>Canopy Cover:</b> <u>100</u> % <b>Dominant Tree/Shrub Species:</b> <u>sugar maple, tulip poplar</u> <b>Dominant Tree Diameter Range (inches):</b> <u>6-12</u> <b>Prime Maternity Trees Visible:</b> <u>Yes</u> <u>X</u> No	
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**OPENING CAN BE DISMISSED IF:**

- Horizontal opening that is less than six inches in diameter
- Vertical opening that is less than one foot in diameter
- Passage terminates less than 50 feet from entrance with no areas beyond that are accessible to bats
- Opening is prone to flooding, collapsed shut and completely sealed, or otherwise inaccessible to bats
- Opening has occurred within the past 12 months due to creation or subsidence


<b>OPENING</b> <b>Type:</b> <u>      </u> Cave <u>      </u> <u>X</u> Mine Portal <u>      </u> Rock Shelter <u>      </u> Sinkhole <u>      </u> Other: _____ <b>Orientation:</b> <u>      </u> Vertical <u>      </u> <u>X</u> Horizontal <b>Entrance Dimensions (feet):</b> <u>      </u> 3 <u>      </u> Width <u>      </u> 1.5 <u>      </u> Height <b>Entrance Stable:</b> <u>      </u> Yes <u>      </u> <u>X</u> No <b>Outside Temperature (°F):</b> <u>      </u> 80	<b>INTERIOR CONDITIONS</b> <b>Interior Dimensions (feet):</b> <u>      </u> 15 <u>      </u> Width <u>      </u> 3 <u>      </u> Height <u>      </u> 24+ <u>      </u> Depth <b>Floor Slope:</b> <u>      </u> Up <u>      </u> <u>X</u> Down <u>      </u> Flat <b>Temperature (°F):</b> <u>      </u> 60 <b>Humidity (%):</b> <u>      </u> n/a <b>Ceiling Conditions:</b> <u>      </u> Sloping <u>      </u> <u>X</u> Flat <u>      </u> <u>X</u> Wet <u>      </u> Dry <b>Evidence of Ceiling Collapse:</b> <u>      </u> Yes <u>      </u> <u>X</u> No	<b>AIRFLOW</b> <u>      </u> In <u>      </u> <u>X</u> Out <u>      </u> None <u>      </u> <u>X</u> Slight <u>      </u> Moderate <u>      </u> Heavy <u>      </u> None  <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>      </u> <u>X</u> None <b>Flooding:</b> <u>      </u> <u>X</u> None <u>      </u> Flooded <u>      </u> Rack Line <b>Distance to nearest water (feet):</b> <u>      </u> approx. 900 (N Fork KY River)
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<b>EVIDENCE OF USE</b> <u>      </u> None <b>Bat:</b> <u>      </u> Guano <u>      </u> Staining <u>      </u> Other: _____ <b>Human:</b> <u>      </u> <u>X</u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor <b>Other Wildlife:</b> <u>      </u> Scat <u>      </u> Tracks <u>      </u> Other: _____	<b>BATS PRESENT</b> <u>      </u> <u>X</u> None <table style="width:100%;"> <tr> <td style="width:33%;">Species <u>      </u></td> <td style="width:33%;">Number <u>      </u></td> <td style="width:33%;">Species <u>      </u></td> <td style="width:33%;">Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> </table>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>
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<b>SKETCH FACING OPENING</b>	<b>PHOTOGRAPH OF OPENING</b>	<b>SKETCH FROM ABOVE</b>
		

**Additional Info (directions to site, fauna observed, local contacts)** During rain events, water flows into portal.

# PHASE 1 HABITAT ASSESSMENT DATA SHEET



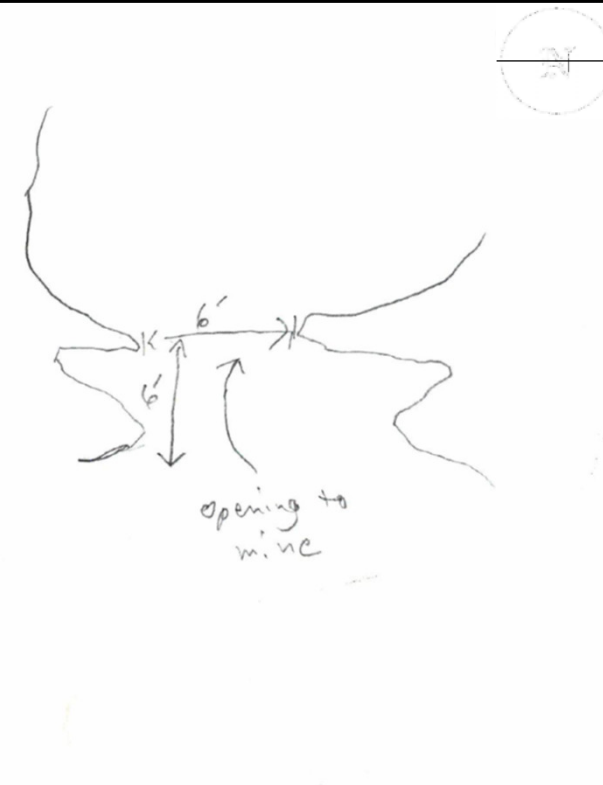
<b>Feature Name/#:</b> <u>Portal 3</u> <b>Date:</b> <u>8/19/2016</u> <b>Project:</b> <u>Kentucky Highway 15 Widening</u> <b>Project #:</b> <u>12-093</u> <b>Surveyors:</b> <u>B. Deetsch</u> <b>Signature:</b> _____	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.272747</u> <b>W</b> <u>-83.208536</u> <b>Camera/Photo #s:</b> <u>Ben's Phone</u>	<b>TERRESTRIAL HABITAT</b> <b>Habitat Type:</b> <u>Forest</u> <b>Canopy Cover:</b> <u>95</u> % <b>Dominant Tree/Shrub Species:</b> <u>sweet gum, tulip poplar,</u> <u>American beech</u> <b>Dominant Tree Diameter Range (inches):</b> <u>6-14</u> <b>Prime Maternity Trees Visible:</b> <u>Yes</u> <u>X</u> No	
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**OPENING CAN BE DISMISSED IF:**

- Horizontal opening that is less than six inches in diameter
- Vertical opening that is less than one foot in diameter
- Passage terminates less than 50 feet from entrance with no areas beyond that are accessible to bats
- Opening is prone to flooding, collapsed shut and completely sealed, or otherwise inaccessible to bats
- Opening has occurred within the past 12 months due to creation or subsidence


<b>OPENING</b> <b>Type:</b> <u>      </u> Cave <u>      </u> <u>X</u> Mine Portal <u>      </u> Rock Shelter <u>      </u> Sinkhole <b>Other:</b> _____ <b>Orientation:</b> <u>      </u> Vertical <u>      </u> <u>X</u> Horizontal <b>Entrance Dimensions (feet):</b> <u>6</u> Width <u>1</u> Height <b>Entrance Stable:</b> <u>      </u> Yes <u>      </u> <u>X</u> No <b>Outside Temperature (°F):</b> <u>76</u>	<b>INTERIOR CONDITIONS</b> <b>Interior Dimensions (feet):</b> <u>10</u> Width <u>2</u> Height <u>6+</u> Depth <b>Floor Slope:</b> <u>      </u> Up <u>      </u> Down <u>      </u> <u>X</u> Flat <b>Temperature (°F):</b> <u>64</u> <b>Humidity (%):</b> <u>n/a</u> <b>Ceiling Conditions:</b> <u>      </u> Sloping <u>      </u> <u>X</u> Flat <u>      </u> Wet <u>      </u> Dry <b>Evidence of Ceiling Collapse:</b> <u>      </u> <u>X</u> Yes <u>      </u> No	<b>AIRFLOW</b> <u>      </u> In <u>      </u> <u>X</u> Out <u>      </u> None <u>      </u> <u>X</u> Slight <u>      </u> Moderate <u>      </u> Heavy <u>      </u> None  <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>      </u> <u>X</u> None <b>Flooding:</b> <u>      </u> <u>X</u> None <u>      </u> Flooded <u>      </u> Rack Line <b>Distance to nearest water (feet):</b> <u>approx. 400 (N Fork KY River)</u>
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<b>EVIDENCE OF USE</b> <u>      </u> <u>X</u> None <b>Bat:</b> <u>      </u> Guano <u>      </u> Staining <b>Other:</b> _____ <b>Human:</b> <u>      </u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor <b>Other Wildlife:</b> <u>      </u> Scat <u>      </u> Tracks <b>Other:</b> _____	<b>BATS PRESENT</b> <u>      </u> <u>X</u> None <table style="width:100%;"> <tr> <td style="width:33%;">Species <u>      </u></td> <td style="width:33%;">Number <u>      </u></td> <td style="width:33%;">Species <u>      </u></td> <td style="width:33%;">Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> </table>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>
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<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> 
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Additional Info (directions to site, fauna observed, local contacts) Mine support beams present inside portal. Entrance is too unstable to fully inspect depth or interior dimensions.

# PHASE 1 HABITAT ASSESSMENT DATA SHEET

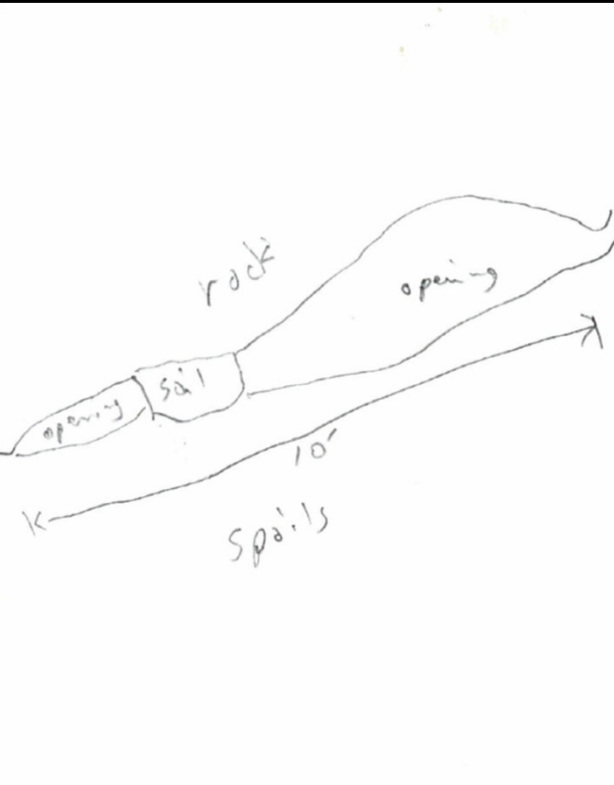

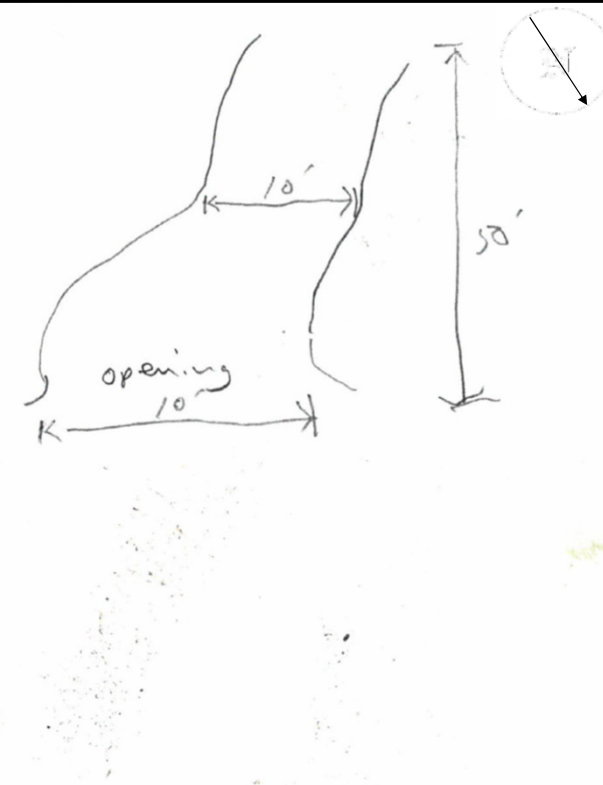
<b>Feature Name/#:</b> <u>Portal 4</u> <b>Date:</b> <u>8/19/2016</u> <b>Project:</b> <u>Kentucky Highway 15 Widening</u> <b>Project #:</b> <u>12-093</u> <b>Surveyors:</b> <u>B. Deetsch</u> <b>Signature:</b> _____	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.274065</u> <b>W</b> <u>-83.20913</u> <b>Camera/Photo #s:</b> <u>Ben's Phone</u>	<b>TERRESTRIAL HABITAT</b> <b>Habitat Type:</b> <u>Forest</u> <b>Canopy Cover:</b> <u>60</u> % <b>Dominant Tree/Shrub Species:</b> <u>tulip poplar, northern red oak</u> <b>Dominant Tree Diameter Range (inches):</b> <u>6-12</u> <b>Prime Maternity Trees Visible:</b> <u>Yes</u> <u>X</u> <u>No</u>	
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**OPENING CAN BE DISMISSED IF:**

- Horizontal opening that is less than six inches in diameter
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<b>OPENING</b> <b>Type:</b> <u>      </u> Cave <u>      </u> <u>X</u> Mine Portal <u>      </u> Rock Shelter <u>      </u> Sinkhole <b>Other:</b> _____ <b>Orientation:</b> <u>      </u> Vertical <u>      </u> <u>X</u> Horizontal <b>Entrance Dimensions (feet):</b> <u>10</u> Width <u>1.5</u> Height <b>Entrance Stable:</b> <u>      </u> <u>X</u> Yes <u>      </u> No <b>Outside Temperature (°F):</b> <u>77</u>	<b>INTERIOR CONDITIONS</b> <b>Interior Dimensions (feet):</b> <u>10</u> Width <u>2</u> Height <u>50+</u> Depth <b>Floor Slope:</b> <u>      </u> Up <u>      </u> Down <u>      </u> Flat <b>Temperature (°F):</b> <u>68</u> <b>Humidity (%):</b> <u>n/a</u> <b>Ceiling Conditions:</b> <u>      </u> Sloping <u>      </u> <u>X</u> Flat <u>      </u> Wet <u>      </u> <u>X</u> Dry <b>Evidence of Ceiling Collapse:</b> <u>      </u> <u>X</u> Yes <u>      </u> No	<b>AIRFLOW</b> <u>      </u> <u>X</u> In <u>      </u> Out <u>      </u> None <u>      </u> <u>X</u> Slight <u>      </u> Moderate <u>      </u> Heavy <u>      </u> None  <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>      </u> <u>X</u> None <b>Flooding:</b> <u>      </u> <u>X</u> None <u>      </u> Flooded <u>      </u> Rack Line <b>Distance to nearest water (feet):</b> <u>approx. 400 (N Fork KY River)</u>
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<b>EVIDENCE OF USE</b> <u>      </u> None <b>Bat:</b> <u>      </u> Guano <u>      </u> Staining <b>Other:</b> _____ <b>Human:</b> <u>      </u> <u>X</u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor <b>Other Wildlife:</b> <u>      </u> Scat <u>      </u> Tracks <b>Other:</b> _____	<b>BATS PRESENT</b> <u>      </u> <u>X</u> None <table style="width:100%;"> <tr> <td style="width:33%;">Species <u>      </u></td> <td style="width:33%;">Number <u>      </u></td> <td style="width:33%;">Species <u>      </u></td> <td style="width:33%;">Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> </table>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>
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<b>SKETCH FACING OPENING</b>	<b>PHOTOGRAPH OF OPENING</b>	<b>SKETCH FROM ABOVE</b>
		

Additional Info (directions to site, fauna observed, local contacts)



# PHASE 1 HABITAT ASSESSMENT DATA SHEET



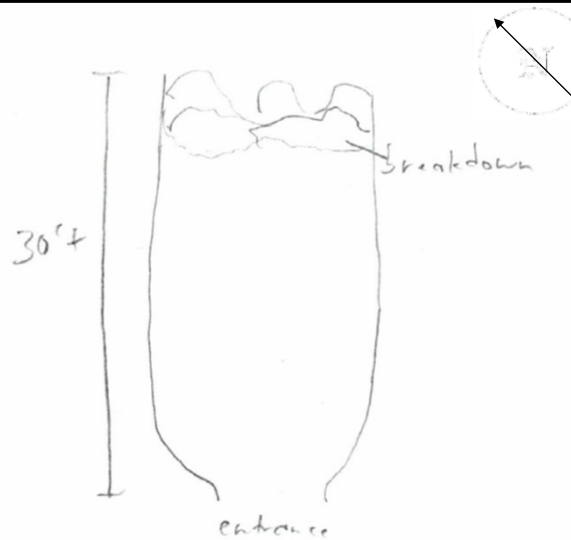
<b>Feature Name/#:</b> <u>Portal 5</u> <b>Date:</b> <u>9/13/2016</u> <b>Project:</b> <u>Kentucky Highway 15 Widening</u> <b>Project #:</b> <u>12-093</u> <b>Surveyors:</b> <u>S. Bishop, B. Deetsch</u> <b>Signature:</b> _____	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.278611</u> <b>W</b> <u>-83.213734</u> <b>Camera/Photo #s:</b> <u>273-84</u>	<b>TERRESTRIAL HABITAT</b> <b>Habitat Type:</b> <u>Forest</u> <b>Canopy Cover:</b> <u>95</u> % <b>Dominant Tree/Shrub Species:</b> <u>tulip poplar, sugar maple, chestnut oak</u> <b>Dominant Tree Diameter Range (inches):</b> <u>6-12</u> <b>Prime Maternity Trees Visible:</b> <u>Yes</u> <u>X</u> <u>No</u>	
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<b>OPENING</b> <b>Type:</b> <u>      </u> Cave <u>      </u> <u>X</u> Mine Portal <u>      </u> Rock Shelter <u>      </u> Sinkhole <b>Other:</b> _____ <b>Orientation:</b> <u>      </u> Vertical <u>      </u> <u>X</u> Horizontal <b>Entrance Dimensions (feet):</b> <u>4</u> Width <u>1</u> Height <b>Entrance Stable:</b> <u>      </u> Yes <u>      </u> <u>X</u> No <b>Outside Temperature (°F):</b> <u>81</u>	<b>INTERIOR CONDITIONS</b> <b>Interior Dimensions (feet):</b> <u>10</u> Width <u>4</u> Height <u>30+</u> Depth <b>Floor Slope:</b> <u>      </u> <u>X</u> Up <u>      </u> Down <u>      </u> Flat <b>Temperature (°F):</b> _____ <b>Humidity (%):</b> <u>n/a</u> <b>Ceiling Conditions:</b> <u>      </u> Sloping <u>      </u> Flat <u>      </u> Wet <u>      </u> Dry <b>Evidence of Ceiling Collapse:</b> <u>      </u> <u>X</u> Yes <u>      </u> No	<b>AIRFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> None <u>      </u> Slight <u>      </u> Moderate <u>      </u> Heavy <u>      </u> None  <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>      </u> <u>X</u> None <b>Flooding:</b> <u>      </u> <u>X</u> None <u>      </u> Flooded <u>      </u> Rack Line <b>Distance to nearest water (feet):</b> <u>approx. 400 (N Fork KY River)</u>
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<b>EVIDENCE OF USE</b> <u>      </u> None <b>Bat:</b> <u>      </u> Guano <u>      </u> Staining <b>Other:</b> _____ <b>Human:</b> <u>      </u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor <b>Other Wildlife:</b> <u>      </u> <u>X</u> Scat <u>      </u> Tracks <b>Other:</b> _____	<b>BATS PRESENT</b> <u>      </u> <u>X</u> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table>	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> 
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Additional Info (directions to site, fauna observed, local contacts) Could not see ceiling or record some other interior features due to small size of entrance and spoil pile in front of entrance.

## **APPENDIX B**

### **USFWS PROJECT PROPOSAL AND AGENCY CORRESPONDENCE**

### Appendix 3: USFWS Project Proposal Form

#### CONTACT INFORMATION

Permittee Name: Seth Bishop  
KDFWR SC Permit # SC1611033 Section 10 USFWS Permit # TE151107-3  
Institution/Company Name (as on Permit): Redwing Ecological Services, Inc.  
Address: 1139 S. Fourth St.  
City: Louisville State: KY Zip: 40203  
Email address: sbishop@redwingeco.com  
Phone #: (502) 625-3009

#### PROPOSED PROJECT OR ACTIVITY INFORMATION

County: Perry Quad: Hazard North  
Project location: latitude: 37.279056° longitude: 83.207025°

(Please include an 8.5" x 11" topo or aerial map with project/activity location and proposed sites identified)

USFWS Project Number (if known): \_\_\_\_\_  
Mining Project ☐ SMCRA Permit Number: \_\_\_\_\_  
Transportation Project ☒ KYTC Item Number: 10-158.00  
Utility Project: \_\_\_\_\_  
AML Project: \_\_\_\_\_  
Other: \_\_\_\_\_

Acres of suitable Indiana bat habitat within project/activity area: \_\_\_\_\_  
Is the project/activity linear? Yes: ☒ No: ☐  
If yes, indicate length of suitable Indiana bat habitat in km (mi): \_\_\_\_\_  
Are caves or portals present? Yes: ☒ No: ☐

#### METHODOLOGY & SURVEY EFFORT

Coordinates of cave/portal (if multiple, please provide locations on project map): latitude: See map longitude: See map  
Name of cave (if known): \_\_\_\_\_  
Estimated Start Date of Fieldwork: September 12, 2016  
Number of Acoustic Nights: \_\_\_\_\_ Number of Mist Net/Harp Trap Nights: 10 (2 per portal)  
Approved acoustic analysis software utilized for bat call identification (please ensure you are using the latest version):  
BCID ☐ EchoClass ☐ Kaleidoscope Pro ☐  
Other: \_\_\_\_\_

*Seth Bishop*

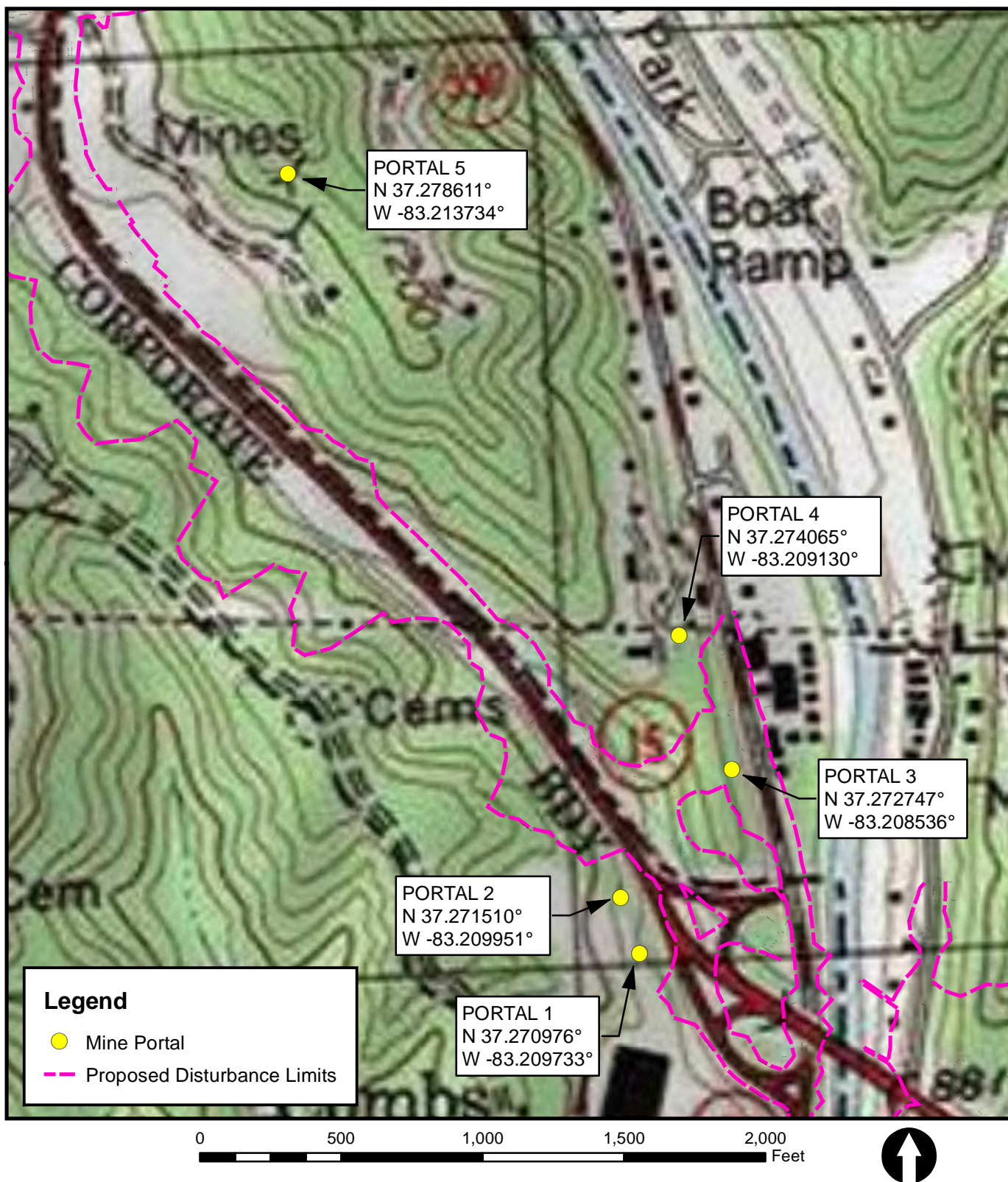
Signature

8/29/16

Date



Source: USA Topo Maps, 2013 National Geographic Society, USGS 7.5-minute Topographic Map - Hazard North, Kentucky Quadrangle.



KENTUCKY 15 WIDENING AND  
RECONSTRUCTION PROJECT  
PERRY COUNTY, KENTUCKY  
KYTC ITEM NO. 10-158.00



PROJECT PROPOSAL  
MAP

REVISED DATE: 08/29/16 | DRAWN BY: SRB

FIGURE 1

## Seth Bishop

---

**From:** DeGarmo, Phil <phil\_degarmo@fws.gov>  
**Sent:** Monday, September 12, 2016 1:15 PM  
**To:** Seth Bishop  
**Subject:** Re: Fall survey project proposal for KY 15 (KYTC 10-158)

Seth,

The U.S. Fish and Wildlife Service has reviewed your proposal and approve of the methodologies. Please proceed with the survey. If you have any questions, please let me or Mike Armstrong know. Future correspondence, please reference FWS 2013-B-0544. Thanks

--

Phil DeGarmo  
U.S. Fish and Wildlife Service  
KY Ecological Services Field Office  
330 West Broadway, Rm 265  
Frankfort, Kentucky 40601

Office: 502-695-0468 x110  
Fax: 502-695-1024  
Cell: 502-229-8830  
[Phil\\_DeGarmo@fws.gov](mailto:Phil_DeGarmo@fws.gov)



## Seth Bishop

---

**From:** Carr, Sunni (FW) <Sunni.Carr@ky.gov>  
**Sent:** Tuesday, August 30, 2016 12:40 PM  
**To:** Seth Bishop  
**Subject:** RE: Project Proposal for KY 15 Widening and Reconstruction Project, Perry County

Thank you for your project notification.  
Hoping the wx cooperates for your survey.  
Sunni

*Sunni L. Carr*

Wildlife Diversity Coordinator  
Kentucky Dept. of Fish and Wildlife Resources  
#1 Sportsman's Lane  
Frankfort, Kentucky 40601  
sunni.carr@ky.gov  
Office 800-858-1549 ext 4446

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**From:** Seth Bishop [mailto:sbishop@redwingeco.com]  
**Sent:** Monday, August 29, 2016 11:12 AM  
**To:** Hyatt, Teresa; Carr, Sunni (FW)  
**Cc:** Richard Clausen; Benjamin Deetsch  
**Subject:** RE: Project Proposal for KY 15 Widening and Reconstruction Project, Perry County

The attachment I sent previously has the wrong date on the proposal form. A revised proposal is attached.

---

**From:** Seth Bishop  
**Sent:** Monday, August 29, 2016 10:45 AM  
**To:** 'Hyatt, Teresa' <[teresa\\_hyatt@fws.gov](mailto:teresa_hyatt@fws.gov)>; [sunni.carr@ky.gov](mailto:sunni.carr@ky.gov)  
**Cc:** Richard Clausen <[rclausen@redwingeco.com](mailto:rclausen@redwingeco.com)>; Benjamin Deetsch <[bdeetsch@redwingeco.com](mailto:bdeetsch@redwingeco.com)>  
**Subject:** Project Proposal for KY 15 Widening and Reconstruction Project, Perry County

Teresa and Sunni,

Attached is a project proposal for a fall survey of five abandoned mine portals associated with the KY 15 Widening and Reconstruction Project (KYTC Item 10-158.00) in Perry County, Kentucky. We are planning to start the survey on September 12, 2016.

Please let me know if you have any questions or need additional information.

Thanks,  
Seth

**Seth R. Bishop**  
Project Ecologist  
Redwing Ecological Services, Inc.  
1139 South Fourth Street  
Louisville, Kentucky 40203

# **APPENDIX C**

## **FALL PORTAL SURVEY DATA SHEETS**



## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 1Date: September 12, 2016Project: KY-15Project #: 12-093State: KentuckyCounty: PerryPersonnel: B. Deutsch / C. Blavins (Palmer)Quad: Hazard NorthMoon Phase: Waxing Gibbous / 82.8%Moon Visible at Site: Yes - through tree canopy  
trap not illuminatedCamera: Lumix

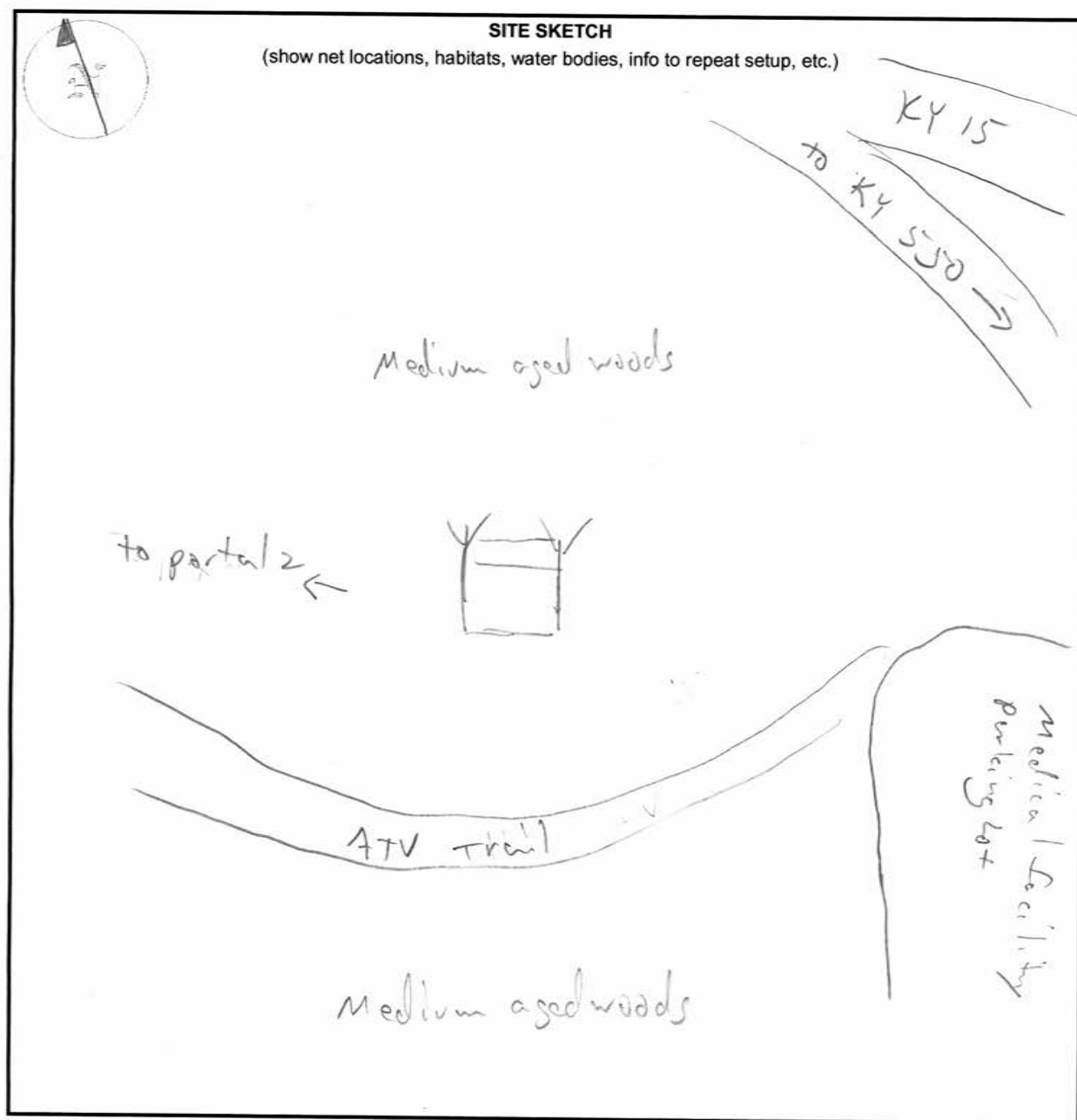
	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:45	82	0	0	///
	20:45	73	0	0	0
	21:45	72	0	0	0
	22:45	70	0	0	0
	23:55	69	0	0	0
End	00:45	70	0	0	0
Total					0

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 1Date: September 12, 2016

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	37.278976, -83.209733	265-267
Trap 2		
Trap 3		
Trap 4		

Camera: Linix

Site/Habitat Description:

Mine portal  
in medium aged woods

Dominant overstory species:

tulip poplar  
sugar maple, sycamore  
american beech

Dominant understory species:

flowering dogwood  
sugar maple

Notes:



## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 1 Date: 9/26/16  
 Project: KY 15 Project #: 12-093  
 State: KY County: Perry  
 Personnel: S. Bishop, C. Blawie Quad: Hazard North  
 Moon Phase: Waning crescent 15 % Moon Visible at Site: No

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:25	72	2	0	
	20:25	71	3	0	0
	21:25	70	3	0	0
	22:25	68	3	0	0
	23:25	68	3	0	0
End	60:25	66	3	0	2
Total					

Camera: Pentax

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	23:40	PESU	F	Adult	PL	34	7.2	0	1	IN	349-357	
2	00:05	PESU	F	Adult	PL	35	8.6	0	1	IN	358-364	
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique:

Yellow paint on lower back

## CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)

N

Same as  
last nightSite: Portal 1Date: 9/26/16

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	↑	
Trap 2		
Trap 3		
Trap 4		

Camera: \_\_\_\_\_

Site/Habitat Description: \_\_\_\_\_

Same

Dominant overstory species: \_\_\_\_\_

Dominant understory species: \_\_\_\_\_

Notes: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 2Date: 9/12/16Project: KY 15Project #: 12-093State: KYCounty: PerryPersonnel: S. Bishop, R. SchulerQuad: Hazard NorthMoon Phase: Waxing gibbous 182 %Moon Visible at Site: YesCamera: Canon

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:45	77	1	0	
	20:45	70	1	0	0
	21:45	69	1	0	0
	22:45	68	1	0	0
	23:45	65	1	0	0
End	00:45	64	1	0	0
Total					0

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

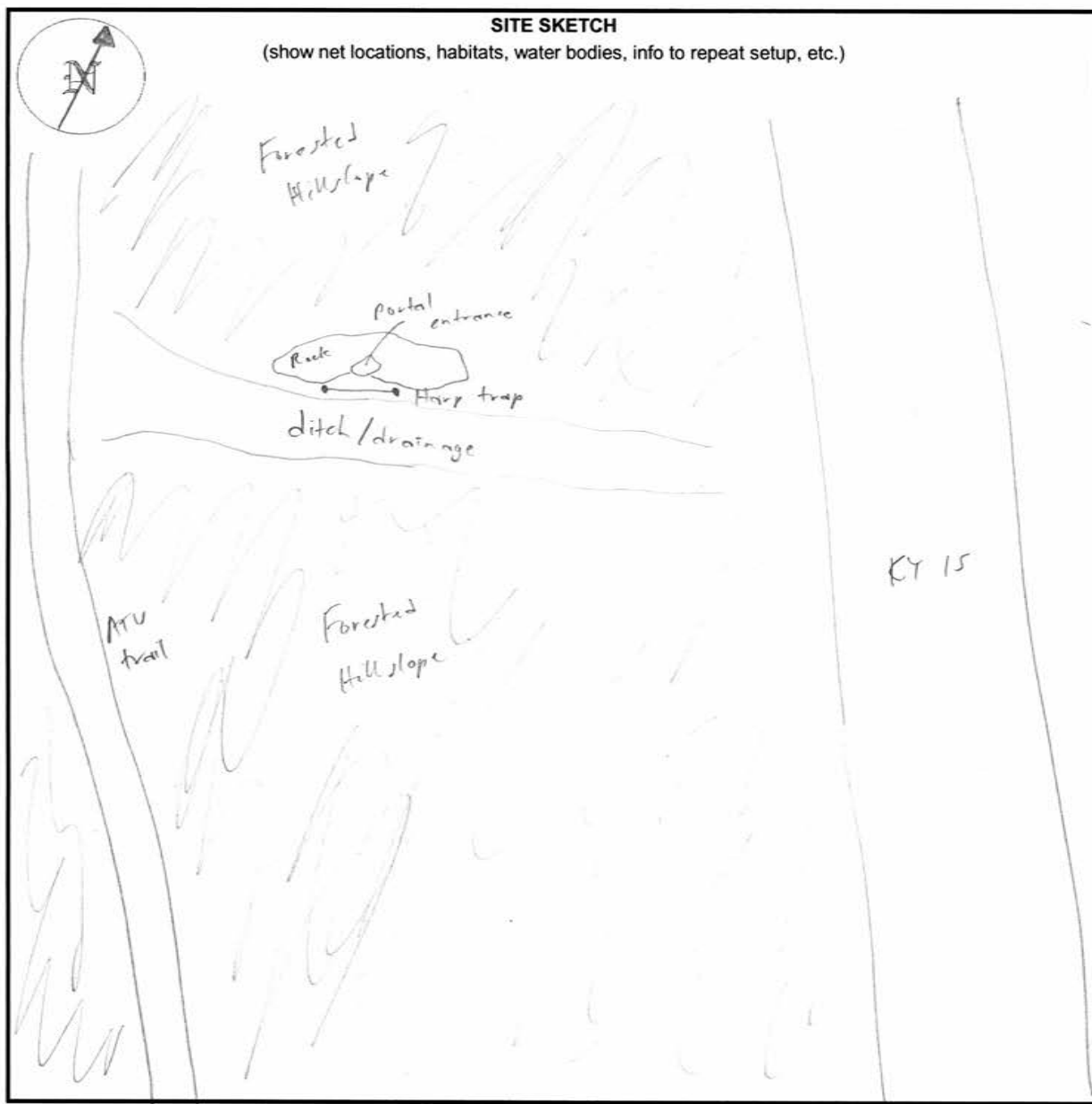
Marking Technique: \_\_\_\_\_



# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Site: Portal 2

Date: 9/12/16

	Harp Trap			
	1	2	3	4
Width (ft)	5			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	37.271510, -83.209951	269-71
Trap 2		
Trap 3		
Trap 4		

Camera: Lumix

Site/Habitat Description: Forested hillside  
above KY 15, near N Fork KY River

Dominant overstory species: tulip poplar,  
sycamore, basswood, sugar maple

Dominant understory species: paw paw,  
flowering dogwood, multiflora rose,  
green ash

Notes: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 2Date: 9/26/16Project: KY 15Project #: 12-093State: KentuckyCounty: PerryPersonnel: B. Deetsch / R. SchulerQuad: Hazard NorthMoon Phase: Waning Crescent 15.4 %Moon Visible at Site: NoCamera: Sony 1

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:26	72	3	0	
	20:26	70	0	0	0
	21:26	68	3	0	0
	22:26	64	3	0	0
End	23:24	67	3	0	0
	24:24	63	3	0	0
Total					0

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: \_\_\_\_\_

# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Same as previous setup

Site: Portal 2

Date: 9/26/16

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	6			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1		
Trap 2		
Trap 3		
Trap 4		

Camera: \_\_\_\_\_

Site/Habitat Description: \_\_\_\_\_

Same

Dominant overstory species: \_\_\_\_\_

Dominant understory species: \_\_\_\_\_

Notes: \_\_\_\_\_



## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 3Date: 9/13/16Project: KY 15Project #: 12-093State: KYCounty: PerryPersonnel: J. Bishop, V. HolbrookQuad: Hazard NorthMoon Phase: Waning gibbous 1 90 %Moon Visible at Site: YesCamera: Canon

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:45	79	1	0	
	20:45	74	1	0	0
	21:45	72	1	0	0
	22:45	71	1	0	0
	23:45	70	1	0	0
End	00:45	69	1	0	0
	Total				0

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
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17												
18												
19												
20												
21												
22												
23												
24												
25												

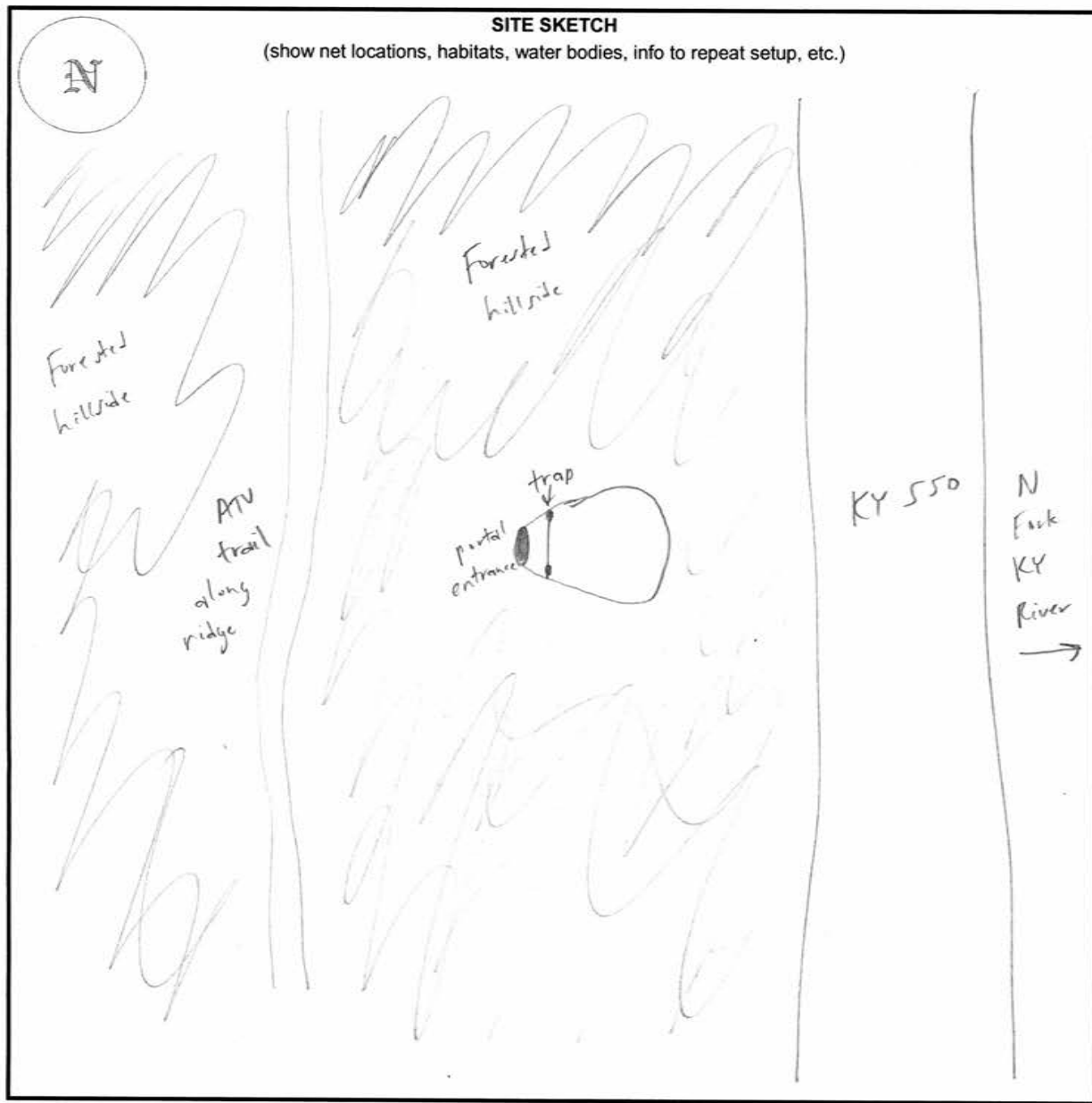
<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: \_\_\_\_\_

# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Site: Portal 3

Date: 9/13/16

	Harp Trap			
	1	2	3	4
Width (ft)	5			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	37.272747, -83.268536	285-89
Trap 2		
Trap 3		
Trap 4		

Camera: Lumix

Site/Habitat Description: Forested hillside, along KY 550, N of N Fork KY River

Dominant overstory species: sugar maple, sycamore, sourwood, green ash

Dominant understory species: flowering dogwood, beech, sweet gum

Notes: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 3Date: 9/27/16Project: KY-15Project #: 12-093State: KentuckyCounty: PerryPersonnel: D. Dauter / R. SchulerQuad: Hazard NorthMoon Phase: Waning Crescent, 8.7 %Moon Visible at Site: NoCamera: Sample 1

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:21	73	0	0	
	20:21	70	0	0	1
	21:21	66	0	0	2
	22:21	63	0	0	1
	23:21	61	0	0	0
End	04:21	59	0	0	0
	Total				4

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	20:21	PSUB	M	Adult	TD	32	6.0	1	1	OUT?	4573-2	Small hole left arm mem.
2	—	—	—	—	—	—	—	—	—	—	4584	Tail mem. huge hole
3	20:48	PSUB	F	Adult	NR	33	7.4	0	1	Out?	4585-4591	
4	21:11	PSUB	F	Adult	PL	34	6.6	0	1	out?	NA	
5	22:04	PSUB	M	Adult	TD	34	6.7	0	1	out	NA	
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)Marking Technique: Red dorsal right arm



## CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)

A

Same as previous setup

Site:

Portal 3

Date:

9/27/16

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	6			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1		
Trap 2		
Trap 3		
Trap 4		

Camera: \_\_\_\_\_

Site/Habitat Description: \_\_\_\_\_

Same

Dominant overstory species: \_\_\_\_\_

Dominant understory species: \_\_\_\_\_

Notes:

Bat 1 did not have splashes but had holes in membrane

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 4Date: September 13, 2016Project: KY15Project #: 12-093State: KentuckyCounty: PerryPersonnel: B. Daetsch/R. SchulerQuad: Hazard NorthMoon Phase: Waxing Gibbous 1 90 %Moon Visible at Site: Yes - Not illuminated due to tree coverCamera: Linux

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:42	82	0	0	
	20:42	79	0	0	0
	21:42	75	0	0	0
	22:42	73	0	0	0
	23:42	75	0	0	0
End	00:42	72	0	0	0
Total					0

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
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17												
18												
19												
20												
21												
22												
23												
24												
25												

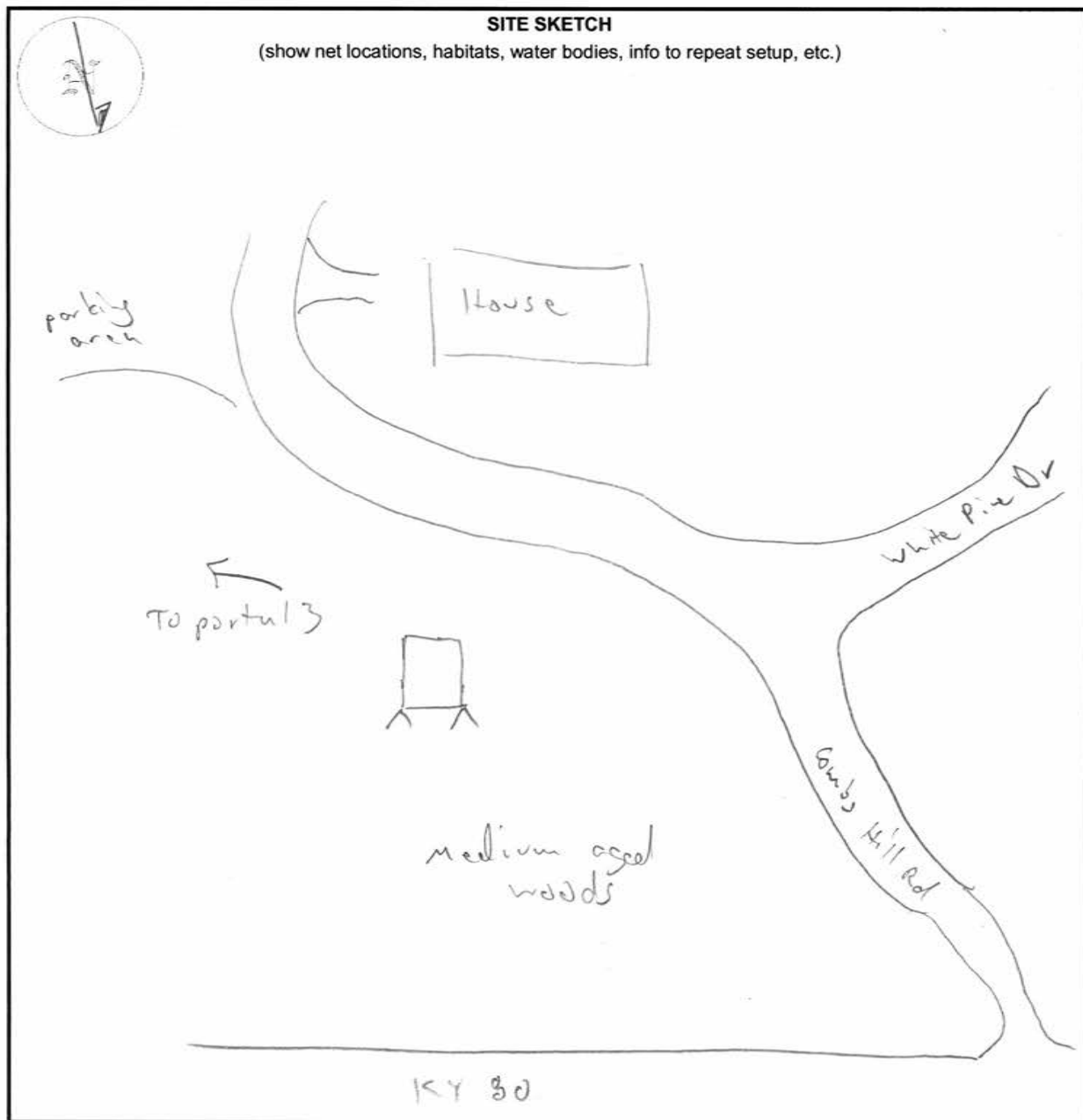
<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: \_\_\_\_\_

# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Site: Portal 1

Date: September 13, 2011

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	37.274065, -83.209170	291-294
Trap 2		
Trap 3		
Trap 4		

Camera: Lucy

Site/Habitat Description: at mine portal  
below Gumbo Hill Rd. site is in  
medium aged woods with lots of  
trash

Dominant overstory species: red maple  
tulip poplar, sweet gum

Dominant understory species: sugar maple  
paupaw, red mulberry

Notes: \_\_\_\_\_



## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 4Date: 9/27/16Project: KY 15Project #: 12-093State: KYCounty: PerryPersonnel: J. Bishop, J. TottyQuad: Hazard NorthMoon Phase: Waning crescent 19 %Moon Visible at Site: NoCamera: Pentax

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:25	73	0	0	
	20:25	63	0	0	0
	21:25	59	0	0	0
	22:25	56	0	0	0
	23:25	55	0	0	0
End	00:25	53	0	0	0
Total					0

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)

N

Same as  
1st nightSite: Portal 4Date: 9/27/16

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1		
Trap 2		
Trap 3		
Trap 4		

Camera: \_\_\_\_\_

Site/Habitat Description: \_\_\_\_\_

Same

Dominant overstory species: \_\_\_\_\_

Dominant understory species: \_\_\_\_\_

Notes: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 5 Date: 9/14/16  
 Project: KY 15 Project #: 12-093  
 State: KY County: Perry  
 Personnel: S. Bishop, R. Schuler, V. Holbrook Quad: Hazard North

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:45	87	0	0	
	20:45	78	0	0	0
	21:45	73	0	0	0
	22:45	71	0	0	0
End	23:45	69	0	0	0
	00:45	68	0	0	0
	Total				0

Moon Phase: waning gibbous 1 95 % Moon Visible at Site: No

Camera: Canon

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive

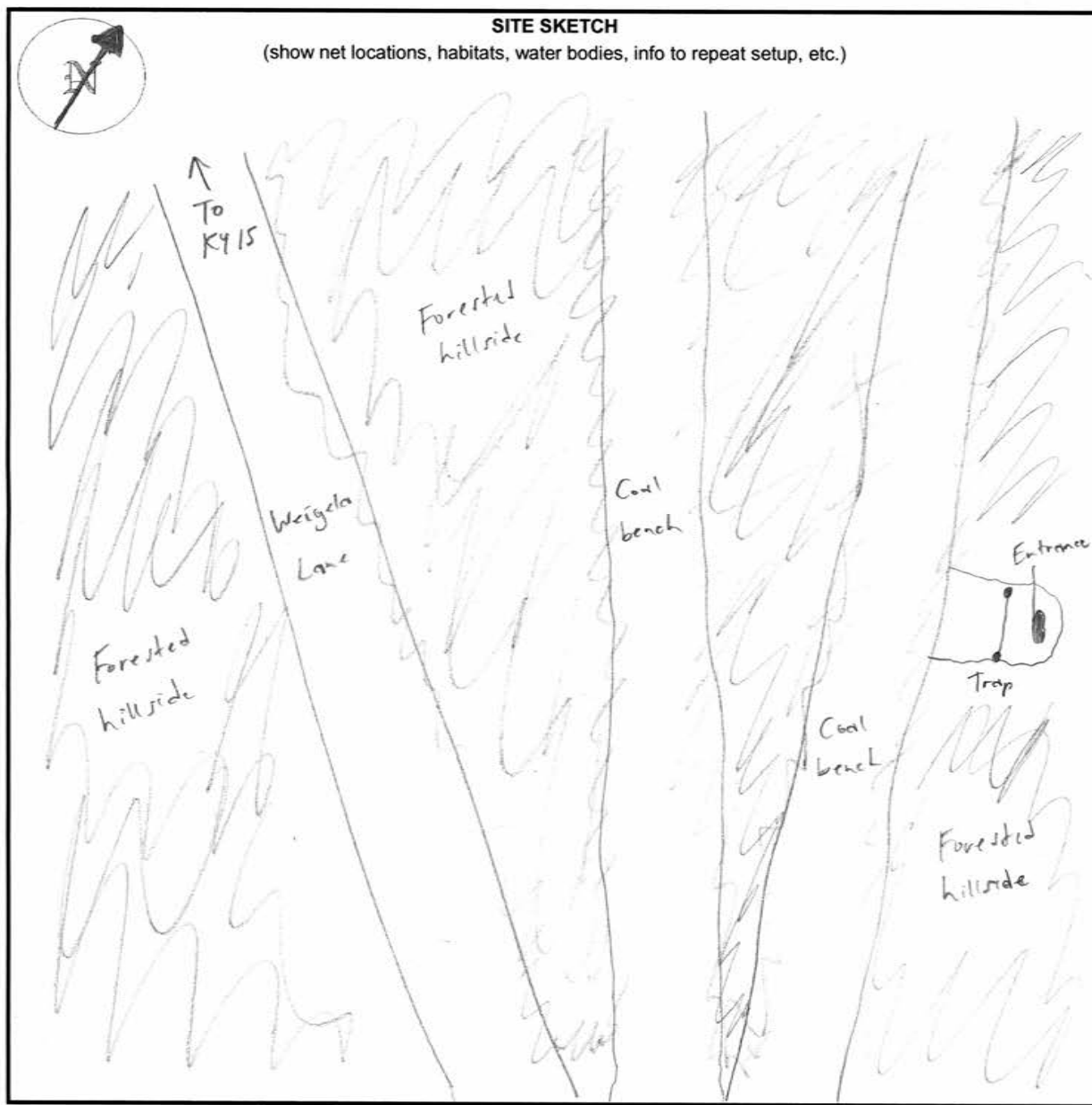
<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: \_\_\_\_\_



# CAVE/PORTAL SURVEY DATA SHEET



Site: Portal 5

Date: 9/14/16

	Harp Trap			
	1	2	3	4
Width (ft)	5			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	37.278611, -83.213734	620-21
Trap 2		
Trap 3		
Trap 4		

Camera: Canon

Site/Habitat Description: Forested hillside  
E of KY 15; along old coal bench

Dominant overstory species: sugar maple,  
tulip poplar, beech

Dominant understory species: green ash,  
saplings of overstory species, tree-of-  
heaven

Notes: \_\_\_\_\_

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 5Date: 9/28/16Project: KY-15Project #: 12-093State: KentuckyCounty: PerryPersonnel: B. Deutsch / J. Totty (Palmer)Quad: Hazard NorthMoon Phase: Waning Crescent 13.3 %Moon Visible at Site: No

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:20	75	3	1	
	20:21	66	3	1	0
	21:20	58	3	0	1
	22:20	59	3	0	0
	23:55	59	5	0	1
End	00:00	59	3	0	0
Total					1

Camera: Sony 1

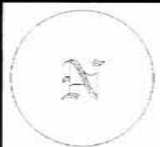
	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	20:40	P. Sub	F	A	PL	34.0	8.09	3	01	Out	4592-9594	
2	23:53	P. Sub	—	—	—	—	—	—	1	In	—	*RECAPTURE*
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)Marking Technique: Green Paint on Tail Membrane

## CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Same as previous

Site: Portal 5Date: 9/28/16

	Harp Trap			
	1	2	3	4
Width (ft)	6			
Height (ft)	6			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1		
Trap 2		
Trap 3		
Trap 4		

Camera: \_\_\_\_\_

Site/Habitat Description: \_\_\_\_\_

Same

Dominant overstory species: \_\_\_\_\_

Dominant understory species: \_\_\_\_\_

Notes:

Started raining at 23:12 / stopped at 23:32  
 Extended survey by 20 minutes due to rain



## Mullins, Ellen M (KYTC)

---

**From:** DeGarmo, Phil <phil\_degarmo@fws.gov>  
**Sent:** Thursday, July 14, 2016 5:27 PM  
**To:** Waldner, David M (KYTC); Harmon, Dave L (KYTC); Mullins, Ellen M (KYTC); Vinegar, Tony L (KYTC)  
**Subject:** KYTC 10-158 response; FWS 2013-B-0544

Dear Mr. Waldner,

Thank you for your letter and Biological Assessment (BA) dated March 2016 evaluating the potential effects of the subject project on the federally listed Indiana bat, gray bat, and Northern long-eared bat (NLEB). We have reviewed the document and your effects determinations on the aforementioned species and offer the following comments.

The proposed project involves improvements of KY-15 from Boone Ridge Road to the KY-15 bypass in Perry County, Kentucky. According to KYTC, the proposed action does not require impacts to habitat for federally listed Kentucky arrow darter; therefore, KYTC has made a determination of "no effect" on this species. KYTC's documentation of this determination is to be maintained on file at KYTC.

Field assessments identified six potential roosting habitat/hibernacula sites for the aforementioned bat species. Based upon the information provided in the BA and the negative results of a fall portal survey conducted in September 2015, it is unlikely that these six portals harbor federally-listed bat species. The proposed project does require removal of suitable summer roosting habitat for the Indiana bat and NLEB. KYTC has determined that the action will "may affect, likely to adversely affect" the Indiana bat and proposes to account for these adverse effects to summer roosting habitat through the processes identified in the Interim Programmatic Agreement for Forest Dwelling bats between FHWA, KYTC, and the USFWS. The USFWS concurs with KYTC's determination for the Indiana bat and agrees with the proposed compliance process.

KYTC has determined that the proposed action is consistent with the NLEB final 4(d) rule and the Service's January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB. The project does not (1) propose impacts to any known NLEB hibernacula; (2) propose tree clearing within 0.25-mile of a known NLEB hibernacula; or, (3) propose cutting or destroying known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31. This project may affect the NLEB; however, there are no effects beyond those previously disclosed in the Service's BO. Any taking that may occur incidental to this project is not prohibited under the final 4(d) rule (50 CFR §17.40(o)). Therefore, the programmatic biological opinion satisfies KYTC/FHWA responsibilities under ESA section 7(a)(2) relative to the NLEB for this project.

As mentioned above, a habitat assessment for year round roosting habitat for the gray bat determined that no suitable/occupied habitat would be impacted; however, KYTC has committed to sediment and erosion control measures in the BA (pages 13-14) in order to minimize potential adverse effects on gray bat foraging habitat. Based on our review of the information provided, we concur with KYTC's determination that the proposed action will "may affect, not likely to adversely affect" the gray bat.

This concludes consultation with the Service and no further action per section 7 of the ESA is required unless the project is modified, a new species is listed, and/or there is additional information not considered as part of this consultation. If you have any questions, please contact me at the information provided below.

Sincerely,

Phil DeGarmo

--

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U.S. Fish and Wildlife Service  
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## BIOLOGICAL ASSESSMENT

for the

Indiana Bat (*Myotis sodalis*), Gray Bat (*Myotis grisescens*),  
and Northern Long-eared Bat (*Myotis septentrionalis*)

Improvements to KY 15 from Boone Ridge Road  
to KY 15 Bypass, Perry County, Kentucky  
KYTC Item No. 10-158.00



Prepared for  
Kentucky Transportation Cabinet  
Division of Environmental Analysis  
and  
Department of Highways District 10

March 2016

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## 1.0 Introduction

Perry County is located within the Dissected Appalachian Plateau (69d) of the Central Appalachians. The area is composed of narrow ridges, deep coves, and narrow valleys and is mostly forested. The meandering valleys of the Middle and North Forks of the Kentucky River cross parts of the county. The county is underlain by Pennsylvanian shale, siltstone, sandstone, and coal, which is mined extensively in the county. Acidic drainage and sedimentation from coal mines have degraded the biological productivity of many streams and, in some reaches; all but the most tolerant aquatic biota have been eliminated. Forest composition in the region is controlled by aspects of slope position, degree of topographic shading, and past usage; therefore, the forest composition is highly variable.

The KY 15 corridor is a vital arterial route into the Appalachian region of Kentucky. Eastern Kentucky has a lack of sufficient transportation infrastructure and system linkage. This section of KY 15 has geometric deficiencies and high traffic volumes, which leads to safety problems. Identified transportation problems associated with existing KY 15 include poor highway geometry and travel service, including a high number of crashes, throughout the current roadway. In addition to horizontal and vertical deficiencies, the route has areas with narrow shoulders, inadequate acceleration lane lengths, and an inadequate number of lanes. Travel safety and functionality are considered the purpose and need objectives for this project.

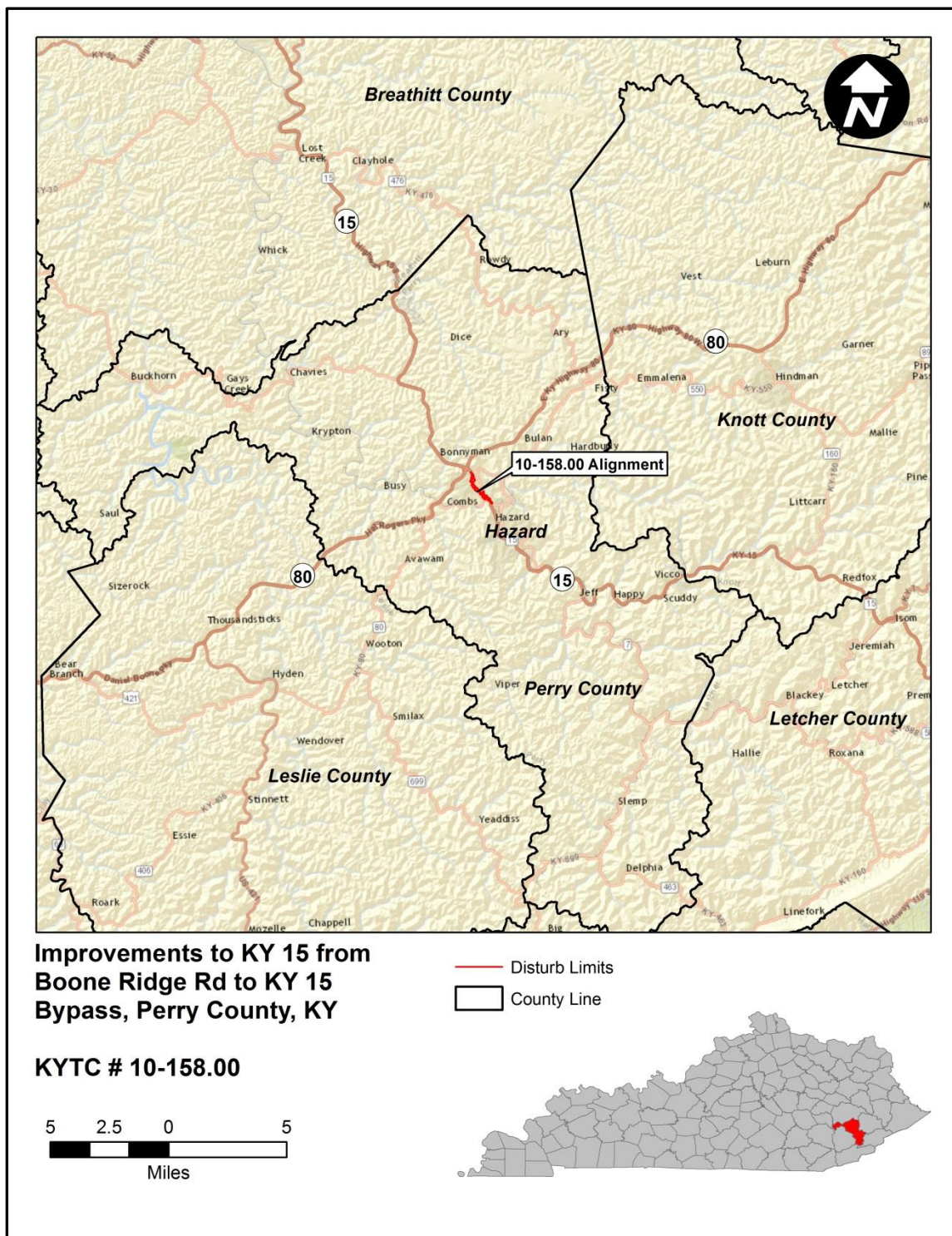
Five alternatives with two options each at Morton Boulevard and Perry Park Road were studied for this project. The preferred alternative was Alternative 4, with the Morton Boulevard Option B, and Perry Park Road Option B. Alternative 4 begins at the intersection of KY 15 and the KY 15 Bypass and terminates north of the Morton Boulevard intersection, where it ties into an adjacent project (KYTC Item No. 10-269.10, with parent Item No. 10-159.00). Design for the two projects is being coordinated to provide matching segments at which they will adjoin. Alternative 4 provides four 12-foot lanes between the KY 15 Bypass and Morton Boulevard intersections, with 6-foot inside shoulders, 10-foot outside shoulders (8-foot paved), and a barrier wall separating traffic. It begins on existing KY 15 at the KY 15 Bypass intersection and continues slightly eastward of the existing roadway, providing a new bridge crossing of the North Fork of the Kentucky River. The KY 15 southbound ramps to KY 550 utilize much of the existing ramps, while the northbound ramps are shifted to the east. This interchange slightly modifies the original configuration, while improving design speeds for the ramps. At the merge point of the northbound ramp, KY 15 returns to the existing alignment and continues to follow it past the Morton Boulevard intersection and northward, with the roadway widened to the west.

Morton Boulevard Option B provides a grade-separated intersection at Morton Boulevard. Morton Boulevard will bridge over KY 15, and will allow for all intersection turning movements to be completed with right turns. KY 15 would have five lanes between KY 550 and Morton Boulevard, with three traveling uphill (northbound) and two downhill (southbound), separated by a barrier wall.

Perry Park Road Option B provides an un-signalized intersection with KY 15 and Perry Park Road. Perry Park Road will travel under the KY 550 Bridge and is extended across KY 15 to

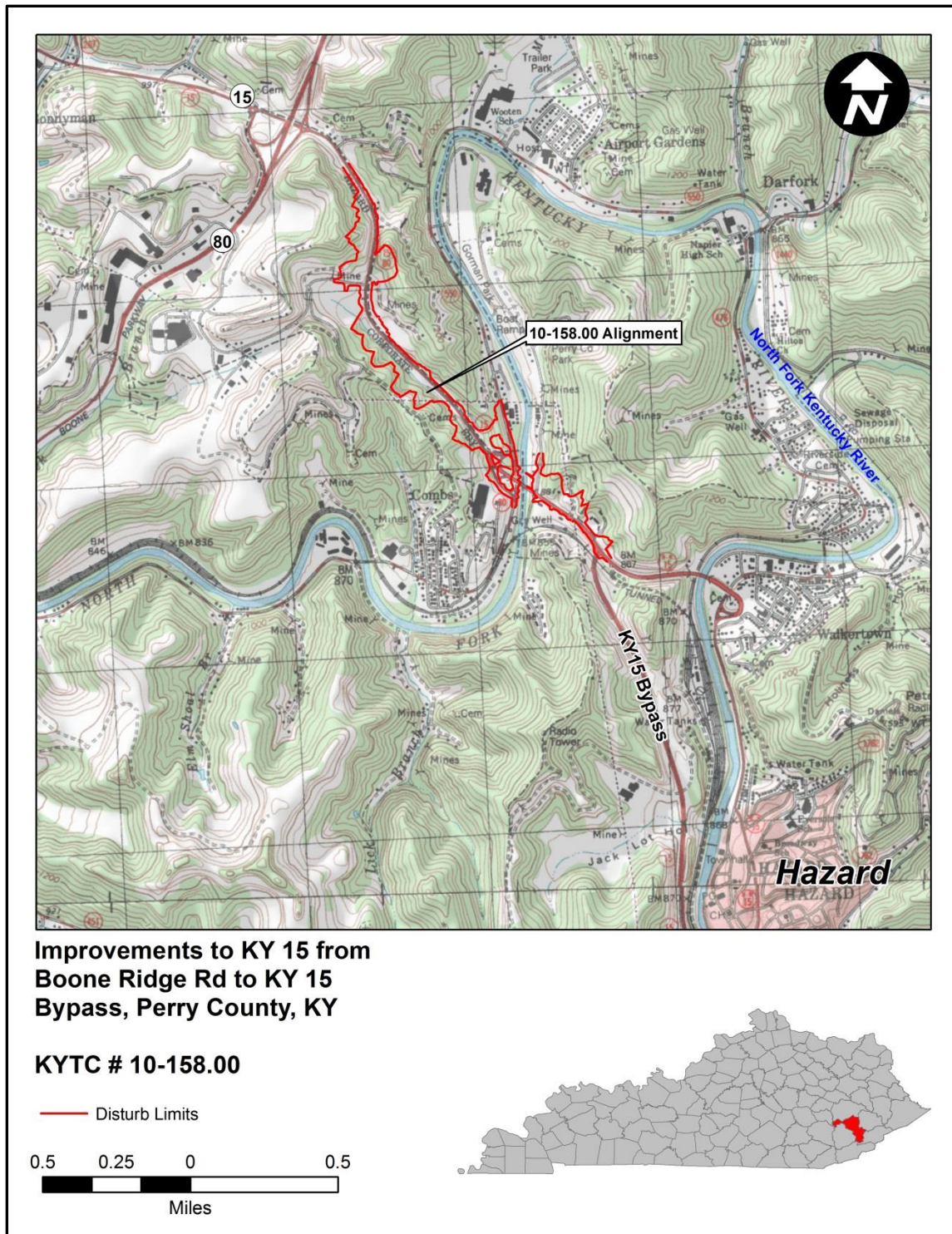
create a four-legged, un-signalized intersection. All access will be made using right turns. Traffic wishing to make left turns will need to turn right and cross under the KY 550 Bridge.





*Figure 1: Project vicinity map showing project location within the surrounding area.*





*Figure 2: Project location map.*

## 2.0 Identification of Listed Species

The identification of listed species for this biological assessment (BA) was based on coordination with the United States Fish and Wildlife Service (USFWS), the Kentucky State Nature Preserves Commission (KSNPC), and the Kentucky Department of Fish and Wildlife Resources (KDFWR). Correspondence with the USFWS was first initiated in June 2013 for an ecological report that addressed only one federally listed species, the Indiana bat (*Myotis sodalis*). Since the report, the northern long-eared bat (*Myotis septentrionalis*) was added to the federal listing as threatened. No USFWS Log No. was assigned to this project.

Correspondence received June 3, 2013, from the KDFWR indicated that no federally-listed or state-listed species are known to occur within close proximity of the project area. The project site does not occur within known Indiana bat critical habitat. Correspondence received May 28, 2013, from the KSNPC lists the gray bat (*Myotis grisescens*) and Indiana bat as the only federally listed species known to occur within ten miles of the project. Based on the resource agency correspondence, this BA will cover the gray bat, Indiana bat, and northern long-eared bat. The KYTC will address the Kentucky arrow darter with “No Effects” documentation.

*Table 1: USFWS Listed Species within Perry County*

Group	Common Name	Scientific Name	Legal Status
Mammals	Indiana bat	<i>Myotis sodalis</i>	Endangered
	Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened
	Gray bat	<i>Myotis grisescens</i>	Endangered
Fish	Kentucky arrow darter	<i>Etheostoma spilotum</i>	Candidate

A Karst Potential Map of Kentucky was reviewed. Karst topography, which occurs in areas with calcareous, erodible limestone or shale bedrock, is absent in the county. Therefore, the Kentucky Speleological Survey (KSS) was not contacted for this project.

## 2.1 Species Statuses

### 2.1.1 Indiana bat (*Myotis sodalis*)

#### 2.1.1.1 Status

The Indiana bat is a temperate, insectivorous, migratory bat that hibernates in caves and abandoned mines during winter and spends the summer season in forested areas. It was listed as an endangered species on March 11, 1967, by the USFWS. However, the Indiana bat did not receive protection until enactment of the Endangered Species Act (ESA) in 1973 (Public Law 93-205), as amended. Critical habitat for the species was designated on September 24, 1976; it consisted of 11 caves and two mines in six states. Several years following its listing, biologists developed an Indiana bat recovery plan which outlines habitat requirements, critical habitat,



potential causes for declines, and recovery objectives. The recovery plan was reviewed and published by the USFWS in 2007 (USFWS 2007).

#### **2.1.1.2 Regional Species Occurrence**

The Indiana bat's range includes most of the eastern United States. It is known to occur from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida (Barbour and Davis 1969, Gardner and Cook 2002). The species' range is generally consistent with the presence of limestone caves that serve as hibernacula in the winter (Menzel et al. 2001). According to the USFWS (2015a), winter survey results from 2015 indicated that there were a total of 17 Priority 1A (P1A) hibernacula accounting for 86% of the wintering bat population. P1A hibernacula have a recorded population of  $\geq 10,000$  bats with  $\geq 5,000$  bats over the past 10 years. The current 2015 population estimate is 523,636 Indiana bats which is a 9.8% decrease from the 2013 population estimate. The Appalachia Region (NC, VA, PA, WV, and east TN) has suffered the largest 2-year population decrease at 70%. The northeast and Midwest regions have suffered equally with 14% decreases. Over 90 percent of the 2015 estimated range wide Indiana bat population hibernates in only four states, Indiana (35%), Missouri (35%), Kentucky (13%), and Illinois (11%). New York has fallen from 9% in 2007 to only 3% in 2015 (<http://www.fws.gov/midwest/endangered/mammals/inba/pdf/2015IBatPopEstimate25Aug2015v2.pdf>).

Summer records for Indiana bats have been documented in more than 30 Kentucky counties well distributed across the state. Due to this wide distribution and the frequent occurrence of suitable habitat conditions, the USFWS considers the Indiana bat to have the potential to occur anywhere in the state that suitable habitat is present.

#### **2.1.1.3 Ecology and Habitat Requirements**

Indiana bats use sloughing bark and cracks in dead, partially dead, and live trees as day roosts during autumn (Kiser and Elliott 1996, MacGregor et al. 1999). Autumn roost trees range from 4.7 to 26.4 inches in diameter at breast height (dbh) and occur in forested, semi-forested, and open habitats (Kiser and Elliott 1996). Depending on local weather conditions, Indiana bats normally enter the hibernaculum in October and remain there through April (Hall 1962, LaVal et al. 1977, LaVal and LaVal 1980).

Prior to entering the hibernacula in autumn, swarming occurs at the entrances of either the hibernacula (Cope and Humphrey 1977) or other caves located near the hibernacula (LaVal et al. 1977). Swarming usually lasts for several weeks (August - September) and mating occurs toward the end of this period. Mated females usually enter directly into hibernation, whereas males may remain active through the end of November. Reproductive females store sperm through the winter, delaying fertilization until early May. During April and May the majority of the Indiana bat population emerges leaving their cave areas to find suitable summer habitat. However, some male and non-reproductive female Indiana bats will remain near the hibernacula during the summer. Females usually start grouping into larger nursery colonies by mid-May and

give birth to a single young between late June and early July (Easterla and Watkins 1969, Humphrey et al. 1977).

Indiana bats hibernate primarily in caves, but they have also have been documented using abandoned mines. As of November 2006, the USFWS (2007) has winter records of 281 distinct hibernacula in 19 states that have been occupied continually since 1995. According to Barbour and Davis (1969), temperature and relative humidity are important factors in the selection of hibernation sites. During the early autumn, Indiana bats roost in warm sections of caves and move to lower temperature areas of the cave as outside temperatures decrease. In mid-winter, Indiana bats tend to roost in portions of the cave where temperatures are cool (37° to 43°F). Relative humidity in Indiana bat hibernacula tends to be high, usually above 74 percent, but not exceeding saturation (Hall 1962, Humphrey et. al 1977, Kurta and Teramino 1994, LaVal et al. 1977).

Indiana bats forage primarily in forested habitats (Cope et al. 1974, Humphrey et al. 1977, LaVal et al. 1977, Belwood 1979), but they will also forage in edges of forests and croplands, fallow fields, and areas of impounded water (Gardner et al. 1991).

Indiana bats may utilize as many as four different foraging areas during nightly foraging (Murray 1998), using the same travel corridor each night to move from the roost tree to the foraging areas. It has been documented that Indiana bats may travel up to three miles from their summer roosts to summer foraging areas and will visit these same areas each night. Reproductively active females traveled a mean distance of 1.5 miles from their roost trees to foraging areas in Illinois (Gardner et al. 1991). During a study by Pruitt et al. (1995) at the Jefferson Proving Ground (JPG), Jefferson County, Indiana, reproductive female bats were found to travel a mean distance of 1.7 miles from their original capture sites to their roost trees. Also at JPG, a male traveled 0.4 miles from the capture site to its roost; this distance is less than, but similar to the distance of 0.7 miles found by Gardner et al. (1991) for males in Illinois.

### **2.1.2 Gray bat (*Myotis grisescens*)**

#### **2.1.2.1 Status**

On April 28, 1976, the gray bat was listed as endangered under ESA of 1973. A recovery plan for the species was completed on July 1, 1982 (Brady et al. 1982). Critical habitat has not been designated.

When the gray bat was listed as federally endangered, there were approximately 128,000 individuals. Elliot (2007) reported range-wide increases of 62 percent in the preceding 20 years. A census conducted in 2002 estimated the gray bat population at 2,600,000 individuals (United States Forest Service (USFS 2005). Cave protection measures instituted for the conservation of gray bats have been largely successful and populations at 73 percent of all caves are stable or increasing. Seventy-nine percent of gray bat colonies in the western portion of their range are stable or increasing.

#### **2.1.2.2 Regional Species Occurrence**

The gray bat is a monotypic species that occupies a limited geographic range in limestone karst areas of the southeastern United States. Most gray bat populations occur in Alabama, Arkansas, Kentucky, Missouri, and Tennessee (Barbour and Davis 1969) with small maternity populations as far north as southern Indiana (Brack et al. 1984a) and as far west as southeastern Kansas (USFWS 1997). In Kentucky the gray bat has been recorded from 45 of the state's 120 counties. The majority of the records are from the Interior Plateau (71) and Interior River Valleys and Hills (72) ecoregions.

#### **2.1.2.3 Ecology and Habitat Requirements**

Habitat requirements for roosts are highly specific, with fewer than 5% of caves representing suitable habitat (Tuttle 1979). The gray bat utilizes varying types of caves during different times of the year, with winter caves usually defined with deep vertical shafts providing a cold air trap, and summer caves (especially maternity caves) characterized by domed ceilings (acting as a warm air trap) and located in close proximity to a stream or water body (Brady et al. 1982, Tuttle 1976b). Other caves, known as dispersal caves, are used as roosting sites during migration from maternity caves to hibernacula. Gray bats of all ages, including newly volant young, typically travel in the tree canopy between roost sites and foraging areas, which may provide protection from predators (Brady et al. 1982).

Gray bats usually forage in riparian areas or over open water bodies such as rivers, streams, lakes, or reservoirs. While foraging, the gray bat consumes a variety of insects, most of which are considered aquatic-based (Brack and LaVal 2006). Studies in Indiana, Kentucky, Alabama, and Missouri have revealed that tricoptera, lepidoptera, coleoptera, and diptera are most frequently consumed, with a total of 14 insect orders shown to be consumed by the species (Brack et al. 1984a, Lacki et al. 1995, Brack and LaVal 2006). Brack and LaVal (2006) described diet variation based on age class with juveniles consuming more coleopterans than adults. The gray bat also demonstrates opportunistic foraging on a micro-scale by feeding on available prey, while it is considered to be more selective in regards to diet on a macro-scale with consumption primarily of aquatic insects (Brack and LaVal 2006).

### **2.1.3 Northern long-eared bat (*Myotis septentrionalis*)**

#### **2.1.3.1 Status**

On October 2, 2013, the northern long-eared bat was proposed for listing by the USFWS as endangered under the ESA of 1973. Neither a recovery plan nor an evaluation of critical habitat is currently available. The decision to list the species as threatened was made on April 1, 2015, primarily due to the threat posed by white-nose syndrome (WNS) (USFWS 2015). Based on hibernacula studies, the northern long-eared bat has suffered estimated losses of up to 93 to 98 percent across the northeastern U.S. since 2005 (Turner et al. 2011). A 4(d) rule was designated to provide appropriate protection within the area where the disease occurs for the remaining individuals during their most sensitive life stages – in maternity roost trees from June 1 through July 31 and at hibernacula sites – but to otherwise eliminate unnecessary regulation



because the species appears stable in areas not yet affected by WNS, mainly in the western part of its range (USFWS 2015). The listing of threatened became effective on May 4, 2015 and the 4(d) rule went into effect on February 16, 2016.

### **2.1.3.2 Regional Species Occurrence**

This species is proposed for protection throughout its entire range, which includes the eastern and north-central U.S. and all Canadian provinces from the Atlantic Coast to the southern Yukon Territory and eastern British Columbia. In the U.S., the northern long-eared bat has been found in 39 states, ranging from Maine to Montana, south to eastern Kansas, eastern Oklahoma, and Arkansas, and east to the Florida panhandle (USFWS 2013b). In Kentucky, the northern long-eared bat has been recorded throughout the majority of the state, with records in 91 of the 120 counties.

### **2.1.3.3 Ecology and Habitat Requirements**

The northern long-eared bat utilizes different habitats during the summer and winter months. Hibernacula typically include caves and abandoned mines with large entrances, relatively constant, cool temperatures (32° to 48° F), high humidity, and minimal air currents (Raesly and Gates 1987, Caceres and Pybus 1997). Sites used within hibernacula are often in high humidity areas, and condensation is often observed on hibernating bats (Barbour and Davis 1969). This species commonly roosts in small crevices and cracks in walls and ceilings, and are often overlooked during hibernacula surveys. Bats have also been observed, although less frequent, roosting in the open (Barbour and Davis 1969, Caceres and Pybus 1997, Whitaker and Mumford 2009). In addition to mines, northern long-eared bats have been found hibernating in other man-made structures, including abandoned railroad tunnels, storm sewers, and dams (Kurta and Teramino 1994, USFWS 2013b).

Summer habitat for the northern long-eared bat consists of a variety of forested habitats used for roosting, foraging, and commuting, including forest blocks and woodlots, as well as linear features such as fencerows, riparian forests, and other wooded corridors. These forested areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Non-wooded areas adjacent to forested habitat may also be utilized, including emergent wetlands, old fields, and agricultural land (USFWS 2014). Typical foraging habitat includes mature upland forests along hillsides and ridges (LaVal et al. 1977, Brack and Whitaker 2001), where bats primarily forage under the canopy one to three meters above the ground (Nagorsen and Brigham 1993). This species may also forage in more open areas, such as forest clearings, over open water, and along roads (van Zyll de Jong 1979); however, it is less likely to forage in riparian areas (LaVal et al. 1977, Brack and Whitaker 2001). Commuting habitat is used to travel between roosting and foraging areas and typically includes forest edges and linear features, such as riparian corridors and fencerows (USFWS 2014).

The diet of the northern long-eared bat primarily consists of moths and beetles, as well as arachnids, flies, leafhoppers, and caddisflies (Nagorsen and Brigham 1993, Brack and Whitaker 2001, Feldhamer et al. 2009). Foraging methods include hawking and gleaning (Nagorsen and

Brigham 1993). This species emerges at dusk, with peak foraging occurring within five hours after sunset, followed by a secondary foraging period within eight hours after sunset (Kunz 1973).

### **3.0 Survey Methods**

#### **3.1 Bat Habitat Assessment**

In-office assessments consisted of referring to recent aerial photography, topographic maps, soil maps, and the Kentucky Geological Survey's web based interactive mapping system, as well as checking the KDFWR and KSNPC's online databases for species accounts in Perry County. Prior to the habitat assessment, a review of USGS topographic quadrangle maps, USGS geologic quadrangle maps, karst potential maps, and mining maps was performed to identify caves, mine portals, sinkholes, rockshelters, and other features within one half mile of the proposed project that could be used as hibernacula or non-forested roosting habitat for the three bat species. The KSS was not contacted because the project is not a known karst area. Also reviewed was a 2013 Aquatic and Terrestrial Assessment document for the project prepared for KYTC by Redwing Ecological Services, Inc. (Redwing). Based on species accounts and records, the scale of the project and impacts, and time constraints, the KYTC has chosen to assume presence for all listed bat species.

Since Palmer, the prime consultant, does not possess a USFWS Recovery Permit for federally-listed bats in Kentucky, Redwing was contacted to provide portal surveys and a Phase 1 Bat Habitat Assessment for this project.

#### **3.2 Phase 1 Habitat Assessment Methodology**

The Phase 1 Habitat Assessment was completed by Redwing in 2013 as part of the Aquatic and Terrestrial Assessment. The assessment was performed by permitted bat biologists who hold a USFWS Recovery Permit for federally-listed bats in Kentucky and who have been authorized by the KDFWR to survey for bats. The assessment identified features that qualified as potential roosting habitat/hibernacula within one kilometer of the project, based on the Indiana Bat Survey Guidance for Kentucky (May 1, 2013). Due to changes in the Indiana Bat Survey Guidance for Kentucky protocols from 2013 to 2015, features identified in 2013 were re-evaluated using the 2015 survey guidance (USFWS KFO and KDFWR 2015). Please refer to Appendix B for a complete description of the Phase 1 Habitat Assessment methodology.

#### **3.3 Phase 1 Habitat Assessment Results**

During the Phase 1 Habitat Assessment, Redwing identified 226 abandoned mine portals located within one kilometer of the project, of which, 22 met the criteria for potential roosting habitat/hibernacula under the 2013 guidelines. An additional 10 undocumented portals were also identified as potential roosting habitat/hibernacula, for a total 32 potential sites. Please refer to Appendix D for a complete analysis of the Phase 1 Habitat Assessment results.

Based on the project plans and 2015 survey guidance (USFWS Kentucky Field Office (KFO) and KDFWR 2015), six of the 32 potential sites may be impacted by the proposed project. One

portal (Portal 121) is within the project disturbance limits, while the other five portals (Portals 37, 38, 39, A2, and A4) are connected to an underground mine which extends under the project disturbance limits. Fall portal surveys were conducted at each site to evaluate use by the three bat species. In conclusion, the proposed KY 15 Widening and Reconstruction project is not anticipated to result in impacts to roosting habitat/hibernacula for the gray bat, Indiana bat, or northern long-eared bat.

### **3.4 Fall Portal Survey**

Prior to conducting the fall portal survey, Redwing submitted a Project Proposal Form to both the USFWS KFO and KDFWR to perform harp trapping surveys beginning on September 15, 2015. Both agencies concurred with the project proposal.

Fall portal surveys were conducted on September 15 and September 29, 2015. No federally-listed bat species were captured during the fall portal survey. Non-listed bats captured during the survey included five tri-colored bats (*Perimyotis subflavus*) at Portal 121 and five tri-colored bats at Portals 37 through A4. One tri-colored bat was recaptured at Portal 121 on the same survey night; however, no bats were recaptured on different survey nights. Please refer to Appendix B for a detailed description of fall portal survey methods and results.

## **4.0 Effects Analysis**

### **4.1 Direct Effects**

#### **4.1.1 Bat Species**

Critical habitat for Indiana bats consists of large hibernacula, which are of primary concern for Indiana bat conservation. The closest critical habitat is Carter Cave in Carter County, Kentucky (Federal Register, 41 FR 41914); however, this habitat is approximately 75 miles from the most northern section of the project area. Therefore, no effects to critical habitat are anticipated.

This project occurs in USFWS-deemed "Potential" Indiana bat habitat. Trees of suitable roost tree diameter (>3 inches dbh for northern long-eared bats, and >5 inches dbh for Indiana bats) with cavities, broken branches, and/or sloughing bark are present within the project right-of-way limits. The proposed project will require the removal of 36 total acres of potential forested habitat within the right-of-way limits that could potentially be used by both Indiana and northern long-eared bats for foraging and/or roosting habitat. Direct effects will be minimized with no tree cutting occurring in June or July, the timeframe when Indiana and northern long-eared pups are present. The KYTC will either utilize the Conservation Strategy for Forest Dwelling Bats in Kentucky or the Federal Highway Administration (FHWA) Range-wide Programmatic Agreement with the USFWS (depending on project timing and other factors) to account for loss of Indiana and northern long-eared bat summer habitat. The KYTC may also use the final 4(d) ruling for the northern long-eared bat, which became effective on February 16, 2016. This project does not occur within 150 feet of a known northern long-eared bat roost tree or within 0.25 miles of a known northern long-eared bat hibernacula.



Bridges over waterways have the potential to provide roosting habitat for bats, especially gray bats. The current KY 15 Bridge over the North Fork Kentucky River will be removed after a new bridge is built and project construction is complete. The removal of this bridge could have direct effects on the gray bat if they are actively using the bridge. In April 2013, Redwing inspected the bridge as part of the Aquatic and Terrestrial Assessment, and found the bridge does not provide suitable roosting habitat for the gray bat due to: the absence of gray bats or other bats; the lack of guano, staining, or other evidence of bat use; the metal superstructure under the bridge deck (gray bats typically prefer bridges made entirely of concrete); heavy traffic use during daylight hours; the poor quality of foraging habitat along this portion of the North Fork Kentucky River; and the disturbed nature of the surrounding area. Currently, the construction plans call for replacing the current bridge with a Prestressed Concrete I-Beam (PCIB) bridge, which may provide a suitable roosting location for gray bats during the summer.

None of the six mine portals surveyed for bat presence during the fall portal survey period (September 1 through October 31) showed evidence of usage by Indiana, northern long-eared, or gray bats, and no other suitable roosting habitat was identified during the Phase 1 Habitat Assessment. As a result, no suitable roosting habitat/hibernacula for the listed bat species is present in the project area; therefore, direct effects to the gray bat are not anticipated as a result of the project.

## **4.2 Indirect Effects**

### **4.2.1 Bat Species**

Potential indirect effects to Indiana and northern long-eared bats that could occur as a result of this project include the loss or modification of winter roosting habitat (portal locations) and a reduction of summer roosting habitat through the removal of 36 acres of potential forested habitat. Winter tree clearing would be a potential indirect effect since it will remove potential habitat for future use. The KYTC will either utilize the Conservation Strategy for Forest Dwelling Bats in Kentucky or the FHWA Range-wide Programmatic Agreement with the USFWS (depending on project timing and other factors) to account for loss of Indiana bat summer habitat. The KYTC may also use the final 4(d) ruling for the northern long-eared bat, which became effective on February 16, 2016. Based on the fall portal survey, no suitable winter roosting is located within one kilometer of the project; thus, impacts to hibernacula are not anticipated. Therefore, indirect effects to winter habitat for these bat species are not anticipated as a result of this project.

Gray bats are presumed to be actively foraging along the North Fork Kentucky River corridor. A potential indirect effect to these bats is a disruption in foraging patterns in the area where the new bridge will be constructed. Gray bats may have to adjust by moving to a different stream corridor or by moving through the construction area and continuing along their current path. This indirect effect is probably insignificant because the KSNPC has only one gray bat record known from Perry County, which was over five miles from the project, and the KDFWR database does not list it as occurring in Perry County.

Disturbance to the aquatic ecosystem is also a potential indirect effect for these bat species. The three bat species discussed in this BA forage extensively on insects, and many insects have an aquatic larvae stage. The project will impact over 2,000 linear feet of perennial stream but this stream is severely impaired with a conductivity of 1,751 microMHOs. Indirect impacts to the aquatic ecosystem include the potential for increased runoff from additional road surfaces, removal of wooded riparian corridors, and increased erosion and sediment deposition to downstream channels. Sediment and or pollutants downstream of the proposed construction activities could reduce the amount of emerging aquatic macroinvertebrates that provide forage for area bats. See Section 5.0 for a complete description of measures to minimize potential adverse impacts to the streams (bat foraging habitat) in or along the project and their macroinvertebrate communities as a result of the project.

### **4.3 Cumulative Effects**

#### **4.3.1 Bat Species**

The ESA regulations define cumulative effects as “those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the Federal action subject to consultation.” Runoff from the proposed road after construction and any future development afterwards should not further impact the area since this project is to upgrade KY 15 to current KYTC standards for roads of its type with no immediate commercial or other development planned.

Several short-term and long-term impacts to the aquatic and terrestrial ecosystem by the proposed project have been identified. Construction will result in the permanent elimination of mature woods and young woods habitats, as well as impacts to perennial and ephemeral streams. These impacts will result in disturbances to both floral and faunal populations. Cumulative effects include the permanent loss of vegetation communities and wildlife communities within the limits of disturbance. Current movement barriers in the form of KY 15 will not change.

Potential cumulative effects associated with the proposed project are shared by the bat species covered in this BA. In addition to the direct and indirect disturbance associated with construction, there will be cumulative disturbance over time created by maintenance and use of the road. Noise disturbance and chemical contamination may be associated with maintenance activities, which may include, but are not limited to, mowing, pavement repairs, ditch maintenance, and management of woody species; however, these activities already occur on the existing road. While there is a permanent cumulative effect of road disturbance, both Indiana and gray bats are capable of adapting to the presence of large roadways, and roosts for each species have been found in proximity to roads (Johnson et al. 2002, Keeley and Tuttle 1979).

### **5.0 Mitigation and Minimization Measures**

A Kentucky Pollutant Discharge Elimination System (KPDES) General Permit will be obtained for construction, therefore reducing/controlling erosion and sedimentation impacts to streams and drainage areas used by species within this BA. The KYTC has committed to the following

minimization measures to ensure no adverse impacts to the stream features, stream water quality, or their macroinvertebrate communities as a result of the project:

- KYTC is bound by the tenets of Kentucky Pollution Discharge System (KPDES), permit number KYR10, to reduce erosion and sedimentation effects from projects involving soil disturbance. As required under Section 213 of the KYTC Standard Specifications, a site-specific Erosion Control Plan, including Best Management Practices (BMPs), will be developed by the resident engineer and contractor prior to onsite activities to ensure continuous erosion control throughout the construction and post-construction period. The plan will identify individual Disturbed Drainage Areas (DDA) where storm water from the construction area will be discharged off site or into waters of the Commonwealth.
- The location of the individual erosion prevention/sediment control measures will be identified by the resident engineer and contractor.
- Mulch will be placed, during grade and drain activities, across all areas where no work will be conducted for a period of 14 consecutive days.
- Silt fence, or other approved method as appropriate, will be installed at the edge of all waterways to eliminate the deposition of rock and debris in the waterway during construction activities. In the unforeseen event that unintended debris does enter the waterway, the resident engineer will halt the contributing activity until appropriate remedial actions have been implemented.
- To the maximum extent plausible, construction activities will take place during low-flow periods.
- Equipment staging and cleaning areas will be located to eliminate direct inputs to waters of the Commonwealth. These areas will be located such that effluent will be filtered through vegetated areas and appropriate sediment controls prior to discharge offsite.
- Concrete will be poured in a manner to avoid spills into the stream. In the unforeseen event that a spill does occur, the USFWS will be notified, and the resident engineer will immediately halt the activity until remedial measures have been implemented.
- KYTC proposes to stabilize areas disturbed during construction activities through vegetation establishment and placement of riprap and geotextile fabric. Re-vegetation of the disturbed areas will allow thermoregulation of water within the area watershed, establish long-term, regenerative stabilization of the stream bank, and provide nutrients to the aquatic macroinvertebrate community through inputs of organic material.
- In areas not treated with rip-rap or otherwise stabilized, re-vegetation of stream bank and riparian zones will occur concurrently with the project progression. Seed mixes used for re-vegetation will follow the standard seed mixes outlined in the KYTC spec book.

## 6.0 Effects Determination

The effects determination for each species is presented below.

### 6.1 Northern long-eared bat

Tree clearing will occur throughout project construction, and impacts to 36 total acres of potential summer roosting and foraging habitat will occur as a result of the project. Since tree clearing will occur, the KYTC will opt to utilize the 4(d) rule to account for loss of northern long-eared bat summer habitat.

The USFWS 4(d) ruling for the northern long-eared bat (effective on February 16, 2016) in respect to this project is, incidental take is prohibited under the following circumstances: take occurs within a hibernaculum or take occurs as the result of tree removal within 0.25 miles (0.4 km) of a known occupied hibernaculum or tree removal destroys a known, occupied maternity roost tree or other trees within a 150-foot radius from the roost tree during the pup season from June 1 through July 31. No direct or indirect impacts to known winter habitat or a known maternity roost tree are anticipated as a result of the proposed project and none are known within the project vicinity. Although KYTC is utilizing the 4(d) ruling for northern long-eared bats, they will still adhere to the restricted tree clearing dates from June 1 to July 31 throughout the project area based on their commitments regarding Indiana bats. Therefore, the formal effects determination for this species is **“may affect, likely to adversely affect” but take is not prohibited.**

### 6.2 Indiana bat

Impacts to 36 total acres of potential summer maternity and foraging habitat will be mitigated through the Conservation Strategy for Forest Dwelling Bats in Kentucky (USFWS-KFO 2015) to account for loss of Indiana bat summer habitat. Indirect effects to summer maternity and foraging habitat are minimal and discountable due largely to the nominal loss of habitat in the project area. No impacts (direct or indirect) to winter habitat are anticipated as a result of the proposed project. Given the location of the project area, the formal effects determination for this species is **“may affect, likely to adversely affect.”**

### 6.3 Gray bat

Direct impacts to gray bats are not anticipated since no roosting habitat is located within the project area or within proximity to the proposed project. Only one gray bat record is known from Perry County (KSNPC), and it is located more than five miles from the project area. Potential indirect effects to this species as a result of the proposed project include temporary impacts to forage supply due to stream alterations. Sediment and/or pollutant deposition downstream of the stream crossing could potentially reduce the amount of available forage for gray bats. However, the KYTC has committed to site-specific erosion control measures and BMPs that will prevent any adverse impacts to gray bat foraging supply. Therefore, the formal effects determination for this species is **“may affect, not likely to adversely affect.”**



## 7.0 Conclusions

The project may result in direct impacts to the Indiana bat. This project will result in indirect impacts to Indiana bat summer roosting/maternity habitat. No suitable winter habitat in the form of caves and other potential hibernacula will be impacted by this project. Therefore, an effects determination of “**may affect, likely to adversely affect**” has been made for the Indiana bat.

The project may result in direct impacts to the northern long-eared bat. This project will result in indirect impacts to northern long-eared bat summer roosting/maternity habitat. No suitable winter habitat in the form of caves and other potential hibernacula will be impacted by this project. Therefore, an effects determination of “**may affect, likely to adversely affect**” **but take is not prohibited** has been made for the northern long-eared bat.

Direct effects to the gray bat are not anticipated, and potential indirect effects are considered discountable. Therefore, an effects determination of “**may affect, not likely to adversely affect**” has been made for gray bat.

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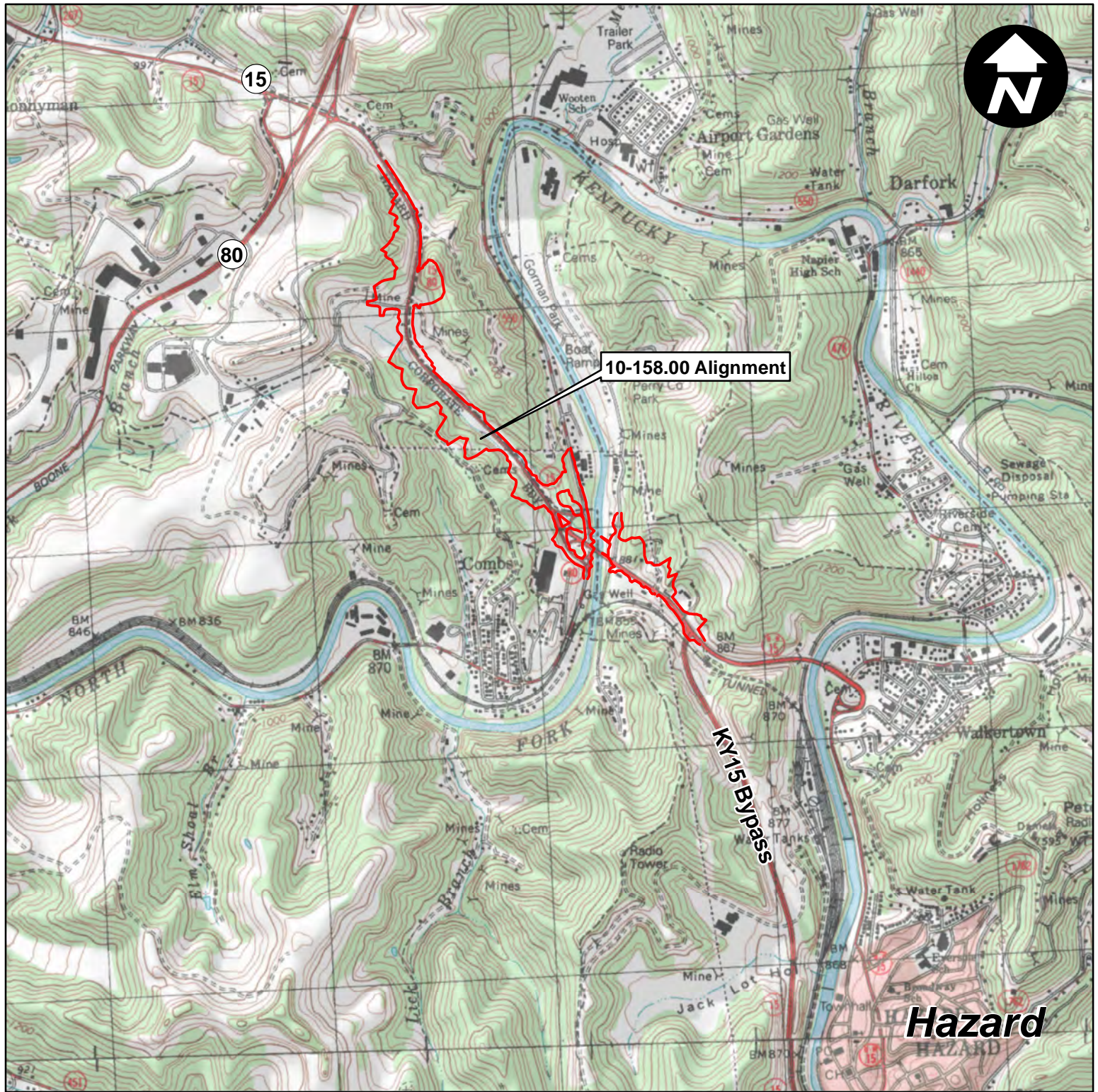
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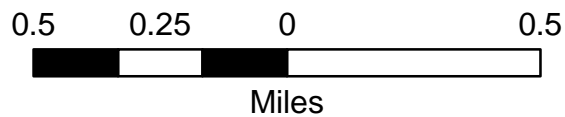
## **Appendix A**

### Bat Habitat Mapping



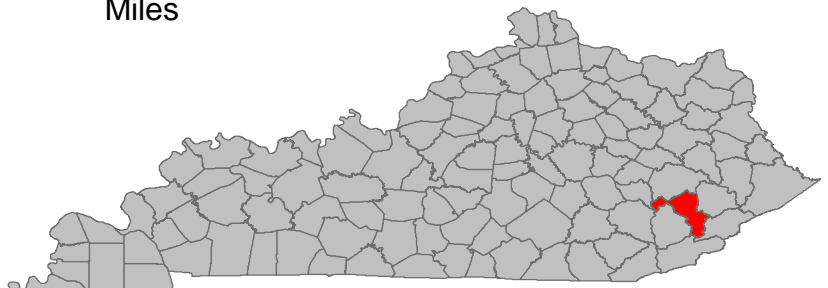


**Improvements to KY 15 from  
Boone Ridge Rd to KY 15  
Bypass, Perry County, KY  
KYTC # 10-158.00**

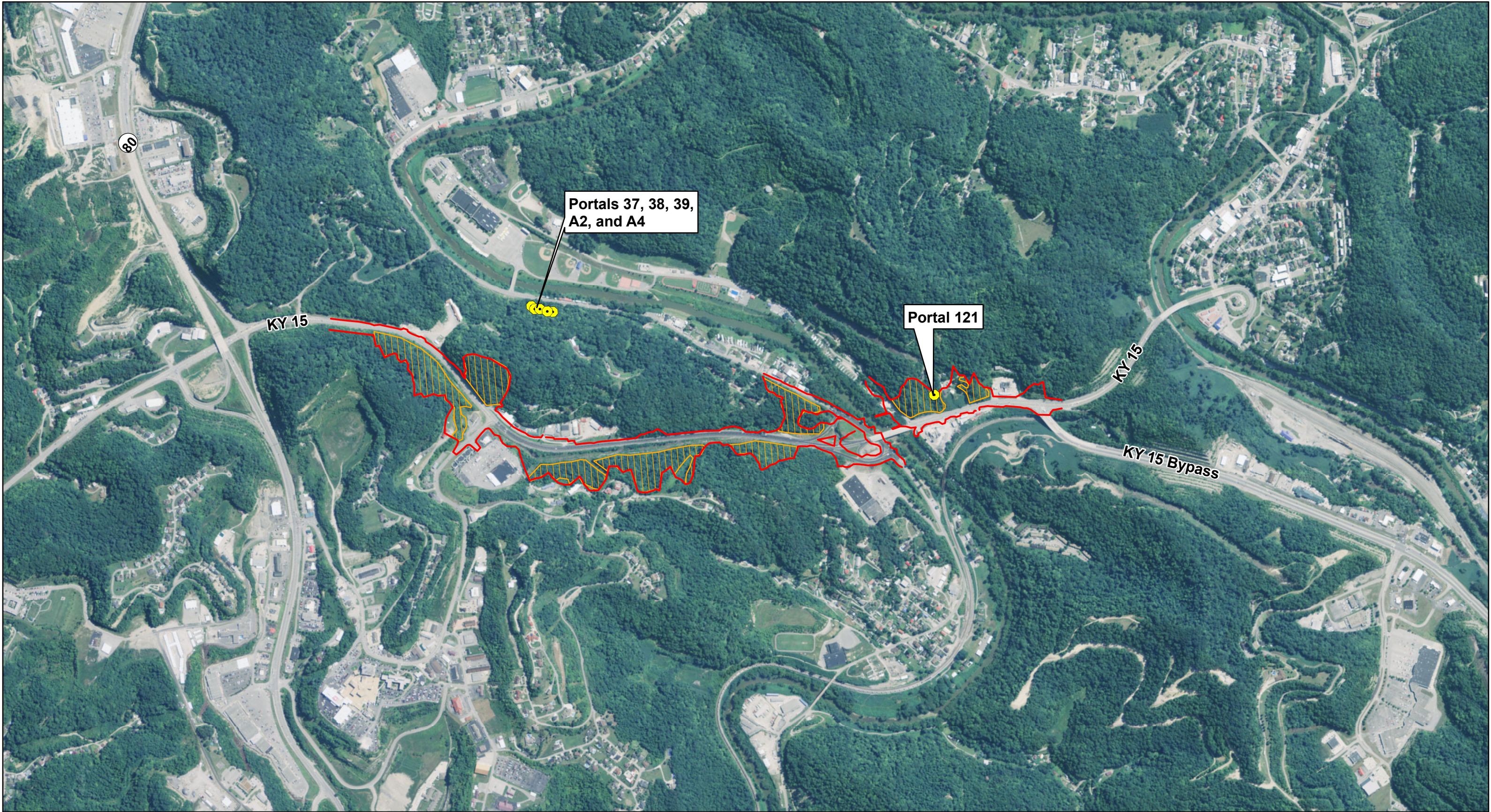


### USFWS Indiana Bat Map

- Disturb Limits
- Potential Habitat






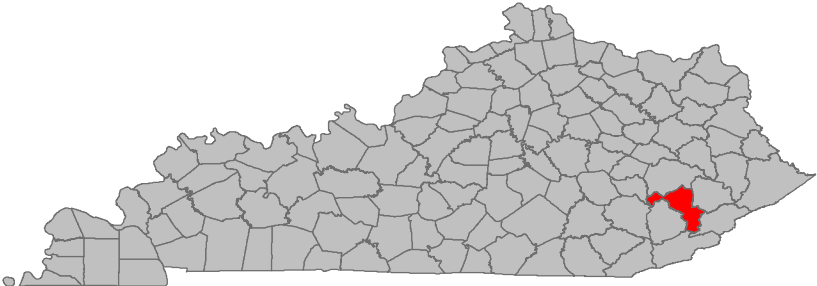
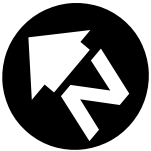
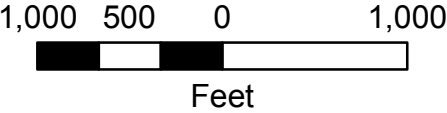




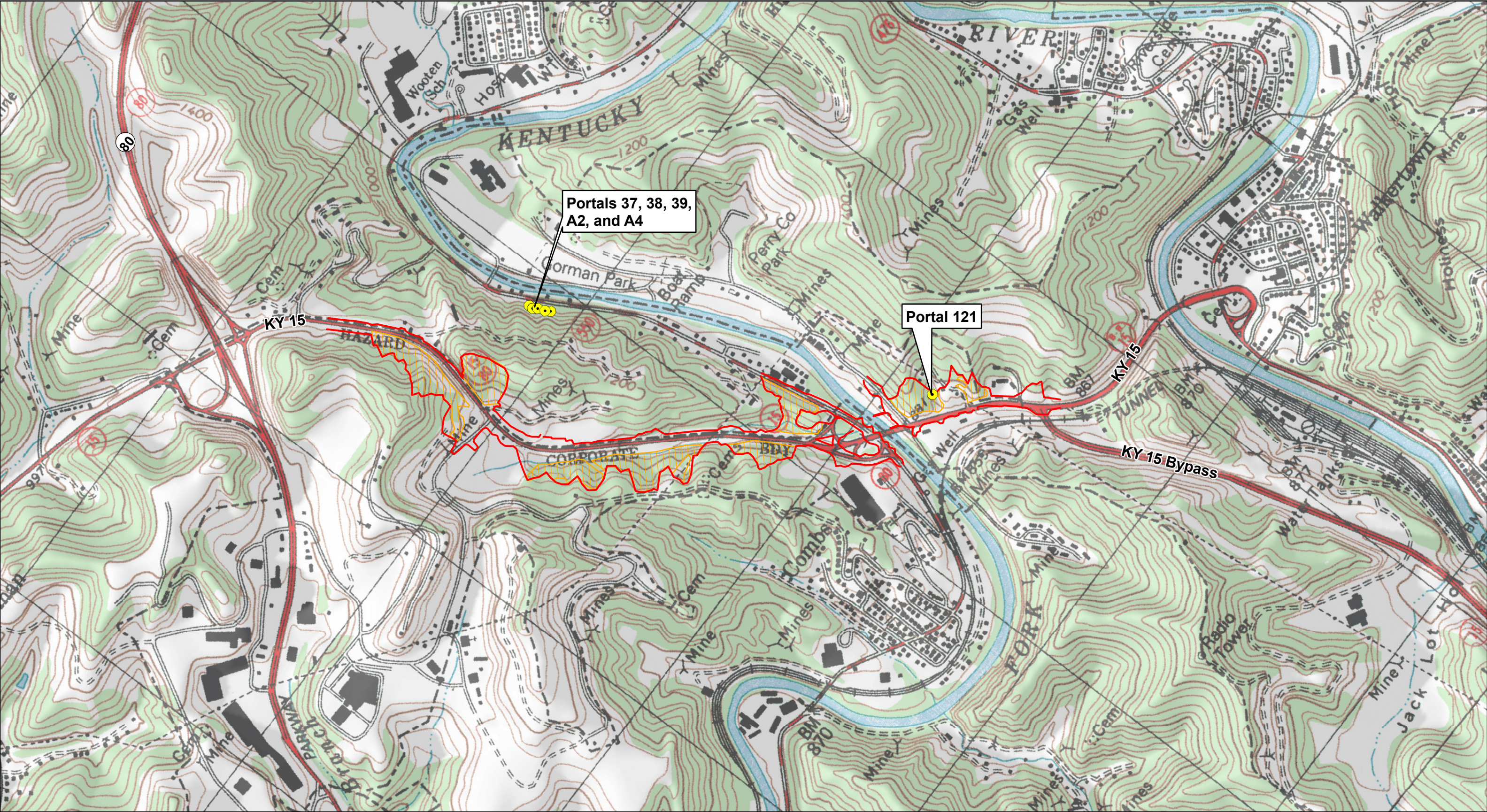
Improvements to KY 15 from  
Boone Ridge Rd to KY 15  
Bypass, Perry County, KY  
KYTC # 10-158.00

Forest Bat Habitat Map

-  Portals
-  Disturb Limits
-  Trees (36 acres)



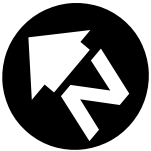
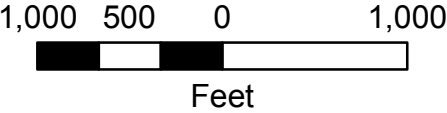




Improvements to KY 15 from  
Boone Ridge Rd to KY 15  
Bypass, Perry County, KY  
KYTC # 10-158.00

Forest Bat Habitat Map

- Portals
- Disturb Limits
- ▨ Trees (36 acres)





## **Appendix B**

### Redwing Bat Data



December 4, 2015

Mr. Ralph Schuler  
Palmer Engineering, Inc.  
400 Shoppers Drive  
Winchester, Kentucky 40392

Subject: **Phase 1 Habitat Assessment and Fall Portal Survey Report  
KY 15 Widening and Reconstruction Project  
Perry County, Kentucky  
KYTC Item No.: 10-158.00  
Redwing Project No.: 12-093**

Dear Mr. Schuler:

Redwing Ecological Services, Inc. (Redwing) is pleased to submit this report to Palmer Engineering, Inc. (Palmer) regarding a Phase 1 Habitat Assessment and fall portal survey for the proposed Kentucky Highway (KY) 15 Widening and Reconstruction project in Perry County, Kentucky. The proposed project is located along KY 15 in Hazard, Kentucky, beginning at the KY 15 bypass and ending approximately 1,900 feet north of Morton Boulevard. The purpose of the Phase 1 Habitat Assessment and fall portal survey is to determine if potential roosting habitat for the gray bat (*Myotis grisescens*) or hibernacula for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) will be impacted by the proposed project. The Phase 1 Habitat Assessment and fall portal survey are described below in terms of methodology, results, and conclusion.

## **METHODOLOGY**

The Phase 1 Habitat Assessment was conducted by Redwing in 2013 as part of an Aquatic and Terrestrial Assessment to document existing ecosystems and identify potential impacts to these ecosystems from several project alternatives. The fall portal survey was performed by Redwing in 2015 as part of a Biological Assessment conducted by Palmer to evaluate potential impacts to federally-listed species from the preferred project alternative (proposed project). The methodologies for the Phase 1 Habitat Assessment and fall portal survey are presented below.

## **PHASE 1 HABITAT ASSESSMENT**

An in-house review of available resources, including USGS topographic quadrangle maps, USGS geologic quadrangle maps, karst potential maps, and available mine maps, were used to identify caves, mine portals, sinkholes, and other underground features within one kilometer of the proposed project. Identified features were mapped utilizing ArcView geographic information system (GIS) software to determine their location relative to the project. Features located within one kilometer of the project were examined through a Phase 1 Habitat Assessment to determine their potential as roosting habitat for the gray bat and hibernacula for the Indiana and northern long-eared bats. Because the Phase 1 Habitat Assessment was conducted in 2013, the protocols listed in the *Indiana Bat Survey Guidance for Kentucky* (May 1, 2013) were followed during the assessment. The guidance required that features within one kilometer of the project be evaluated for potential roosting habitat/hibernacula instead of the one half-mile buffer used in the current version of the guidance, *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2015).

The Phase 1 Habitat Assessment was conducted by permitted bat biologists Seth Bishop and Benjamin Deetsch, who each hold a U.S. Fish and Wildlife Service (USFWS) Recovery Permit for federally-listed bats in Kentucky and have been authorized by the Kentucky Department of Fish and Wildlife Resources (KDFWR) to survey for bats. The assessment was performed according to the protocols for identifying potential Indiana bat hibernacula listed in the 2013 survey guidance. Due to similarities in hibernacula used by the gray bat, Indiana bat, and northern long-eared bat, these survey protocols were utilized to identify potential hibernacula for all three bat species. The protocols were also used to identify summer roosting habitat for the gray bat.

### **Field Assessment Methodology**

During the Phase 1 Habitat Assessment, a sub-meter accurate GPS unit was used to locate each identified feature within one kilometer of the proposed project. Each located feature was documented and photographed. Features that met the criteria for a potential hibernaculum were recorded on Phase 1 Habitat Assessment data sheets. If a feature could not be found at the GPS location, a search was conducted until the feature was either located or the surrounding area was thoroughly covered. Features that could not be located were assumed to be closed. Some features are no longer present due to development of the area. Previously unidentified features encountered during the Phase 1 Habitat Assessment were marked on field maps generated from recent aerial photographs and project plans, and recorded with a sub-meter accurate GPS unit. A photograph of each feature and a brief description were also recorded.



Based on the 2013 survey guidance, identified features were considered to be potential roosting habitat/hibernacula for the three bat species if they exhibited the following characteristics: 1) opening larger than one foot in diameter; 2) passage(s) that extend beyond the dark zone and do not end within 40 feet of the entrance; 3) airflow; 4) no evidence of flooding or collapse; 5) opening occurred prior to the past 12 months; and 6) vertical passage at least two feet in diameter with some airflow (USFWS KFO and KDFWR 2013). Features lacking one or more of these characteristics were determined to be unsuitable as roosting habitat/hibernacula for the three bat species. Other characteristics used to evaluate features included temperature and the presence of bats or evidence of bat use (i.e. guano, ceiling staining). The criteria for potential hibernacula have been updated in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2015) to include features that have: 1) a horizontal opening larger than six inches in diameter; 2) a vertical opening larger than one foot in diameter; and 3) a passage(s) that extends more than 50 feet from the entrance. As a result, features identified in 2013 that are located within the project disturbance limits or connected to an underground mine under the disturbance limits were re-evaluated using the 2015 survey guidance.

### **Impact Identification Methodology**

Features identified as potential roosting habitat/hibernacula were evaluated to determine potential impacts as a result of the proposed project, including damage or loss of the features, microclimate alterations, and the loss of forested habitat around the features.

Damage or Loss: Features located near the proposed project could be damaged or lost during construction through fill, capping, or blasting. Potential direct impacts from these construction activities to features located near the project were examined.

Microclimate Impacts: The proposed project could impact the microclimates of underground features in a variety of ways, including direct impacts such as filling, capping, or blasting, and indirect impacts from the removal of adjacent forested habitat or redirection of airflow. As a result, potential microclimate impacts were evaluated for each feature identified as potential bat habitat.

Forested Habitat Impacts: Loss of potential roosting, foraging, commuting, and swarming habitat from tree clearing and separation of forested blocks (fragmentation) could impact the use of features by bats. These potential indirect impacts were reviewed during the assessment.

## FALL PORTAL SURVEY

Features identified as potential roosting habitat/hibernacula for the three bat species during the Phase 1 Habitat Assessment that could be impacted by the proposed project were evaluated through a fall portal survey to document potential use by these species. The survey followed the protocols listed in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2015) and was led by permitted bat biologists Seth Bishop and Benjamin Deetsch. The survey was conducted on two nights during the fall sampling period (September 1 and October 31), and each night of sampling was separated by at least two weeks.

During the survey, a harp trap was set up at the entrance of each feature, and tarps were used to block the remainder of the entrance and funnel bats into the trap. The survey period began at sunset and continued for five hours. All bats captured during the portal survey were identified by permitted bat biologists and released at the site of capture. Data recorded for each captured bat included species, sex, age, reproductive condition, forearm length, and weight. A wing-damage score was also noted for each bat, based on the Reichard Wing-Damage Index used to characterize the wing condition of bats affected by White-Nose Syndrome (WNS). A unique mark for each survey night was also applied to each captured bat to allow for the identification of recaptured individuals. Decontamination procedures outlined in the USFWS's *National White-Nose Syndrome Decontamination Protocol – Version 06.25.2012* were followed to help minimize the potential transmission of WNS between captured bats. Individuals were also noted as flying in or out of the portal, if discernable, and baffle bars were attached to the harp traps to aid in this determination. Photographs were taken of each species, and are included in the photographic log attached to this report.

## RESULTS

The results of the Phase 1 Habitat Assessment and fall portal survey are discussed below.

### PHASE 1 HABITAT ASSESSMENT

The in-house review of topographic, geologic, and karst potential maps shows that the proposed project is located in an area classified as non-karst by the Kentucky Geological Survey (KGS), and no caves, sinkholes, or other karst features are mapped within one kilometer of the project (KGS 2015). Based on the location of the project within a non-karst area, the Kentucky Speleological Society (KSS) was not contacted regarding the locations of known karst features within the vicinity

of the project. The review of available mine maps identified multiple underground mines in the project vicinity, which resulted in the identification of 226 abandoned mine portals located within one kilometer of the project (Figure 1) (KOMSL 2013). These portals were examined during the Phase 1 Habitat Assessment to determine their potential as habitat for the three bat species.

The Phase 1 Habitat Assessment was conducted from June 3 through June 6, 2013. During the assessment, 22 of the 226 abandoned mine portals were determined to meet the criteria for potential roosting habitat/hibernacula for the three bat species under the 2013 survey guidance (Figure 1). In addition, 10 previously undocumented portals were identified during the assessment that meet the criteria for potential roosting habitat/hibernacula. The results of the Phase 1 Habitat Assessment for these 32 portals are summarized in Table 1. Phase 1 Habitat Assessment Data Sheets for these features are included as Appendix A.

The remaining abandoned mine portals were either: 1) closed; 2) not found; 3) located in an area that has been developed; 4) inaccessible due to steep terrain; or 5) lacked of one or more of the criteria listed in the 2013 guidance. Eight portals (Portals 34, 35, 36, 224, 119, 76, 127, and 123) located in the proposed disturbance limits or connected to underground mines located under the disturbance limits that failed to meet the criteria for potential roosting habitat/hibernacula under the 2013 survey guidance were re-evaluated under the 2015 survey guidance (Figure 1). A review of field notes and photographs showed that these portals also fail to meet the criteria under the 2014 survey guidance, with the exception of Portal 119. This horizontal portal has an entrance that is greater than six inches in diameter; therefore, the portal was re-visited in 2015. The 2015 assessment showed that the feature ends within 50 feet of the entrance and does not meet the criteria for potential roosting habitat/hibernacula. A photograph of Portal 119 is included in the photographic log at the end of this report.

Based on ArcView GIS mapping and the proposed project plans, one abandoned mine portal (Portal 121) that meets the criteria for potential roosting habitat/hibernacula is located within the disturbance limits for the project (Figure 1). Four additional portals (Portals 37, 38, 39, and A2) are connected to an underground mine located under the disturbance limits. As a result, the project will result in impacts to Portal 121 and may result in impacts to Portals 37 – A2, which could result in impacts to federally-listed bats using these features as roosting habitat and/or hibernacula. To document potential use of these features by the three bat species, surveys were conducted at each feature. Due to safety concerns associated with entering abandoned mine portals, direct surveys of these features could not be performed; therefore, a fall portal survey was conducted at each portal to evaluate use by the three bat species. The results of these surveys are discussed in the following section.



The remaining 27 abandoned mine portals that meet the criteria for potential roosting habitat/hibernacula are located outside the project disturbance limits and are not associated with underground mines located under the disturbance limits. These portals are also separated from the project by streams/alluvium or topographic breaks (ridges and valleys), and are not anticipated to be impacted by construction or blasting activities associated with the project.

## **FALL PORTAL SURVEY**

Prior to the fall portal survey, a reconnaissance site visit was conducted on August 26, 2015 to confirm that Portals 121, 37, 38, 39, and A2 are still present and represent potential roosting habitat/hibernacula. All five portals appeared to be unchanged since the 2013 Phase 1 Habitat Assessment, and continue to meet the criteria for potential roosting habitat/hibernacula. During the reconnaissance, one additional mine portal was found adjacent to Portals 37 – A2. The new portal, Portal A4, is connected to the same underground mine as Portals 37 – A2, and meets the criteria for potential roosting habitat/hibernacula. As a result, Portal A4 was also surveyed during the fall portal survey. A photograph of A4 is included in the photographic log at the end of this report.

A project proposal was submitted on September 9, 2015 to the USFWS Kentucky Field Office (KFO) and KDFWR proposing harp trap surveys at Portals 121, 37, 38, 39, A2, and A4. Both agencies concurred with the project proposal on September 9, 2015. Copies of the project proposal and correspondence with the USFWS KFO and KDFWR are included as Appendix B.

The fall portal survey was conducted at Portals 121 and 37 – A4 on September 15 and September 29, 2015 (Figure 2). Based on mine maps, Portals 37 – A4 are entrances to the same underground mine and are connected by internal passages (Figure 3). As a result, the survey protocols for inter-connected portals listed in the 2015 survey guidance were used for these five portals. Under these protocols, half of the inter-connected portals are surveyed on the first survey night, and the other half are completely blocked. On the second survey night, the survey efforts are reversed. On September 15, harp traps were set up at Portals 39, A2, and A4, and Portals 37 and 38 were blocked. On September 29, harp traps were set up at Portals 37 and 38, and Portals 39, A2, and A4 were blocked. Portal 121 was surveyed on both nights. Photographs of each surveyed portal are included in the photographic log at the end of this report.

No federally-listed bat species were captured during the fall portal survey. Non-listed bats captured during the survey included five tri-colored bats at Portal 121 and five tri-colored bats at Portals 37 – A4. One tri-colored bat was recaptured at Portal 121 on the same survey night; however, no bats were recaptured on different survey nights. The results of the fall portal survey are summarized in

the following table. A summary of data recorded for each captured bat is included in Table 2, and on the portal survey data sheets in Appendix C.

Species	Common Name	Portal 121	Portals 37, 38, 39, A2, A4	Total Captures per Species
<i>Perimyotis subflavus</i>	tri-colored bat	5	5	10
Total Captures per Portal		5	5	

Weather conditions during the fall portal survey were within the allowable ranges listed in the 2015 survey guidance. Temperatures did not fall below 10° Celsius (C) [50° Fahrenheit (F)] either survey night, and average starting and ending temperatures were 22° C (71° F) and 17° C (63° F), respectively. Wind speeds were between zero and three miles per hour (0 to 1 on Beaufort scale) on both survey nights. Cloud cover ranged from clear to overcast during the survey. Two separate precipitation events occurred on September 29, including one event from 21:20 to 21:30 and a second event from 22:30 to 22:45. These precipitation events totaled less than 30 minutes and did not require the survey night to be suspended or repeated, per the 2015 survey guidance. The survey period was also extended for 30 minutes at both survey locations. The moon phase was waxing crescent (6% illuminated) on September 15 and waning gibbous (94% illuminated) on September 29. The weather conditions recorded for each survey night are included on the portal survey data sheets in Appendix C.


## CONCLUSION

Based on the results of the Phase 1 Habitat Assessment and fall portal survey, the proposed KY 15 Widening and Reconstruction project is not anticipated to result in impacts to roosting habitat/hibernacula for the gray bat, Indiana bat, or northern long-eared bat.

We appreciate the opportunity to assist you on this important project. Please call Neil Guthals or Seth Bishop at (502) 625-3009 with any questions on this report or the overall project.

Sincerely,

  
Seth R. Bishop  
Project Ecologist

  
Neil A. Guthals  
Senior Ecologist

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Attachments:   Tables  
                      Figures  
                      Photographs  
                      Appendix A – Phase 1 Habitat Assessment Data Sheets  
                      Appendix B – USFWS Project Proposal and Correspondence  
                      Appendix C – Fall Portal Survey Data Sheets



## TABLES

**Table 1: Phase 1 Habitat Assessment Summary**  
**KY 15 Widening & Reconstruction Project**  
**Perry County, Kentucky**  
**KYTC Item No. 10-158.00**

Characteristics	Portal										
	A1	A2	A3	B4	B5	B6	B7	B8	B9	4	8
Opening type	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal
Opening size (HxW in feet)	4 x 1.5	10 x 2	60	8 x 2.5	8 x 2.5	6.5 x 2.5	4 x 1.5	6 x 1.5	8 x 1.5	7 x 3	5.5 x 1
Internal dimensions (HxW in feet)	15 x 8	12 x 2   8 x 2.5	5 x 1   2 x 1.5	25 x 3	1 x 1	30 x 3	20 x 4	20 x 3	15 x 6	10 x 2.5	9 x 3
Slope	Flat	Up   Flat	Flat	Up	Up	Down	Flat	Down	Up	Flat	Flat
Entrance stable?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Direction of airflow	Out	Out	Out	Out	Out	None	Out	Out	Out	Out	In
Amount of airflow	Moderate	Moderate	Heavy	Slight	Slight	None	Slight	Slight	Slight	Slight	Slight
Air warmer or cooler than outside?	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler
Evidence of collapse?	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No
Ceiling condition	Sloping / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry
Amount of water in opening	None	Out	None	None	None	None	None	None	None	None	None
Evidence of past flooding?	None	None	None	None	None	None	None	None	None	None	None
Observed length of portal (feet)	36	66   78	78+   54	40+	36+	40+	40	40+	60+	60+	54+
Distance to nearest water source (feet)	30	250	2,000	90	110	1,440	975	975	1,600	200	250
% canopy cover	95	85	90	95	80	50	90	90	95	95	80
Foraging signs?	None	None	None	None	None	None	None	None	None	None	None
<b>Potential Bat Habitat?</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Bats Present?</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>

Characteristics	Portal										
	10	31	32	37	38	39	51	92	93	94	118
Opening type	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Tunnel	Mine Portal
Opening size (HxW in feet)	10 x 2.5	6.5 x 1	6.5 x 3	7 x 2	8.5 x 1	19 x 2.5	7 x 1	15 x 4	8 x 2	11 x 4	3 x 1
Internal dimensions (HxW in feet)	10 x 3	20 x 3	10 x 4	15 x 1.5	8 x 2	10 x 3   10 x 4	30 x 3	20 x 5	30 x 2	10 x 5	10 x 3
Slope	Flat	Flat	Flat	Flat	Up	Flat	Flat	Flat	Down	Flat	Down
Entrance stable?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Direction of airflow	In	Out	Out	In	Out	In	None	In	In	Out	In
Amount of airflow	Moderate	Heavy	Moderate	Moderate	Moderate	Heavy	None	Slight	Moderate	Slight	Slight
Air warmer or cooler than outside?	Warmer	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler
Evidence of collapse?	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Ceiling condition	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Sloping / Dry	Flat / Dry	Flat	Sloping / Dry
Amount of water in opening	None	None	None	None	None	None	None	None	None	Pooled	None
Evidence of past flooding?	None	None	None	None	None	None	None	None	None	None	None
Observed length of portal (feet)	45+	54	27+	60+	54	60	60+	85	40+	0	10
Distance to nearest water source (feet)	250	250	250	200	250	250	100	1,675	1,750	0	285
% canopy cover	95	80	25	10	80	85	95	95	100	100	100
Foraging signs?	None	None	None	None	None	None	None	None	None	None	None
<b>Potential Bat Habitat?</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Bats Present?</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>

Characteristics	Portal									
	121	143	146	154	155	156	172	175	206	219
Opening type	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal	Mine Portal
Opening size (HxW in feet)	13 x 3.5	6 x 1.5	5 x 2	8 x 1	12 x 5	13 x 4.5	15 x 3	2 x 1	6 x 1.5	2 x 7
Internal dimensions (HxW in feet)	15 x 3	12 x 2.5	7 x 2.5	20 x 4	40 x 4.5	30 x 4.5	15 x 3	15 x 2.5	12 x 4	8 x 2
Slope	Flat	Flat	Up	Up	Flat	Flat	Flat	Flat	Flat	Down
Entrance stable?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Direction of airflow	Out	Out	In	Out	Out	In	Out	In	Out	Out
Amount of airflow	Heavy	Slight	Slight	Slight	Moderate	Moderate	Slight	Moderate	Heavy	Moderate
Air warmer or cooler than outside?	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler	Cooler
Evidence of collapse?	No	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
Ceiling condition	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Wet	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry	Flat / Dry
Amount of water in opening	None	None	None	None	None	None	None	None	None	None
Evidence of past flooding?	None	None	None	None	None	None	None	None	None	None
Observed length of portal (feet)	40+	40+	40+	40+	60+	78+	40+	4	39+	30+
Distance to nearest water source (feet)	570	250	210	875	780	785	900	935	1,800	2,000
% canopy cover	90	40	85	75	75	75	85	100	50	80
Foraging signs?	None	None	None	None	None	None	None	None	None	None
<b>Potential Bat Habitat?</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Bats Present?</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>	<b>None</b>

Note: Phase 1 Habitat Assessment performed from June 3 through June 6, 2013.



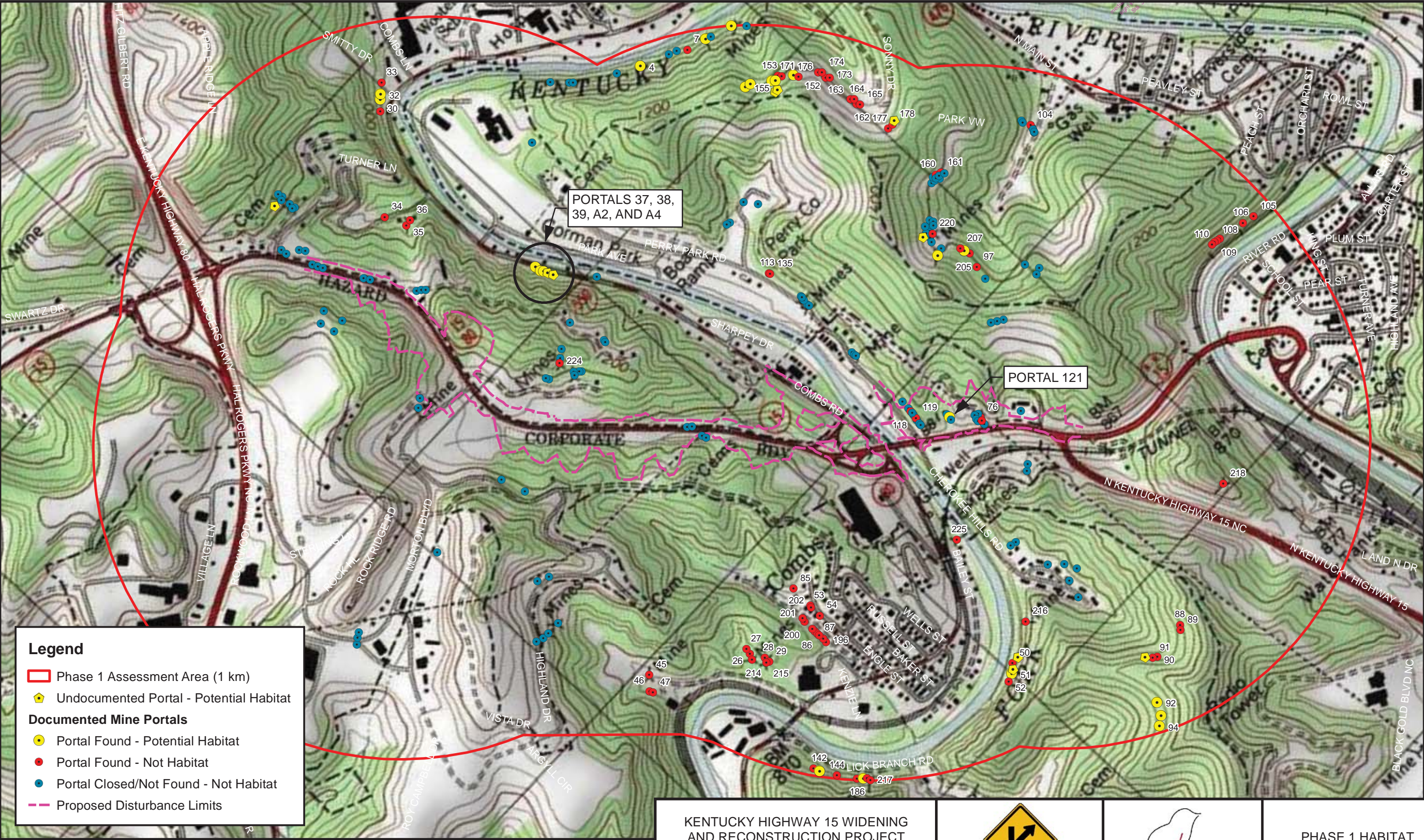
**Table 2: Fall Portal Survey Captured Bat Data**  
**KY 15 Widening & Reconstruction Project**  
**Perry County, Kentucky**  
**KYTC Item No. 10-158.00**

Portal	Date	Time	Species	Sex	Age	Reproductive Condition	Forearm (mm)	Weight (g)	Wing Score	Trap	Flight In/Out	Notes
121	9/15/2015	23:20	<i>Perimyotis subflavus</i>	F	A	NR	34	8.6	0	1	In	
	9/15/2015	23:57	<i>Perimyotis subflavus</i>	F	A	NR	34	8.0	0	1	In	
	9/29/2015	21:35	<i>Perimyotis subflavus</i>	M	A	TD	33	7.2	0	1	In	
	9/29/2015	22:15	<i>Perimyotis subflavus</i>	M	A	TD	34	8.1	0	1	Out	
	9/29/2015	22:22	<i>Perimyotis subflavus</i>	M	A	TD	33	7.7	0	1	Out	
	9/29/2015	00:52	<i>Perimyotis subflavus</i>	-	-	-	-	-	-	1	In	Recapture of previous bat (22:22).
39	9/15/2015	22:52	<i>Perimyotis subflavus</i>	M	A	TD	35	7.6	0	3	In	
A2	9/15/2015	23:52	<i>Perimyotis subflavus</i>	F	A	NR	34	7.6	0	2	In	
	9/15/2015	01:20	<i>Perimyotis subflavus</i>	F	A	NR	34	7.4	0	2	Indeterminate	
A4	9/15/2015	01:25	<i>Perimyotis subflavus</i>	-	-	-	-	-	-	1	-	Escaped from hand.
38	9/29/2015	21:45	<i>Perimyotis subflavus</i>	F	A	NR	35	7.5	0	1	Indeterminate	

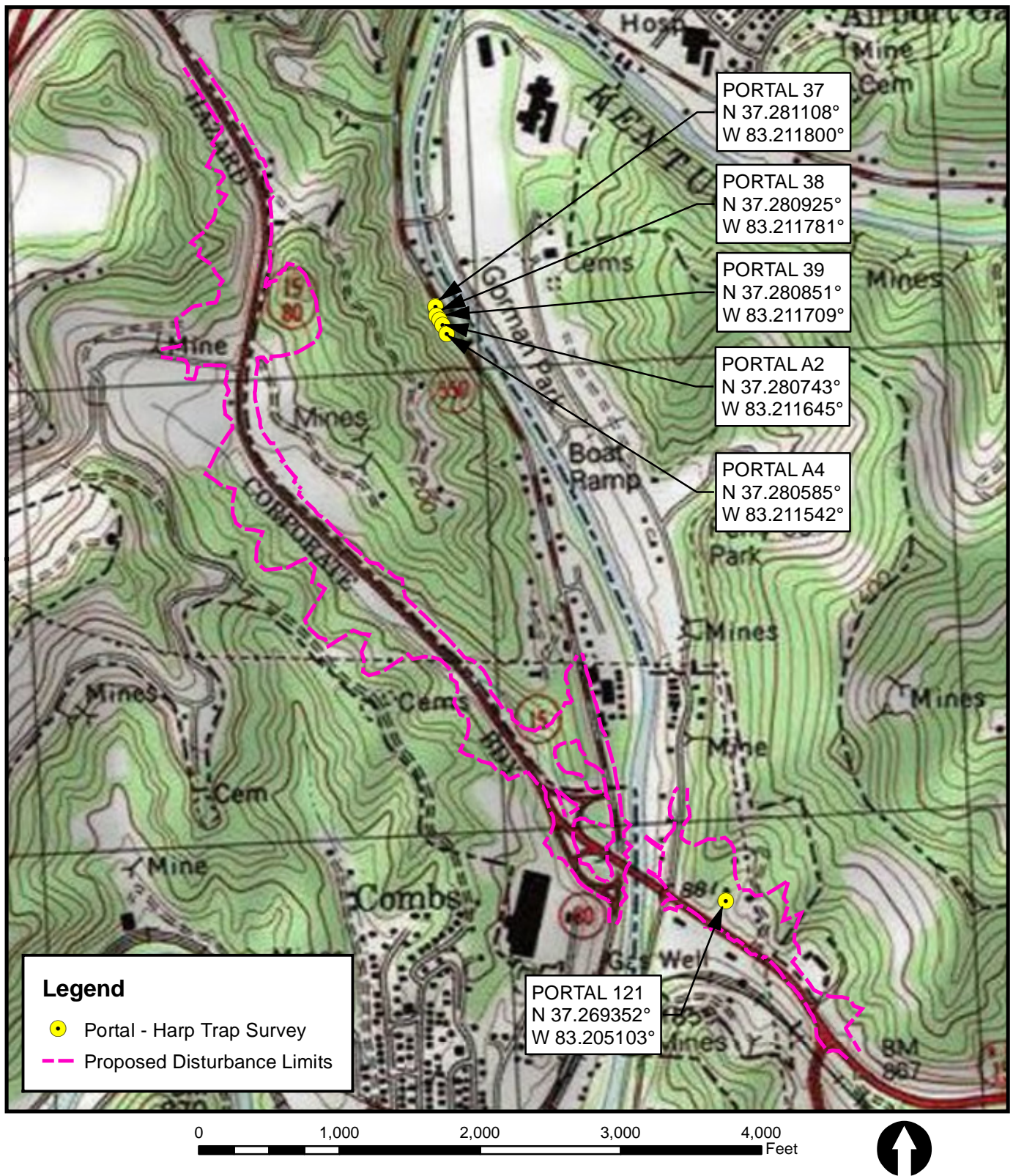
A = Adult; M = Male; F = Female; TD = Testes Descended; NR = Non-Reproductive

## **FIGURES**









KENTUCKY HIGHWAY 15 WIDENING  
AND RECONSTRUCTION PROJECT  
PERRY COUNTY, KENTUCKY  
KYTC ITEM NO. 10-158.00



FALL PORTAL  
SURVEY MAP

REVISED DATE: 10-20-15 | DRAWN BY: EDB/SRB

FIGURE 2



Source: World Imagery - Esri and the GIS User Community (2014); Project design provided by Palmer Engineering; Mine map - Kentucky Office of Mine Safety and Licensing.



**Legend**

- Portal - Harp Trap Survey
- Proposed Disturbance Limits



KENTUCKY HIGHWAY 15 WIDENING  
AND RECONSTRUCTION PROJECT  
PERRY COUNTY, KENTUCKY  
KYTC ITEM NO.10-158.00

REVISED DATE: 10-20-15 | DRAWN BY: BJD/SRB



PORTALS 37 - A4  
MINE MAP

FIGURE 3

P:\2012 Projects\12-093-KY15PerryCo\Figures\Phase 1 and Mine Map for USFWS Sheet 1.mxd, 10-20-2015, temp



## **PHOTOGRAPHS**





Photograph 1: View of Portal 119. This portal did not meet the criteria for potential roosting habitat/hibernacula under the 2013 survey guidance, but was re-evaluated under the 2015 guidance. The portal also failed to meet the criteria under the 2015 survey guidance. September 16, 2015.



Photograph 2: View of Portal A4. This portal was discovered adjacent to Portals 37 – A2 during the August 26, 2015 reconnaissance site visit. August 26, 2015.





Photograph 3: View of the harp trap at Portal 121. This portal was surveyed on September 15 and 29, 2015. September 29, 2015.



Photograph 4: View of the harp trap at Portal A4. This portal was surveyed on September 15, 2015. September 15, 2015.





Photograph 5: View of the harp trap at Portal A2. This portal was surveyed on September 15, 2015.  
September 15, 2015.



Photograph 6: View of the harp trap at Portal 39. This portal was surveyed on September 15, 2015.  
September 15, 2015.





Photograph 7: View of the harp trap at Portal 38. This portal was surveyed on September 29, 2015.  
September 29, 2015.



Photograph 8: View of the harp trap at Portal 37. This portal was surveyed on September 29, 2015.  
September 29, 2015.





Photograph 9: Example of the blocking method used during the survey of Portals 37 – A4. September 29, 2015.






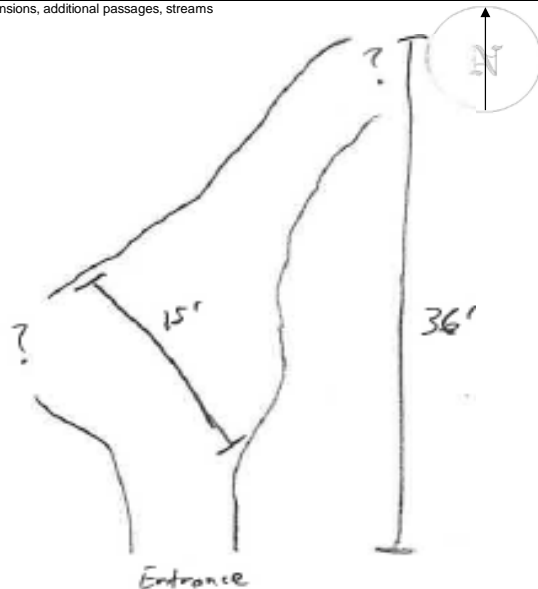
Photograph 10: A tri-colored bat captured during the fall portal survey. This was the only species captured during the survey. September 15, 2015.

# **APPENDIX A**


## **PHASE 1 HABITAT ASSESSMENT DATA SHEETS**



# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/3/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>A1</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>75</u> <b>Distance to nearest water (feet):</b> <u>30 (vernal pool)</u> <b>Signature:</b> <u><i>S. Bishop</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2878°</u> <b>W</b> <u>83.2169°</u> <b>Photo #s:</b> <u>38-39</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>95</u> % Dominant Tree/Shrub Species: <u>American Elm</u> <u>Beech</u> <u>Tulip Poplar</u> Dominant Tree Diameter Range (inches): <u>5-20</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009	
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>4</u> Width <u>1.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>15</u> Width <u>8</u> Height <u>36+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>56</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input checked="" type="checkbox"/> Sloping <input type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line			
<b>EVIDENCE OF USE</b> Human Disturbance: <input checked="" type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> None Species _____ Number _____ Species _____ Number _____ <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiurus noctivagus</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>					
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 			
Additional Info (directions to site, fauna observed, local contacts) <u>Portal appears to curve to the right and extend beyond 36 feet.</u>							

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>A2</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>70</u> <b>Distance to nearest water (feet):</b> <u>250 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2807°</u> <b>W</b> <u>83.2116°</u> <b>Photo #s:</b> <u>68-69</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>85</u> % Dominant Tree/Shrub Species: <u>Ohio Buckeye</u> <u>Sugar Maple</u> <u>Beech</u> Dominant Tree Diameter Range (inches): <u>4-14</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>10</u> Width <u>2</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>C 12 / L 8*</u> Width <u>C 2 / L 2.5</u> Height <u>C 66 / L 78</u> Depth _____ Floor Slope: <u>C</u> Up <input type="checkbox"/> Down <u>L</u> Flat Temperature (°F): <u>57</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> Pooled <input type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiorycter noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 
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Additional Info (directions to site, fauna observed, local contacts) \_\_\_\_\_ \*Portal splits into two passages after entrance. Central passage is 12 feet (w) X 2 feet (h), with a floor that slopes up. Left passage is 8 feet (w) X 2.5 feet (h), with a flat floor. Central passage is 66 feet deep, and left passage is 78 feet deep.

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>A3</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>70</u> <b>Distance to nearest water (feet):</b> <u>2,000 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2736°</u> <b>W</b> <u>83.2010°</u> <b>Photo #s:</b> <u>74-77</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>90</u> % Dominant Tree/Shrub Species: <u>Sycamore</u> <u>Sugar Maple</u> <u>Tulip Poplar</u> Dominant Tree Diameter Range (inches): <u>5-16</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>  </u> * Width <u>  </u> * Height <u>  </u> Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> See notes for multiple openings Interior Dimensions (feet): <u>60</u> Width <u>  </u> * Height <u>  </u> * Depth <u>  </u> Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>61</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:50%;"> Species _____ Number _____  Species _____ Number _____  <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</small> </td> <td style="width:50%;"> Species _____ Number _____  Species _____ Number _____  <small>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</small> </td> </tr> </table>	Species _____ Number _____ Species _____ Number _____ <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</small>	Species _____ Number _____ Species _____ Number _____ <small>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</small>
Species _____ Number _____ Species _____ Number _____ <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</small>	Species _____ Number _____ Species _____ Number _____ <small>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</small>		

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> include: dimensions, additional passages, streams 
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Additional Info (directions to site, fauna observed, local contacts) \*Portal has 8 small openings that appear to have been made by an auger. Only 2 of the openings are larger than on foot in diameter. The left opening is 5 feet (w) x 1 foot (h). The central opening is 2 feet (w) x 1.5 feet (h). Depth varies from 54 feet on the right side of the portal to 78+ feet on the left side. Height of interior is 4 feet. Two passages in interior appear to extend into portal further.

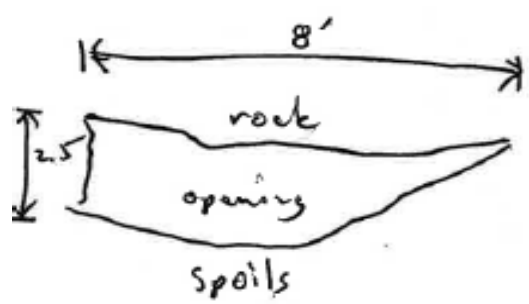

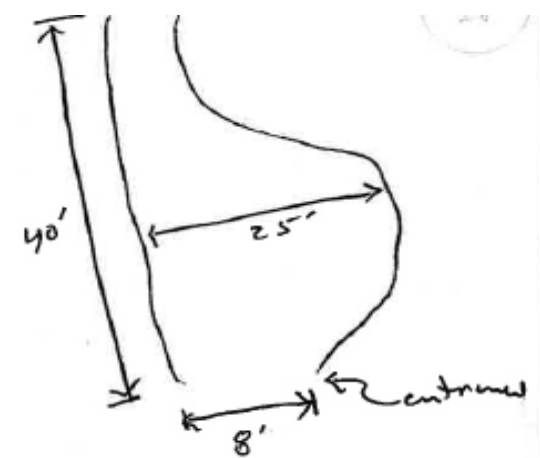


# Phase 1 Habitat Assessment

<b>Date:</b> 6/4/2013 <b>Job Name:</b> KY 15 <b>Project #:</b> KYTC 10-158.00 <b>Site #:</b> B4 <b>Survey Crew:</b> B. Deetsch / R. Fangman <b>Outside Temperature (°F):</b> 66 <b>Distance to nearest water (feet):</b> 90 to North Fork KY River <b>Signature:</b> <i>B. Deetsch</i>	<b>State:</b> Kentucky <b>County:</b> Perry <b>USGS Quad:</b> Hazard North <b>GPS Coord:</b> N 37.2628° <b>W</b> 83.2100° <b>Photo #s:</b> 344-345	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: 95 % Dominant Tree/Shrub Species: Sugar Maple American Beech Rosebay Rhododendron Dominant Tree Diameter Range (inches): 4-8 Prime Maternity Trees Visible: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	 REDWING ECOLOGICAL SERVICES, INC. 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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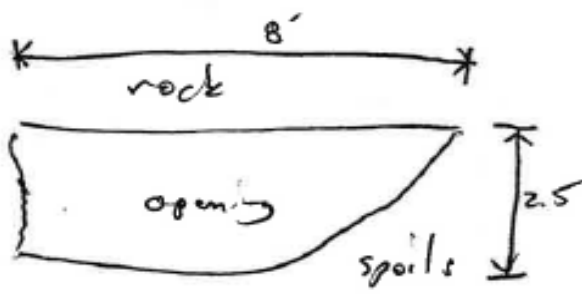

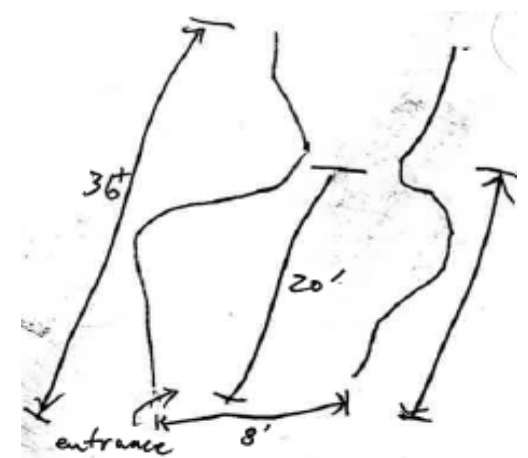
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): 8 Width 2.5 Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): 25 Width 3 Height 40+ Depth Floor Slope: <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): 53 Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <div style="font-size: small;"> <p>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)</p> <p>* C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)</p> <p>* E. fus = <i>Eptesicus fuscus</i> (Big brown bat)</p> <p>* L. bor = <i>Lasiurus borealis</i> (Red bat)</p> <p>* L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</p> <p>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)</p> <p>* L. sem = <i>Lasiurus seminolus</i> (Seminole bat)</p> <p>* M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)</p> <p>* M. gri = <i>Myotis grisescens</i> (Gray bat)</p> <p>* M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</p> <p>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)</p> <p>* M. sep = <i>Myotis septentrionalis</i> (Northern bat)</p> <p>* M. sod = <i>Myotis sodalis</i> (Indiana bat)</p> <p>* N. hum = <i>Nycticeius humeralis</i> (Evening bat)</p> <p>* P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</p> </div>	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____						
Species _____	Number _____	Species _____	Number _____						


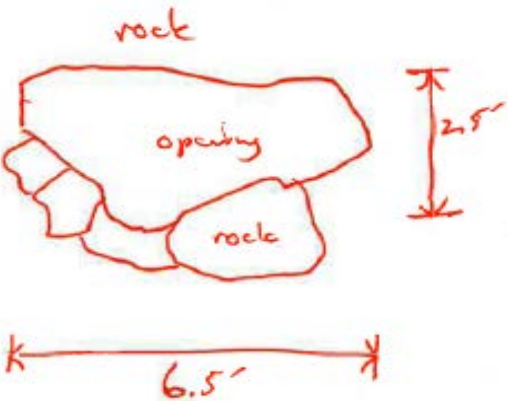

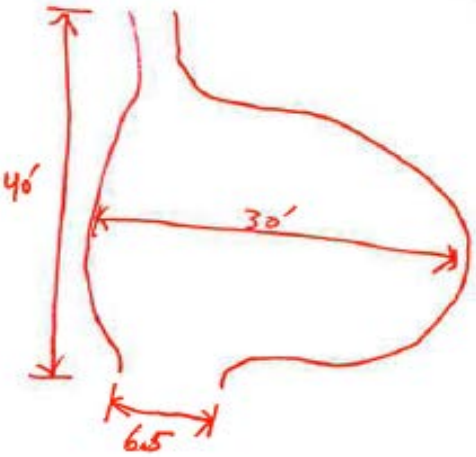
<b>SKETCH FACING OPENING</b>	<b>PHOTOGRAPH OF OPENING</b>	<b>SKETCH FROM ABOVE</b>
		<p>-include: dimensions, additional passages, streams</p> 

Additional Info (directions to site, fauna observed, local contacts) Spider webs at entrance, could not GPS, no coverage, probably ties to 51.

# Phase 1 Habitat Assessment


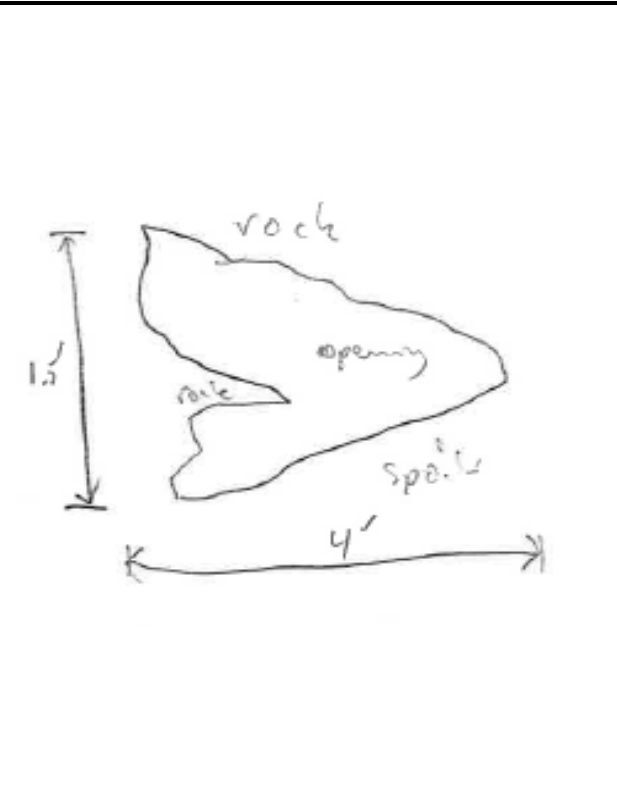

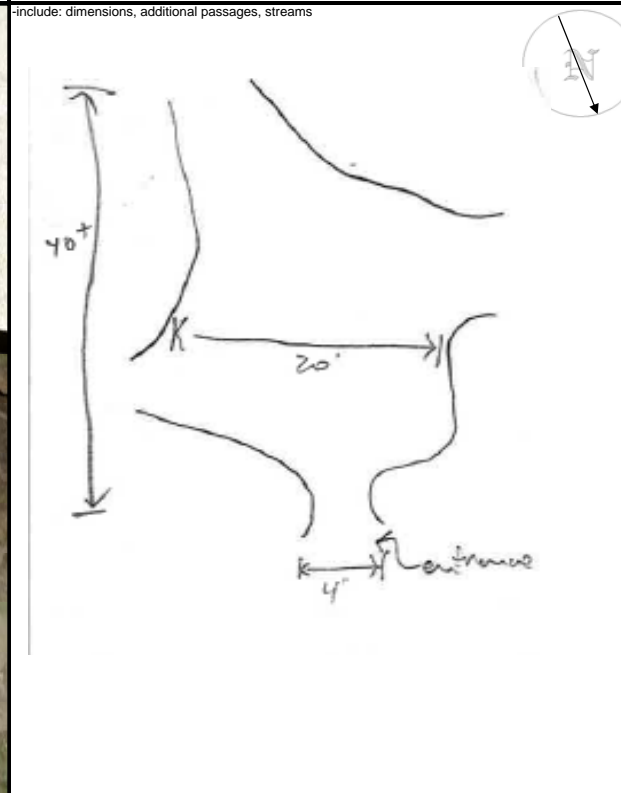
<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>B5</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>66</u> <b>Distance to nearest water (feet):</b> <u>110 to North Forky KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2630°</u> <u>W 83.2096°</u> <b>Photo #s:</b> <u>354-355</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>80</u> % Dominant Tree/Shrub Species: <u>Rosebay Rhododendron</u> <u>Sugar Maple</u> <u>Basswood</u> Dominant Tree Diameter Range (inches): <u>4-6</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009	
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>8</u> Width <u>2.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): _____ Width _____ Height <u>36+</u> Depth _____ Floor Slope: <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>52</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line			
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None Species _____ Number _____ Species _____ Number _____ Species _____ Number _____ Species _____ Number _____ <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>					
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 			
Additional Info (directions to site, fauna observed, local contacts) <u>Adjacent to ephemeral stream, ceiling collapse at 20 feet but passage continues on and opening is greater than 1 foot x 1 foot.</u>							

# Phase 1 Habitat Assessment


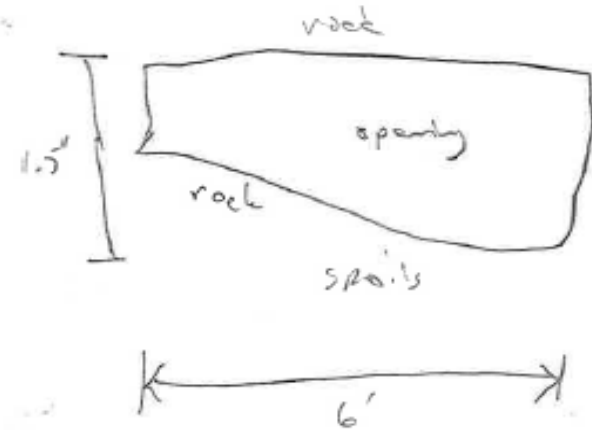

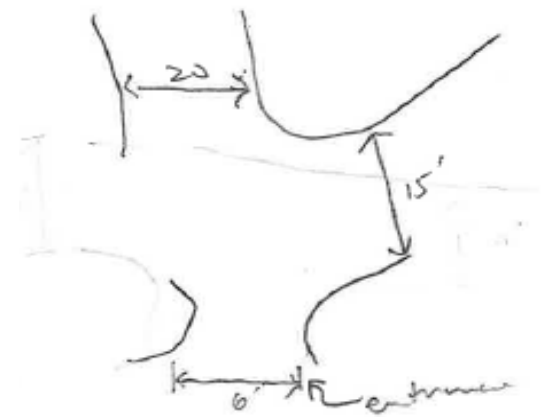
<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>B6</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>70</u> <b>Distance to nearest water (feet):</b> <u>*1,440 to North Fork KY River</u> <b>Signature:</b> <u><i>[Signature]</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2603°</u> <u>W 83.2063°</u> <b>Photo #s:</b> <u>362-363</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>50</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>American Beech</u> <u>Spicebush</u> Dominant Tree Diameter Range (inches): <u>1-6</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>6.5</u> Width <u>2.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>30</u> Width <u>3</u> Height <u>40+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input checked="" type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>55</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input checked="" type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <small> * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat) </small>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <u>On edge of access road.</u>													




## Phase 1 Habitat Assessment

Date: <u>6/5/2013</u> Job Name: <u>KY 15</u> Project #: <u>KYTC 10-158.00</u> Site #: <u>B7</u> Survey Crew: <u>B. Deetsch / R. Fangman</u> Outside Temperature (°F): <u>73</u> Distance to nearest water (feet): <u>*975 to North Fork KY River</u> Signature: <u><i>Bryce / Deetsch</i></u>		State: <u>Kentucky</u> County: <u>Perry</u> USGS Quad: <u>Hazard North</u> GPS Coord: <u>N 37.2796°</u> <u>W 83.2009°</u> Photo #: <u>383-385</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <u>X</u> Woods <u>      </u> Open Field <u>      </u> Developed Canopy Cover: <u>      </u> 90 <u>      </u> % Dominant Tree/Shrub Species: <u>      </u> Tulip Poplar <u>      </u> Sweet Birch <u>      </u> Sugar Maple Dominant Tree Diameter Range (inches): <u>      </u> 4-8 Prime Maternity Trees Visible: <u>      </u> Yes <u>      </u> X No		 REDWING ECOLOGICAL SERVICES, INC. 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009	
<b>OPENING</b> Type: <u>      </u> Cave <u>      </u> X Mine Portal <u>      </u> Rock Shelter <u>      </u> Sink Hole <u>      </u> Other: <u>      </u> Orientation: <u>      </u> Vertical <u>      </u> X Horizontal Entrance Dimensions (feet): <u>      </u> 4 <u>      </u> Width <u>      </u> 1.5 <u>      </u> Height Entrance Stable: <u>      </u> X Yes <u>      </u> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>      </u> 20 <u>      </u> Width <u>      </u> 4 <u>      </u> Height <u>      </u> 40 <u>      </u> Depth Floor Slope: <u>      </u> Up <u>      </u> Down <u>      </u> X Flat Temperature (°F): <u>      </u> 49 <u>      </u> Humidity (%): <u>      </u> Ceiling Conditions: <u>      </u> Sloping <u>      </u> X Flat <u>      </u> Wet <u>      </u> X Dry Evidence of Ceiling Collapse: <u>      </u> Yes <u>      </u> X No Evidence of Staining <u>      </u> Yes <u>      </u> X No		<b>AIRFLOW</b> <u>      </u> In <u>      </u> X Out <u>      </u> None <u>      </u> X Slight <u>      </u> Moderate <u>      </u> Heavy <u>      </u> None  <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>      </u> X None Flooding: <u>      </u> X None <u>      </u> Flooded <u>      </u> Rack Line			
<b>EVIDENCE OF USE</b> <u>      </u> X None Human Disturbance: <u>      </u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor Foraging Signs: <u>      </u> Moth Wings <u>      </u> Guano Wildlife Use: <u>      </u> Scat <u>      </u> Footprints <u>      </u> Other: <u>      </u>		<b>BATS PRESENT</b> <u>      </u> X None <table style="width: 100%;"> <tr> <td style="width: 50%;">           Species <u>      </u> Number <u>      </u>            Species <u>      </u> Number <u>      </u> </td> <td style="width: 50%;">           Species <u>      </u> Number <u>      </u>            Species <u>      </u> Number <u>      </u> </td> </tr> </table> <div style="font-size: small;">             * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)              * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)              * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)              * L. bor = <i>Lasiurus borealis</i> (Red bat)              * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)              * L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)              * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)              * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)              * M. gri = <i>Myotis grisescens</i> (Gray bat)              * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)           </div> <div style="font-size: small;">             * M. luc = <i>Myotis lucifugus</i> (Little brown bat)              * M. sep = <i>Myotis septentrionalis</i> (Northern bat)              * M. sod = <i>Myotis sodalis</i> (Indiana bat)              * N. hum = <i>Nycticeius humeralis</i> (Evening bat)              * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)           </div>				Species <u>      </u> Number <u>      </u> Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u> Species <u>      </u> Number <u>      </u>
Species <u>      </u> Number <u>      </u> Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u> Species <u>      </u> Number <u>      </u>						
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 			
Additional Info (directions to site, fauna observed, local contacts) <u>      </u> Mine pillar: <u>      </u>							

# Phase 1 Habitat Assessment

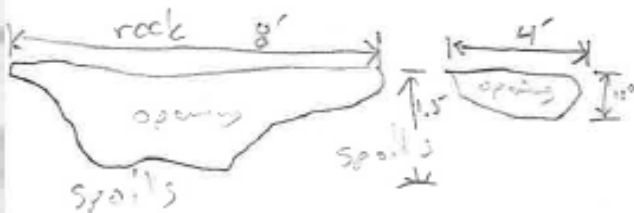

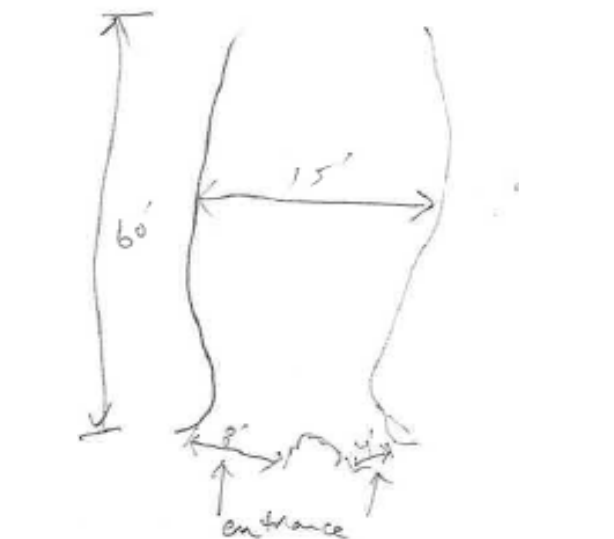
<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>B8</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>73</u> <b>Distance to nearest water (feet):</b> <u>*975 to North Fork KY River</u> <b>Signature:</b> <u><i>[Signature]</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2797°</u> <u>W 83.2010°</u> <b>Photo #s:</b> <u>386-387</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>90</u> % Dominant Tree/Shrub Species: <u>Tulip Poplar</u> <u>Sweet Birch</u> <u>Sugar Maple</u> Dominant Tree Diameter Range (inches): <u>4-8</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009			
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>6</u> Width <u>1.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>20</u> Width <u>3</u> Height <u>40+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input checked="" type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>52</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line					
<b>EVIDENCE OF USE</b> Human Disturbance: <input type="checkbox"/> None <input checked="" type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table border="0" style="width:100%;"> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>				Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____								
Species _____ Number _____	Species _____ Number _____								
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 					
Additional Info (directions to site, fauna observed, local contacts)									

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/6/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>B9</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>69</u> <b>Distance to nearest water (feet):</b> <u>1,600 to North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2766°</u> <u>W 83.1987°</u> <b>Photo #s:</b> <u>406-407</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>95</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Tulip Poplar</u> <u>Basswood</u> Dominant Tree Diameter Range (inches): <u>4-10</u> Prime Maternity Trees Visible: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>8</u> Width <u>1.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>15</u> Width <u>6</u> Height <u>60+</u> Depth _____ Floor Slope: <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>55</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: inline-block; width: 33%;"> * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat) </div> <div style="display: inline-block; width: 33%;"> * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat) </div> <div style="display: inline-block; width: 33%;"> * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat) </div> </div>	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____						
Species _____	Number _____	Species _____	Number _____						

<b>SKETCH FACING OPENING</b>	<b>PHOTOGRAPH OF OPENING</b>	<b>SKETCH FROM ABOVE</b>
		<p>-include: dimensions, additional passages, streams</p> 

Additional Info (directions to site, fauna observed, local contacts)
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## Phase 1 Habitat Assessment

Date: 6/4/2013

Job Name: KY 15


Project #: KYTC 10-158.00

Site #: 4

Survey Crew: S. Bishop / K. Russo

Outside Temperature (°F): 68

Distance to nearest water (feet): 200 North Fork KY River

Signature: 

State: Kentucky

County: Perry

USGS Quad: Hazard North

GPS Coord: N 37.2830°

W 83.2038°

Photo #s: 60-61

Terrestrial Habitat

Habitat Type: ☒ Woods ☐ Open Field ☐ Developed

Canopy Cover: 95 %

Dominant Tree/Shrub Species: 


Beech

Rhododendron

Sugar Maple

Dominant Tree Diameter Range (inches): 1-20

Prime Maternity Trees Visible: ☐ Yes ☒ No



1139 S. Fourth Street, Louisville, KY 40203  
(502) 625-3009

Opening

Type: ☐ Cave ☒ Mine Portal

☐ Rock Shelter ☐ Sink Hole

☐ Other:

Orientation: ☐ Vertical ☒ Horizontal

Entrance Dimensions (feet): 7 Width 3 Height

Entrance Stable: ☒ Yes ☐ No

Interior Conditions

Interior Dimensions (feet): 10 Width 2.5 Height 60+ Depth

Floor Slope: ☐ Up ☐ Down ☒ Flat

Temperature (°F): 55 Humidity (%): N/A

Ceiling Conditions: ☐ Sloping ☒ Flat ☐ Wet ☒ Dry

Evidence of Ceiling Collapse: ☒ Yes ☐ No

Evidence of Staining: ☐ Yes ☒ No

Airflow

☐ In ☒ Out ☐ None

☒ Slight ☐ Moderate ☐ Heavy ☐ None

Waterflow

☐ In ☐ Out ☐ Pooled ☒ None

Flooding: ☒ None ☐ Flooded ☐ Rack Line

Evidence of Use ☒ None

Human Disturbance: ☐ Trash ☐ Graffiti ☐ Fire ☐ Archaeological ☐ Odor

Foraging Signs: ☐ Moth Wings ☐ Guano

Wildlife Use: ☐ Scat ☐ Footprints ☐ Other:

Bats Present ☒ None

Species 

Number

Species 

Number

\* C. raf = *Corynorhinus rafinesquii* (Raf. big-eared bat)

\* C. tow = *Corynorhinus townsendii* (VA big-eared bat)

\* E. fus = *Eptesicus fuscus* (Big brown bat)

\* L. bor = *Lasiurus borealis* (Red bat)

\* L. cin = *Lasiurus cinereus* (Hoary bat)

\* L. nyc = *Lasiorycteris noctivagans* (Silver-haired bat)

\* L. sem = *Lasiurus seminolus* (Seminole bat)

\* M. aus = *Myotis austroriparius* (Southeastern myotis)

\* M. gri = *Myotis grisescens* (Gray bat)

\* M. lei = *Myotis leibii* (Eastern small-footed bat)

\* M. luc = *Myotis lucifugus* (Little brown bat)

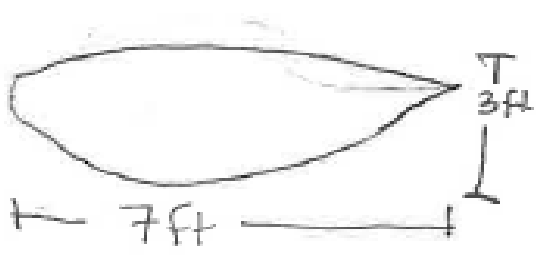
\* M. sep = *Myotis septentrionalis* (Northern bat)

\* M. sod = *Myotis sodalis* (Indiana bat)


\* N. hum = *Nycticeius humeralis* (Evening bat)

\* P. sub = *Perimyotis subflavus* (Tri-color bat)

Sketch Facing Opening

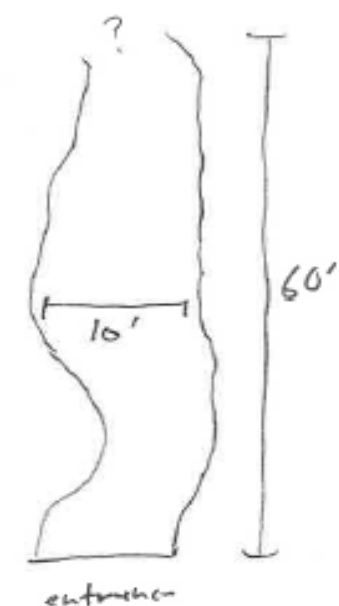


Photograph of Opening



Sketch from Above


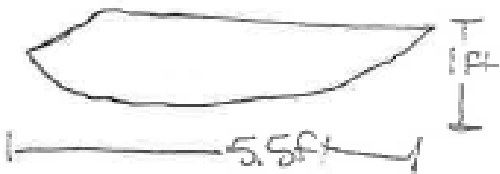

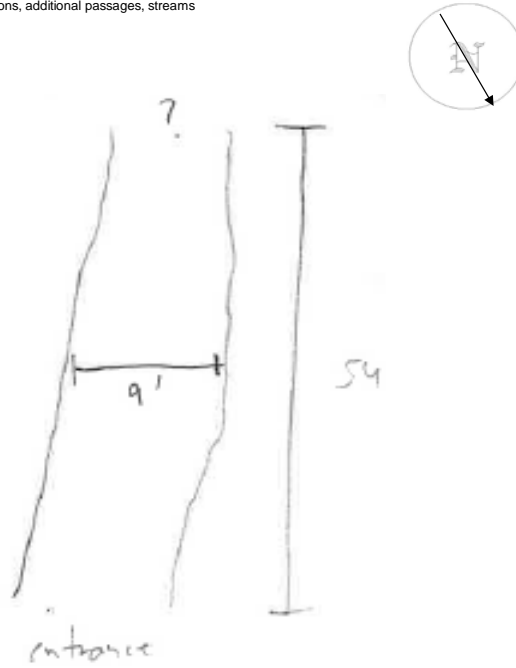
include: dimensions, additional passages, streams






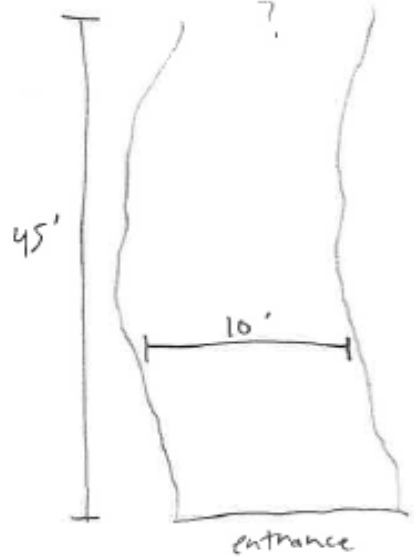
Additional Info (directions to site, fauna observed, local contacts)

Appears to extend past 60 feet to the left.

## Phase 1 Habitat Assessment


<b>Date:</b> 6/4/2013 <b>Job Name:</b> KY 15 <b>Project #:</b> KYTC 10-158.00 <b>Site #:</b> 8 <b>Survey Crew:</b> S. Bishop / K. Russo <b>Outside Temperature (°F):</b> 62 <b>Distance to nearest water (feet):</b> 250 North Fork KY River <b>Signature:</b> <i>S. Bishop</i>		<b>State:</b> Kentucky <b>County:</b> Perry <b>USGS Quad:</b> Hazard North <b>GPS Coord:</b> N 37.2822° W 83.2014° <b>Photo #s:</b> 55-57		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: 80 % Dominant Tree/Shrub Species: <u>Beech</u> <u>Sugar Maple</u> <u>American Elm</u> Dominant Tree Diameter Range (inches): <u>3-15</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> ECOLOGICAL SERVICES, INC. 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009	
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): 5.5 Width 1 Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): 9 Width 3 Height 54+ Depth Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): 58 Humidity (%): N/A Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line			
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None Species _____ Number _____ Species _____ Number _____ <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</small>		Species _____ Number _____ Species _____ Number _____ <small>* L. myc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</small>		<small>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>	
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 			
Additional Info (directions to site, fauna observed, local contacts) Portal appears to continue beyond 54 feet.							

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>10</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>61</u> <b>Distance to nearest water (feet):</b> <u>250 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2819°</u> <b>W</b> <u>83.2004°</u> <b>Photo #s:</b> <u>53-54</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>95</u> % Dominant Tree/Shrub Species: <u>Beech</u> <u>Sugar Maple</u> <u>American Elm</u> Dominant Tree Diameter Range (inches): <u>6-20</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009	
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>10</u> Width <u>2.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>10</u> Width <u>3</u> Height <u>45+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>62</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line			
<b>EVIDENCE OF USE</b> Human Disturbance: <input checked="" type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input checked="" type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input checked="" type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> None Species _____ Number _____ Species _____ Number _____ <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</small>		Species _____ Number _____ Species _____ Number _____ <small>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>			
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 			
Additional Info (directions to site, fauna observed, local contacts) <u>Entrance passage continues past 45 feet; Ash observed at portal entrance.</u>							



# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/3/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>31</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>84</u> <b>Distance to nearest water (feet):</b> <u>250 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2877°</u> <b>W</b> <u>83.2113°</u> <b>Photo #s:</b> <u>49-50</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>80</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Beech</u> <u>American Elm</u> Dominant Tree Diameter Range (inches): <u>8-20</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>6.5</u> Width <u>1</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>20</u> Width <u>3</u> Height <u>54</u> Depth Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>54</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: flex; justify-content: space-between;"> <div> <p>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)</p> <p>* C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)</p> <p>* E. fus = <i>Eptesicus fuscus</i> (Big brown bat)</p> <p>* L. bor = <i>Lasiurus borealis</i> (Red bat)</p> <p>* L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</p> </div> <div> <p>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)</p> <p>* L. sem = <i>Lasiurus seminolus</i> (Seminole bat)</p> <p>* M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)</p> <p>* M. gri = <i>Myotis grisescens</i> (Gray bat)</p> <p>* M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</p> </div> <div> <p>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)</p> <p>* M. sep = <i>Myotis septentrionalis</i> (Northern bat)</p> <p>* M. sod = <i>Myotis sodalis</i> (Indiana bat)</p> <p>* N. hum = <i>Nycticeius humeralis</i> (Evening bat)</p> <p>* P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</p> </div> </div> </div>	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> include: dimensions, additional passages, streams 
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Additional Info (directions to site, fauna observed, local contacts)	Appears to end at 54 feet; separate passage to the right, cannot determine depth.

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/3/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>32</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>85</u> <b>Distance to nearest water (feet):</b> <u>250 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2878°</u> <b>W</b> <u>83.2112°</u> <b>Photo #s:</b> <u>47-48</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>25</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Beech</u> <u>American Elm</u> Dominant Tree Diameter Range (inches): <u>8-20</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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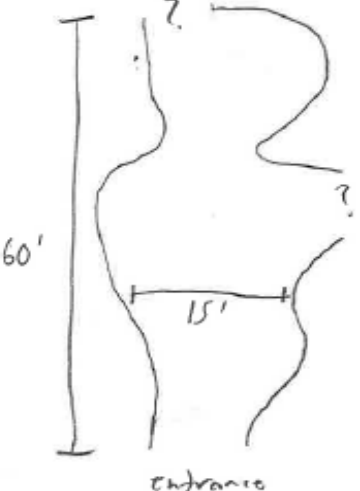
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>6.5</u> Width <u>3</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>10</u> Width <u>4</u> Height <u>27+</u> Depth Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>59</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <div style="font-size: small;"> <p>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)</p> <p>* C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)</p> <p>* E. fus = <i>Eptesicus fuscus</i> (Big brown bat)</p> <p>* L. bor = <i>Lasius borealis</i> (Red bat)</p> <p>* L. cin = <i>Lasius cinereus</i> (Hoary bat)</p> <p>* L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)</p> <p>* L. sem = <i>Lasius seminolus</i> (Seminole bat)</p> <p>* M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)</p> <p>* M. gri = <i>Myotis grisescens</i> (Gray bat)</p> <p>* M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</p> <p>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)</p> <p>* M. sep = <i>Myotis septentrionalis</i> (Northern bat)</p> <p>* M. sod = <i>Myotis sodalis</i> (Indiana bat)</p> <p>* N. hum = <i>Nycticeius humeralis</i> (Evening bat)</p> <p>* P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</p> </div>	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> include: dimensions, additional passages, streams 
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Additional Info (directions to site, fauna observed, local contacts)	Passage may extend to right past 27 feet.

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>37</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>69</u> <b>Distance to nearest water (feet):</b> <u>200 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2811°</u> <b>W</b> <u>83.2118°</u> <b>Photo #s:</b> <u>70-71</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>10</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Basswood</u> <u>Ohio Buckeye</u> Dominant Tree Diameter Range (inches): <u>6-20</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009					
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>7</u> Width <u>2</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>15</u> Width <u>1.5</u> Height <u>60+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>64</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line							
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>				Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____									
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____									
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 							
Additional Info (directions to site, fauna observed, local contacts) <span style="float: right;">Portal may extend past 60 feet; possible passage off to right.</span>											



# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>38</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>71</u> <b>Distance to nearest water (feet):</b> <u>250 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2809°</u> <b>W</b> <u>83.2117°</u> <b>Photo #s:</b> <u>65-67</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>80</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Beech</u> <u>Ohio Buckeye</u> Dominant Tree Diameter Range (inches): <u>3-14</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>8.5</u> Width <u>1</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>8</u> Width <u>2</u> Height <u>54</u> Depth Floor Slope: <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>56</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: flex; justify-content: space-between;"> <div> <p>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)</p> <p>* C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)</p> <p>* E. fus = <i>Eptesicus fuscus</i> (Big brown bat)</p> <p>* L. bor = <i>Lasiurus borealis</i> (Red bat)</p> <p>* L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</p> </div> <div> <p>* L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)</p> <p>* L. sem = <i>Lasiurus seminolus</i> (Seminole bat)</p> <p>* M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)</p> <p>* M. gri = <i>Myotis grisescens</i> (Gray bat)</p> <p>* M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</p> </div> <div> <p>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)</p> <p>* M. sep = <i>Myotis septentrionalis</i> (Northern bat)</p> <p>* M. sod = <i>Myotis sodalis</i> (Indiana bat)</p> <p>* N. hum = <i>Nycticeius humeralis</i> (Evening bat)</p> <p>* P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</p> </div> </div> </div>	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 
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Additional Info (directions to site, fauna observed, local contacts)	Unable to see if passage extends past 54 feet.

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>39</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>73</u> <b>Distance to nearest water (feet):</b> <u>250 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2808°</u> <b>W</b> <u>83.2117°</u> <b>Photo #s:</b> <u>63-64</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>85</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Beech</u> <u>Ohio Buckeye</u> Dominant Tree Diameter Range (inches): <u>2-12</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>19</u> Width <u>2.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>L 10 / R 10*</u> Width <u>L 3 / R 4</u> Height <u>60</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>58</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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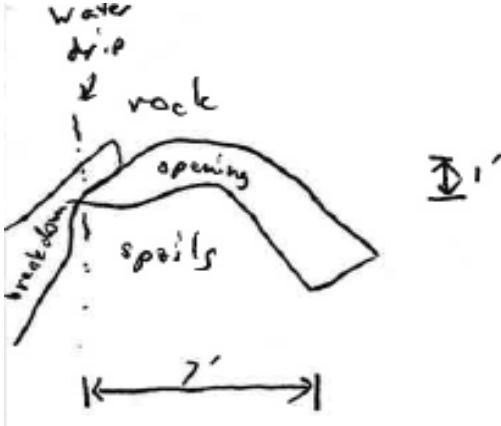

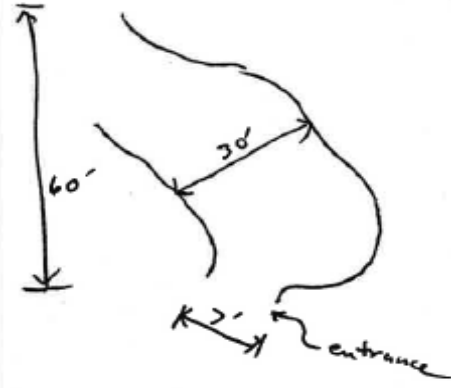
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiorycter noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 
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Additional Info (directions to site, fauna observed, local contacts) \_\_\_\_\_


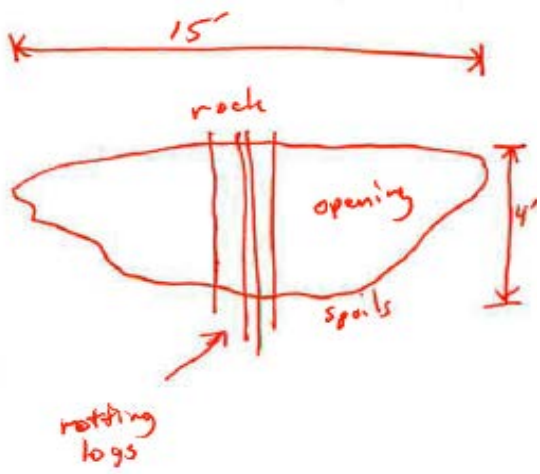

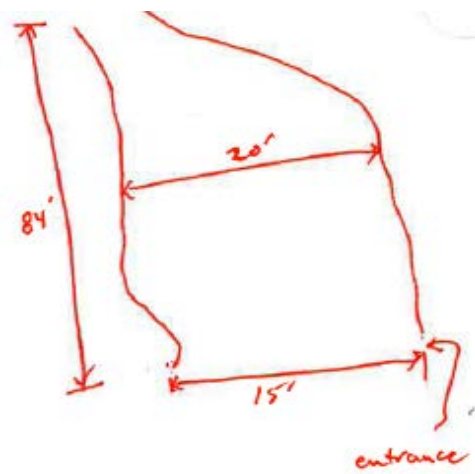
\*Splits into two passages about 10 feet into opening. Left passage is 10 feet (w) x 3 feet (h). Right passage is 10 feet (w) x 4 feet (h). Portal ends at 60 feet.

# Phase 1 Habitat Assessment


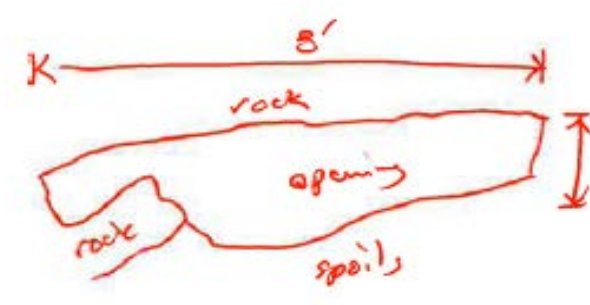

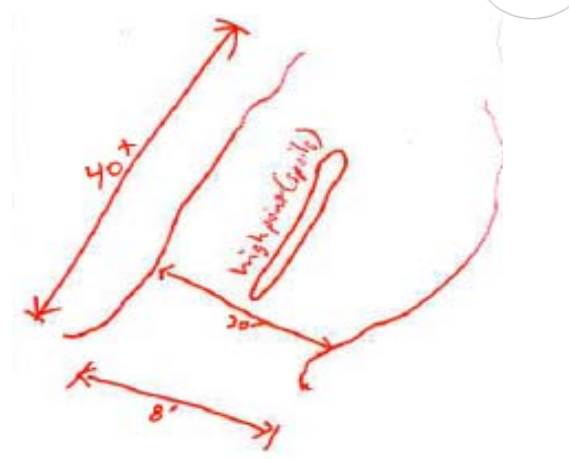
<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>51</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>66</u> <b>Distance to nearest water (feet):</b> <u>100 to North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2629°</u> <b>W</b> <u>83.2099°</u> <b>Photo #s:</b> <u>341-342</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>95</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>American Beech</u> <u>Rosebay Rhododendron</u> Dominant Tree Diameter Range (inches): <u>4-8</u> Prime Maternity Trees Visible: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>7</u> Width <u>1</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>30</u> Width <u>3</u> Height <u>60+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>56</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input checked="" type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input checked="" type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: inline-block; width: 30%;"> * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat) </div> <div style="display: inline-block; width: 30%;"> * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat) </div> <div style="display: inline-block; width: 30%;"> * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat) </div> </div>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <span style="float: right;">Trickle of water flowing over opening (ephemeral stream), probably ties into B4, no GPS coverage.</span>													



# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/4/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>92</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>70</u> <b>Distance to nearest water (feet):</b> <u>1,675 to North Fork KY River</u> <b>Signature:</b> <u><i>[Signature]</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2591°</u> <u>W 83.2072°</u> <b>Photo #s:</b> <u>368-369</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>95</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Basswood</u> <u>Mockernut Hickory</u> Dominant Tree Diameter Range (inches): _____ Prime Maternity Trees Visible: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>15</u> Width <u>4</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>20</u> Width <u>5</u> Height <u>85</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>59</u> Humidity (%): _____ Ceiling Conditions: <input checked="" type="checkbox"/> Sloping <input type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <u>Phoebe nest in entrance.</u>													

## Phase 1 Habitat Assessment

Date: <u>6/4/2013</u> Job Name: <u>KY 15</u> Project #: <u>KYTC 10-158.00</u> Site #: <u>93</u> Survey Crew: <u>B. Deetsch / R. Fangman</u> Outside Temperature (°F): <u>74</u> Distance to nearest water (feet): <u>1,750 to North Fork KY River</u> Signature: <u><i>B. Deetsch</i></u>		State: <u>Kentucky</u> County: <u>Perry</u> USGS Quad: <u>Hazard North</u> GPS Coord: <u>N 37.2588°</u> <u>W 83.2074°</u> Photo #s: <u>364-365</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>100</u> % Dominant Tree/Shrub Species: <u>Sycamore</u> <u>White Oak</u> <u>Tulip Poplar</u> Dominant Tree Diameter Range (inches): <u>6-12</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> ECOLOGICAL SERVICES, INC. 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009			
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>8</u> Width <u>2</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>30</u> Width <u>2</u> Height <u>40+</u> Depth Floor Slope: <input type="checkbox"/> Up <input checked="" type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>56</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line					
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:50%;">Species _____ Number _____</td> <td style="width:50%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: flex; justify-content: space-between;"> <div>           * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)            * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)            * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)            * L. bor = <i>Lasiurus borealis</i> (Red bat)            * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)         </div> <div>           * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)            * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)            * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)            * M. gri = <i>Myotis grisescens</i> (Gray bat)            * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)         </div> <div>           * M. luc = <i>Myotis lucifugus</i> (Little brown bat)            * M. sep = <i>Myotis septentrionalis</i> (Northern bat)            * M. sod = <i>Myotis sodalis</i> (Indiana bat)            * N. hum = <i>Nycticeius humeralis</i> (Evening bat)            * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)         </div> </div> </div>				Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____								
Species _____ Number _____	Species _____ Number _____								
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> *include: dimensions, additional passages, streams 					
Additional Info (directions to site, fauna observed, local contacts) <u>Near large sycamore.</u>									


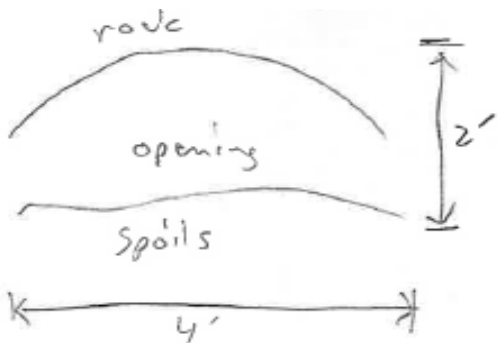




# Phase 1 Habitat Assessment


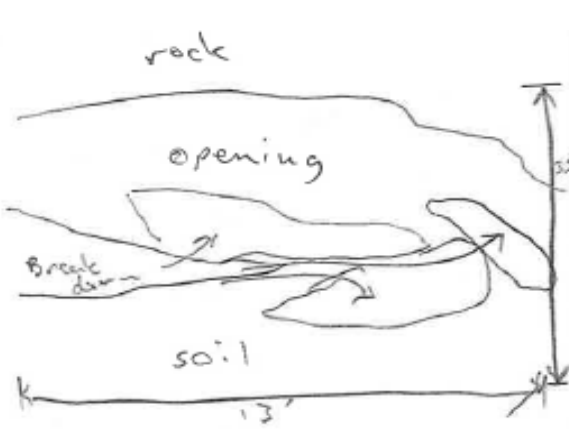

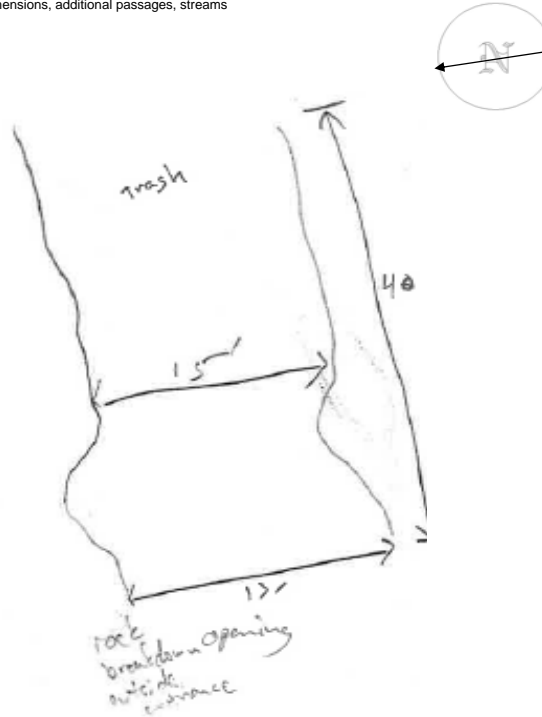
Date: <u>6/4/2013</u> Job Name: <u>KY 15</u> Project #: <u>KYTC 10-158.00</u> Site #: <u>94</u> Survey Crew: <u>B. Deetsch / R. Fangman</u> Outside Temperature (°F): <u>71</u> Distance to nearest water (feet): <u>0 - standing water in feature</u> Signature: <u>[Signature]</u>		State: <u>Kentucky</u> County: <u>Perry</u> USGS Quad: <u>Hazard North</u> GPS Coord: N <u>37.2586°</u> W <u>83.2078°</u> Photo #s: <u>366-367</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>100</u> % Dominant Tree/Shrub Species: <u>Tulip Poplar</u> <u>Sugar Maple</u> <u>White Oak</u> Dominant Tree Diameter Range (inches): <u>4-12</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input checked="" type="checkbox"/> Other: <u>Tunnel?</u> Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>11</u> Width <u>4</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>10</u> Width <u>5</u> Height <u>      </u> Depth <u>      </u> Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>54</u> Humidity (%): <u>      </u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: <u>      </u>		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u></td> <td>Number <u>      </u></td> <td>Species <u>      </u></td> <td>Number <u>      </u></td> </tr> </table> <div style="font-size: small;">             * C. raf = Corynorhinus rafinesquii (Raf. big-eared bat)              * C. tow = Corynorhinus townsendi (VA big-eared bat)              * E. fus = Eptesicus fuscus (Big brown bat)              * L. bor = Lasius borealis (Red bat)              * L. cin = Lasius cinereus (Hoary bat)              * L. nyc = Lasioryctes noctivagans (Silver-haired bat)              * L. sem = Lasius seminolus (Seminole bat)              * M. aus = Myotis austroriparius (Southeastern myotis)              * M. gn = Myotis grisescens (Gray bat)              * M. lei = Myotis leibii (Eastern small-footed bat)              * M. luc = Myotis lucifugus (Little brown bat)              * M. sep = Myotis septentrionalis (Northern bat)              * M. sod = Myotis sodalis (Indiana bat)              * N. hum = Nycticeius humeralis (Evening bat)              * P. sub = Perimyotis subflavus (Tri-color bat)           </div>				Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>
Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>										
Species <u>      </u>	Number <u>      </u>	Species <u>      </u>	Number <u>      </u>										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <u>Appears to be a tunnel - light can be seen straight through - no coal seam observed up to 2 feet water. Depth scales at 400 feet, measured at least 45+, pheobe nest in entrance.</u>													




# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/3/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>118</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>71</u> <b>Distance to nearest water (feet):</b> <u>285 North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2702°</u> <b>W</b> <u>83.2059°</u> <b>Photo #s:</b> <u>317-318</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>100</u> % Dominant Tree/Shrub Species: <u>American Beech</u> <u>Northern Red Oak</u> <u>Sugar Maple</u> Dominant Tree Diameter Range (inches): <u>4-10</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>3</u> Width <u>1</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>10</u> Width <u>3</u> Height <u>10</u> Depth Floor Slope: <input type="checkbox"/> Up <input checked="" type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>61</u> Humidity (%): _____ Ceiling Conditions: <input checked="" type="checkbox"/> Sloping <input type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> Human Disturbance: <input type="checkbox"/> None <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: <input checked="" type="checkbox"/> X		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <u>Spiderwebs across entrance, depth is 10 feet from narrow point, but could run side to side, heavy traffic nearby.</u>													

## Phase 1 Habitat Assessment

Date: <u>6/3/2013</u> Job Name: <u>KY 15</u> Project #: <u>KYTC 10-158.00</u> Site #: <u>121</u> Survey Crew: <u>B. Deetsch / R. Fangman</u> Outside Temperature (°F): <u>74</u> Distance to nearest water (feet): <u>570 to North Fork KY River</u> Signature: <u><i>B. Deetsch</i></u>		State: <u>Kentucky</u> County: <u>Perry</u> USGS Quad: <u>Hazard North</u> GPS Coord: <u>N 37.2693°</u> <u>W 83.2051°</u> Photo #s: <u>324-326</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <u>X</u> Woods <u>      </u> Open Field <u>      </u> Developed Canopy Cover: <u>      </u> 90 <u>      </u> % Dominant Tree/Shrub Species: <u>      </u> Green Ash <u>      </u> Black Cherry <u>      </u> Sycamore Dominant Tree Diameter Range (inches): <u>      </u> 6-10 Prime Maternity Trees Visible: <u>      </u> Yes <u>X</u> No		 <b>REDWING</b> ECOLOGICAL SERVICES, INC. 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009			
<b>OPENING</b> Type: <u>      </u> Cave <u>X</u> Mine Portal <u>      </u> Rock Shelter <u>      </u> Sink Hole <u>      </u> Other: <u>      </u> Orientation: <u>      </u> Vertical <u>X</u> Horizontal Entrance Dimensions (feet): <u>13</u> Width <u>3.5</u> Height Entrance Stable: <u>X</u> Yes <u>      </u> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>15</u> Width <u>3</u> Height <u>40+</u> Depth Floor Slope: <u>      </u> Up <u>      </u> Down <u>X</u> Flat Temperature (°F): <u>61.5</u> Humidity (%): <u>      </u> Ceiling Conditions: <u>      </u> Sloping <u>X</u> Flat <u>      </u> Wet <u>X</u> Dry Evidence of Ceiling Collapse: <u>      </u> Yes <u>X</u> No Evidence of Staining: <u>      </u> Yes <u>X</u> No		<b>AIRFLOW</b> <u>      </u> In <u>X</u> Out <u>      </u> None <u>      </u> Slight <u>      </u> Moderate <u>X</u> Heavy <u>      </u> None <b>WATERFLOW</b> <u>      </u> In <u>      </u> Out <u>      </u> Pooled <u>X</u> None Flooding: <u>X</u> None <u>      </u> Flooded <u>      </u> Rack Line					
<b>EVIDENCE OF USE</b> <u>      </u> None Human Disturbance: <u>X</u> Trash <u>      </u> Graffiti <u>      </u> Fire <u>      </u> Archaeological <u>      </u> Odor Foraging Signs: <u>      </u> Moth Wings <u>      </u> Guano Wildlife Use: <u>      </u> Scat <u>      </u> Footprints <u>      </u> Other: <u>      </u>		<b>BATS PRESENT</b> <u>X</u> None <table border="0" style="width:100%;"> <tr> <td style="width:50%;">Species <u>      </u> Number <u>      </u></td> <td style="width:50%;">Species <u>      </u> Number <u>      </u></td> </tr> <tr> <td>Species <u>      </u> Number <u>      </u></td> <td>Species <u>      </u> Number <u>      </u></td> </tr> </table> <div style="font-size: small;">             * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)              * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)              * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)              * L. bor = <i>Lasiurus borealis</i> (Red bat)              * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)              * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)              * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)              * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)              * M. gri = <i>Myotis grisescens</i> (Gray bat)              * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)              * M. luc = <i>Myotis lucifugus</i> (Little brown bat)              * M. sep = <i>Myotis septentrionalis</i> (Northern bat)              * M. sod = <i>Myotis sodalis</i> (Indiana bat)              * N. hum = <i>Nycticeius humeralis</i> (Evening bat)              * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)           </div>				Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u>
Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u>								
Species <u>      </u> Number <u>      </u>	Species <u>      </u> Number <u>      </u>								
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> *include: dimensions, additional passages, streams 					
Additional Info (directions to site, fauna observed, local contacts) <u>Near old truck, near road.</u>									

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>143</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>83</u> <b>Distance to nearest water (feet):</b> <u>250 to North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2648°</u> <b>W</b> <u>83.2177°</u> <b>Photo #s:</b> <u>374-375</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>40</u> % Dominant Tree/Shrub Species: <u>Green Ash</u> <u>Sugar Maple</u> <u>Basswood</u> Dominant Tree Diameter Range (inches): <u>4-8</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
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<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>6</u> Width <u>1.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>12</u> Width <u>2.5</u> Height <u>40+</u> Depth Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>51</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
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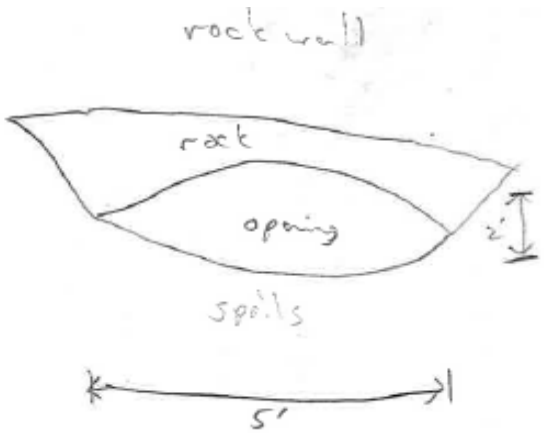

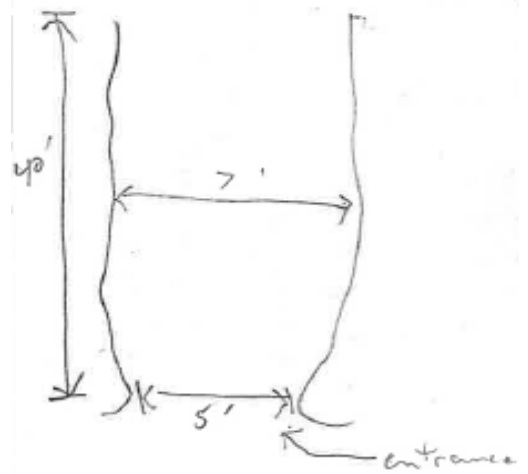
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> <td style="width:33%;">Species _____</td> <td style="width:33%;">Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: flex; justify-content: space-between;"> <div> <p>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)</p> <p>* C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)</p> <p>* E. fus = <i>Eptesicus fuscus</i> (Big brown bat)</p> <p>* L. bor = <i>Lasiurus borealis</i> (Red bat)</p> <p>* L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</p> </div> <div> <p>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)</p> <p>* L. sem = <i>Lasiurus seminolus</i> (Seminole bat)</p> <p>* M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)</p> <p>* M. gri = <i>Myotis grisescens</i> (Gray bat)</p> <p>* M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</p> </div> <div> <p>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)</p> <p>* M. sep = <i>Myotis septentrionalis</i> (Northern bat)</p> <p>* M. sod = <i>Myotis sodalis</i> (Indiana bat)</p> <p>* N. hum = <i>Nycticeius humeralis</i> (Evening bat)</p> <p>* P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</p> </div> </div> </div>	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____						
Species _____	Number _____	Species _____	Number _____						

<b>SKETCH FACING OPENING</b>	<b>PHOTOGRAPH OF OPENING</b>	<b>SKETCH FROM ABOVE</b>
		<p>-include: dimensions, additional passages, streams</p> 


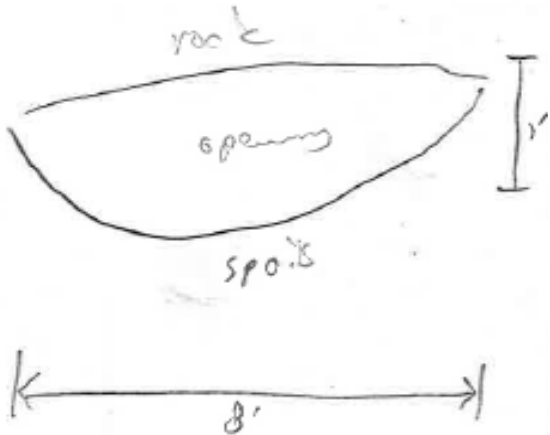

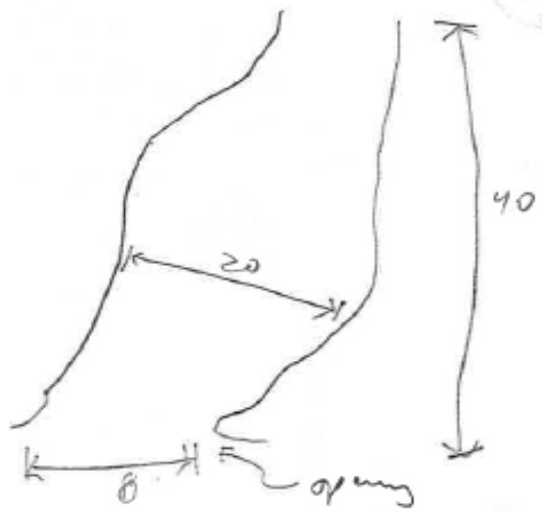
Additional Info (directions to site, fauna observed, local contacts)
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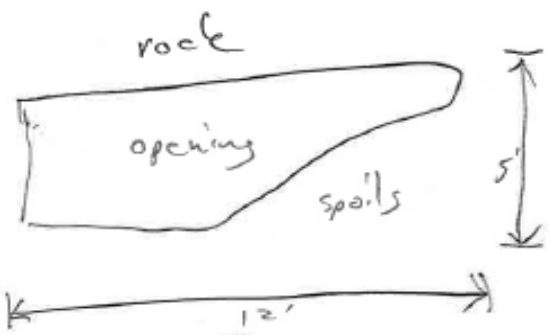

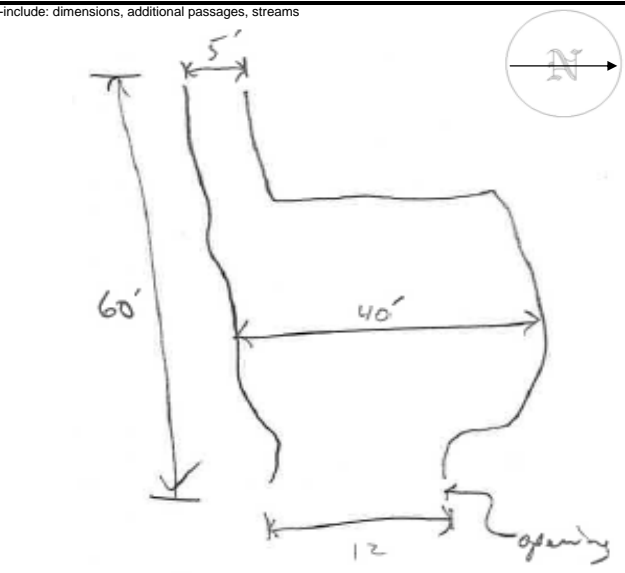
# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>146</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>68</u> <b>Distance to nearest water (feet):</b> <u>210 to North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2637°</u> <b>W</b> <u>83.2167°</u> <b>Photo #s:</b> <u>372-373</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>85</u> % Dominant Tree/Shrub Species: <u>American Beech</u> <u>Ohio Buckeye</u> <u>Sugar Maple</u> Dominant Tree Diameter Range (inches): <u>6-12</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>5</u> Width <u>2</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>7</u> Width <u>2.5</u> Height <u>40+</u> Depth _____ Floor Slope: <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>53</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasiurus noctivagus</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <u>Old mine pillar inside.</u>													

## Phase 1 Habitat Assessment


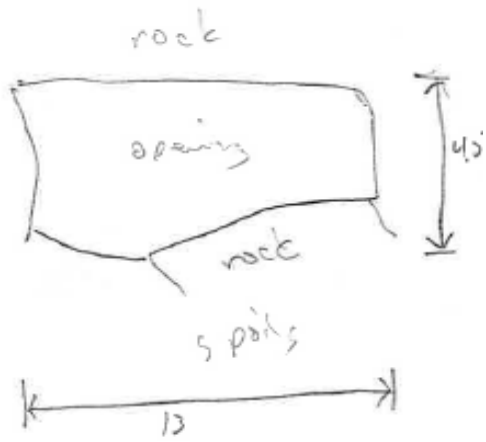

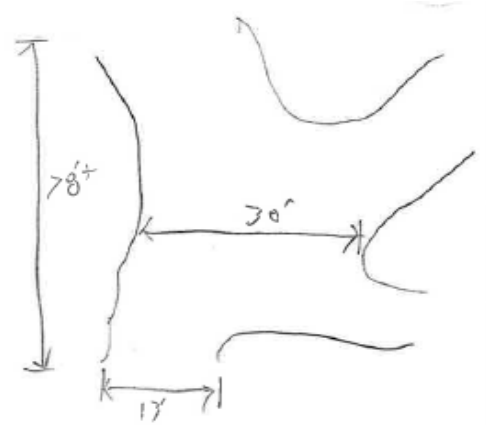
Date: <u>6/5/2013</u> Job Name: <u>KY 15</u> Project #: <u>KYTC 10-158.00</u> Site #: <u>154</u> Survey Crew: <u>B. Deetsch / R. Fangman</u> Outside Temperature (°F): <u>68</u> Distance to nearest water (feet): <u>875 to North Fork KY River</u> Signature: <u><i>B. Deetsch</i></u>		State: <u>Kentucky</u> County: <u>Perry</u> USGS Quad: <u>Hazard North</u> GPS Coord: <u>N 37.2799°</u> <u>W 83.2008°</u> Photo #s: <u>393-394</u>		TERRESTRIAL HABITAT Habitat Type: <u>X</u> Woods <u>    </u> Open Field <u>    </u> Developed Canopy Cover: <u>    </u> 75 <u>    </u> % Dominant Tree/Shrub Species: <u>    </u> Tulip Poplar <u>    </u> Sugar Maple <u>    </u> Sycamore Dominant Tree Diameter Range (inches): <u>    </u> 4-8 Prime Maternity Trees Visible: <u>    </u> Yes <u>X</u> No		 <b>REDWING</b> ECOLOGICAL SERVICES, INC. 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009	
<b>OPENING</b> Type: <u>    </u> Cave <u>X</u> Mine Portal <u>    </u> Rock Shelter <u>    </u> Sink Hole <u>    </u> Other: <u>    </u> Orientation: <u>    </u> Vertical <u>X</u> Horizontal Entrance Dimensions (feet): <u>    </u> 8 <u>    </u> Width <u>    </u> 1 <u>    </u> Height Entrance Stable: <u>X</u> Yes <u>    </u> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>    </u> 20 <u>    </u> Width <u>    </u> 4 <u>    </u> Height <u>    </u> 40+ <u>    </u> Depth Floor Slope: <u>X</u> Up <u>    </u> Down <u>    </u> Flat Temperature (°F): <u>    </u> 57 <u>    </u> Humidity (%): <u>    </u> Ceiling Conditions: <u>    </u> Sloping <u>X</u> Flat <u>X</u> Wet <u>    </u> Dry Evidence of Ceiling Collapse: <u>    </u> Yes <u>X</u> No Evidence of Staining: <u>    </u> Yes <u>X</u> No		<b>AIRFLOW</b> <u>    </u> In <u>X</u> Out <u>    </u> None <u>X</u> Slight <u>    </u> Moderate <u>    </u> Heavy <u>    </u> None  <b>WATERFLOW</b> <u>    </u> In <u>    </u> Out <u>    </u> Pooled <u>X</u> None Flooding: <u>X</u> None <u>    </u> Flooded <u>    </u> Rack Line			
<b>EVIDENCE OF USE</b> <u>X</u> None Human Disturbance: <u>    </u> Trash <u>    </u> Graffiti <u>    </u> Fire <u>    </u> Archaeological <u>    </u> Odor Foraging Signs: <u>    </u> Moth Wings <u>    </u> Guano Wildlife Use: <u>    </u> Scat <u>    </u> Footprints <u>    </u> Other: <u>    </u>		<b>BATS PRESENT</b> <u>X</u> None Species <u>    </u> Number <u>    </u> Species <u>    </u> Number <u>    </u> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)          * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)          * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)          * L. bor = <i>Lasiurus borealis</i> (Red bat)          * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)          * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)          * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)          * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)          * M. gri = <i>Myotis grisescens</i> (Gray bat)          * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</small>					
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> <small>-include: dimensions, additional passages, streams</small> 			
Additional Info (directions to site, fauna observed, local contacts)							

# Phase 1 Habitat Assessment


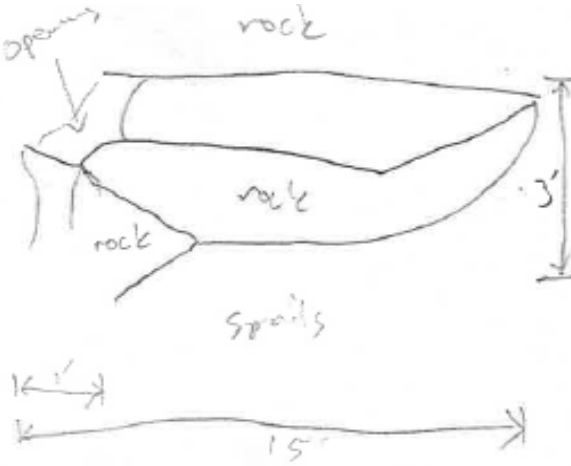

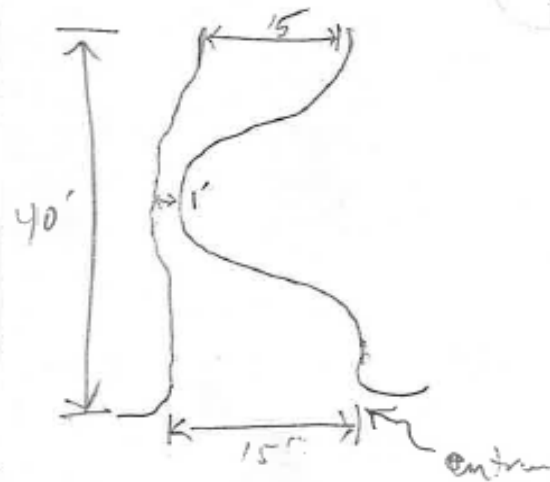
<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>155</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>68</u> <b>Distance to nearest water (feet):</b> <u>780 to North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2804°</u> <u>W 83.2016°</u> <b>Photo #s:</b> <u>390-392</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>75</u> % Dominant Tree/Shrub Species: <u>Sycamore</u> <u>Tulip Poplar</u> <u>Basswood</u> Dominant Tree Diameter Range (inches): <u>4-8</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>12</u> Width <u>5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>40</u> Width <u>4.5</u> Height <u>60+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>52</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <small> * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat) </small>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> <small>-include: dimensions, additional passages, streams</small> 									
Additional Info (directions to site, fauna observed, local contacts) <u>old mine pillars, phoebe nest</u>													






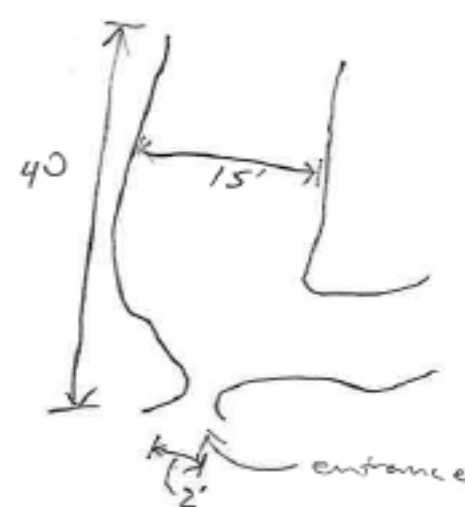
# Phase 1 Habitat Assessment

<b>Date:</b> 6/5/2013 <b>Job Name:</b> KY 15 <b>Project #:</b> KYTC 10-158.00 <b>Site #:</b> 156 <b>Survey Crew:</b> B. Deetsch / R. Fangman <b>Outside Temperature (°F):</b> 69 <b>Distance to nearest water (feet):</b> 785 to North Fork KY River <b>Signature:</b> <i>B. Deetsch</i>		<b>State:</b> Kentucky <b>County:</b> Perry <b>USGS Quad:</b> Hazard North <b>GPS Coord:</b> N 37.2803° <b>W 83.2014°</b> <b>Photo #s:</b> 388-389		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: 75 % Dominant Tree/Shrub Species: Sycamore Tulip Poplar Basswood Dominant Tree Diameter Range (inches): 4-8 Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <p>1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009</p>			
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): 13 Width 4.5 Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): 30 Width 4.5 Height 78+ Depth Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): 60 Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line					
<b>EVIDENCE OF USE</b> Human Disturbance: <input type="checkbox"/> None <input checked="" type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table border="0" style="width:100%;"> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <p><small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)                  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)                  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)                  * L. bor = <i>Lasiurus borealis</i> (Red bat)                  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)                  * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)                  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)                  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)                  * M. gri = <i>Myotis grisescens</i> (Gray bat)                  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)                  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)                  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)                  * M. sod = <i>Myotis sodalis</i> (Indiana bat)                  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)                  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small></p>				Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____								
Species _____ Number _____	Species _____ Number _____								
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 					
Additional Info (directions to site, fauna observed, local contacts) Old mine pillars present.									

# Phase 1 Habitat Assessment


<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>172</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>70</u> <b>Distance to nearest water (feet):</b> <u>900 to North Fork KY River</u> <b>Signature:</b> <u><i>[Signature]</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2799°</u> <u>W 83.2007°</u> <b>Photo #s:</b> <u>399-402</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>85</u> % Dominant Tree/Shrub Species: <u>Tulip Poplar</u> <u>Sugar Maple</u> <u>Dogwood</u> Dominant Tree Diameter Range (inches): <u>4-8</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>15</u> Width <u>3</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>15</u> Width <u>3</u> Height <u>40+</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>55</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: inline-block; width: 48%;"> * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat) </div> <div style="display: inline-block; width: 48%;"> * L. nyc = <i>Lasiorycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat) </div> <div style="display: inline-block; width: 48%;"> * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat) </div> </div>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts)													

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>175</u> <b>Survey Crew:</b> <u>B. Deetsch / R. Fangman</u> <b>Outside Temperature (°F):</b> <u>71</u> <b>Distance to nearest water (feet):</b> <u>935 to North Fork KY River</u> <b>Signature:</b> <u><i>B. Deetsch</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2796°</u> <b>W</b> <u>83.2001°</u> <b>Photo #s:</b> <u>379-380</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>100</u> % Dominant Tree/Shrub Species: <u>Sugar Maple</u> <u>Black Cherry</u> <u>Tulip Poplar</u> Dominant Tree Diameter Range (inches): <u>2-6</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>2</u> Width <u>1</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>15</u> Width <u>2.5</u> Height <u>4</u> Depth _____ Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>56</u> Humidity (%): _____ Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <small>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat)  * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)  * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</small>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <span style="float: right;">Entrance is covered in active spider webs and a slimy salamander inside.</span>													



# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>206</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>75</u> <b>Distance to nearest water (feet):</b> <u>1,800 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>	<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord:</b> <u>N 37.2724°</u> <u>W 83.2003°</u> <b>Photo #s:</b> <u>78 &amp; 79</u>	<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>50</u> % Dominant Tree/Shrub Species: <u>Tulip Poplar</u> <u>Beech</u> <u>Sugar Maple</u> Dominant Tree Diameter Range (inches): <u>6-12</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------


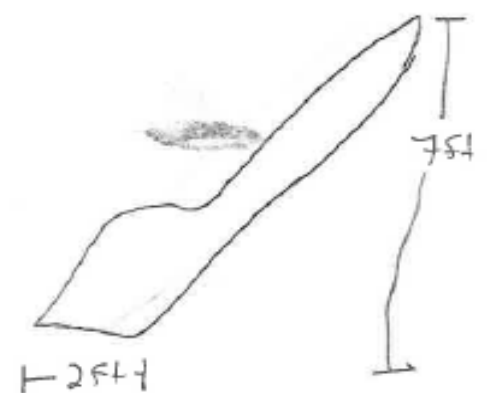
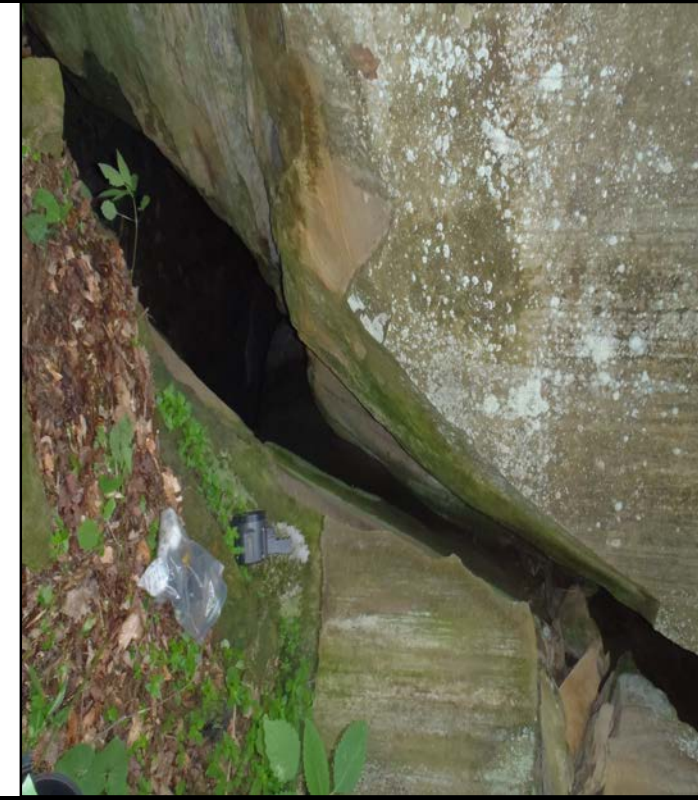
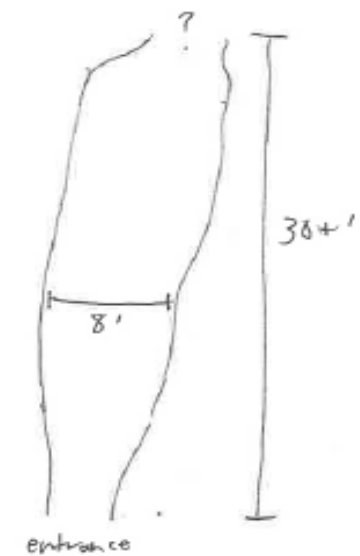
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>6</u> Width <u>1.5</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>12</u> Width <u>4</u> Height <u>39+</u> Depth Floor Slope: <input type="checkbox"/> Up <input type="checkbox"/> Down <input checked="" type="checkbox"/> Flat Temperature (°F): <u>50</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of Staining: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____	<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> <td style="width:33%;">Species _____ Number _____</td> </tr> <tr> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> <td>Species _____ Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: flex; justify-content: space-between;"> <div> <p>* C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)</p> <p>* C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)</p> <p>* E. fus = <i>Eptesicus fuscus</i> (Big brown bat)</p> <p>* L. bor = <i>Lasiurus borealis</i> (Red bat)</p> <p>* L. cin = <i>Lasiurus cinereus</i> (Hoary bat)</p> </div> <div> <p>* L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)</p> <p>* L. sem = <i>Lasiurus seminolus</i> (Seminole bat)</p> <p>* M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)</p> <p>* M. gri = <i>Myotis grisescens</i> (Gray bat)</p> <p>* M. lei = <i>Myotis leibii</i> (Eastern small-footed bat)</p> </div> <div> <p>* M. luc = <i>Myotis lucifugus</i> (Little brown bat)</p> <p>* M. sep = <i>Myotis septentrionalis</i> (Northern bat)</p> <p>* M. sod = <i>Myotis sodalis</i> (Indiana bat)</p> <p>* N. hum = <i>Nycticeius humeralis</i> (Evening bat)</p> <p>* P. sub = <i>Perimyotis subflavus</i> (Tri-color bat)</p> </div> </div> </div>	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____	Species _____ Number _____
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					
Species _____ Number _____	Species _____ Number _____	Species _____ Number _____					

<b>SKETCH FACING OPENING</b> 	<b>PHOTOGRAPH OF OPENING</b> 	<b>SKETCH FROM ABOVE</b> include: dimensions, additional passages, streams 
--------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------

Additional Info (directions to site, fauna observed, local contacts)	Passage appears to extend past 39 feet in depth.

# Phase 1 Habitat Assessment

<b>Date:</b> <u>6/5/2013</u> <b>Job Name:</b> <u>KY 15</u> <b>Project #:</b> <u>KYTC 10-158.00</u> <b>Site #:</b> <u>219</u> <b>Survey Crew:</b> <u>S. Bishop / K. Russo</u> <b>Outside Temperature (°F):</b> <u>78</u> <b>Distance to nearest water (feet):</b> <u>2,000 North Fork KY River</u> <b>Signature:</b> <u><i>S. Bishop</i></u>		<b>State:</b> <u>Kentucky</u> <b>County:</b> <u>Perry</u> <b>USGS Quad:</b> <u>Hazard North</u> <b>GPS Coord: N</b> <u>37.2729°</u> <b>W</b> <u>83.2011°</u> <b>Photo #s:</b> <u>84 &amp; 85</u>		<b>TERRESTRIAL HABITAT</b> Habitat Type: <input checked="" type="checkbox"/> Woods <input type="checkbox"/> Open Field <input type="checkbox"/> Developed Canopy Cover: <u>80</u> % Dominant Tree/Shrub Species: <u>Beech</u> <u>Tulip Poplar</u> <u>Sugar Maple</u> Dominant Tree Diameter Range (inches): <u>1-12</u> Prime Maternity Trees Visible: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		 <b>REDWING</b> <small>ECOLOGICAL SERVICES, INC.</small> 1139 S. Fourth Street, Louisville, KY 40203 (502) 625-3009							
<b>OPENING</b> Type: <input type="checkbox"/> Cave <input checked="" type="checkbox"/> Mine Portal <input type="checkbox"/> Rock Shelter <input type="checkbox"/> Sink Hole <input type="checkbox"/> Other: _____ Orientation: <input type="checkbox"/> Vertical <input checked="" type="checkbox"/> Horizontal Entrance Dimensions (feet): <u>2</u> Width <u>7</u> Height Entrance Stable: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>INTERIOR CONDITIONS</b> Interior Dimensions (feet): <u>8</u> Width <u>2</u> Height <u>30+</u> Depth Floor Slope: <input type="checkbox"/> Up <input checked="" type="checkbox"/> Down <input type="checkbox"/> Flat Temperature (°F): <u>59</u> Humidity (%): <u>N/A</u> Ceiling Conditions: <input type="checkbox"/> Sloping <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Wet <input checked="" type="checkbox"/> Dry Evidence of Ceiling Collapse: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Evidence of Staining <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<b>AIRFLOW</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Out <input type="checkbox"/> None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/> None  <b>WATERFLOW</b> <input type="checkbox"/> In <input type="checkbox"/> Out <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> None Flooding: <input checked="" type="checkbox"/> None <input type="checkbox"/> Flooded <input type="checkbox"/> Rack Line									
<b>EVIDENCE OF USE</b> <input checked="" type="checkbox"/> None Human Disturbance: <input type="checkbox"/> Trash <input type="checkbox"/> Graffiti <input type="checkbox"/> Fire <input type="checkbox"/> Archaeological <input type="checkbox"/> Odor Foraging Signs: <input type="checkbox"/> Moth Wings <input type="checkbox"/> Guano Wildlife Use: <input type="checkbox"/> Scat <input type="checkbox"/> Footprints <input type="checkbox"/> Other: _____		<b>BATS PRESENT</b> <input checked="" type="checkbox"/> None <table style="width:100%;"> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> <tr> <td>Species _____</td> <td>Number _____</td> <td>Species _____</td> <td>Number _____</td> </tr> </table> <div style="font-size: small;"> <div style="display: inline-block; width: 48%;"> * C. raf = <i>Corynorhinus rafinesquii</i> (Raf. big-eared bat)  * C. tow = <i>Corynorhinus townsendii</i> (VA big-eared bat)  * E. fus = <i>Eptesicus fuscus</i> (Big brown bat)  * L. bor = <i>Lasiurus borealis</i> (Red bat)  * L. cin = <i>Lasiurus cinereus</i> (Hoary bat) </div> <div style="display: inline-block; width: 48%;"> * L. nyc = <i>Lasionycteris noctivagans</i> (Silver-haired bat)  * L. sem = <i>Lasiurus seminolus</i> (Seminole bat)  * M. aus = <i>Myotis austroriparius</i> (Southeastern myotis)  * M. gri = <i>Myotis grisescens</i> (Gray bat)  * M. lei = <i>Myotis leibii</i> (Eastern small-footed bat) </div> <div style="display: inline-block; width: 48%;"> * M. luc = <i>Myotis lucifugus</i> (Little brown bat)  * M. sep = <i>Myotis septentrionalis</i> (Northern bat)  * M. sod = <i>Myotis sodalis</i> (Indiana bat)  * N. hum = <i>Nycticeius humeralis</i> (Evening bat)  * P. sub = <i>Perimyotis subflavus</i> (Tri-color bat) </div> </div>				Species _____	Number _____	Species _____	Number _____	Species _____	Number _____	Species _____	Number _____
Species _____	Number _____	Species _____	Number _____										
Species _____	Number _____	Species _____	Number _____										
<b>SKETCH FACING OPENING</b> 		<b>PHOTOGRAPH OF OPENING</b> 		<b>SKETCH FROM ABOVE</b> -include: dimensions, additional passages, streams 									
Additional Info (directions to site, fauna observed, local contacts) <span style="float: right;">Portal likely continues past 30 feet.</span>													

## **APPENDIX B**

# **USFWS PROJECT PROPOSAL AND CORRESPONDENCE**



### Appendix 3: USFWS Project Proposal Form

#### CONTACT INFORMATION

Permittee Name: Seth Bishop

KDFWR SC Permit # SC1511028

Section 10 USFWS Permit # TE151107-2

Institution/Company Name (as on Permit): Redwing Ecological Services, Inc.

Address: 1139 S. Fourth St.

City: Louisville

State: KY

Zip: 40203

Email address: sbishop@redwingeco.com

Phone #: (502) 625-3009

#### PROPOSED PROJECT OR ACTIVITY INFORMATION

County: Perry

Quad: Hazard North

Project location: latitude: 37.279056°

longitude: 83.207025°

(Please include an 8.5" x 11" topo or aerial map with project/activity location and proposed sites identified)

USFWS Project Number (if known): \_\_\_\_\_

Mining Project ☐

SMCRA Permit Number: \_\_\_\_\_

Transportation Project ☒

KYTC Item Number: 10-158.00

Utility Project: \_\_\_\_\_

AML Project: \_\_\_\_\_

Other: \_\_\_\_\_

Acres of suitable Indiana bat habitat within project/activity area: \_\_\_\_\_

Is the project/activity linear? Yes: ☒ No: ☐

If yes, indicate length of suitable Indiana bat habitat in km (mi): \_\_\_\_\_

Are caves or portals present? Yes: ☒ No: ☐

#### METHODOLOGY & SURVEY EFFORT

Coordinates of cave/portal (if multiple, please provide locations on project map):

latitude: See map

longitude: See map

Name of cave (if known): \_\_\_\_\_

Estimated Start Date of Fieldwork: September 15, 2015

Number of Acoustic Nights: \_\_\_\_\_

Number of Mist Net/Harp Trap Nights: 2 at 121; 2 at 37-A4

Approved acoustic analysis software utilized for bat call identification (please ensure you are using the latest version):

BCID ☐

EchoClass ☐

Kaleidoscope Pro ☐

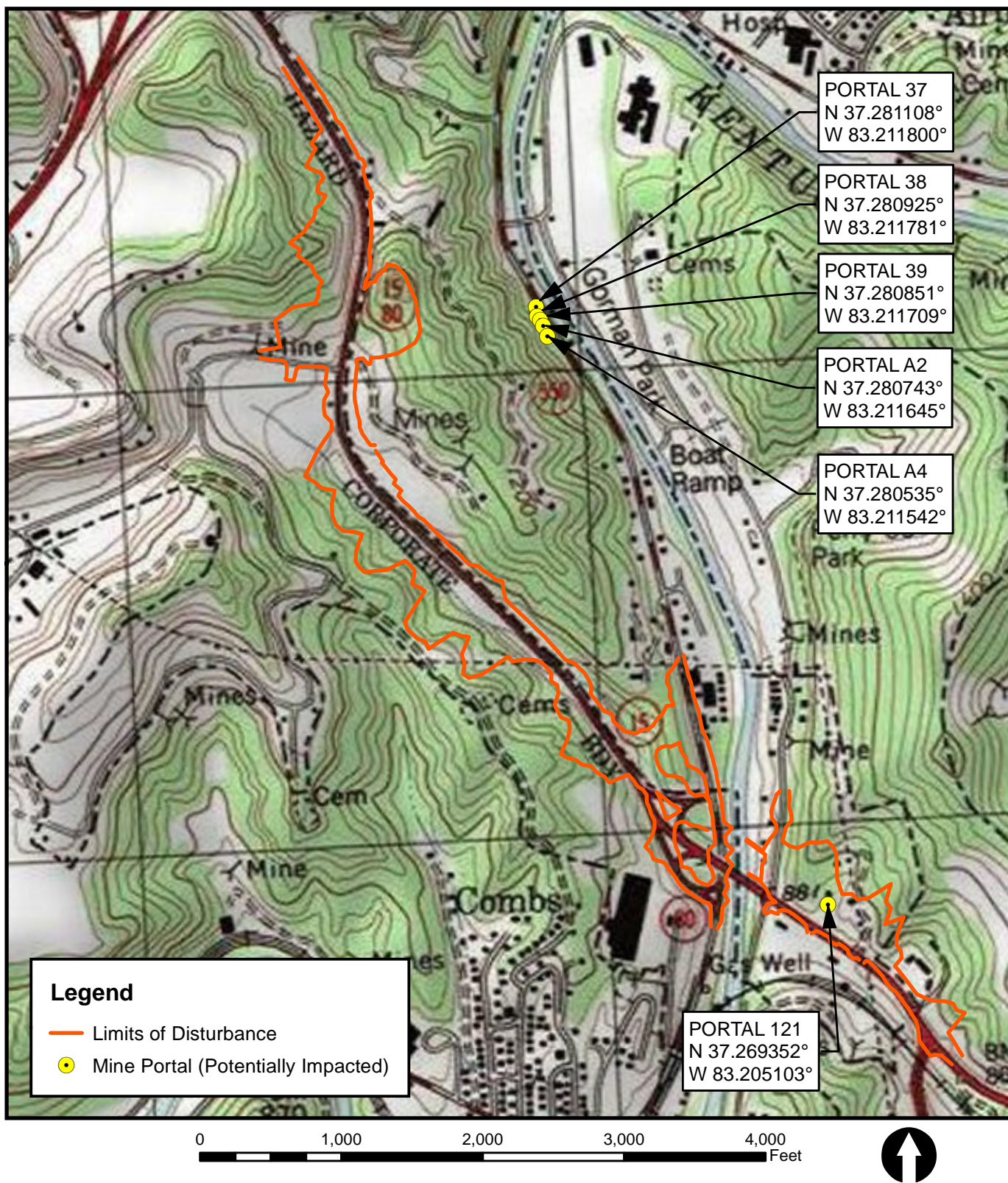
Other: \_\_\_\_\_

*Seth Bishop*

Signature

*9/9/15*

Date



KENTUCKY HIGHWAY 15 WIDENING  
AND RECONSTRUCTION PROJECT  
PERRY COUNTY, KENTUCKY  
KYTC ITEM NO. 10-158.00



USFWS PROJECT  
PROPOSAL MAP

REVISED DATE: 09-09-15 | DRAWN BY: BJD/EDB

FIGURE 1



## Seth Bishop

---

**From:** Armstrong, Mike <mike\_armstrong@fws.gov>  
**Sent:** Wednesday, September 09, 2015 2:24 PM  
**To:** Seth Bishop  
**Cc:** DeGarmo, Phil; sunni.carr@ky.gov; Boerger, Ellen (KYTC); Ralph Schuler; Neil Guthals; Benjamin Deetsch  
**Subject:** Re: Project Proposal Form - KY 15

Thanks Seth. I think your approach sounds reasonable.

Mike

---

Mike Armstrong  
SE Bat Recovery and WNS Coordinator  
U.S. Fish & Wildlife Service  
330 W. Broadway, Room 265  
Frankfort, KY 40601  
502-229-4632 (Cell)

On Wed, Sep 9, 2015 at 11:50 AM, Seth Bishop <[sbishop@redwingeco.com](mailto:sbishop@redwingeco.com)> wrote:

Phil, Mike, and Sunni,

Please find attached a Project Proposal Form regarding a fall portal survey for the KY 15 Widening and Reconstruction project in Perry County, Kentucky. The survey is proposed for six portals that are either in the project disturbance limits (Portal 121) or are part of an underground mine that extends under the disturbance limits (Portals 37, 38, 39, A2, and A4). Five of the six portals (Portals 37-A4) are connected based on available mine maps, and we are proposing to use the modified survey method for inter-connected portals listed in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2015). Therefore, we would survey for two nights at Portal 121 and two nights at Portals 37-A4, with each night separated by at least two weeks. For Portals 37-A4, we will set up harp traps at three of the five portals and block the other two on the first night, then switch the set up the second night (harp traps at the two portals that were blocked the first night and block the three portals that were surveyed). We are planning on beginning the survey on Tuesday, September 15.

Please let me know if you have any questions or need additional information.

Thanks,

Seth



## Seth Bishop

---

**From:** Carr, Sunni (FW) <Sunni.Carr@ky.gov>  
**Sent:** Wednesday, September 09, 2015 2:44 PM  
**To:** Seth Bishop  
**Subject:** RE: Project Proposal Form - KY 15

Seth,  
Thank you for your work notification. We look forward to your results.  
All the best,  
Sunni

*Sunni L. Carr*

Wildlife Diversity Coordinator  
Kentucky Dept. of Fish and Wildlife Resources  
#1 Sportsman's Lane  
Frankfort, Kentucky 40601  
Office 800-858-1549 ext 4446  
Cell 502-221-1377

---

**From:** Seth Bishop [mailto:sbishop@redwingeco.com]  
**Sent:** Wednesday, September 09, 2015 11:50 AM  
**To:** DeGarmo, Phil; mike\_armstrong@fws.gov; Carr, Sunni (FW)  
**Cc:** Boerger, Ellen (KYTC); Ralph Schuler; Neil Guthals; Benjamin Deetsch  
**Subject:** Project Proposal Form - KY 15

Phil, Mike, and Sunni,

Please find attached a Project Proposal Form regarding a fall portal survey for the KY 15 Widening and Reconstruction project in Perry County, Kentucky. The survey is proposed for six portals that are either in the project disturbance limits (Portal 121) or are part of an underground mine that extends under the disturbance limits (Portals 37, 38, 39, A2, and A4). Five of the six portals (Portals 37-A4) are connected based on available mine maps, and we are proposing to use the modified survey method for inter-connected portals listed in the *Supplemental Indiana Bat Survey Guidance for Kentucky* (April 27, 2015). Therefore, we would survey for two nights at Portal 121 and two nights at Portals 37-A4, with each night separated by at least two weeks. For Portals 37-A4, we will set up harp traps at three of the five portals and block the other two on the first night, then switch the set up the second night (harp traps at the two portals that were blocked the first night and block the three portals that were surveyed). We are planning on beginning the survey on Tuesday, September 15.

Please let me know if you have any questions or need additional information.

Thanks,  
Seth

Seth Bishop  
Project Ecologist  
Redwing Ecological Services, Inc.  
1139 South Fourth St.  
Louisville, KY 40203

# **APPENDIX C**

## **FALL PORTAL SURVEY DATA SHEETS**

## CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 121Date: Sept 15, 2015Project: KY 15Project #: 12-093State: KYCounty: PerryPersonnel: S. Bishop + R. SchulerQuad: Hazard NorthMoon Phase: Waxing Crescent 6 %Moon Visible at Site: NOCamera: LUMIX

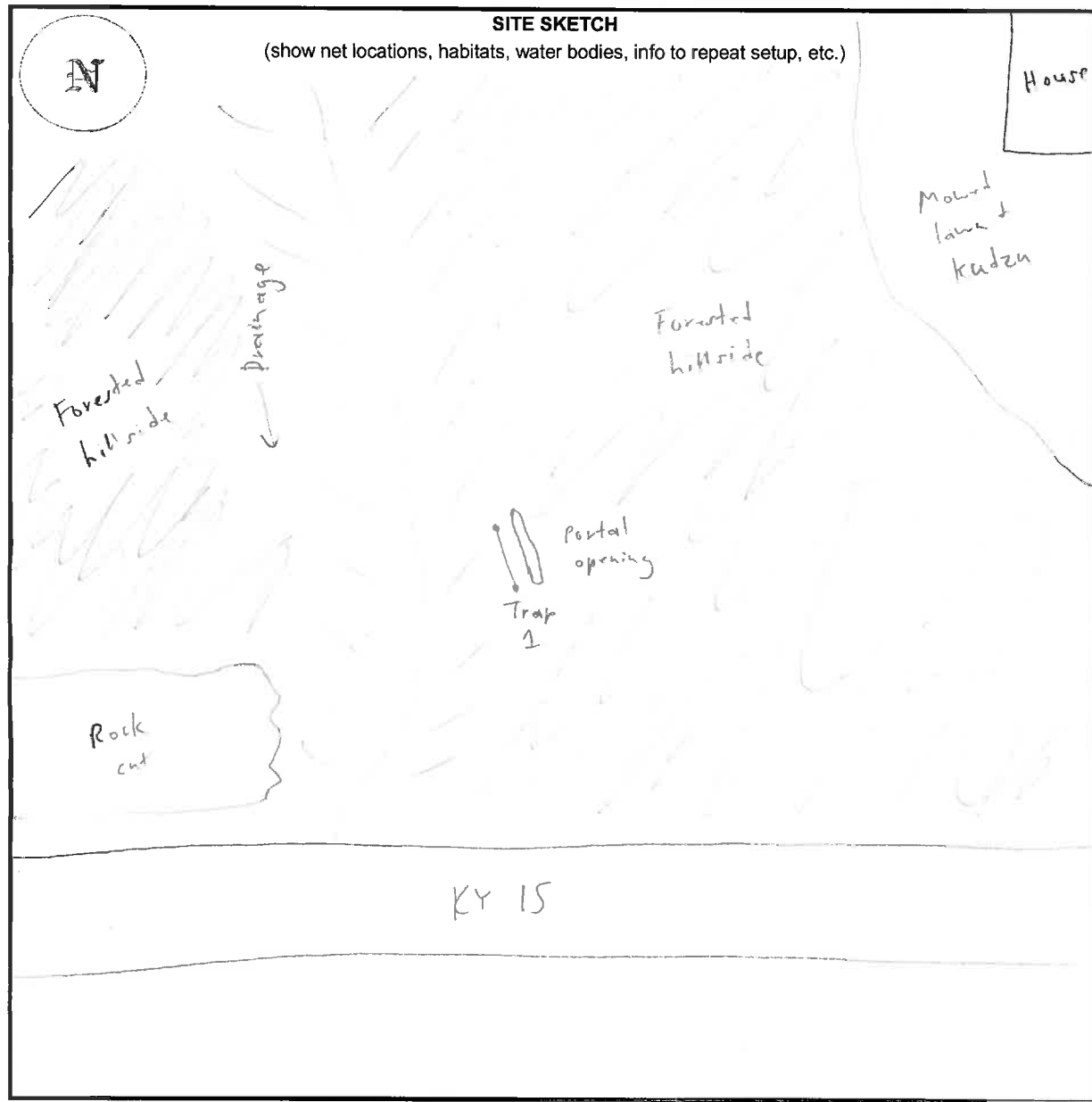
	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	1945	70°F	0	0	
	2045	61°F	0	0	0
	2145	61°F	0	0	0
	2245	59°F	0	0	0
	2345	59°F	0	0	1
End	0045	57°F	0	0	1
	Total				2

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	2320	PESU	♀	Adult	NR	34	8.6	0	1	IN	024-0274	
2	2357	PESU	F	Adult	NR	34	8.0	0	1	IN		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)Marking Technique: Yellow paint on back



# CAVE/PORTAL SURVEY DATA SHEET



Site: Portal 121

Date: 9/15/15

	Harp Trap			
	1	2	3	4
Width (ft)	5			
Height (ft)	5			
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	X			
Other:				

	Latitude/Longitude	Photos
Trap 1	37.269552°N/83.205103°W	1972-74
Trap 2		
Trap 3		
Trap 4		

Camera: Palmer

Site/Habitat Description: Abandoned mine  
portal in forested drainage near  
KY 15; mid-growth mature hardwood  
forest; area previously disturbed

Dominant overstory species: Green ash,  
Tulip poplar, Sycamore, Black walnut

Dominant understory species: Bush honeysuckle,  
Box elder, Green ash

Notes: Used bottle bar to trap log  
to help determine if bat was  
going to leave

# CAVE/PORTAL SURVEY DATA SHEET

Site: Portal 121 Date: Sept 29, 2015  
 Project: KY 15 Project #: 12-093  
 State: KY County: Perry  
 Personnel: B. Doster / R. Schuler Quad: Harold North  
 Moon Phase: Waning gibbous 194 % Moon Visible at Site: NO

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:30	70°	3	0	
	20:30	70°	3	0	0
	21:30	70°	3	0	0
	22:30	68°	3	0	3
	23:30	66°	3	0	0
End	00:38	67°	3	0	0
	01:00	68°	3	0	0
Camera:	Canon				Total 3

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	21:35	PESU	M	A	TD	33	7.2	0	1	IN	—	
2	22:15	PESU	M	A	TD	34	8.1	0	1	OUT	13-14-15	
3	22:22	PESU	M	A	TD	33	7.7	0	1	OUT	—	
4	00:52	PESU	—	—	—	—	—	—	1	IN	—	Recapture of Bat #3
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive

<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: Red Paint on Back

# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)

N

Same as previous set-up  
on 9/15/15

Site:

portal 121

Date:

9/29/15

	Harp Trap			
	1	2	3	4
Width (ft)				
Height (ft)				
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal				
Other:				

	Latitude/Longitude	Photos
Trap 1		
Trap 2		
Trap 3		
Trap 4		

Camera: \_\_\_\_\_

Site/Habitat Description: \_\_\_\_\_

Dominant overstory species: \_\_\_\_\_

Dominant understory species: \_\_\_\_\_

Notes: Rain from 9:20 to 9:30;  
2nd rain event from 10:30 to 10:45



# CAVE/PORTAL SURVEY DATA SHEET

Site: Portals 37, 38, 39, A2, A4 Date: 9/15/15  
 Project: KY 15 Project #: 12-093  
 State: Kentucky County: Parry  
 Personnel: B. Dutton / R. Anderson Quad: Hazard North  
 Moon Phase: Waxing crescent 16 % Moon Visible at Site: NO

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:50	—	0	0	
	20:50	—	0	0	0
	21:50	64	0	0	0
	22:50	64	0	0	0
	23:50	63	0	0	1
End	06:50	63	0	0	1
	Total				4

Camera: Pentax

(2 while closing traps)

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	22:52	PEJU	M	A	TD	35	7.6	0	3/39	In	455-460	
2	23:52	PEJU	F	A	NR	34	7.6	0	2/A2	In	461-464	
3	01:20	PEJU	F	A	NR	34	7.9	0	2/A2	?	—	
4	01:25	PEJU	—	—	—	—	—	—	1/A4	?	—	escaped from hand
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive

<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

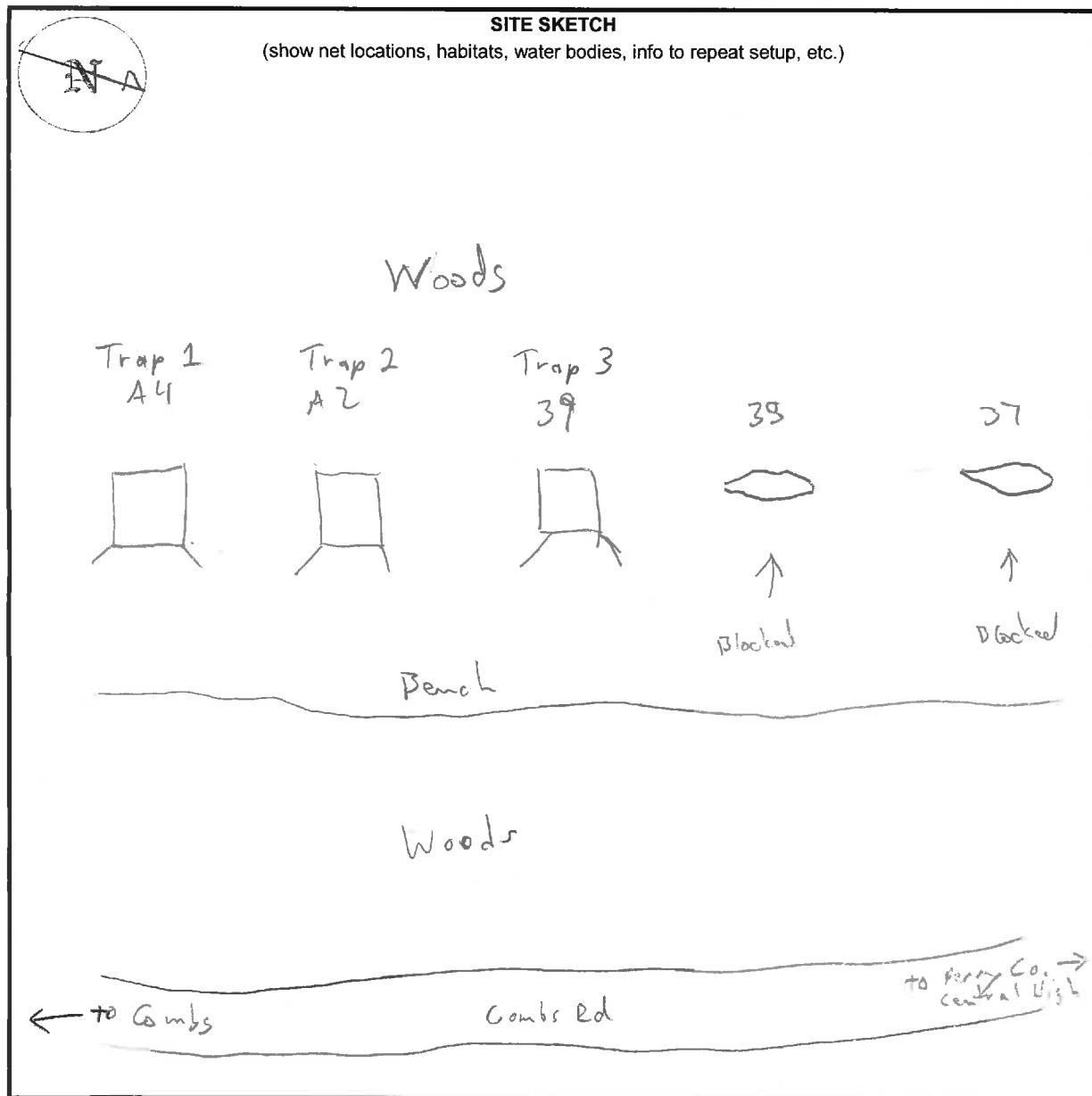
<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique: Red paint on back

# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Site: Portals 37-A4

Date: 9/15/15

	Harp Trap			
	1	2	3	4
Width (ft)	5	5	5	
Height (ft)	5.5	5	5	
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	A4	A2	39	
Other:				

	Latitude/Longitude	Photos
Trap 1	37.280585°N 83.211542°W	1966-67
Trap 2	37.280743°N 83.211645°W	1968-69
Trap 3	37.280851°N 83.211709°W	1970-71
Trap 4		

Camera: Palmer

Site/Habitat Description: 5 abandoned  
mine portals in 3rd-4th growth  
mature upland hardwood forest

Dominant overstory species: Sugar maple  
American elm, Shagbark hickory

Dominant understory species: 15' or more  
bitternut hickory, Impatiens sp. trailing  
arbutus, Ohio buckeye, poison ivy, etc.

Notes: 38 + 37 blocked  
Photos on Palmer camera  
Duplicate photos sent @ 2010

# CAVE/PORTAL SURVEY DATA SHEET

Site: Portals 37, 38, 39, A2, A4 Date: 9/29/15  
 Project: KY 15 Project #: 12-093  
 State: KY County: Perry  
 Personnel: J. Bishop / B. Carnahan Quad: Hazard North  
 Moon Phase: Waning gibbous 1 94 % Moon Visible at Site: No

	Time	Temp	Sky <sup>2</sup>	Wind <sup>3</sup>	# of Bats
Start	19:45	72	3	0	
	20:45	70	3	0	0
	21:45	69	3	0	1
	22:45	67	3	0	0
	23:45	66	3	0	0
End	00:45	65	3	1	0
	01:15	62	3	/ Total	
	Camera: Canon D				

	Time (24hr)	Species	Sex	Age	Repro. Cond. <sup>1</sup>	Forearm (mm)	Weight (g)	Wing Score	Trap #	Flight In/Out	Photo #	Notes
1	21:45	2ESU	F	A	NR	35	7.5	0	4	2	20-23	
2												
3												
4												
5												
6												
7												
8												
9												
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11												
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22												
23												
24												
25												

<sup>1</sup> Reproductive Condition: P=pregnant; L=lactating; PL=post-lactating; TD= testes descended, NR=non-reproductive

<sup>2</sup> Sky Code: 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

<sup>3</sup> Wind Code: 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Marking Technique:

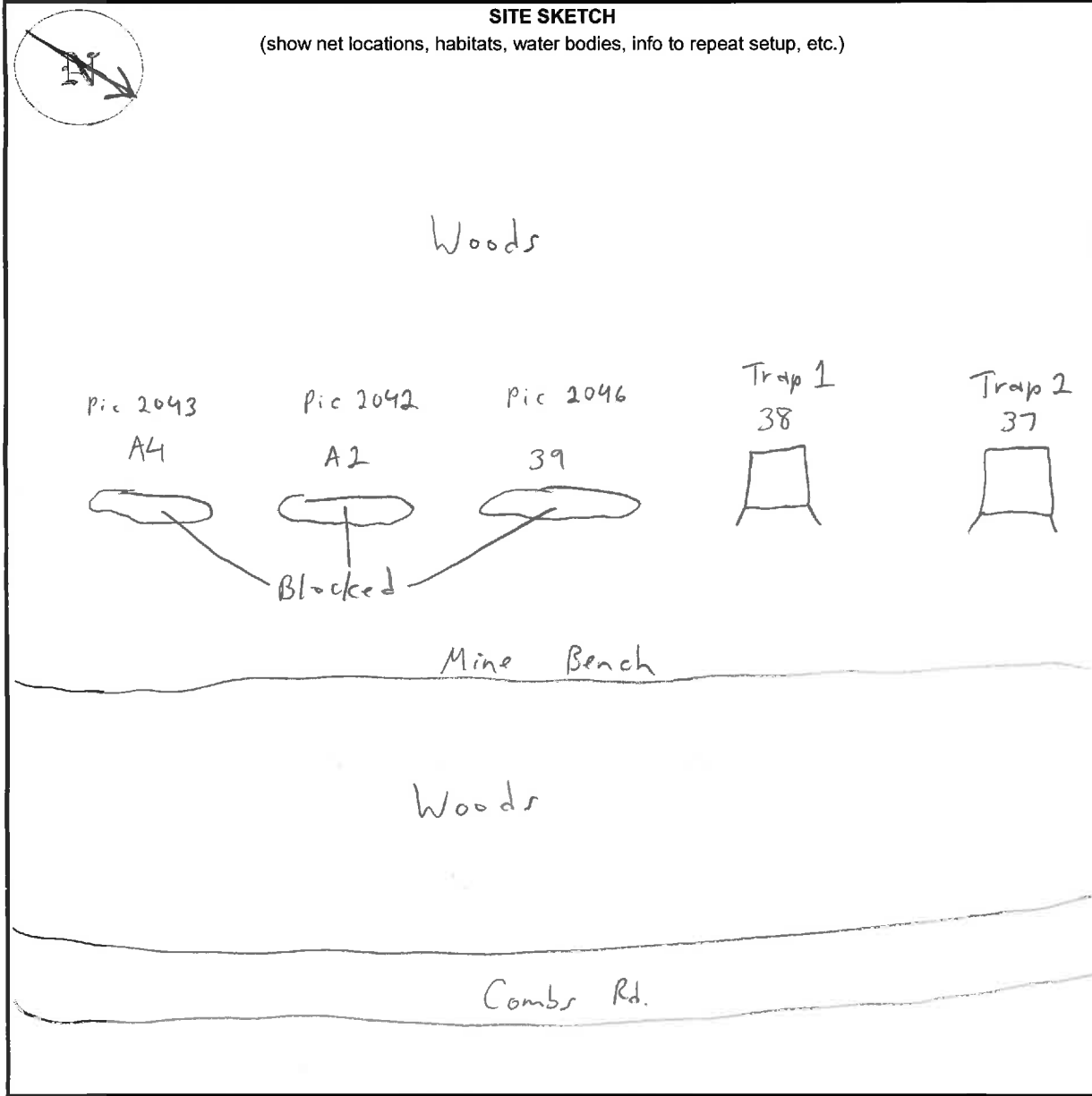
yellow paint on middle toe



# CAVE/PORTAL SURVEY DATA SHEET

## SITE SKETCH

(show net locations, habitats, water bodies, info to repeat setup, etc.)



Site: Portals 37-A4

Date: 9/29/15

	Harp Trap			
	1	2	3	4
Width (ft)	5	5		
Height (ft)	5	5		
Location				
Road/Trail				
Road Rut				
Stream				
Pond				
Forest Edge				
Cave/Portal	38	37		
Other:				

	Latitude/Longitude	Photos
Trap 1	37.280925/83.211781	2044-45
Trap 2	37.281108/83.211800	2039-40
Trap 3		
Trap 4		

Camera: Palmer

Site/Habitat Description:

See datasheet for 9/15/15

Dominant overstory species:

Dominant understory species:

Notes: Rain from 9:20 to 9:30;  
2nd rain event from 10:30 to 10:45

## **Appendix C**

### Correspondence



**KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES  
TOURISM, ARTS, AND HERITAGE CABINET**

**Steven L. Beshear**  
Governor

#1 Sportsman's Lane  
Frankfort, Kentucky 40601  
Phone (502) 564-3400  
1-800-858-1549  
Fax (502) 564-0506  
fw.ky.gov

**Marcheta Sparrow**  
Secretary

**Dr. Jonathan W. Gassett**  
Commissioner

3 June 2013

K. Marie Russo  
Staff Biologist  
Redwing Ecological Services, Inc.  
1139 South Fourth Street  
Louisville, KY 40203

RE: Request for Information  
Kentucky Highway 15 Widening and Reconstruction Project  
Perry County, Kentucky  
Redwing Project No.: 12-093  
KYTC Item No.: 10-158.00

Dear Ms. Russo:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for information pertaining to the subject project. The Kentucky Fish and Wildlife Information System indicates that no federally- or state-listed threatened/endangered species are known to occur within close proximity to the project study area. No trout streams/fish spawning areas, critical habitat, or protected natural areas are known to occur within the study area. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

To minimize indirect impacts to aquatic resources, strict erosion control measures should be developed and implemented prior to any construction to minimize siltation into streams and storm water drainage systems located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed. Any planning should include measures designed to eliminate and/or reduce impacts to stream and wetland habitats. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset the losses.

I hope this information is helpful to you, and if you have questions or require additional information, please call me at (502) 564-7109 extension 4453.

Sincerely,

A handwritten signature in cursive script, appearing to read "Daniel Seal".





Steven L. Beshear  
Governor



Leonard K. Peters  
Secretary  
Energy and Environment Cabinet

Donald S. Dott, Jr.  
Director

Commonwealth of Kentucky  
Kentucky State Nature Preserves Commission  
801 Schenkel Lane  
Frankfort, Kentucky 40601-1403  
502-573-2886 Voice  
502-573-2355 Fax

June 17, 2013

K. Marie Russo  
Redwing Ecological Services, Inc.  
1139 S. Fourth St.  
Louisville, KY 40203

Data Request 13-072

Dear Ms. Russo:

This letter is in response to your data request of May 28, 2013 for the KY 15 Reconstruction & Widening (12-093) (Perry County) project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur near the project area on the Hazard North and Hazard South USGS Quadrangles, as shown on the map provided. Please see the attached reports for more information, which reflect analysis of the project area with three buffers applied:

- 1-mile for all records – 1 record
- 5-mile for aquatic records – 1 record
- 5-mile for federally listed species – 1 record
- 10-mile for mammals and birds – 15 records

*Juglans cinerea* (White walnut, KSNPC Threatened) is known to occur near the project area. The species is listed by the United States Fish and Wildlife Service as a Species of Management Concern. This tree is found in mesic wooded ravines and along streams.

*Corynorhinus rafinesquii* (Rafinesque's big-eared bat, federal species of management concern, KSNPC special concern), *Myotis grisescens* (Gray myotis, federally listed endangered, KSNPC threatened), *Myotis leibii* (Eastern small-footed myotis, federal species of management concern, KSNPC threatened), and *Myotis sodalis* (Indiana myotis, federally listed endangered, KSNPC endangered) are known to occur within ten miles of the project area. A thorough survey for these species should be conducted by a qualified biologist if suitable habitat will be disturbed. The survey should include a search for potential roost and winter sites, and a mistnetting census at

numerous points within the proposed corridor, particularly in preferred summer habitat. Summer foraging habitats include upland forests, bottomland forests and riparian corridors. Suitable roost and winter sites include sandstone and limestone caves, rockhouses, cliffhines, auger holes, and abandoned mines. In order to avoid impacts to bats, bottomland forests and riparian corridors, particularly near caves, should not be disturbed.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Kentucky State Nature Preserves Commission, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Kentucky State Nature Preserves Commission." The exact location of plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Kentucky State Nature Preserves Commission's Data Manager (801 Schenkel Lane, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

Data Request 13-072

June 17, 2013

Page 3

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Sara Hines  
Data Manager

SLD/SGH

Enclosures: Data Report and Interpretation Key





## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Kentucky Ecological Services Field Office  
330 West Broadway, Suite 265  
Frankfort, Kentucky 40601  
(502) 695-0468

June 5, 2013

Ms. K. Marie Russo  
Redwing Ecological Services, Inc.  
1139 South Fourth Street  
Louisville, KY 40203

Re: KYTC Item No. 10-158.00; KY Highway 15 widening and reconstruction project;  
located in Perry County, Kentucky

Dear Ms. Russo:

Thank you for the opportunity to provide comments on the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed this proposed project and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

In accordance with the provisions of the Fish and Wildlife Coordination Act, the Service has reviewed the project with regards to the effects the proposed actions may have on wetlands and/or other jurisdictional waters. We recommend that project plans be developed to avoid impacting wetland areas and/or streams, and reserve the right to review any required federal or state permits at the time of public notice issuance. The U.S. Army Corps of Engineers should be contacted to assist you in determining if wetlands or other jurisdictional waters are present or if a permit is required.

In order to assist you in determining if the proposed project has the potential to impact protected species, we have searched our records for occurrences of listed species within the vicinity of the proposed project. Based upon the information provided to us and according to our databases, we believe that the Indiana bat (*Myotis sodalis*) is the only federally listed species that has the potential to occur within the project vicinity.

### **Indiana bat**

The proposed project site is located within habitat designated as "potential habitat" for the Indiana bat and we believe that: (1) forested areas in the vicinity of and on the project area may potentially provide suitable summer roosting and foraging habitat for the Indiana bat; and (2) caves, rockshelters, and abandoned underground mines in the vicinity of and on the project area may potentially provide suitable wintering habitat for the Indiana bat. Our belief that potentially suitable habitat may be present is based on the information provided in your correspondence, the

fact that much of the project site and/or surrounding areas contain forested habitats that are within the natural range of this species, and our knowledge of the life history characteristics of the species.

The Indiana bat utilizes a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (*i.e.*, dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Male Indiana bats have been observed roosting in trees as small as 5 inches DBH.

Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula (*i.e.* cave) to feed and roost until temperatures drop to a point that forces them into hibernation. This “swarming” period is dependent upon weather conditions and lasts from about September 15 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Research has shown that bats exhibiting this “swarming” behavior will range up to five miles from chosen hibernacula during this time. For hibernation, the Indiana bat prefers limestone caves, sandstone rockshelters, and abandoned underground mines with stable temperatures of 39 to 46 degrees F and humidity above 74 percent but below saturation.

Because we have concerns relating to the Indiana bat on this project and due to the lack of occurrence information available on this species relative to the proposed project area, we have the following recommendations relative to Indiana bats:

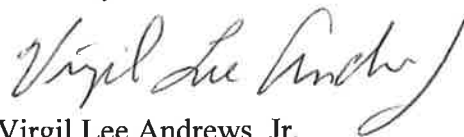
- The project proponent can modify the proposed project to eliminate or reduce impacts to potential Indiana bat roost trees. If this is not practicable, we would recommend that the project proponent only remove potential roost trees within the project area between October 15 and March 31 in order to avoid directly impacting summer roosting Indiana bats. Removing trees during the specified “unoccupied” period avoids direct effects to Indiana bats.
- Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter habitat for Indiana bats. Therefore, we would recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as Indiana bat habitat by this office.

If your project schedule requires the clearing of potential Indiana bat roosting trees during the period of April 1 to October 14, you have two primary options for addressing impacts to Indiana bats:

- The project proponent can survey the project site to determine the presence or absence of Indiana bats within the project area in an effort to determine if potential effects are likely. A qualified biologist who holds the appropriate collection permits for the Indiana bat must undertake such surveys, and we would appreciate the opportunity to approve the biologist's survey plan prior to the survey being undertaken and to review all survey results, both positive and negative. If any Indiana bats are identified, we would request written notification of such occurrence(s) and further coordination and consultation.
- The project proponent can enter into a Conservation Memorandum of Agreement (MOA) with the Service to gain flexibility in project timing with regard to the removal of suitable Indiana bat habitat. In exchange for this flexibility, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation of minimization and mitigation measures as set forth in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Jessi Miller at (502) 695-0468 extension 104.

Sincerely,

A handwritten signature in cursive script that reads "Virgil Lee Andrews, Jr." The signature is written in dark ink and is positioned above the printed name.

Virgil Lee Andrews, Jr.  
Field Supervisor



## **Appendix D**

### Photo Log

**Improvements to KY 15 from Boone Ridge Road  
to KY 15 Bypass, Perry County, Kentucky  
KYTC Item No. 10-158.00**



**Photo 1:** Standing south of KY 15 bypass looking north along KY 15 corridor near the beginning of the project



**Photo 2:** Standing north of KY 550 intersection looking north along KY 15 corridor in the middle of the project





**Photo 3:** Standing north of KY 80 Hal Rogers Parkway looking south along KY 15 corridor near the end



**Photo 4:** Standing along the north bank of North Fork Kentucky River looking at the bridge to be replaced





**Photo 5:** Standing along the north bank of North Fork Kentucky River looking at the bridge to be replaced as potential bat roosting habitat



**Photo 6:** Standing under KY 15 Bridge over North Fork Kentucky River looking at the bridge as potential bat roosting habitat. Photo provided by Redwing April 2013



**Photo 7:** Standing under KY 15 Bridge over North Fork Kentucky River looking at the bridge as potential bat roosting habitat. Photo provided by Redwing April 2013



**Photo 8:** Example of harp trap set up at Portals 37, 38, 39, A2, and A4: September 15, 2015





**Photo 9:** Example of harp trap set up at Portals 37, 38, 39, A2, and A4: September 15, 2015



**Photo 10:** Example of portal blockade at Portals 37, 38, 39, A2, and A4: September 29, 2015





**Photo 11:** Example of portal blockade at Portals 37, 38, 39, A2, and A4: September 29, 2015

**Please refer to Redwings document in Appendix B for complete  
harp trapping procedures, results, and photographs**