



## EXECUTIVE SUMMARY – VIA EMAIL

**DATE:** June 8, 2018

**TO:** Ms. Rebecca Thompson – Qk4  
rthompson@qk4.com

**FROM:** Neil Guthals and Benjamin Deetsch  
Redwing Ecological Services, Inc.

**SUBJECT:** **Terrestrial and Aquatic Assessment  
Science Hill Planning Study  
Pulaski County, Kentucky  
KYTC Item No.: 8-9010.00  
Redwing Project: 18-045**

Redwing Ecological Services, Inc. (Redwing) is pleased to provide this summary of the terrestrial and aquatic assessment performed in support of the Science Hill Planning Study. The proposed project involves an alternatives study for the reconstruction of Kentucky Highway 635 to eliminate an at grade railroad crossing and replace it with a railroad separation crossing in the community of Science Hill, Kentucky. The overall study area includes 11 preliminary alternatives located within two study areas, a north study area of approximately 193 acres and a south study area of approximately 400 acres.

The north study area is bordered by West Langdon Road to the north, U.S. Hwy 27 to the east, Chloe Street to the south, and Copper Drive to the west. The south study area is more linear in shape and extends west from the intersection of U.S. Hwy 27 and West Frog Hollow Road to the intersection of Dunn Street and Stanford Street before turning south to Northridge Drive in Pulaski County, Kentucky (Figure 1). The purpose of the assessment is to identify major ecological resources within the study area for use in project planning process and in completion of National Environmental Policy Act (NEPA) documentation.

The study area is located in a rural and semi-rural area of Pulaski County, surrounding the city of Science Hill. The study area is dominated by roads, railroad corridor, residential and commercial development, and a baseball park. Habitats include maintained lawn, pasture, young woods habitat, and mature woods habitat. The assessment is summarized below in terms of study methodology, results, and potential impacts.

### METHODOLOGY

Occurrence records maintained by the U.S. Fish and Wildlife Service - Kentucky Field Office (USFWS KFO), Kentucky Department of Fish and Wildlife Resources (KDFWR), and the Kentucky State Nature Preserves Commission (KSNPC) were reviewed as part of this assessment. The USFWS's Information for Planning and Conservation (IPaC) website was used to obtain a list of threatened/endangered (T/E) species that may occur within the study area. The Kentucky Speleological Society (KSS) was contacted regarding the study area and information was requested regarding any potential concerns. During the in-house review, USGS topographic quadrangle maps, geologic maps, the Pulaski County soil survey, karst potential maps, and

available mine maps were reviewed to identify caves, mine portals, sinkholes, and other underground features within the study area.

Following in-house review, Redwing conducted a vehicular reconnaissance of the study area to identify the approximate location and extent of waters/wetlands and to identify potential T/E species habitat. During the reconnaissance, the presence of streams and open water bodies was evaluated on the basis of ordinary high water mark (OHWM), defined bed and bank features, and flow regimes. Potential wetland areas were investigated following the Routine On-Site Determination Method as defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont – Version 2.0* (April 2012). The locations and extent of jurisdictional features and T/E species habitat presented in this summary have only been approximated and have not been formally delineated or verified by the appropriate resource agency, which holds final authority over determination.

## RESULTS

Redwing performed a reconnaissance of the study area on May 17 and 18, 2018. The results of the assessment are presented below in terms of federally-listed species and waters of the U.S.

**Federally-listed Species:** The following table presents federally-listed species potentially occurring in the study area as identified in the USFWS IPaC and the presence/absence of suitable habitat in the study area. The KYTC Pulaski County species list also includes the blackside dace (*Phoxinus cumberlandensis*), catspaw mussel (*Epioblasma obliquata*), clubshell (*Pleurobema clava*), cracking pearlymussel (*Hemistena lata*), dromedary pearlymussel (*Dromus dromas*); fanshell (*Cyprogenia stegaria*), least tern (*Sternula antillarum athalassos*), oyster mussel (*Epioblasma capaeiformis*), rabbitsfoot (*Theliderma cylindrica*), ring pink (*Obovaria retusa*), rough pigtoe (*Pleurobema plenum*), and spectaclecase (*Margaritifera monodonta*). Correspondence from the resource agencies is provided in the Appendix.

Scientific Name	Common Name	Federal Status	Habitat Present
<b>Mammals</b>			
<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat	Endangered	No
<i>Myotis grisescens</i>	gray bat	Endangered	Foraging
<i>Myotis septentrionalis</i>	northern long-eared bat	Threatened	Yes
<i>Myotis sodalis</i>	Indiana bat	Endangered	Yes
<b>Mussels</b>			
<i>Alamindonta atropurpurea</i>	Cumberland elktoe	Endangered	No
<i>Epioblasma brevidens</i>	Cumberlandian combshell	Endangered	No
<i>Epioblasma florentina walkeri</i>	tan riffleshell	Endangered	No
<i>Epioblasma triquetra</i>	snuffbox	Endangered	No
<i>Pegias fabula</i>	littlewing pearlymussel	Endangered	No
<i>Ptychobranchus subtentum</i>	fluted kidneyshell	Endangered	No
<i>Villosa trabalis</i>	Cumberland bean	Endangered	No
<b>Plants</b>			
<i>Platanthera intergrilabia</i>	white fringeless orchid	Threatened	No
<i>Spiraea virginiana</i>	Virginia spiraea	Threatened	No

The USFWS IPaC response notes that there are no critical habitats within the study area. The KSNPC response noted concern for the project regarding Henslow's sparrow (*Ammodramus henslowii*) (a species of management concern), which is an element occurrence located west and outside of the north study area, but within the one-mile search buffer. The KDFWR response noted the four federally-listed bat species along with five state-listed bird species. The response noted no caves or unique natural areas within one-mile of the study area. The KDFWR response also recommended best management practices for stream crossings and erosion control measures. The KSS was contacted regarding caves within three miles of the project. The KSS response indicated that three known caves are located within three miles of the study area: Andes Cave, Gridler Cave 1 and Gridler Cave 2. Andes Cave is noted as being located immediately west of the south study area (approximately 1,200 feet), but unverified.

A review of mine maps, topographic quadrangle maps, and geologic maps did not identify any underground or surface mines within the study area and the study area is classified as very high, medium, low, and non-karst potential. No caves, rockshelters, or other underground features were observed within study area during the reconnaissance. No roosting habitat was identified for the Virginia big-eared bat or the gray bat or winter hibernacula for the Indiana bat or northern long-eared bat. Sinkholes were observed in the study area, but none were suitable for bat use. The mature woods habitat in the study area was identified as suitable summer roosting, foraging, and commuting habitat for the Indiana and northern long-eared bats. This habitat totals approximately 64.0 acres (Figure 2). The project is located in potential habitat for the Indiana bat and in a known quadrangle with hibernaculum buffers for the northern long-eared bat (Figure 3 and 4). The perennial streams within the study area are considered foraging and commuting habitat for the gray bat.

Potential habitat for the federally-listed mussel species includes streams and small rivers with moderate to fast-flowing current and substrate consisting of sand, gravel, cobble, and boulders. Two perennial streams are located within the study area; however, these features are highly impacted area, extensively channelized, exhibit heavy sediment deposition, or are not large enough to be considered habitat for the identified mussel species. Furthermore, no live mussels or relic shells were observed during the reconnaissance. Therefore, these federally-listed mussel species are considered absent from the proposed area.

The study area does not appear to contain suitable habitat for the white fringeless orchid due to the lack of permanently wet areas with acidic, organic soils and partial shade. Virginia spiraea is typically found along the floodplains of second and third-order high-gradient streams. This species prefers areas that are frequently disturbed by scour, such as eroded banks, bars, and natural levees, and often grows in areas where high water has deposited sediment and woody debris. The study area does not appear to contain suitable habitat for the Virginia spiraea.

Waters of the U.S.: The attached Table 1 summarizes potential streams, wetlands, and open waters identified within the study area. The identified features are presented on Figure 2. The reconnaissance survey identified two perennial streams totaling 1,926 linear feet (0.232 acre), 11 intermittent streams totaling 6,546 linear feet (0.552 acre), six ephemeral streams totaling 1,084 linear feet (0.036 acre), 23 wetlands totaling 11.075 acres, and 17 ponds totaling 3.926 acres.

The National Wetlands Inventory mapped both perennial streams (Perennial 1 and 2), one wetland (Wetland 16), seven open water ponds (Open Water 1, 5, 6, 9, 10, 12, and 16), and one wetland (not identified, appears filled) within the study area. No areas within the 100-year floodplain were identified within the study area (Figure 5).

## POTENTIAL IMPACTS

Federally-listed Species: The study area is located in a quadrangle with known hibernaculum buffers for the northern long-eared bat, as well as potential summer habitat for the Indiana bat. It appears that impacts to the Indiana and northern long-eared bat from this project may be addressed following guidance provided in the Revised Conservation Strategy for Forest-Dwelling Bats in the Commonwealth of Kentucky (2016) and a contribution to the Imperiled Bat Conservation Fund (IBCF). Additionally, the 4(d) Rule may be used to address impacts to the northern long-eared bat if it is determined by the USFWS that the project is not located within 0.25 mile of a known hibernacula. Impacts to the perennial stream could adversely impact foraging habitat for gray bat. Adverse effects to other federally-listed threatened/endangered species are not anticipated as a result of the project.

Jurisdictional Waters: Impacts to less than 500 feet of stream or 0.5 acre of Waters of the U.S. for each single and complete project are permissible under Nationwide Permit (NWP) 14 for linear transportation projects under Section 404 of the Clean Water Act. An Individual Water Quality Certification under Section 401 of the Clean Water Act is required if impacts to each intermittent or perennial stream are greater than 300 feet, the overall project impacts greater than 500 feet of intermittent and perennial stream within each hydrologic unit code (HUC) 14, or the project results in impacts greater than 0.5 acre of wetland.

We appreciate the opportunity to assist with this important project. Please contact Neil Guthals or Ben Deetsch at (502) 625-3009 with questions regarding this report.

Attachments: Table  
Figures  
Appendix – Resource Agency Correspondence

File: P:\2018 Projects\18-045-Science Hill Planning Study\Reports\Executive Summary-Science Hill Study.docx

## **TABLE**

**Table 1: Summary of Water/Wetland Features**

**Science Hill Planning Study**

**Pulaski County, Kentucky**

**KYTC Item No.: 8-9010.00**

**Redwing Project: 18-045**

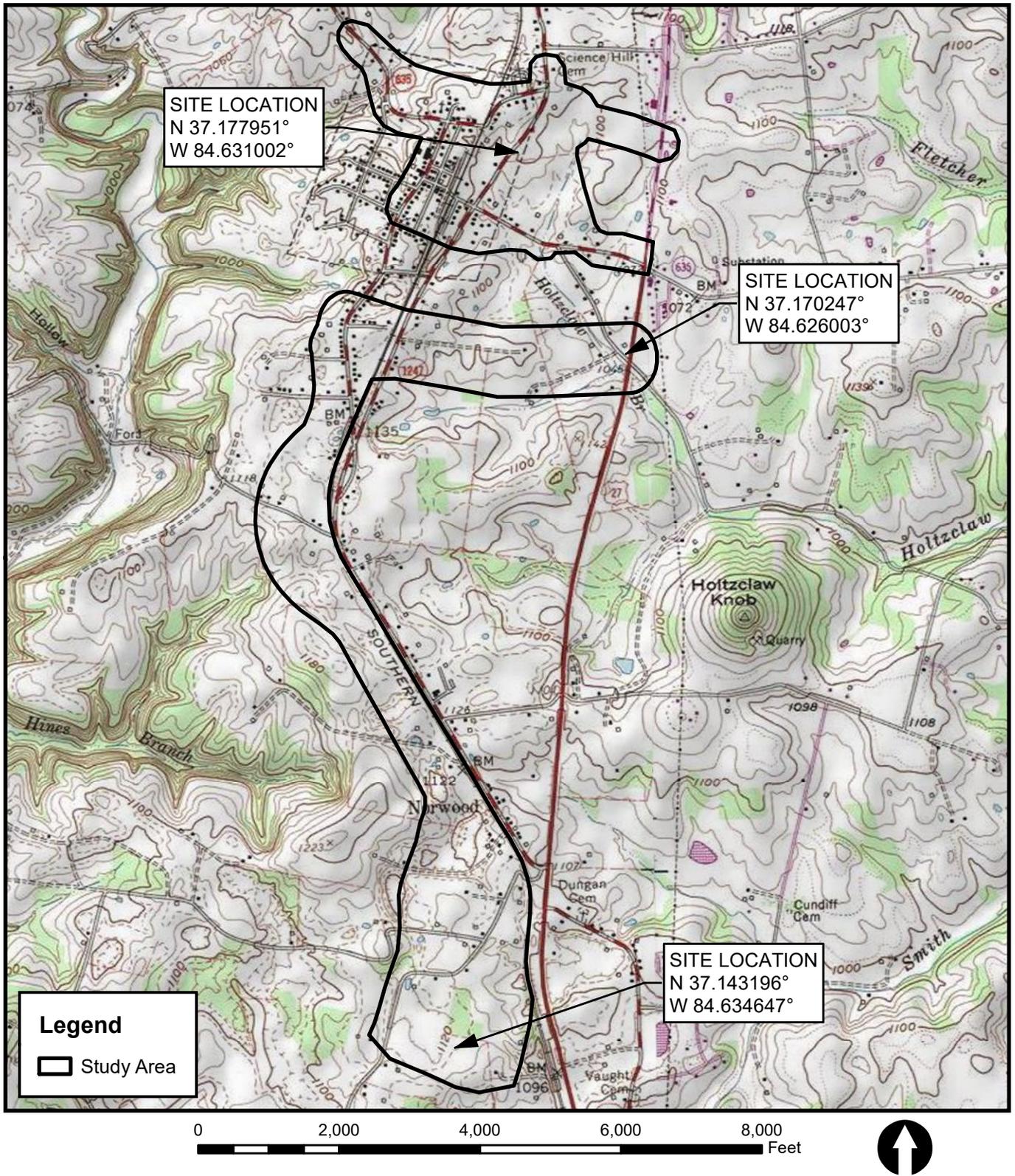
<b>Feature</b>	<b>Stream Length (feet)</b>	<b>Area (acre)</b>	<b>Status</b>
Perennial Stream 1	811	0.130	Jurisdictional
Perennial Stream 2	1,115	0.102	Jurisdictional
<b>Perennial Stream Total</b>	<b>1,926</b>	<b>0.232</b>	
Intermittent Stream 1	2,182	0.200	Jurisdictional
Intermittent Stream 2	803	0.083	Jurisdictional
Intermittent Stream 3	1,037	0.095	Jurisdictional
Intermittent Stream 4	310	0.021	Jurisdictional
Intermittent Stream 5	524	0.036	Jurisdictional
Intermittent Stream 6	276	0.009	Jurisdictional
Intermittent Stream 7	65	0.002	Jurisdictional
Intermittent Stream 8	304	0.010	Jurisdictional
Intermittent Stream 9	82	0.005	Jurisdictional
Intermittent Stream 10	556	0.077	Jurisdictional
Intermittent Stream 11	407	0.014	Jurisdictional
<b>Intermittent Stream Total</b>	<b>6,546</b>	<b>0.552</b>	
Ephemeral Stream 1	51	0.002	Jurisdictional
Ephemeral Stream 2	141	0.005	Jurisdictional
Ephemeral Stream 3	397	0.009	Jurisdictional
Ephemeral Stream 4	189	0.013	Jurisdictional
Ephemeral Stream 5	68	0.002	Jurisdictional
Ephemeral Stream 6	238	0.005	Jurisdictional
<b>Ephemeral Stream Total</b>	<b>1,084</b>	<b>0.036</b>	
Wetland 1	---	0.957	Jurisdictional
Wetland 2	---	0.024	Jurisdictional
Wetland 3	---	0.020	Jurisdictional
Wetland 4	---	0.195	Jurisdictional
Wetland 5	---	0.035	Jurisdictional
Wetland 6	---	0.052	Jurisdictional
Wetland 7	---	0.063	Jurisdictional
Wetland 8	---	0.164	Jurisdictional
Wetland 9	---	0.347	Jurisdictional
Wetland 10	---	0.039	Jurisdictional
Wetland 11	---	0.181	Jurisdictional
Wetland 12	---	0.048	Jurisdictional
Wetland 13	---	0.048	Jurisdictional
Wetland 14	---	6.683	Jurisdictional
Wetland 15	---	0.250	Jurisdictional
Wetland 16	---	0.087	Jurisdictional
Wetland 17	---	0.530	Jurisdictional
Wetland 18	---	0.171	Jurisdictional
Wetland 19	---	0.855	Jurisdictional
Wetland 20	---	0.081	Jurisdictional
Wetland 21	---	0.103	Jurisdictional
Wetland 22	---	0.055	Jurisdictional
Wetland 23	---	0.087	Jurisdictional
<b>Wetland Total</b>		<b>11.075</b>	

**Table 1: Summary of Water/Wetland Features**  
**Science Hill Planning Study**  
**Pulaski County, Kentucky**  
**KYTC Item No.: 8-9010.00**  
**Redwing Project: 18-045**

Open Water 1	---	0.203	Jurisdictional
Open Water 2	---	0.018	Jurisdictional
Open Water 3	---	0.051	Jurisdictional
Open Water 4	---	0.047	Jurisdictional
Open Water 5	---	0.192	Jurisdictional
Open Water 6	---	0.251	Jurisdictional
Open Water 7	---	0.104	Jurisdictional
Open Water 8	---	0.508	Jurisdictional
Open Water 9	---	0.231	Jurisdictional
Open Water 10	---	0.353	Jurisdictional
Open Water 11	---	0.398	Jurisdictional
Open Water 12	---	0.548	Jurisdictional
Open Water 13	---	0.319	Jurisdictional
Open Water 14	---	0.151	Jurisdictional
Open Water 15	---	0.119	Jurisdictional
Open Water 16	---	0.341	Jurisdictional
Open Water 17	---	0.092	Jurisdictional
<b>Open Water Total</b>		<b>3.926</b>	

## **FIGURES**

Source: USGS 7.5-minute Topographic Map - Science Hill and Bobtown, Kentucky Quadrangles.



P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Site Location.mxd, 06-8-2018, ebowman

SCIENCE HILL PLANNING STUDY  
PULASKI COUNTY, KENTUCKY  
KYTC ITEM NO.: 8-9010.00

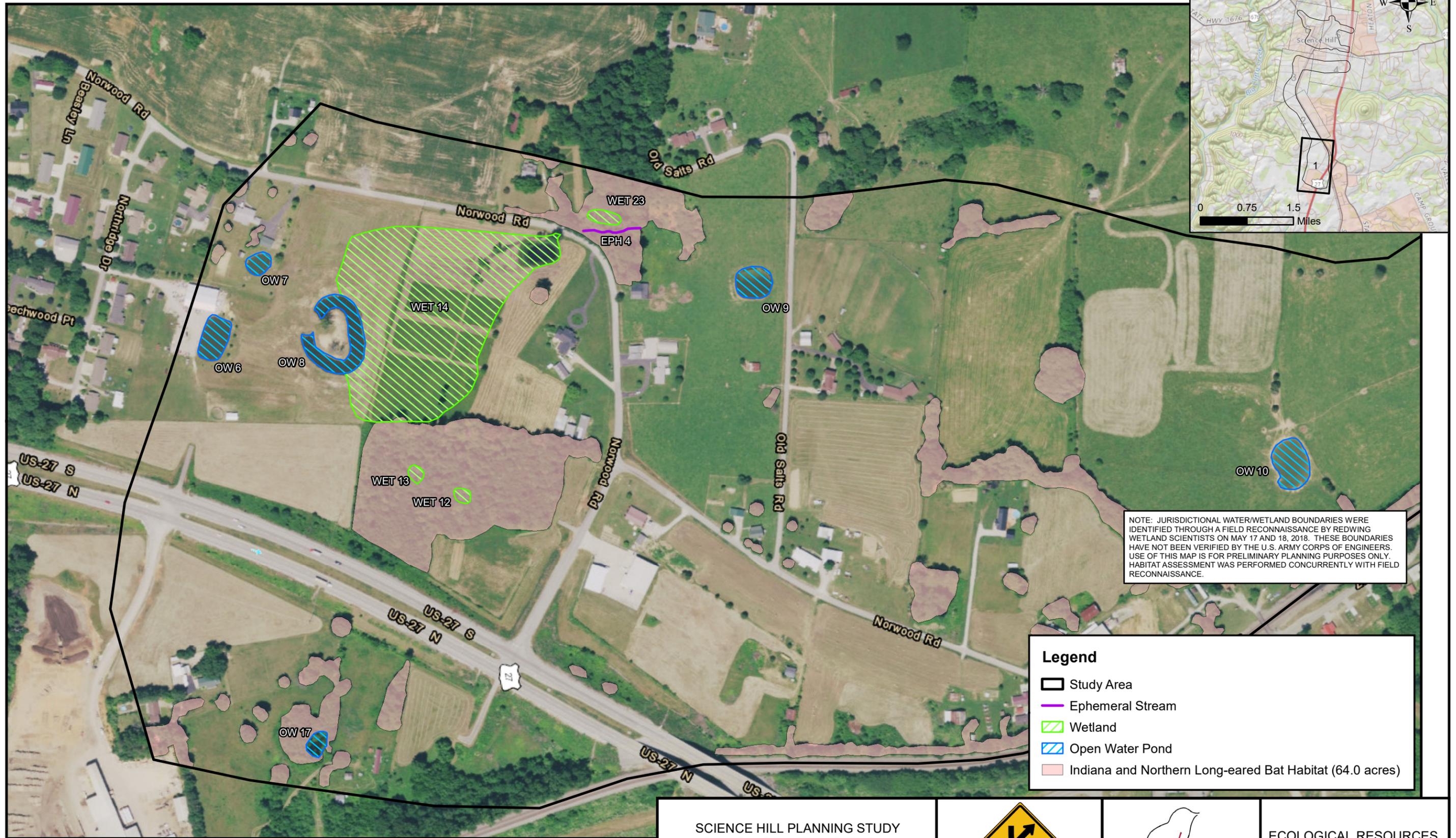


SITE LOCATION MAP

REVISED DATE: 05-15-18 | DRAWN BY: BJD

FIGURE 1

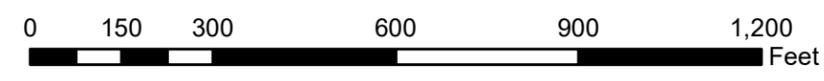
Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE IDENTIFIED THROUGH A FIELD RECONNAISSANCE BY REDWING WETLAND SCIENTISTS ON MAY 17 AND 18, 2018. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY. HABITAT ASSESSMENT WAS PERFORMED CONCURRENTLY WITH FIELD RECONNAISSANCE.

**Legend**

- Study Area
- Ephemeral Stream
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)



SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00  
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ECOLOGICAL RESOURCES  
 MAP  
 FIGURE 2  
 SHEET 1 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



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- Study Area
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- Indiana and Northern Long-eared Bat Habitat (64.0 acres)

0 150 300 600 900 1,200 Feet



SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
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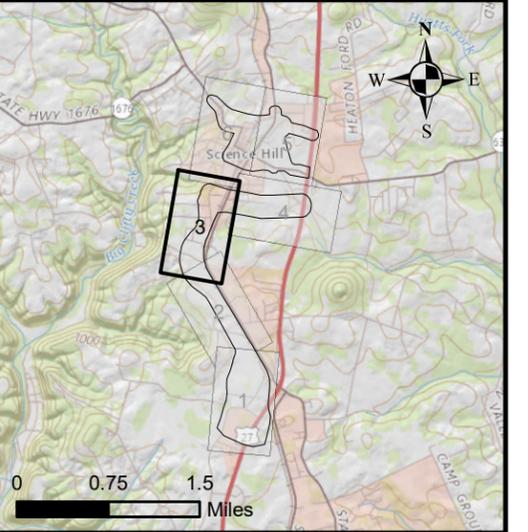


ECOLOGICAL RESOURCES MAP

FIGURE 2  
 SHEET 2 of 6

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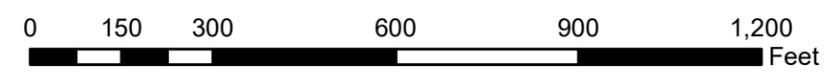
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**Legend**

- Study Area
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SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
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ECOLOGICAL RESOURCES  
 MAP

FIGURE 2  
 SHEET 3 of 6

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Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygissserver.ky.gov ArcGIS services (2016).



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**Legend**

- Study Area
- Perennial Stream (Gray Bat Foraging Habitat)
- Intermittent Stream
- Ephemeral Stream
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)



SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
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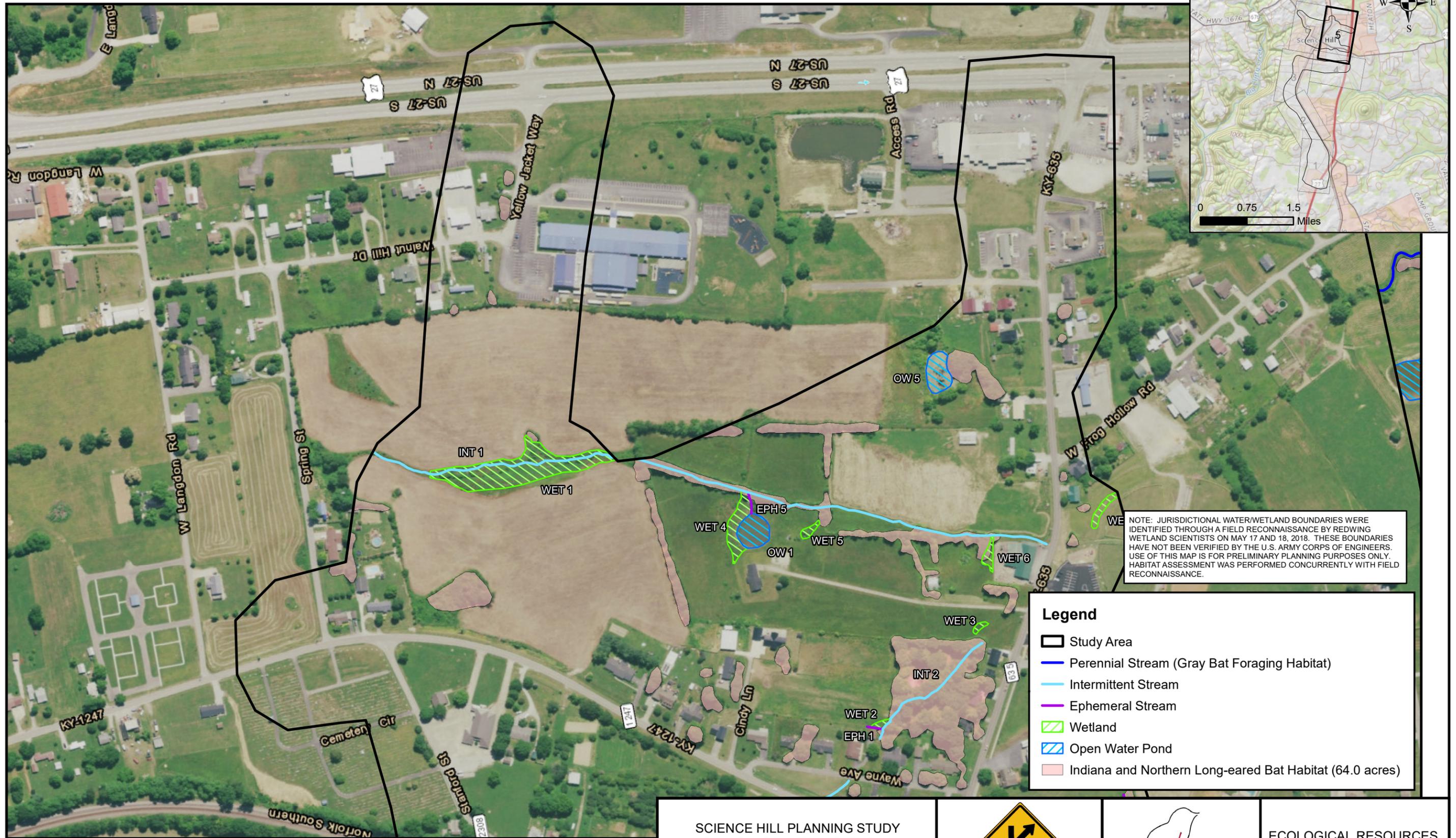


ECOLOGICAL RESOURCES MAP

FIGURE 2  
 SHEET 4 of 6

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0 150 300 600 900 1,200 Feet



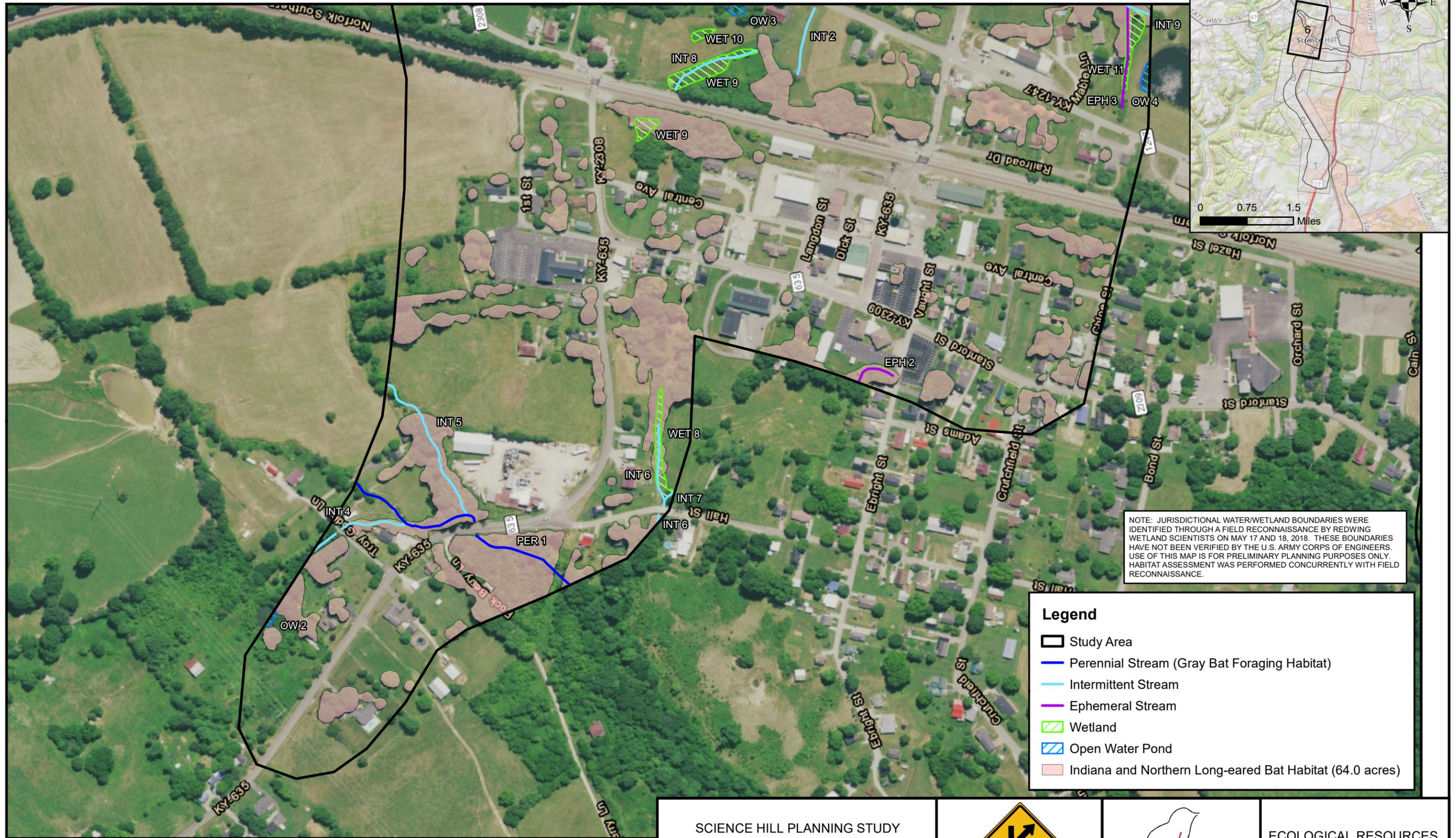
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ECOLOGICAL RESOURCES MAP  
 FIGURE 2  
 SHEET 5 of 6

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Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



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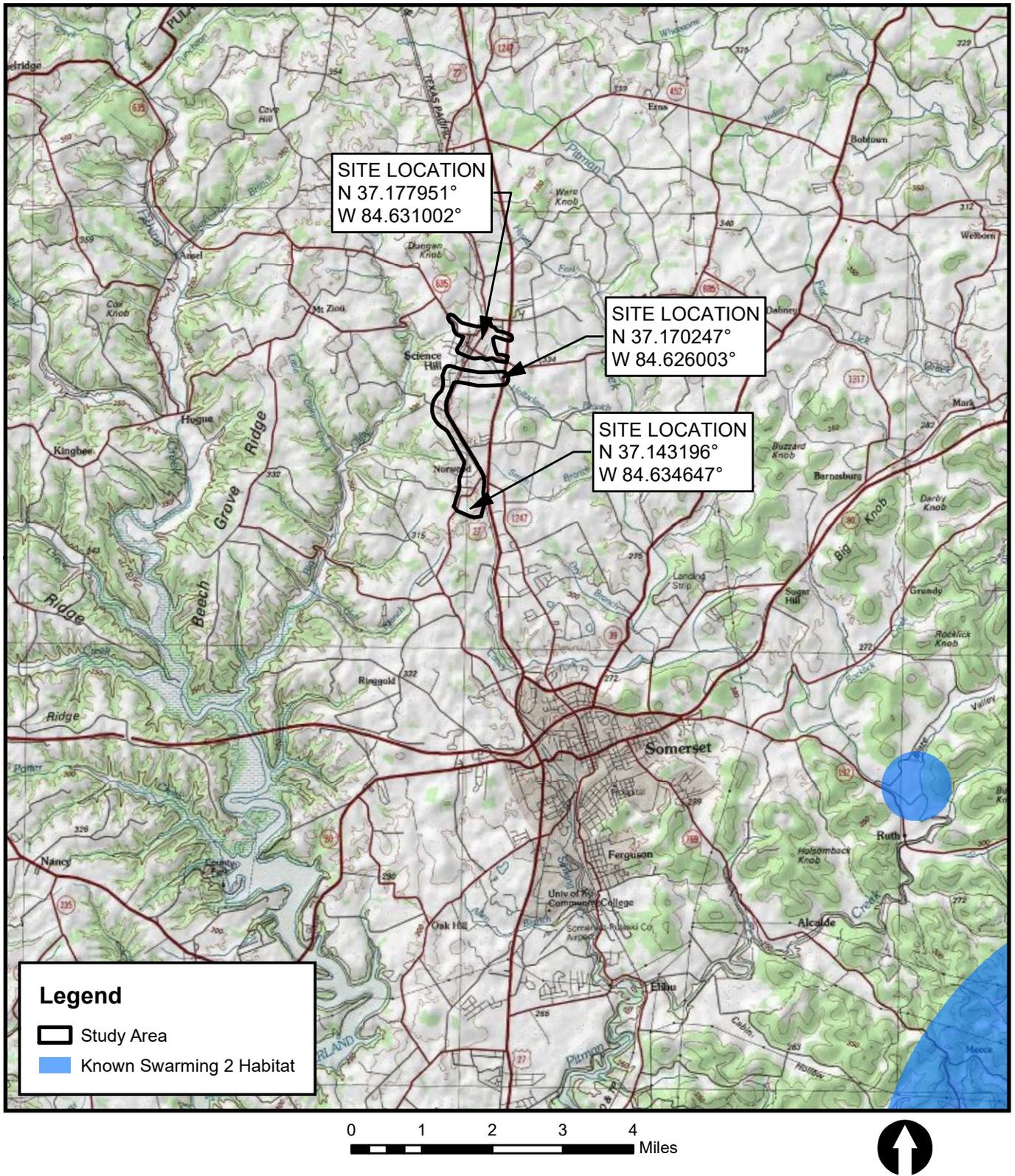
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ECOLOGICAL RESOURCES MAP  
 FIGURE 2  
 SHEET 6 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

Source: USA Topo Maps, (2013) National Geographic Society, USGS 7.5-minute Topographic Map - Bobtown, Delmer, Science Hill, and Somerset, Kentucky Quadrangles; USFWS Kentucky Field Office - Indiana Bat Habitat (2018).



P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Known Indiana Bat Map.mxd, 06-8-2018, ebowman

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PULASKI COUNTY, KENTUCKY  
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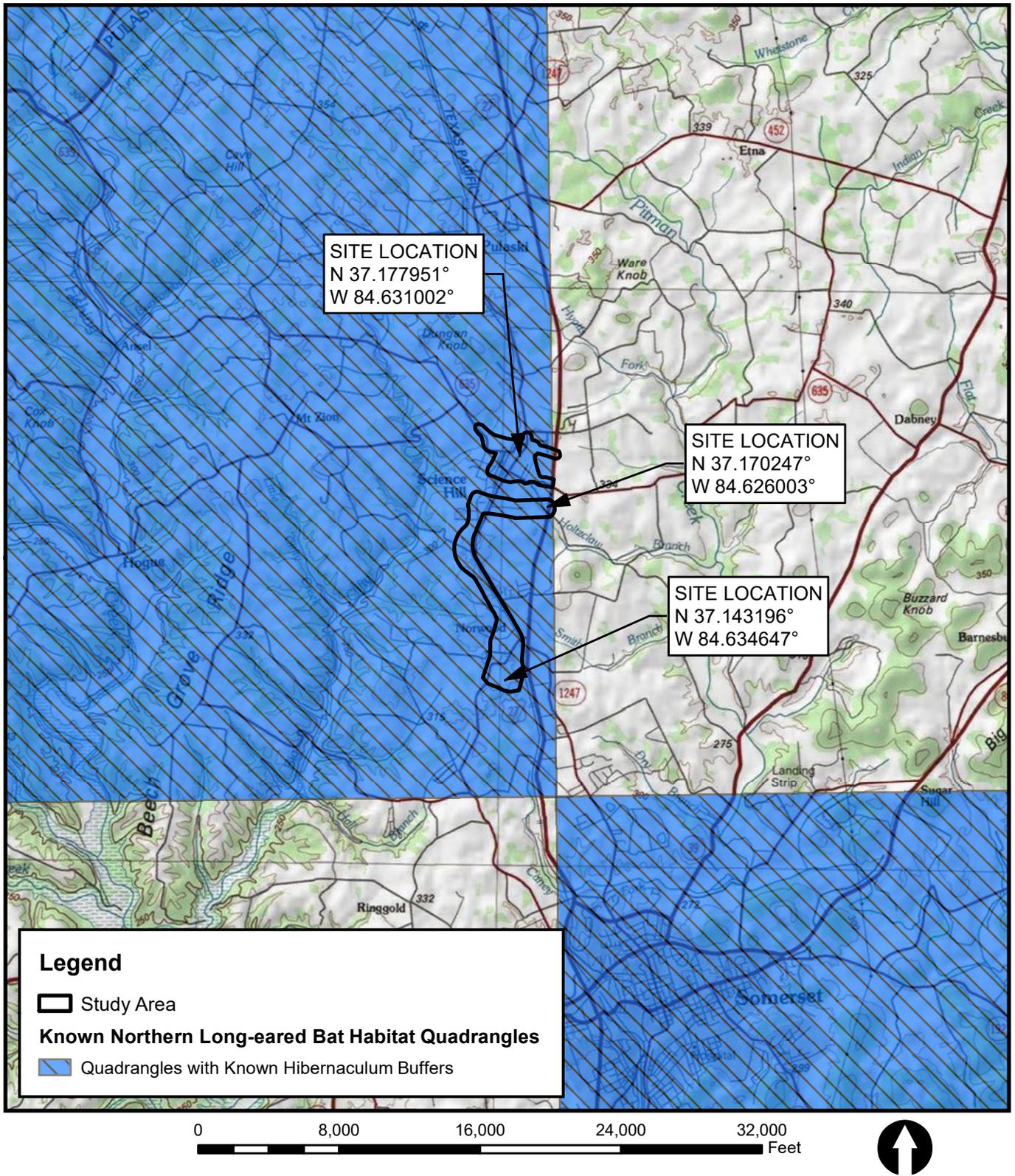


KNOWN INDIANA BAT  
HABITAT MAP

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FIGURE 3

Source: USA Topo Maps, (2013) National Geographic Society, USGS 7.5-minute Topographic Map - Bobtown, Delmer, Science Hill, and Somerset, Kentucky Quadrangles; USFWS Kentucky Field Office - Northern Long-eared Bat Habitat (2016).



P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Known Northern Quad Map.mxd, 06-8-2018, ebowman

**Legend**

-  Study Area
- Known Northern Long-eared Bat Habitat Quadrangles**
-  Quadrangles with Known Hibernaculum Buffers

SCIENCE HILL PLANNING STUDY  
PULASKI COUNTY, KENTUCKY  
KYTC ITEM NO.: 8-9010.00



KNOWN NORTHERN  
LONG-EARED BAT  
QUADRANGLE MAP

REVISED DATE: 06-06-18 | DRAWN BY: BJD

FIGURE 4

**APPENDIX**  
**RESOURCE AGENCY CORRESPONDENCE**



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Kentucky Ecological Services Field Office  
J C Watts Federal Building, Room 265  
330 West Broadway  
Frankfort, KY 40601-8670  
Phone: (502) 695-0468 Fax: (502) 695-1024  
<http://www.fws.gov/frankfort/>

In Reply Refer To:

May 16, 2018

Consultation Code: 04EK1000-2018-SLI-0657

Event Code: 04EK1000-2018-E-02270

Project Name: Science Hill Planning Study

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

Your concern for the protection of endangered and threatened species is greatly appreciated. The purpose of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. The species list attached to this letter fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the ESA to provide information as to whether any proposed or listed species may be present in the area of a proposed action. This is not a concurrence letter; additional consultation with the Service may be required.

### **The Information in Your Species List:**

The enclosed species list identifies federal trust species and critical habitat that may occur within the boundary that you entered into IPaC. For your species list to most accurately represent the species that may potentially be affected by the proposed project, the boundary that you input into IPaC should represent the entire “action area” of the proposed project by considering all the potential “effects of the action,” including potential direct, indirect, and cumulative effects, to federally-listed species or their critical habitat as defined in 50 CFR 402.02. This includes effects of any “interrelated actions” that are part of a larger action and depend on the larger action for their justification and “interdependent actions” that have no independent utility apart from the action under consideration (e.g.; utilities, access roads, etc.) and future actions that are reasonably certain to occur as a result of the proposed project (e.g.; development in response to a new road). If your project is likely to have significant indirect effects that extend well beyond the project footprint (e.g., long-term impacts to water quality), we highly recommend that you

coordinate with the Service early to appropriately define your action area and ensure that you are evaluating all the species that could potentially be affected.

We must advise you that our database is a compilation of collection records made available by various individuals and resource agencies available to the Service and may not be all-inclusive. This information is seldom based on comprehensive surveys of all potential habitats and, thus, does not necessarily provide conclusive evidence that species are present or absent at a specific locality. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please note that “critical habitat” refers to specific areas identified as essential for the conservation of a species that have been designated by regulation. Critical habitat usually does not include all the habitat that the species is known to occupy or all the habitat that may be important to the species. Thus, even if your project area does not include critical habitat, the species on the list may still be present.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and associated information. To re-access your project in IPaC, go to the IPaC web site (<https://ecos.fws.gov/ipac/>), select “Need an updated species list?”, and enter the consultation code on this letter.

### **ESA Obligations for Federal Projects:**

Under sections 7(a)(1) and 7(a)(2) of the ESA and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

If a Federal project (a project authorized, funded, or carried out by a federal agency) may affect federally-listed species or critical habitat, the Federal agency is required to consult with the Service under section 7 of the ESA, pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). Recommended contents of a Biological Assessment are described at 50 CFR 402.12. For projects other than major construction activities, the Service suggests that a biological evaluation

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similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat.

### **ESA Obligations for Non-federal Projects:**

Proposed projects that do not have a federal nexus (non-federal projects) are not subject to the obligation to consult under section 7 of the ESA. However, section 9 of the ESA prohibits certain activities that directly or indirectly affect federally-listed species. These prohibitions apply to all individuals subject to the jurisdiction of the United States. Non-federal project proponents can request technical assistance from the Service regarding recommendations on how to avoid and/or minimize impacts to listed species. The project proponent can choose to implement avoidance, minimization, and mitigation measures in a proposed project design to avoid ESA violations.

### **Additional Species-specific Information:**

In addition to the species list, IPaC also provides general species-specific technical assistance that may be helpful when designing a project and evaluating potential impacts to species. To access this information from the IPaC site (<https://ecos.fws.gov/ipac/>), click on the text “My Projects” on the left of the black bar at the top of the screen (you will need to be logged into your account to do this). Click on the project name in the list of projects; then, click on the “Project Home” button that appears. Next, click on the “See Resources” button under the “Resources” heading. A list of species will appear on the screen. Directly above this list, on the right side, is a link that will take you to pdfs of the “Species Guidelines” available for species in your list. Alternatively, these documents and a link to the “ECOS species profile” can be accessed by clicking on an individual species in the online resource list.

### **Next Steps:**

Requests for additional technical assistance or consultation from the Kentucky Field Office should be submitted following guidance on the following page <http://www.fws.gov/frankfort/PreDevelopment.html> and the document retrieved by clicking the “outline” link at that page. When submitting correspondence about your project to our office, please include the Consultation Tracking Number in the header of this letter. (There is no need to provide us with a copy of the IPaC-generated letter and species list.)

Attachment(s):

- Official Species List
-

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Kentucky Ecological Services Field Office**

J C Watts Federal Building, Room 265

330 West Broadway

Frankfort, KY 40601-8670

(502) 695-0468

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## Project Summary

Consultation Code: 04EK1000-2018-SLI-0657

Event Code: 04EK1000-2018-E-02270

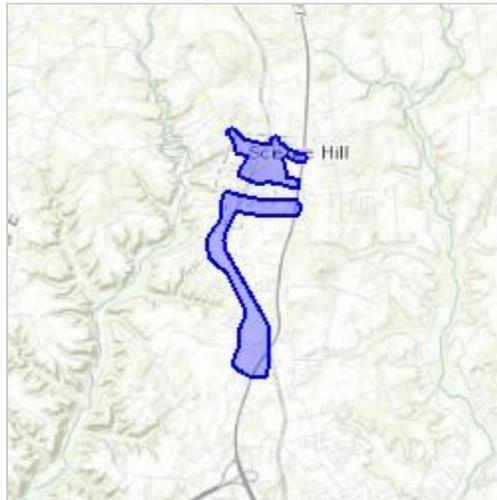
Project Name: Science Hill Planning Study

Project Type: TRANSPORTATION

Project Description: Planning Study

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/37.1782674869998N84.6321108348323W>



Counties: Pulaski, KY

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## Endangered Species Act Species

There is a total of 13 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.
-

## Mammals

NAME	STATUS
<p><b>Gray Bat <i>Myotis grisescens</i></b>            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6329">https://ecos.fws.gov/ecp/species/6329</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/21/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/21/office/42431.pdf</a></p>	Endangered
<p><b>Indiana Bat <i>Myotis sodalis</i></b>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            This species only needs to be considered under the following conditions:           <ul style="list-style-type: none"> <li>▪ All activities in this location should consider possible effects to this species. The project area includes "potential" habitat.</li> </ul>           Species profile: <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/1/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/1/office/42431.pdf</a>            Species survey guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/survey/population/1/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/survey/population/1/office/42431.pdf</a></p>	Endangered
<p><b>Northern Long-eared Bat <i>Myotis septentrionalis</i></b>            No critical habitat has been designated for this species.            This species only needs to be considered under the following conditions:           <ul style="list-style-type: none"> <li>▪ The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.</li> </ul>           Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a></p>	Threatened
<p><b>Virginia Big-eared Bat <i>Corynorhinus (=Plecotus) townsendii virginianus</i></b>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/8369">https://ecos.fws.gov/ecp/species/8369</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/27/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/27/office/42431.pdf</a></p>	Endangered

## Clams

NAME	STATUS
<p>Cumberland Bean (pearlymussel) <i>Villosa trabalis</i></p> <p>Population: Wherever found; Except where listed as Experimental Populations            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6061">https://ecos.fws.gov/ecp/species/6061</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/317/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/317/office/42431.pdf</a></p>	Endangered
<p>Cumberland Elktoe <i>Alasmidonta atropurpurea</i></p> <p>There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1248">https://ecos.fws.gov/ecp/species/1248</a></p>	Endangered
<p>Cumberlandian Combshell <i>Epioblasma brevidens</i></p> <p>Population: Wherever found; Except where listed as Experimental Populations            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3119">https://ecos.fws.gov/ecp/species/3119</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/353/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/353/office/42431.pdf</a></p>	Endangered
<p>Fluted Kidneyshell <i>Ptychobranthus subtentum</i></p> <p>There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1397">https://ecos.fws.gov/ecp/species/1397</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/1559/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/1559/office/42431.pdf</a></p>	Endangered
<p>Littlewing Pearlymussel <i>Pegias fabula</i></p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/2572">https://ecos.fws.gov/ecp/species/2572</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/335/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/335/office/42431.pdf</a></p>	Endangered
<p>Snuffbox Mussel <i>Epioblasma triquetra</i></p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/4135">https://ecos.fws.gov/ecp/species/4135</a></p>	Endangered
<p>Tan Riffleshell <i>Epioblasma florentina walkeri</i> (= <i>E. walkeri</i>)</p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1247">https://ecos.fws.gov/ecp/species/1247</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/346/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/346/office/42431.pdf</a></p>	Endangered

## Flowering Plants

NAME	STATUS
Virginia Spiraea <i>Spiraea virginiana</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1728">https://ecos.fws.gov/ecp/species/1728</a>	Threatened
White Fringeless Orchid <i>Platanthera integrilabia</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1889">https://ecos.fws.gov/ecp/species/1889</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## KENTUCKY STATE NATURE PRESERVES COMMISSION

**Matthew G. Bevin**  
Governor

300 Sower Blvd  
Frankfort, Kentucky 40601-1132  
Phone 502-573-2886  
Fax 502-573-2355  
<http://naturepreserves.ky.gov>

**Charles G. Snavelly**  
Secretary

**Zeb Weese**  
Executive Director

May 16, 2018

Benjamin Deetsch  
Redwing Ecological Services, Inc.  
1339 S. Fourth St.  
Louisville, KY 40203

Project: Science Hill Planning Study  
Project ID: 18-0021  
Project Type: Transportation  
Site Acreage: 591.10  
Site Lat/Lon: 37.148076 / -84.634318  
County: Pulaski  
USGS Quad: Bobtown; Science Hill  
Watershed HUC12: Big Clifty Creek-Fishing Creek; Upper Pitman Creek  
Physiographic Region: Eastern Pennyroyal

Dear Benjamin Deetsch,

This letter is in response to your data request for the project referenced above. 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 within your general project area. Your project does pose a concern at this time, therefore please see the attached reports for more detailed information.

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 Heritage Branch (300 Sower Blvd - 4th Floor, Frankfort, KY, 40601. Phone: (502) 782-7828).

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



Project ID: 18-0021  
May 16, 2018  
Page 2

surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

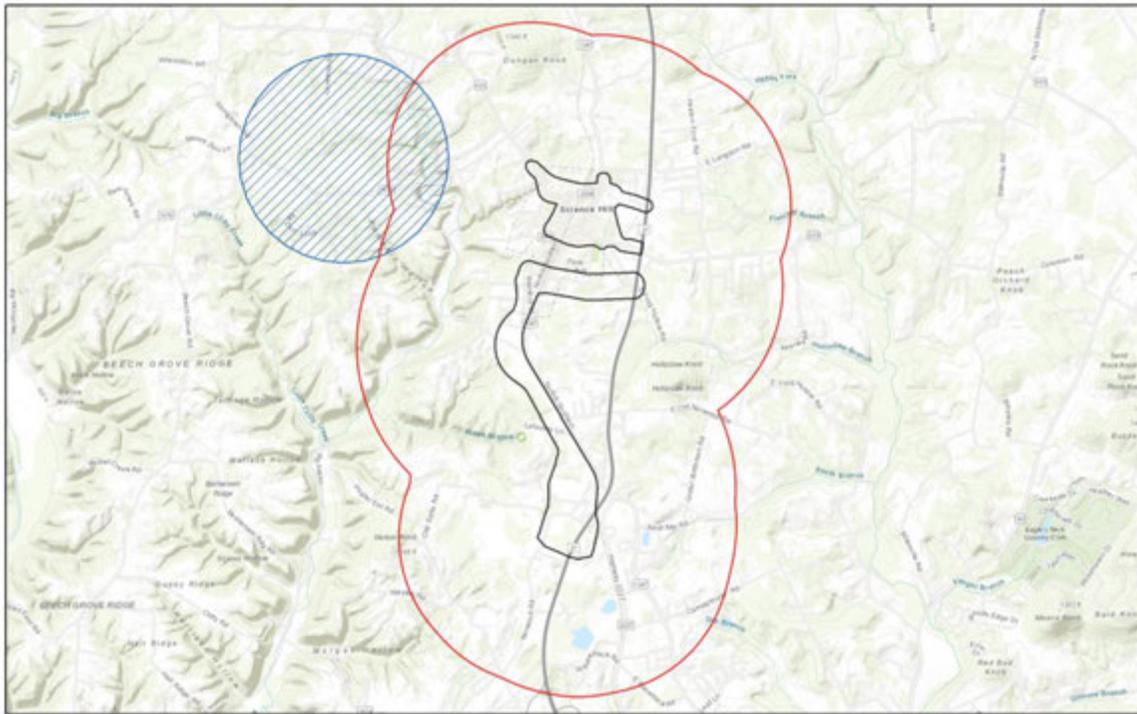
If you have any questions, or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Ian Horn  
Geoprocessing Specialist

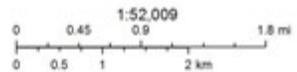


# Science Hill Planning Study



May 16, 2018

-  Project Boundary
-  Buffered Project Boundary
-  Element Occurrences
-  Conservation Sites



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, MRCAN, GeoBase, IGN, Kataster NL, Ordnance Survey, Esri



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

**Matthew G. Bevin**  
Governor

**Regina Stivers**  
Acting Secretary

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

**Frank Jemley, III**  
Acting Commissioner

29 May 2018

Redwing Ecological Consultants, Inc.  
Attn: Benjamin J. Deetsch  
1139 South Fourth Street  
Louisville, KY 40203

RE: Request for Information  
Science Hill Planning Study Project  
Pulaski County, Kentucky  
Redwing Project No.: 18-045  
KYTC Item No.: 8-9010.00

Dear Mr. Deetsch:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for updated information pertaining to the subject project. The Kentucky Fish and Wildlife Information System indicates that the federally-listed Indiana bat (*Myotis sodalis*), Grey bat (*Myotis grisescens*), and Northern Long-eared bat (*Myotis septentrionalis*) are known to occur within 10 miles of the project site. The state-listed Barn Owl (*Tyto alba*), Bald Eagle (*Haliaeetus leucocephalus*), Bobolink (*Dolichonyx oryzivorus*), Dark-eyed Junco (*Junco hyemalis*), and Snowy Egret (*Egretta thula*) are known to occur within one mile of the project site. No caves or other unique natural areas are known to occur within one mile of the project site. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

KDFWR recommends coordination with the U.S. Fish and Wildlife Service Kentucky Field Office (502-695-0468) as it pertains to tree cutting and possible impacts to bats. KDFWR also recommends that you contact the appropriate US Army Corps of Engineers office and the Kentucky Division of Water prior to any work within the waterways or wetland habitats of Kentucky. Additionally, KDFWR recommends the following for the portions of the project that impact streams:

- Channel changes located within the project area should incorporate natural stream channel design.
- If culverts are used, the culvert should be designed to allow the passage of aquatic organisms.
- Culverts should be designed so that degradation upstream and downstream of the culvert does not occur.
- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt into area streams.



- Replanting of disturbed areas after construction, including stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. We recommend a 100 foot forested buffer along each stream bank.
- Return all disturbed instream habitat to a stable condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging any streams within the project area.

To minimize indirect impacts to the aquatic environment, the KDFWR recommends that erosion control measures be developed and implemented prior to construction to reduce siltation into waterways 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.

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 4471.

Sincerely,



Dan Stoelb  
Environmental Scientist

Cc: Environmental Section File

## Neil Guthals

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**From:** Howard <hkalnitz@fuse.net>  
**Sent:** Saturday, May 19, 2018 2:04 PM  
**To:** Benjamin Deetsch  
**Subject:** FW: KSS Data Request by Benjamin Deetsch (deetsch.5.17.18)

Hi Ben  
My fault, I forgot your name is not automatically on the reply list....  
Howard

---

**From:** Howard <hkalnitz@fuse.net>  
**Sent:** Thursday, May 17, 2018 9:15 PM  
**To:** 'Kentucky Speleological Survey' <christopherdmorris@gmail.com>  
**Cc:** sarahmariecaver@gmail.com; caverjoshbrewer23@gmail.com; vanders33@yahoo.com; jcassidy17@yahoo.com  
**Subject:** RE: KSS Data Request by Benjamin Deetsch (deetsch.5.17.18)

Hi Ben  
We find three caves in your search area of a three mile buffer around your study corridor:

	<b>Kentucky Transportation Cabinet Federal Highway Administration</b>  <b>NO EFFECT FINDING</b>		
<b>KYTC Item No:</b>	8-9010.00	<b>Route:</b>	Science Hill Planning Study Project
<b>Quadrangle(s):</b>	Science Hill; Bobtown	<b>County(ies):</b>	Pulaski
<b>Project Description:</b> (Type of improvement, areas to be impacted, crossroad improvements, easements, etc.)			
The proposed project involves an alternatives study of 11 preliminary alternatives for the reconstruction of the Kentucky Highway 635 to eliminate an at-grade railroad crossing and replace with a railroad separation crossing.			
<b>Listed Species:</b> (Attach copy of USFWS county list, KSNPC web site and KDFWR web site) (107) WFO, (111) VS, (401) CEM, (402) SCM, (403) FSM, (404) CCM, (405) OM, (406) TRM, (407) EPM, (412) RPM, (413) LWPM, (416) CM, (417) RPTM, (419) FKM, (421) CBPM, (427) SNB, (428) DRDR, (429) CRPM, (430) RFM, (505) BSD, (802) ILT, (901) VBB, (902) GB, (903) IB, (904) NLEB			
<b>Methodologies:</b> (Methods of assessment, who, what, when, resources, etc.)			
Field assessment was performed by Redwing during May 17 and 18, 2018. The study area consists of young woods habitat, mature woods habitat, and agricultural/pasture areas along with residential and commercial developments.			
<b>Results:</b> (Compare habitat used by listed species with available habitat)			
No suitable streams for mussel species or BSD. No habitat for WFO or VS. No habitat for ILT. No caves or suitable roosting habitat for GB and VBB or winter hibernaculum for IB and NLEB. Perennial streams provide foraging habitat for GB. Mature woods habitat and scattered mature trees represent potential summer habitat for the IB and NLEB. The project is not located within known habitat for IB. The project is located within a topographic quadrangle with known hibernaculum for NLEB.			
<b>Determinations:</b> Potential summer habitat for the IB. Known Hibernaculum Quadrangle for the NLEB. No habitat and, thus, no effect for other federally-listed species in Pulaski County.			

The project has been assessed in accordance with the provisions of Section 7 of the Endangered Species Act. As a designated representative of the FHWA, the KYTC has determined that the project will have No Effect on listed species or their critical habitat other than the IB and NLEB, and further Section 7(a)(2) consultation with the Service is not required with the exception of IB and NLEB.

\_\_\_\_\_ KYTC Signature

\_\_\_\_\_ Date

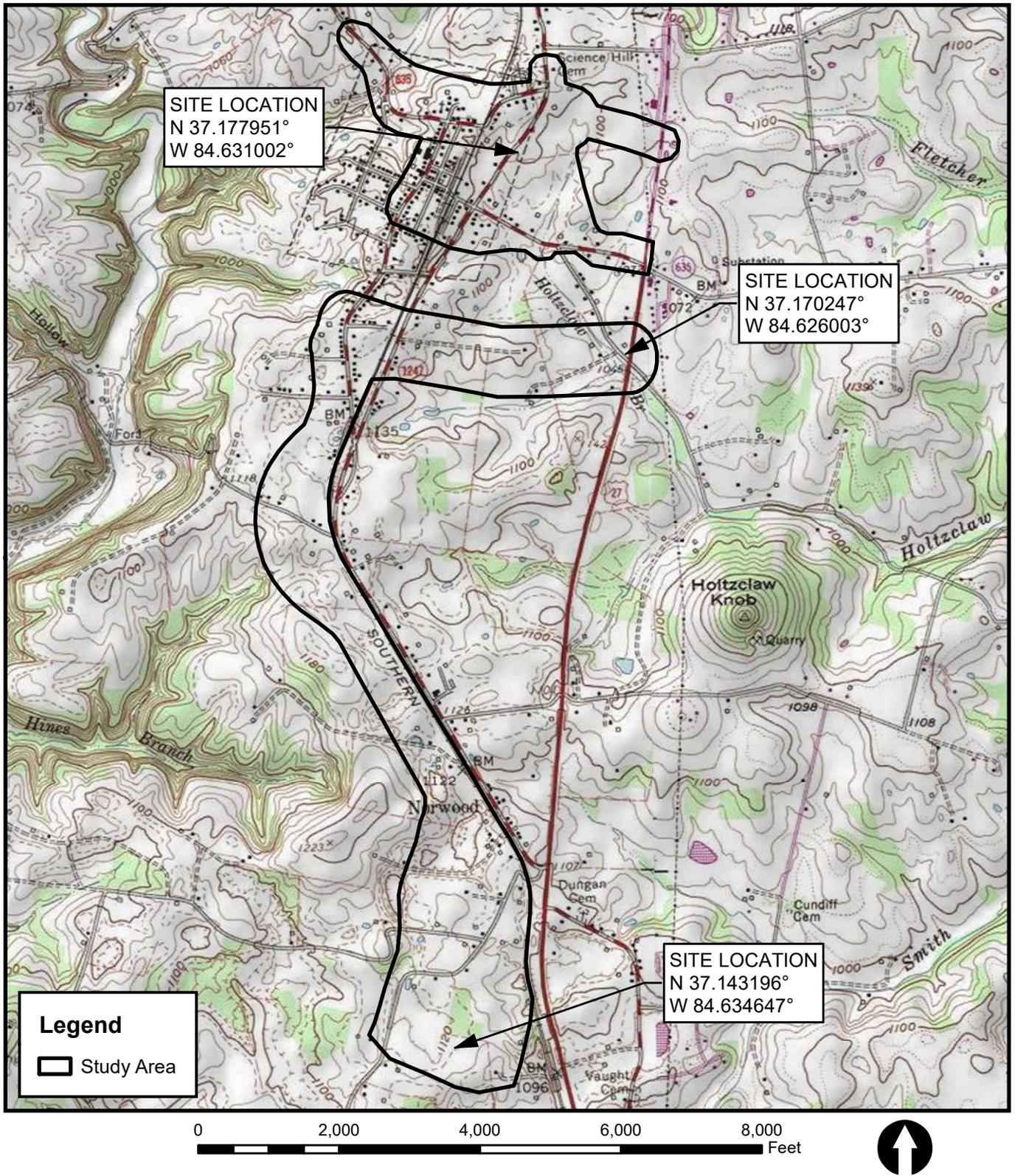
\_\_\_\_\_ Print Name

EATS updated

\_\_\_\_\_ Name Date

## FIGURES

Source: USGS 7.5-minute Topographic Map - Science Hill and Bobtown, Kentucky Quadrangles.



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SCIENCE HILL PLANNING STUDY  
PULASKI COUNTY, KENTUCKY  
KYTC ITEM NO.: 8-9010.00

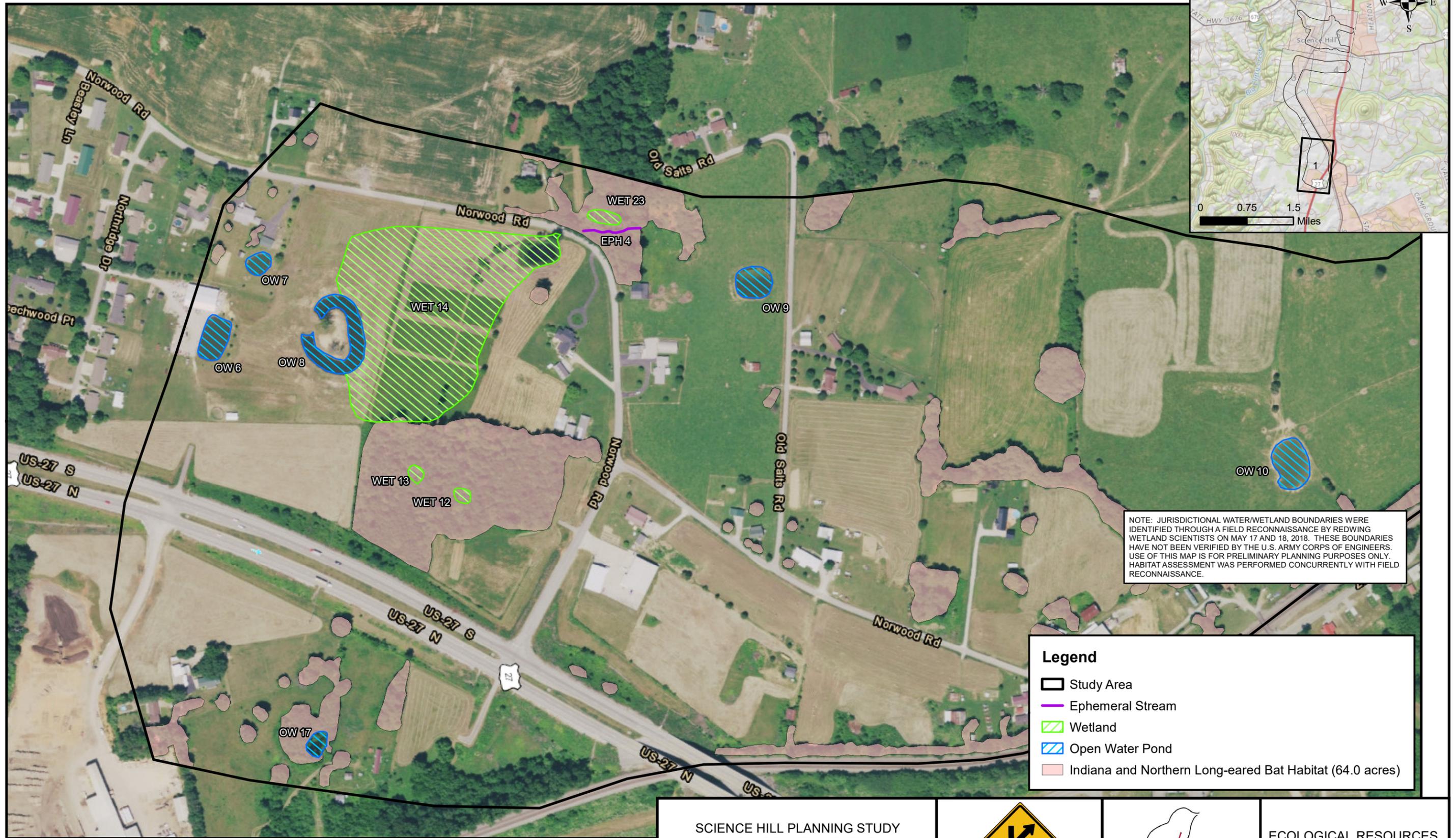


SITE LOCATION MAP

REVISED DATE: 05-15-18 | DRAWN BY: BJD

FIGURE 1

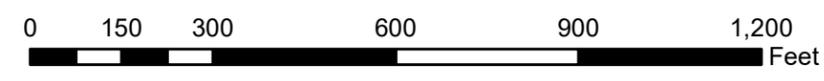
Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE IDENTIFIED THROUGH A FIELD RECONNAISSANCE BY REDWING WETLAND SCIENTISTS ON MAY 17 AND 18, 2018. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY. HABITAT ASSESSMENT WAS PERFORMED CONCURRENTLY WITH FIELD RECONNAISSANCE.

**Legend**

- Study Area
- Ephemeral Stream
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)



SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00  
 REVISED DATE: 06-08-18 | DRAWN BY: EDB/JMD/BJD



ECOLOGICAL RESOURCES MAP

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Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE IDENTIFIED THROUGH A FIELD RECONNAISSANCE BY REDWING WETLAND SCIENTISTS ON MAY 17 AND 18, 2018. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY. HABITAT ASSESSMENT WAS PERFORMED CONCURRENTLY WITH FIELD RECONNAISSANCE.

**Legend**

- Study Area
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)

0 150 300 600 900 1,200 Feet



SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00  
 REVISED DATE: 06-08-18 | DRAWN BY: EDB/JMD/BJD



ECOLOGICAL RESOURCES MAP  
 FIGURE 2  
 SHEET 2 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

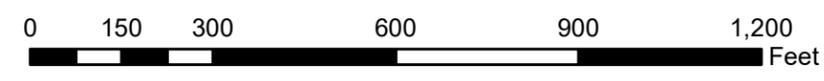
Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE IDENTIFIED THROUGH A FIELD RECONNAISSANCE BY REDWING WETLAND SCIENTISTS ON MAY 17 AND 18, 2018. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY. HABITAT ASSESSMENT WAS PERFORMED CONCURRENTLY WITH FIELD RECONNAISSANCE.

**Legend**

-  Study Area
-  Indiana and Northern Long-eared Bat Habitat (64.0 acres)



SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00

REVISED DATE: 06-08-18 | DRAWN BY: EDB/JMD/BJD

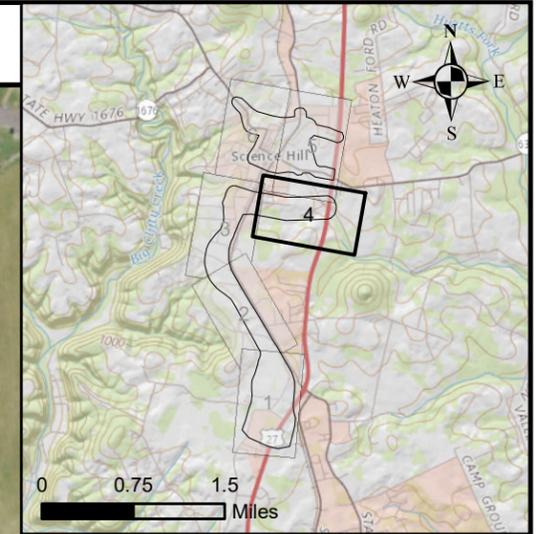


ECOLOGICAL RESOURCES  
 MAP

FIGURE 2  
 SHEET 3 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

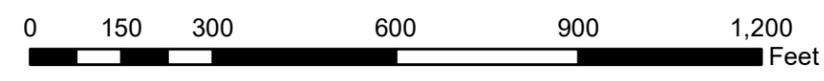
Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygissserver.ky.gov ArcGIS services (2016).



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**Legend**

- Study Area
- Perennial Stream (Gray Bat Foraging Habitat)
- Intermittent Stream
- Ephemeral Stream
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)



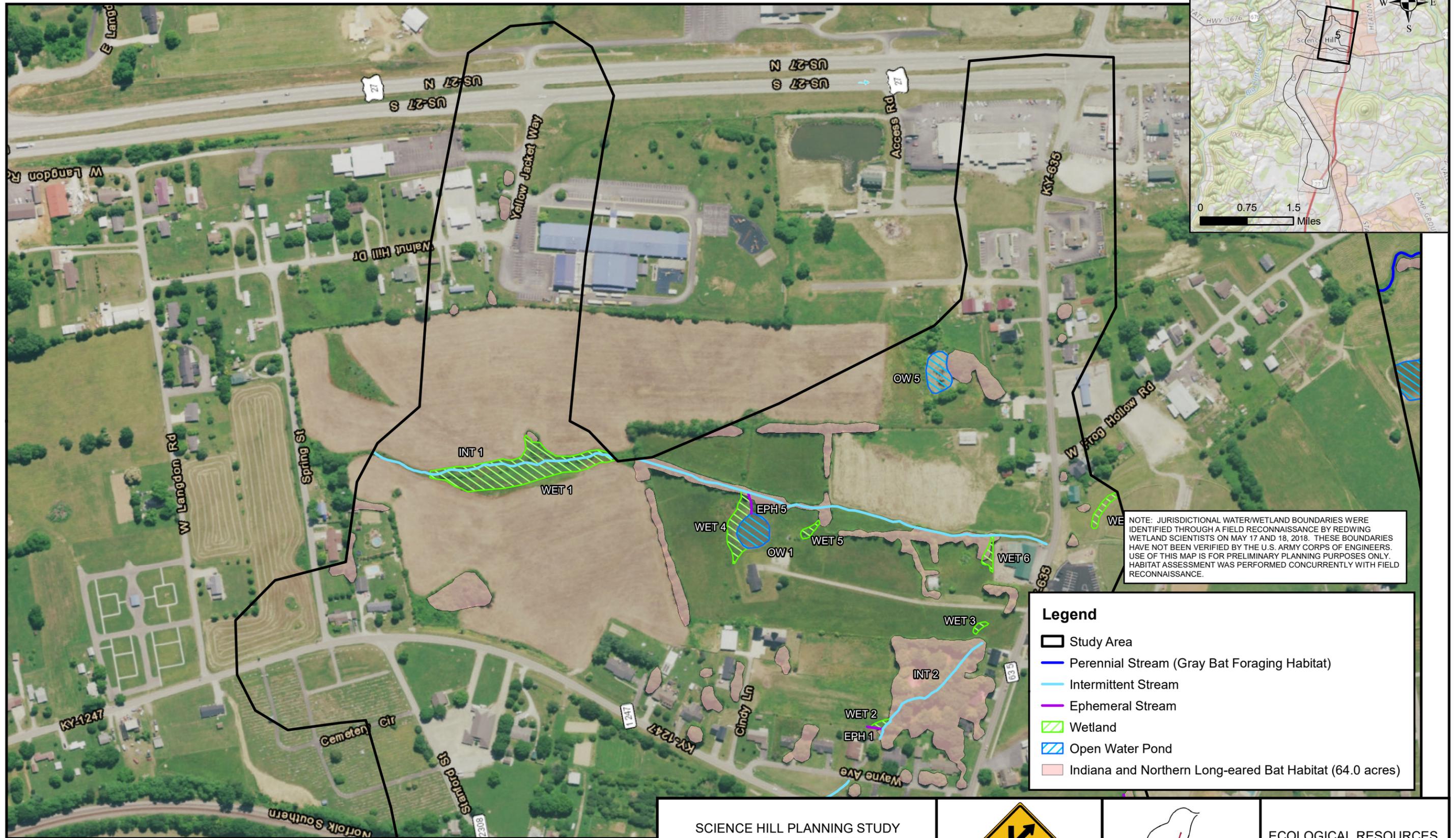
SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00  
 REVISED DATE: 06-08-18 | DRAWN BY: EDB/JMD/BJD



ECOLOGICAL RESOURCES MAP  
 FIGURE 2  
 SHEET 4 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



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**Legend**

- Study Area
- Perennial Stream (Gray Bat Foraging Habitat)
- Intermittent Stream
- Ephemeral Stream
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)

0 150 300 600 900 1,200 Feet



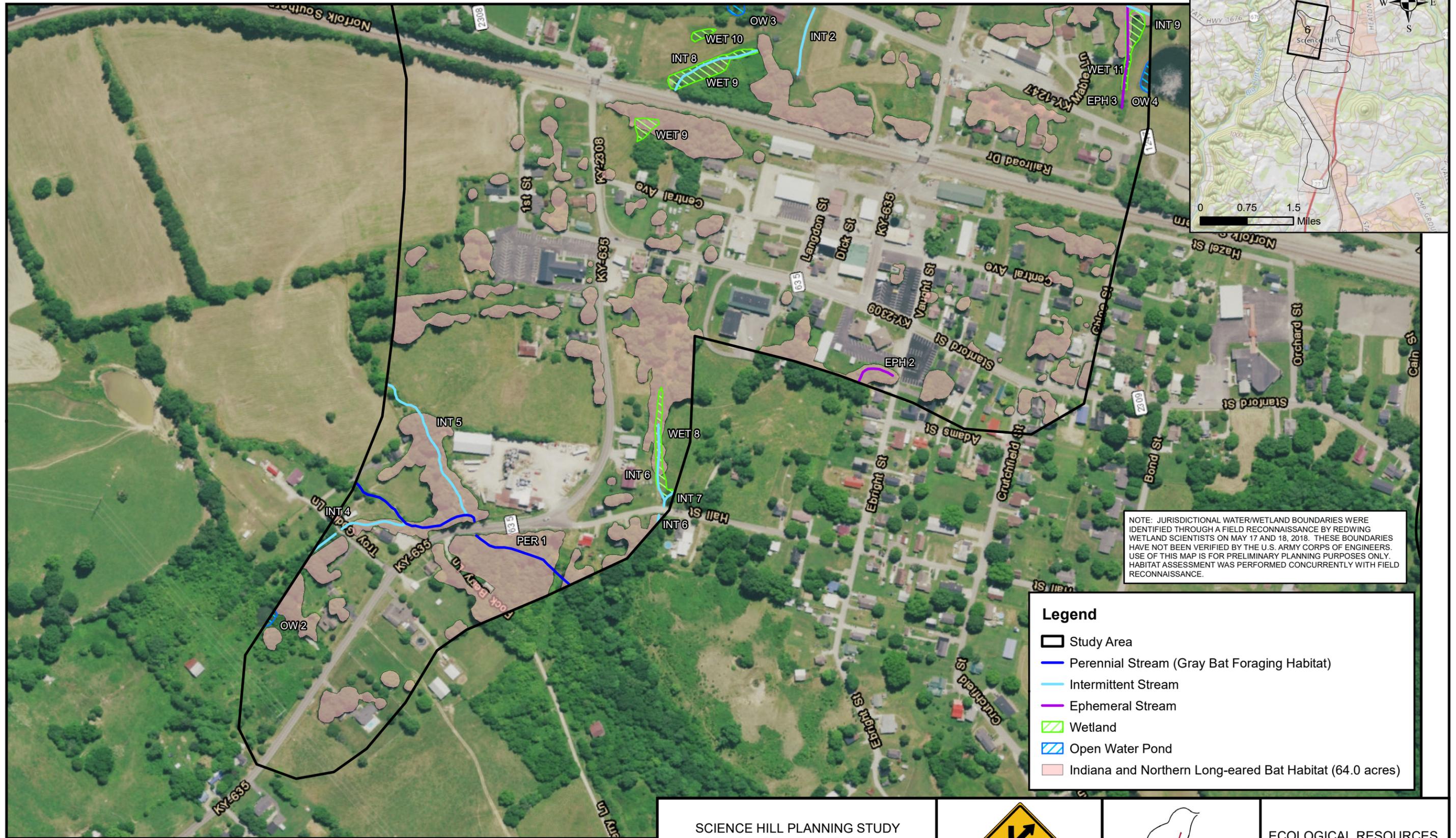
SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00  
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ECOLOGICAL RESOURCES MAP  
 FIGURE 2  
 SHEET 5 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2016).



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE IDENTIFIED THROUGH A FIELD RECONNAISSANCE BY REDWING WETLAND SCIENTISTS ON MAY 17 AND 18, 2018. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY. HABITAT ASSESSMENT WAS PERFORMED CONCURRENTLY WITH FIELD RECONNAISSANCE.

**Legend**

- Study Area
- Perennial Stream (Gray Bat Foraging Habitat)
- Intermittent Stream
- Ephemeral Stream
- Wetland
- Open Water Pond
- Indiana and Northern Long-eared Bat Habitat (64.0 acres)

0 150 300 600 900 1,200 Feet



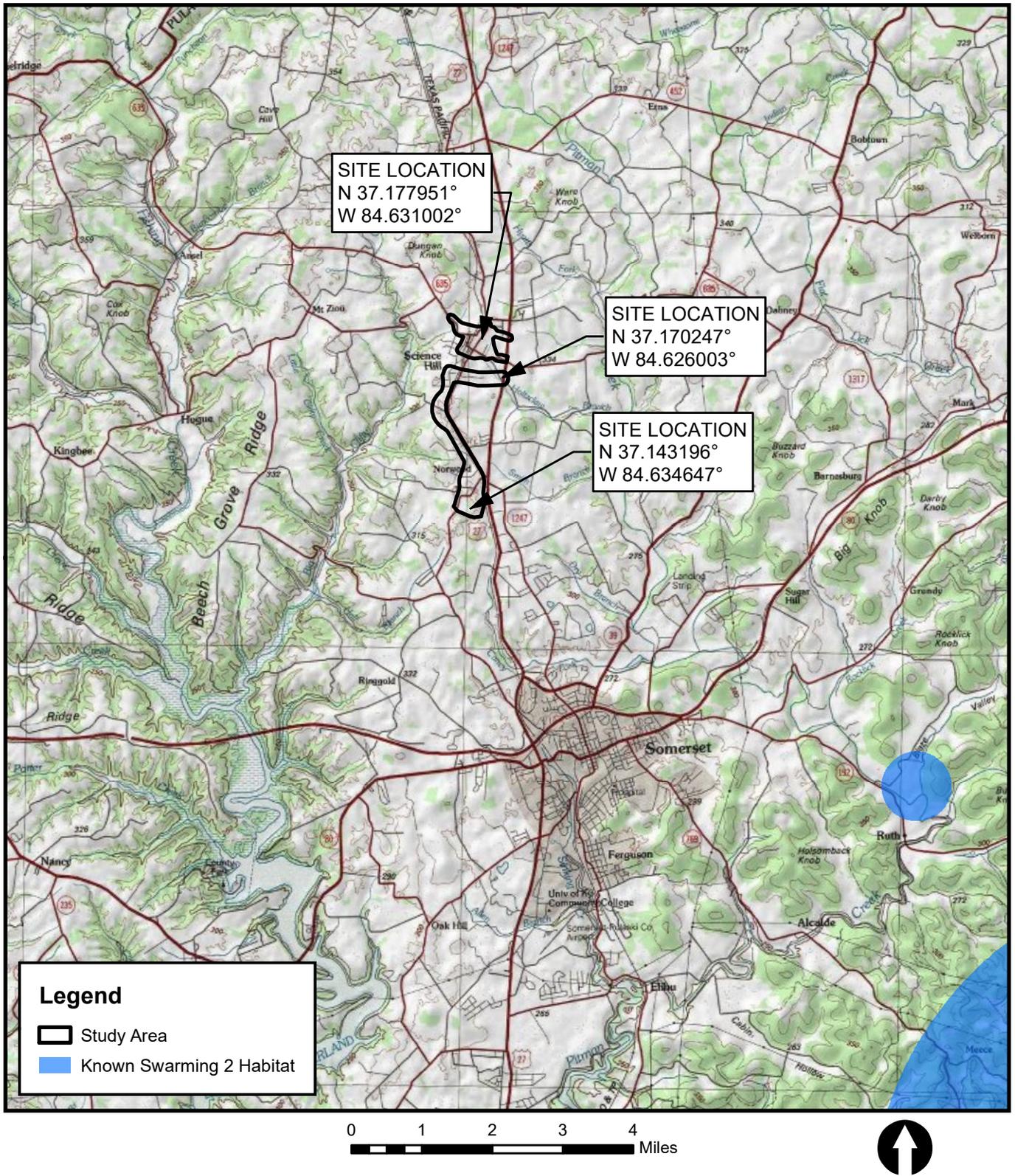
SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00  
 REVISED DATE: 06-08-18 | DRAWN BY: EDB/JMD/BJD



ECOLOGICAL RESOURCES MAP  
 FIGURE 2  
 SHEET 6 of 6

P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Ecological Resources Map.mxd, 06-8-2018, ebowman

Source: USA Topo Maps, (2013) National Geographic Society, USGS 7.5-minute Topographic Map - Bobtown, Delmer, Science Hill, and Somerset, Kentucky Quadrangles; USFWS Kentucky Field Office - Indiana Bat Habitat (2018).



P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Known Indiana Bat Map.mxd, 06-8-2018, ebowman

SCIENCE HILL PLANNING STUDY  
PULASKI COUNTY, KENTUCKY  
KYTC ITEM NO.: 8-9010.00

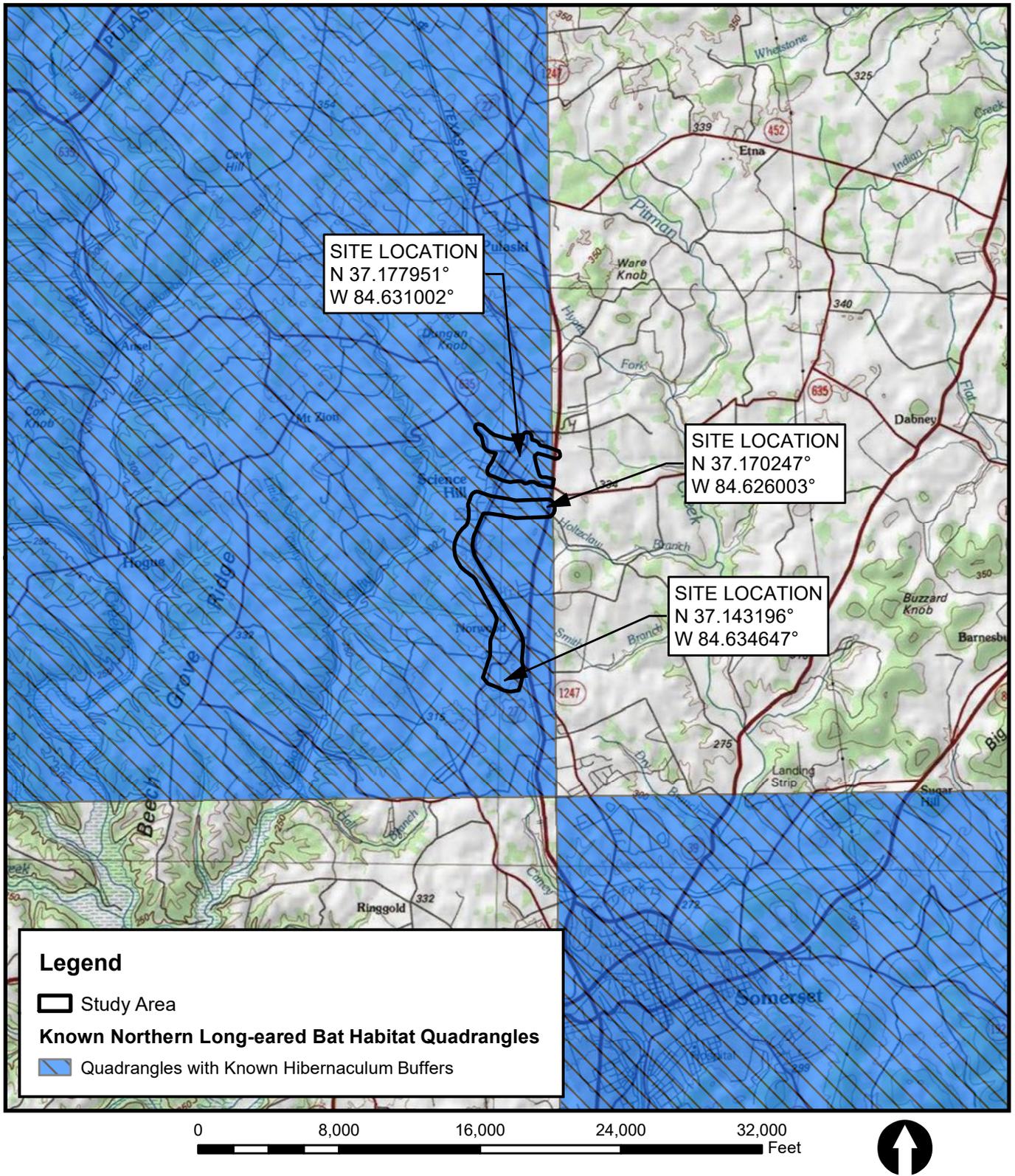


KNOWN INDIANA BAT  
HABITAT MAP

REVISED DATE: 06-06-18 | DRAWN BY: BJD

FIGURE 3

Source: USA Topo Maps, (2013) National Geographic Society, USGS 7.5-minute Topographic Map - Bobtown, Delmer, Science Hill, and Somerset, Kentucky Quadrangles; USFWS Kentucky Field Office - Northern Long-eared Bat Habitat (2016).



P:\2018 Projects\18-045-Science Hill Planning Study\Figures\Known Northern Quad Map.mxd, 06-8-2018, ebowman

**Legend**

-  Study Area
- Known Northern Long-eared Bat Habitat Quadrangles**
-  Quadrangles with Known Hibernaculum Buffers

SCIENCE HILL PLANNING STUDY  
 PULASKI COUNTY, KENTUCKY  
 KYTC ITEM NO.: 8-9010.00



KNOWN NORTHERN  
 LONG-EARED BAT  
 QUADRANGLE MAP

REVISED DATE: 06-06-18 | DRAWN BY: BJD

FIGURE 4

# PHOTOGRAPHS



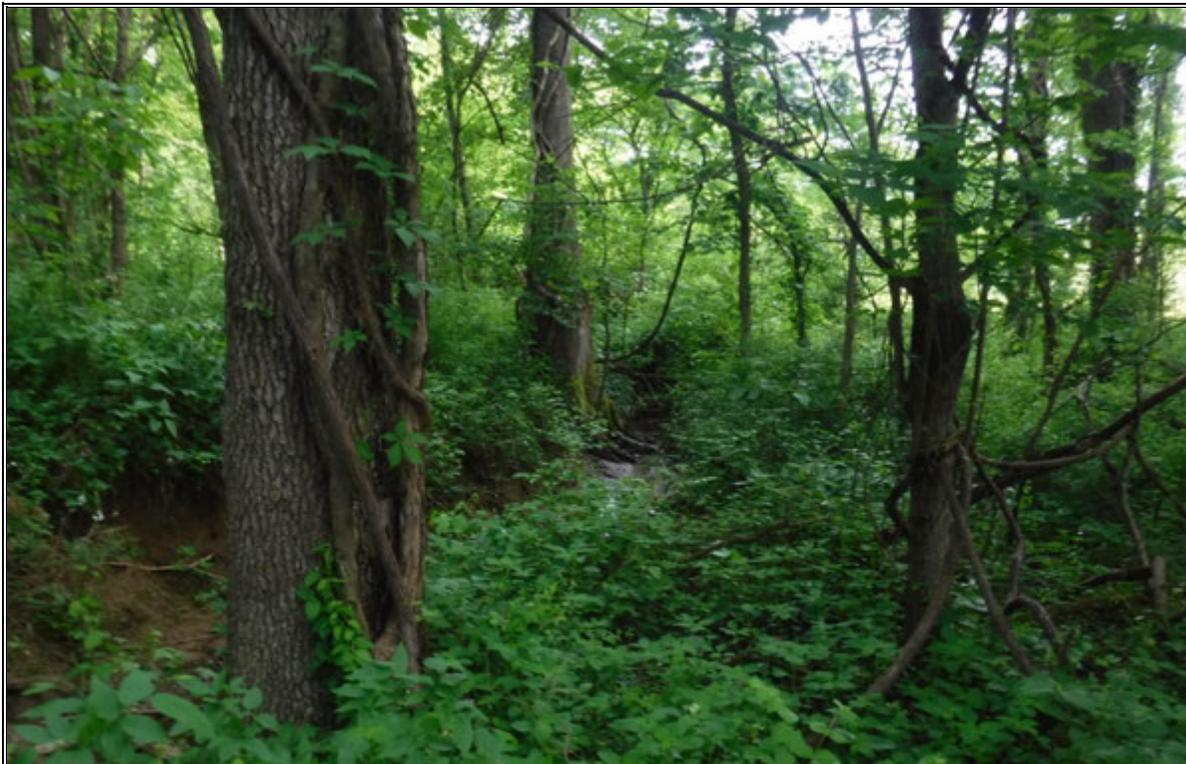
Photograph 1: View facing west of crop field habitat found in the north study area. May 17, 2018.



Photograph 2: View of maintained lawn habitat in the northern portion of the southern study area. This habitat is common in both study areas. May 18, 2018.



Photograph 3: View of young woods habitat foreground and mature woods habitat in the background. This photograph was taken in the north study area facing southwest. May 17, 2018.



Photograph 4: View of mature woods habitat in the south study area. This habitat is found throughout both study areas and provides suitable summer habitat for Indiana and northern long-eared bats (*Myotis sodalis* and *Myotis septentrionalis*). May 18, 2018.



Photograph 5: View facing upstream of Perennial 1 located in the western portion of the north study area. Not suitable habitat for federally-protected fish or mussel species. Suitable gray bat foraging and commuting habitat. May 17, 2018.



Photograph 6. View of a typical intermittent stream (Intermittent 1), located in the eastern portion of the north study area. May 17, 2017.



Photograph 7: View facing south of a typical open water pond (Open Water Pond 9), located in the southwest portion of the south study area. May 18, 2018.



Photograph 8. View of a typical emergent wetland (Wetland 11) located in the southern portion of the north study area. May 17, 2018.

## RESOURCE AGENCY CORRESPONDENCE



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Kentucky Ecological Services Field Office  
J C Watts Federal Building, Room 265  
330 West Broadway  
Frankfort, KY 40601-8670  
Phone: (502) 695-0468 Fax: (502) 695-1024  
<http://www.fws.gov/frankfort/>

In Reply Refer To:

May 16, 2018

Consultation Code: 04EK1000-2018-SLI-0657

Event Code: 04EK1000-2018-E-02270

Project Name: Science Hill Planning Study

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

Your concern for the protection of endangered and threatened species is greatly appreciated. The purpose of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. The species list attached to this letter fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the ESA to provide information as to whether any proposed or listed species may be present in the area of a proposed action. This is not a concurrence letter; additional consultation with the Service may be required.

### **The Information in Your Species List:**

The enclosed species list identifies federal trust species and critical habitat that may occur within the boundary that you entered into IPaC. For your species list to most accurately represent the species that may potentially be affected by the proposed project, the boundary that you input into IPaC should represent the entire “action area” of the proposed project by considering all the potential “effects of the action,” including potential direct, indirect, and cumulative effects, to federally-listed species or their critical habitat as defined in 50 CFR 402.02. This includes effects of any “interrelated actions” that are part of a larger action and depend on the larger action for their justification and “interdependent actions” that have no independent utility apart from the action under consideration (e.g.; utilities, access roads, etc.) and future actions that are reasonably certain to occur as a result of the proposed project (e.g.; development in response to a new road). If your project is likely to have significant indirect effects that extend well beyond the project footprint (e.g., long-term impacts to water quality), we highly recommend that you

coordinate with the Service early to appropriately define your action area and ensure that you are evaluating all the species that could potentially be affected.

We must advise you that our database is a compilation of collection records made available by various individuals and resource agencies available to the Service and may not be all-inclusive. This information is seldom based on comprehensive surveys of all potential habitats and, thus, does not necessarily provide conclusive evidence that species are present or absent at a specific locality. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please note that “critical habitat” refers to specific areas identified as essential for the conservation of a species that have been designated by regulation. Critical habitat usually does not include all the habitat that the species is known to occupy or all the habitat that may be important to the species. Thus, even if your project area does not include critical habitat, the species on the list may still be present.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and associated information. To re-access your project in IPaC, go to the IPaC web site (<https://ecos.fws.gov/ipac/>), select “Need an updated species list?”, and enter the consultation code on this letter.

### **ESA Obligations for Federal Projects:**

Under sections 7(a)(1) and 7(a)(2) of the ESA and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

If a Federal project (a project authorized, funded, or carried out by a federal agency) may affect federally-listed species or critical habitat, the Federal agency is required to consult with the Service under section 7 of the ESA, pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). Recommended contents of a Biological Assessment are described at 50 CFR 402.12. For projects other than major construction activities, the Service suggests that a biological evaluation

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similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat.

### **ESA Obligations for Non-federal Projects:**

Proposed projects that do not have a federal nexus (non-federal projects) are not subject to the obligation to consult under section 7 of the ESA. However, section 9 of the ESA prohibits certain activities that directly or indirectly affect federally-listed species. These prohibitions apply to all individuals subject to the jurisdiction of the United States. Non-federal project proponents can request technical assistance from the Service regarding recommendations on how to avoid and/or minimize impacts to listed species. The project proponent can choose to implement avoidance, minimization, and mitigation measures in a proposed project design to avoid ESA violations.

### **Additional Species-specific Information:**

In addition to the species list, IPaC also provides general species-specific technical assistance that may be helpful when designing a project and evaluating potential impacts to species. To access this information from the IPaC site (<https://ecos.fws.gov/ipac/>), click on the text “My Projects” on the left of the black bar at the top of the screen (you will need to be logged into your account to do this). Click on the project name in the list of projects; then, click on the “Project Home” button that appears. Next, click on the “See Resources” button under the “Resources” heading. A list of species will appear on the screen. Directly above this list, on the right side, is a link that will take you to pdfs of the “Species Guidelines” available for species in your list. Alternatively, these documents and a link to the “ECOS species profile” can be accessed by clicking on an individual species in the online resource list.

### **Next Steps:**

Requests for additional technical assistance or consultation from the Kentucky Field Office should be submitted following guidance on the following page <http://www.fws.gov/frankfort/PreDevelopment.html> and the document retrieved by clicking the “outline” link at that page. When submitting correspondence about your project to our office, please include the Consultation Tracking Number in the header of this letter. (There is no need to provide us with a copy of the IPaC-generated letter and species list.)

Attachment(s):

- Official Species List
-

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Kentucky Ecological Services Field Office**

J C Watts Federal Building, Room 265

330 West Broadway

Frankfort, KY 40601-8670

(502) 695-0468

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## Project Summary

Consultation Code: 04EK1000-2018-SLI-0657

Event Code: 04EK1000-2018-E-02270

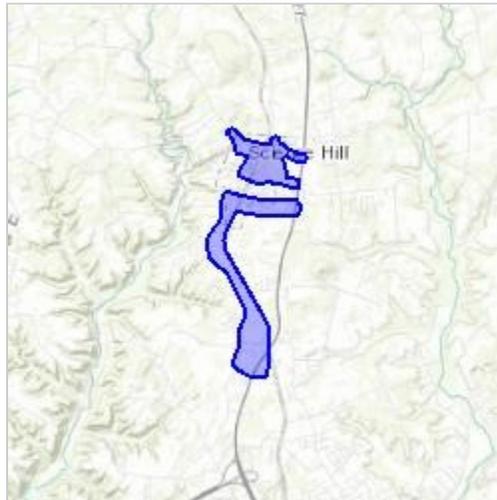
Project Name: Science Hill Planning Study

Project Type: TRANSPORTATION

Project Description: Planning Study

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/37.1782674869998N84.6321108348323W>



Counties: Pulaski, KY

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## Endangered Species Act Species

There is a total of 13 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.
-

## Mammals

NAME	STATUS
<p><b>Gray Bat</b> <i>Myotis grisescens</i></p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6329">https://ecos.fws.gov/ecp/species/6329</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/21/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/21/office/42431.pdf</a></p>	Endangered
<p><b>Indiana Bat</b> <i>Myotis sodalis</i></p> <p>There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>▪ All activities in this location should consider possible effects to this species. The project area includes "potential" habitat.</li> </ul> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/1/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/1/office/42431.pdf</a>            Species survey guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/survey/population/1/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/survey/population/1/office/42431.pdf</a></p>	Endangered
<p><b>Northern Long-eared Bat</b> <i>Myotis septentrionalis</i></p> <p>No critical habitat has been designated for this species.            This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>▪ The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.</li> </ul> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a></p>	Threatened
<p><b>Virginia Big-eared Bat</b> <i>Corynorhinus (=Plecotus) townsendii virginianus</i></p> <p>There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/8369">https://ecos.fws.gov/ecp/species/8369</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/27/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/27/office/42431.pdf</a></p>	Endangered

## Clams

NAME	STATUS
<p>Cumberland Bean (pearlymussel) <i>Villosa trabalis</i></p> <p>Population: Wherever found; Except where listed as Experimental Populations            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6061">https://ecos.fws.gov/ecp/species/6061</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/317/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/317/office/42431.pdf</a></p>	Endangered
<p>Cumberland Elktoe <i>Alasmidonta atropurpurea</i></p> <p>There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1248">https://ecos.fws.gov/ecp/species/1248</a></p>	Endangered
<p>Cumberlandian Combshell <i>Epioblasma brevidens</i></p> <p>Population: Wherever found; Except where listed as Experimental Populations            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3119">https://ecos.fws.gov/ecp/species/3119</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/353/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/353/office/42431.pdf</a></p>	Endangered
<p>Fluted Kidneyshell <i>Ptychobranthus subtentum</i></p> <p>There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1397">https://ecos.fws.gov/ecp/species/1397</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/1559/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/1559/office/42431.pdf</a></p>	Endangered
<p>Littlewing Pearlymussel <i>Pegias fabula</i></p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/2572">https://ecos.fws.gov/ecp/species/2572</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/335/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/335/office/42431.pdf</a></p>	Endangered
<p>Snuffbox Mussel <i>Epioblasma triquetra</i></p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/4135">https://ecos.fws.gov/ecp/species/4135</a></p>	Endangered
<p>Tan Riffleshell <i>Epioblasma florentina walkeri</i> (= <i>E. walkeri</i>)</p> <p>No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1247">https://ecos.fws.gov/ecp/species/1247</a>            General project design guidelines:  <a href="https://ecos.fws.gov/ipac/guideline/design/population/346/office/42431.pdf">https://ecos.fws.gov/ipac/guideline/design/population/346/office/42431.pdf</a></p>	Endangered

## Flowering Plants

NAME	STATUS
Virginia Spiraea <i>Spiraea virginiana</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1728">https://ecos.fws.gov/ecp/species/1728</a>	Threatened
White Fringeless Orchid <i>Platanthera integrilabia</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1889">https://ecos.fws.gov/ecp/species/1889</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## Species Information

### Federal Threatened, Endangered, and Candidate Species observations for selected counties

Linked life history provided courtesy of NatureServe Explorer .

Records may include both recent and historical observations.

[US Status Definitions](#) [Kentucky Status Definitions](#)

List Federal Threatened, Endangered, and Candidate Species observations in 1 selected county.

Selected county is: Pulaski.

Scientific Name and Life History	Common Name and Pictures	Class	County	US Status	KY Status	WAP	Reference
<i>Alasmodonta atropurpurea</i>	Cumberland Elktoe	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Chrosomus cumberlandensis</i>	Blackside Dace	Actinopterygii	Pulaski	T	T	Yes	Reference
<i>Corynorhinus townsendii virginianus</i>	Virginia Big-eared Bat	Mammalia	Pulaski	E	E	Yes	Reference
<i>Cumberlandia monodonta</i>	Spectaclecase	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Dromus dromas</i>	Dromedary Pearlymussel	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Epioblasma brevidens</i>	Cumberlandian Combshell	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Epioblasma capsaeformis</i>	Oyster Mussel	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Epioblasma florentina walkeri</i>	Tan Riffleshell	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Epioblasma obliquata obliquata</i>	Catspaw	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Epioblasma triquetra</i>	Snuffbox	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Etheostoma sagitta</i>	Cumberland Arrow Darter	Actinopterygii	Pulaski	C	S	Yes	Reference
<i>Myotis grisescens</i>	Gray Myotis	Mammalia	Pulaski	E	T	Yes	Reference
<i>Myotis septentrionalis</i>	Northern Myotis	Mammalia	Pulaski	T	E		Reference
<i>Myotis sodalis</i>	Indiana Bat	Mammalia	Pulaski	E	E	Yes	Reference
<i>Pegias fabula</i>	Littlewing Pearlymussel	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Pleurobema plenum</i>	Rough Pigtoe	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Ptychobranhus subtentum</i>	Fluted Kidneyshell	Bivalvia	Pulaski	E	E	Yes	Reference
<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot	Bivalvia	Pulaski	T	T	Yes	Reference
<i>Sternula antillarum athalassos</i>	Interior Least Tern	Aves	Pulaski	E	E	Yes	Reference

Villosa trabalis	Cumberland Bean	Bivalvia	Pulaski	E	E	Yes	Reference
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20 species are listed



## KENTUCKY STATE NATURE PRESERVES COMMISSION

**Matthew G. Bevin**  
Governor

300 Sower Blvd  
Frankfort, Kentucky 40601-1132  
Phone 502-573-2886  
Fax 502-573-2355  
<http://naturepreserves.ky.gov>

**Charles G. Snavelly**  
Secretary

**Zeb Weese**  
Executive Director

May 16, 2018

Benjamin Deetsch  
Redwing Ecological Services, Inc.  
1339 S. Fourth St.  
Louisville, KY 40203

Project: Science Hill Planning Study  
Project ID: 18-0021  
Project Type: Transportation  
Site Acreage: 591.10  
Site Lat/Lon: 37.148076 / -84.634318  
County: Pulaski  
USGS Quad: Bobtown; Science Hill  
Watershed HUC12: Big Clifty Creek-Fishing Creek; Upper Pitman Creek  
Physiographic Region: Eastern Pennyroyal

Dear Benjamin Deetsch,

This letter is in response to your data request for the project referenced above. 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 within your general project area. Your project does pose a concern at this time, therefore please see the attached reports for more detailed information.

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 Heritage Branch (300 Sower Blvd - 4th Floor, Frankfort, KY, 40601. Phone: (502) 782-7828).

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



Project ID: 18-0021  
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Page 2

surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

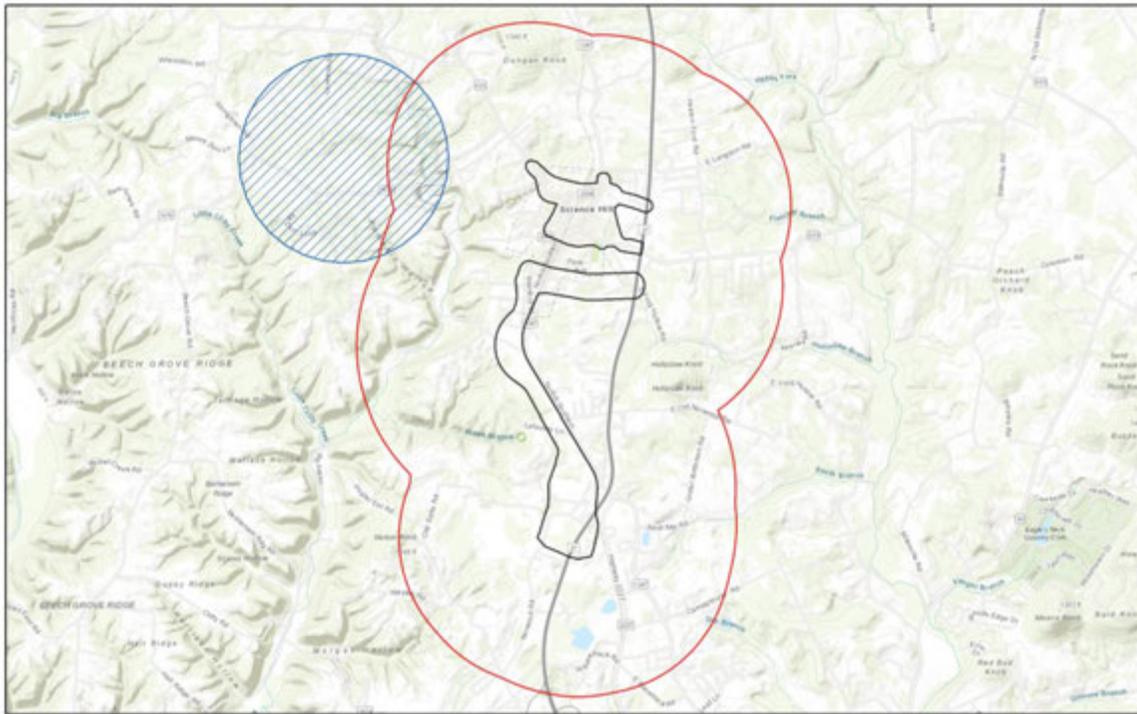
If you have any questions, or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Ian Horn  
Geoprocessing Specialist

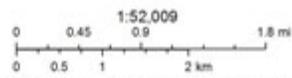


# Science Hill Planning Study



May 16, 2018

-  Project Boundary
-  Buffered Project Boundary
-  Element Occurrences
-  Conservation Sites



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, MRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

## Neil Guthals

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**From:** Howard <hkalnitz@fuse.net>  
**Sent:** Saturday, May 19, 2018 2:04 PM  
**To:** Benjamin Deetsch  
**Subject:** FW: KSS Data Request by Benjamin Deetsch (deetsch.5.17.18)

Hi Ben  
My fault, I forgot your name is not automatically on the reply list....  
Howard

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**From:** Howard <hkalnitz@fuse.net>  
**Sent:** Thursday, May 17, 2018 9:15 PM  
**To:** 'Kentucky Speleological Survey' <christopherdmorris@gmail.com>  
**Cc:** sarahmariecaver@gmail.com; caverjoshbrewer23@gmail.com; vanders33@yahoo.com; jcassidy17@yahoo.com  
**Subject:** RE: KSS Data Request by Benjamin Deetsch (deetsch.5.17.18)

Hi Ben  
We find three caves in your search area of a three mile buffer around your study corridor: