

APPENDIX E – ENVIRONMENTAL RED FLAG SUMMARY

**ENVIRONMENTAL RED FLAG
SUMMARY
US 68X AND US 231X PLANNING
STUDY
KYTC ITEM NO. N/A**

Warren County

US 68X from south of Robinson Avenue (MP 1.000) to north of Avenue of Champions (MP 1.626)

US 231X from north of Normal Street (MP 2.300) to south of Holly Drive (MP 2.600)



Prepared for:
Kentucky Transportation Cabinet
Central Office
Division of Environmental Analysis
Highway District 3

Prepared by:
Stantec Consulting Services Inc.

November 1, 2017

**ENVIRONMENTAL RED FLAG SUMMARY
US 68X AND US 231X PLANNING STUDY
KYTC ITEM NO. N/A**

Executive Summary

This Environmental Red Flag Summary has been prepared for the US 68X and US 231X Planning Study in Bowling Green, Warren County, Kentucky (KYTC Item No. not assigned). The purpose of the Planning Study is to evaluate operational and safety improvements at the Russellville Road intersections with Morgantown Road and University Boulevard and options to widen the underpass on Russellville Road. The purpose of this Environmental Red Flag Summary is to identify environmental resources of significance, potential jurisdictional features, and other environmental areas of concern that should be considered during project development. Natural and human environment resources within the study area were identified from secondary sources, as well as a pedestrian survey conducted on August 30, 2017. Based on this information, the key environmental features within the study area include:

Surface Streams: None present in the study area or immediate vicinity.

Wetlands: None present in the study area or immediate vicinity.

Threatened and Endangered Species: Seventeen (17) federal-listed species (14 endangered, 3 threatened) have the potential to occur in the study area, with 10 federal-listed species recorded within 5-miles of the study area. Potential summer roost and foraging habitat for the federal-endangered Indiana bat and Gray myotis (Gray bat) and the federal-threatened northern long-eared bat occurs in limited amounts in the study area. Suitable habitat for Gray myotis is known to be present, as several cave entrances are known within the study area vicinity. The study area lies within USFWS-designated Known Summer 1 habitat for Northern long-eared bat. No known habitat for the Kentucky cave shrimp is located in the study area. Two (2) state-threatened plant species have occurrence records within the study area.

Groundwater: Three (3) water wells are mapped within the study area, related to monitoring of a former gas station site. Two (2) springs are mapped within the study area, neither of which are named features or used as a source water supply. Underground drainage conduits are known to occur within the study area, part of the Lost River system.

Karst: The project area is underlain by bedrock with high potential for karst. Four (4) sinkholes are mapped underlying the study area, accounting for approximately 13% of the land area. Two (2) cave entrances and two mapped caves are known within the study area.

Floodplain: Two (2) separate 100-year floodplain areas are mapped within the study area, both associated with sinkholes. One location currently utilizes an installed Vortechs® stormwater management system.

Hazardous Materials Concerns: Eleven (11) potential hazardous materials concern sites are identified within or immediately adjacent to the study area, including: 6 sites with UST records (1 active), 3 sites with RCRA records, 2 sites with AIRS air emission records, 1 TRI record site, 2 automotive sales/service businesses, 1 site with a posted "Hazardous Waste" placard, and 1 electrical substation. Sites of potential concern are concentrated along US 68X southwest of the railroad crossing.

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Noise: Sensitive noise receptors include: 1 elementary school, 9 facilities on the Western Kentucky University campus (residence halls, educational or athletic structures), 3 apartment complexes, 1 residential neighborhood, and two playgrounds.

Environmental Justice (EJ): All four (4) census tracts in the study area have a minority population percentage greater than the county and state averages, while three (3) census tracts have a low-income population percentage greater than the county and state averages.

Cultural and Historic Resources: Twenty-seven (27) previously surveyed cultural-historic resources having an undetermined NRHP status are present in the study area, all being houses located along Sumpter Ave.

Community Resources: Community resources include two railroad crossings (one overpass, one at-grade), one elementary school, and a portion of the Western Kentucky University campus.

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Environmental Red Flag Summary

Stantec Consulting Services, Inc. has prepared this Environmental Red Flag Summary as part of the US 68X and US 231X Planning Study (KYTC Item No. not assigned) being conducted for the Kentucky Transportation Cabinet (KYTC). This summary identifies known natural and human features which occur within the study area that should be considered during project development. The study area under review includes the intersections of Russellville Road at Morgantown Road and University Boulevard (junction and disjunction of US 68X and US 231X), approximately 1,600-feet apart, and adjacent connecting roads in Bowling Green, Warren County, Kentucky (see **Figure 1**). The study area encompasses 0.13-square mile (86.1 acres), with maximum dimensions of approximately 2,300-feet by 2,100-feet (see **Figure 2**).

Table 1 below provides a summary of the features that were identified within the study area. Natural environment features within the study area are identified on **Figure 3.1**, and human environment features are identified on **Figure 3.2**. The information listed in Table 1 and shown on the attached mapping was obtained from secondary sources and a pedestrian survey conducted on August 30, 2017. A photo inventory of the study area is attached (**Attachment A**), which highlights environmental features throughout the study area and shows representative views of land uses present. This information provides an overview of resources of significance within the study area, as well as other environmental issues of potential concern. More detailed environmental studies may be required as the project is further developed in accordance with the National Environmental Policy Act (NEPA).

Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area Warren County, KY		
Environmental Category	Resource/Feature	Source/Information
USGS Streams	No USGS streams are mapped within the study area. The karst nature of the landscape results in very few surface stream features in the study area vicinity.	Source: USGS 24K NHD dataset (2004a)
Other Streams	Multiple underground conduits are mapped within the study area, all part of the Lost River system that underlies Bowling Green. Underground conduits were mapped based in part on Karst Dye Trace Flow studies. No surface streams are evident on aerial photography or were observed during field review of the study area. Surface runoff in the project area is accommodated by vegetated swales and a storm sewer system.	Source: KDOW (2017), field survey
Watersheds	The study area lies within the Jennings Creek Subwatershed (HUC-12: 051100020902) of the Barren River Sub-basin. No KDOW designated Priority Watersheds or TMDL's are located in or adjacent to the study area. The study area does not occur within a Source Water Assessment and Protection Program (SWAPP) area.	Source: USGS 8-Digit HUC (2004b), KDOW 305b and 303(d) Report (2014), KDOW (2017), KDOW SWAPP (2013)

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<p align="center">Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area Warren County, KY</p>		
<p align="center">Environmental Category</p>	<p align="center">Resource/Feature</p>	<p align="center">Source/Information</p>
<p>Wetlands</p>	<p>No NWI-mapped wetlands are located in the study area, and no hydric soils are mapped in the study area.</p> <p>No wet areas or potential wetlands were observed in the study area during field review activities.</p>	<p>Source: KEPPC 24K NWI map dataset (2002), USDA SSURGO KY227 (2016), field survey</p>
<p>Ponds</p>	<p>No ponds are mapped within the study area and no standing water features were observed during field review activities.</p>	<p>Source: KEPPC 24K NWI map dataset (2002), ESRI Aerial map service layer, field survey</p>
<p>USFWS Species List</p>	<p>Seventeen (17) federally-listed species are known or have the potential to occur in the study area, including:</p> <ul style="list-style-type: none"> • Indiana bat (<i>Myotis sodalis</i>, endangered), Gray bat (<i>Myotis grisescens</i>, endangered), and Northern long-eared bat (<i>Myotis septentrionalis</i>, threatened) are known to occur in Warren County; • Eleven (11) endangered mussels [clubshell (<i>Pleurobema clava</i>), fanshell (<i>Cyprogenia stegaria</i>), northern riffleshell (<i>Epioblasma torulosa rangiana</i>), orangefoot pimpleback (<i>Plethobasus cooperianus</i>), pink mucket (<i>Lampsilis abrupta</i>), purple cat's paw (<i>Epioblasma obliquata obliquata</i>), ring pink (<i>Obovaria retusa</i>), rough pigtoe (<i>Pleurobema plenum</i>), sheepnose (<i>Plethobasus cyphus</i>), snuffbox (<i>Epioblasma triquetra</i>), and spectaclecase (<i>Cumberlandia monodonta</i>)], and one (1) threatened mussel [rabbitsfoot (<i>Quadrula cylindrica cylindrica</i>)] are listed as being potentially affected by activities in the study area; • The Kentucky cave shrimp (<i>Palaemonias ganteri</i>, endangered) and Price's potato-bean (<i>Apio priceana</i>, threatened) may or could potentially be affected by activities in the study area. <p>The study area lies within a Known Summer 1 Habitat designated area for Northern long-eared bat. This designated habitat type refers to mitigation measures required for impacts to potential habitat for forest dwelling bats. No specifically designated habitat type for the Indiana bat is present within the study area.</p> <p>Limited potential summer roost and foraging habitat for Indiana bat and Northern long-eared bat (woodlots and riparian woodlands) is present in a small woodlot located in the northwest corner of the study area.</p> <p>Habitat for Gray bat is not likely to be present as the known cave entrances in the study area vicinity were artificially generated (water well and drill hole) and both are currently sealed. Caves known to be present in the study area are reported to have no</p>	<p>Source: USFWS IPaC Trust Resource Report (2017a), USFWS Kentucky Ecological Services Field Office, Indiana bat and northern long-eared bat habitat areas map (2016a), USFWS Conservation Strategy (2016b), KYTC Programmatic Biological Assessment (2012), ESRI Aerial map service layer, NatureServe (2017), USFWS (2017b), KSS (2017), USFWS (1993), KDOW (2017)</p>

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Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area Warren County, KY		
Environmental Category	Resource/Feature	Source/Information
	<p>natural entrances (Chris Groves, Western Kentucky University, personal communication).</p> <p>None of the 12 federally-listed mussel species included in the IPaC report have suitable habitat present in the study area, as there are no stream present.</p> <p>The USFWS lists the Kentucky cave shrimp as potentially being affected by activities in the study area, though this project is not located within their critical habitat (Mammoth Cave system only) and no known habitat exists.</p> <p>Habitat for Price’s potato-bean may be present in the limited extent of open woodland having a powerline clearing located in the northwest portion of the study area.</p> <p>No USFWS designated critical habitat for any of these listed species is located in or near the study area.</p>	
KDFWR Species List	<p>KDFWR lists 43 additional State-Threatened, Endangered, and Special Concern Species (beyond the 17 species listed by USFWS, above) as occurring (either recently or historically) in the Bowling Green South USGS quadrangle that covers the study area. These include:</p> <ul style="list-style-type: none"> • 13 state-endangered species (8 birds, 3 fishes, 2 mussels) • 13 state-threatened species (10 birds, 2 mussels, 1 snail) • 17 state-special concern species (12 birds, 2 fish, 1 mussel, 1 insect, 1 crustacean) 	Source: KDFWR - Species List for Bowling Green South Quadrangle (2017)
KSNPC Species Database	<p>KSNPC provided 81 records for 44 federal or state-endangered, threatened, or special concern listed species within 10-miles of the study area. These include:</p> <ul style="list-style-type: none"> • 1 amphibian (federal-species of management concern); • 12 birds (2 federal-species of management concern, 3 state-endangered, 5 state-threatened, and 2 state species of concern); • 2 crustaceans (1 federal-species of management concern and 1 state-species of concern); • 4 fishes (3 federal-species of management concern and 1 state-species of concern); • 13 mussels (7 federal-endangered, 1 federal-threatened, 2 federal-species of management concern, 1 state-endangered and 2 state-species of concern); • 1 Insect (state-historical record); • 5 mammals (2 federal-endangered, 1 federal threatened, 1 federal species of management concern, and 1 state-species 	Source: KSNPC Natural Heritage Database response (August 16, 2017)

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**Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area
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Environmental Category	Resource/Feature	Source/Information
	<p>of concern);</p> <ul style="list-style-type: none"> • 1 snail (state-threatened); and • 5 plants (1 federal-threatened, 1 state-endangered and 3 state-threatened); <p>Two occurrence records are known within the study area, for two plant species in one location. Four bat species have known hibernacula within 5-miles of the study area.</p> <p>The KSNPC data response includes occurrence records for 9 federal-endangered species, 3 federal-threatened species and 10 federal-species of management concerns, along with 22 state-listed species, all within 10-miles of the study area.</p>	
Groundwater	<p>Three water wells are mapped within the study area; all are plugged and present at a former gas station as part of the state UST regulatory program. No wellhead protection areas are mapped in the study area, with the nearest such area located outside of Warren County.</p> <p>Two (2) springs are mapped within the study area, neither of which are used as a source water supply. One spring is located on the same property as the plugged water wells along Russellville Road. The second spring is located in an undeveloped field in the northwest corner of the study area.</p> <p>Underground drainage conduits exist in the study area and vicinity, part of the Lost River system that flows under the study area.</p>	<p>Source: KGS Water Wells and Springs data repository and dataset layer (2017a), KGS ArcGIS Service Layer (2017b), KDOW Wellhead Protection Areas data download (2012b)</p>
Karst	<p>The project area is underlain by bedrock with high potential for karst, in addition to having intense karst geology. Four sinkholes are mapped underlying the study area, accounting for approximately 13% of the area. Large sinkholes are located between Russelville Road and Creason Street, and north of Holly Drive.</p> <p>Two (2) cave entrances are known within study area, leading to separate caves (Creason Cave and Robinson Cave) that are mapped under the study area. Both entrances are non-natural (drilled shaft or dug well) used for exploration of the caves and are currently sealed.</p> <p>KYTC has a policy for use of specific drainage designs (grass swales and detention basins) in roadway improvement projects in known karst areas.</p>	<p>Source: Paylor and Currens (2002), Warren County Karst Areas (Carey and Stickney 2004), KGS (2003), KGS (2005), KSS Data Request response (August 2, 2017), KYTC-DEA (2016)</p>

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Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area Warren County, KY		
Environmental Category	Resource/Feature	Source/Information
Floodplain	<p>FEMA 100-Year floodplains are present at two locations within the study area, both associated with the larger sinkholes present and represent closed depressions isolated from surface features.</p> <p>The floodplain area present in the middle of the Study Area currently has four Vortechs® stormwater treatment and flood control devices installed under the parking lot. This system is sized to accommodate existing runoff and flow volume and conditions. See Geotechnical Overview for detailed information.</p>	<p>Source: FEMA National Flood Hazard Layer (2016), KYTC (2017b)</p>
Floodway	No FEMA designated floodway occurs in the study area or vicinity.	Source: FEMA National Flood Hazard Layer (2016)
Farmlands	No soils identified as Prime Farmland are mapped within the study area. No active farmland is present within the study area.	Source: USDA SSURGO KY227 (2016), field survey
Hazardous Materials	<p>Database records review summary: 9 sites of potential concern occur within or immediately adjacent to the study area, including 4 USEPA-Envirofacts Sites (3 RCRA records, 2 AIRS air emission records, and 1 TRI [Toxics Release Inventory] record), and 6 UST sites (1 active). No Superfund, CERCLA, NPL or Brownfields sites are located within 1-mile of the study area.</p> <p>Field survey indicated 2 additional potential hazardous materials concern sites: the WKU Supply-Services out-building that posted a “Hazardous Waste” placard and an electrical substation, along with 2 automotive service businesses (both with existing database records).</p> <p>Summary: 11 potential hazardous materials concern sites. Multiple UST records within the study area report removal of tanks more than 10 years ago. Sites of potential concern are concentrated along Russellville Road (US 68X) near the western intersection with Morgantown Road (US 231) and southwards.</p>	<p>Source: USEPA Envirofacts (2017a), KDWM (2016), aerial photo review, ESRI USGS map service layer, field survey</p>
Oil and Gas Wells	No oil or gas wells are mapped within or near the study area. The nearest producing oil/gas well is approximately 1.2-miles northwest of the study area.	Source: KGS (2016)
Section 4(f)	No Section 4(f) resources were identified in the study area through secondary source information or during field survey. No public use recreational facilities are present in the study area, as all of the recreational facilities are for restricted use by Western Kentucky University or McNeill Elementary School.	Source: ESRI USA Parks dataset (2015), KGN LocalParks dataset (2007), field survey
Section 6(f)	Based on current Land and Water Conservation Fund (LWCF) records, there are no Section 6(f) resources in the study area.	Source: NPS LWCF list (2017), ESRI USA Parks dataset (2015), ESRI Aerial map service layer, field survey

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Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area Warren County, KY		
Environmental Category	Resource/Feature	Source/Information
Air Quality	<p>The study area is not located in a Nonattainment Area for 8-hour ozone (2008 standard), or a Maintenance area for PM2.5 (1997 Standard or 2012 Standard) for the transportation-related criteria pollutants for which the EPA has established National Ambient Air Quality Standards (NAAQS) for Transportation Criteria Pollutants.</p> <p>Two (2) USEPA permitted air emissions facilities are located within or immediately adjacent to the study area, both on Russellville Road (US 68) at Robinson Ave. One facility is a manufacturing plant, the other is a dry cleaner business (currently vacant).</p>	<p>Source: KYTC (2016a), KYTC (2016b), USEPA Green Book (2017b), USEPA Envirofacts (2017a)</p>
Noise	<p>Noise sensitive land use areas are present throughout the eastern and southern portions of the study area, consisting of the following:</p> <p>Activity Category “B” land use</p> <ul style="list-style-type: none"> • four student residence halls, • three apartment complexes, • one residential neighborhood, <p>Activity Category “C” land use (exterior)</p> <ul style="list-style-type: none"> • three Western Kentucky University sports facilities, • two outdoor playgrounds, <p>Activity Category “D” land use (interior)</p> <ul style="list-style-type: none"> • one public institutional structure (the Jones Jagger Hall and Child Care Center), • W.R. McNeill Elementary school. <p>The study area is primarily urban, dominated by residential and recreational facilities east of the railroad tracks and commercial facilities west of the railroad tracks.</p>	<p>Source: KYTC Noise Policy (2011), field survey</p>

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**Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area
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Environmental Category	Resource/Feature	Source/Information
Environmental Justice	<p>The project area includes portions of Census Tracts 103, 104, 109 and 110.01.</p> <p>Based on the most recent U.S. Census Bureau American Community Survey (ACS; 2011-2015) data available, all four Tracts in the study area have a percentage minority population (15.8% - 45.4%) greater than the county average (15.7%) and the state average (12.0%).</p> <p>Tract 109 is the only tract having a percentage low-income population (17.0%) less than the county (18%) and state (18.5%) levels. The remaining three tracts range from 38.3% (Tract 110.01) to 56.2% (Tract 104).</p> <p>Additional analysis of socio-economic conditions in the study area is being conducted by the Barren River ADD, and will be provided in a separate report.</p>	<p>Source: USCB TIGER lines 2015, ACS 5-year data 2011-2015 (2016), KYTC Environmental Justice Analysis (2014)</p>
Cultural - Archaeology	<p>Based on a review of National Register of Historic Places (NRHP) and the Kentucky Office of State Archaeology (OSA) Preliminary Site Check response, no archaeological sites are known in or near the study area.</p> <p>No archaeological surveys have been conducted in the vicinity. Only the northwest corner of the study area appears to have been spared from prior surface disturbance activities; it is likely that work proposed outside of existing right-of-way in this area will require archaeological survey.</p>	<p>Source: NPS (2017), KOSA (2017)</p>
Cultural - Historic	<p>Based on a review of Kentucky Heritage Council (KHC) Site Check response the following potential historic resources were identified within the study area:</p> <ul style="list-style-type: none"> • 27 structures (all houses) with undetermined NRHP status <p>No NRHP listed resources were identified within or near the study area. All of the houses identified in the KHC response are listed as KHC Historic Resources and are located on Sumpter Ave. No restricted information was provided in the KHC response. Additional cultural historic investigations are recommended for any proposed project activities.</p>	<p>Source: NPS (2017), KHC (2017), National Register of Historic Places website review</p>
Houses of Worship	<p>No houses of worship (church, mosque, synagogue, etc.) were identified in the study area.</p>	<p>Source: ESRI USA topo map service layer, Google Maps, field survey</p>
Schools	<p>Western Kentucky University encompasses approximately 40% (36 acres) of the study area, comprised primarily of residential housing and athletic and support facilities. One elementary school (McNeill Elementary) is also present.</p>	<p>Source: ESRI USA topo map service layer, ESRI Aerial map service layer, Google Maps, field survey</p>

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Table 1: Environmental Resources/Features in the US 68X and US 231X Study Area Warren County, KY		
Environmental Category	Resource/Feature	Source/Information
Cemeteries	No cemeteries are located within or near the study area.	Source: ESRI USA topo map service layer, ESRI Aerial map service layer, Google Maps, KDOW Watershed Viewer (2017), field survey
Public Services	Public service and utility facilities located within the study area include: <ul style="list-style-type: none"> • CSX Railroad bridge over Russellville Road (US 231) • CSX Railroad at-grade crossing at Robinson Ave • 1 electrical substation on University Blvd (US 68X) at north end of study area 	Source: ESRI USA topo map service layer, ESRI Aerial map service layer, Google Maps, KDOW Watershed Viewer (2017), KIA (2007), field survey
Residences and Businesses	Residential land use in the study area includes single-family homes Along Sumpter Ave and Creason Street, and multi-family apartment complexes along Creason Street and Robinson Ave. Commercial businesses are concentrated along US 68 and US 231X west of the railroad tracks, with one additional business at the corner of Robinson Ave and Creason St.	Source: ESRI Aerial map service layer, field survey

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ENVIRONMENTAL RED FLAG SUMMARY
US 68X AND US 231X PLANNING STUDY
KYTC ITEM NO. N/A

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ENVIRONMENTAL RED FLAG SUMMARY
US 68X AND US 231X PLANNING STUDY
KYTC ITEM NO. N/A

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FIGURES

1. Study Area Map
2. Project Location Map
- 3.1 Environmental Footprint: Natural Environment
- 3.2 Environmental Footprint: Human Environment

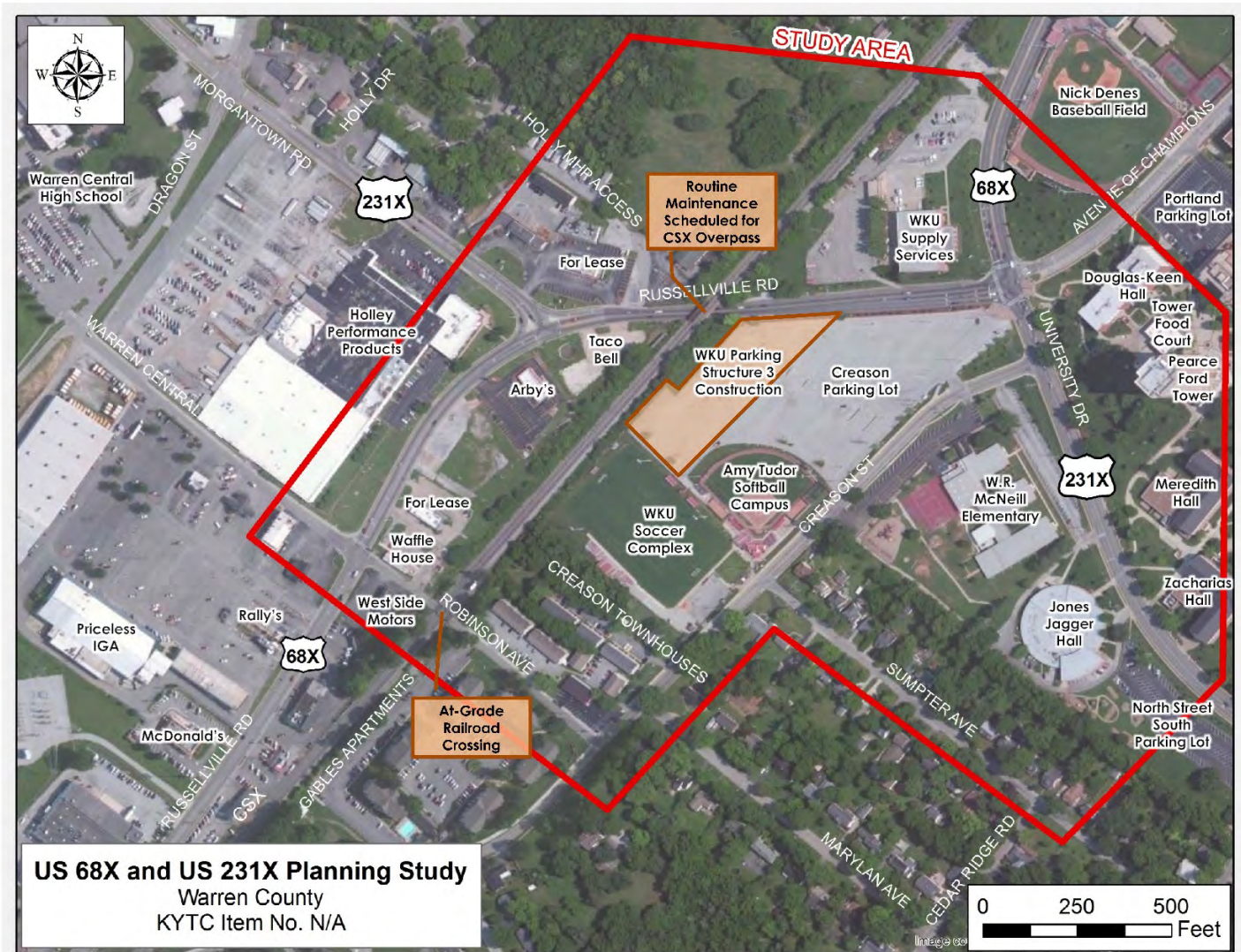
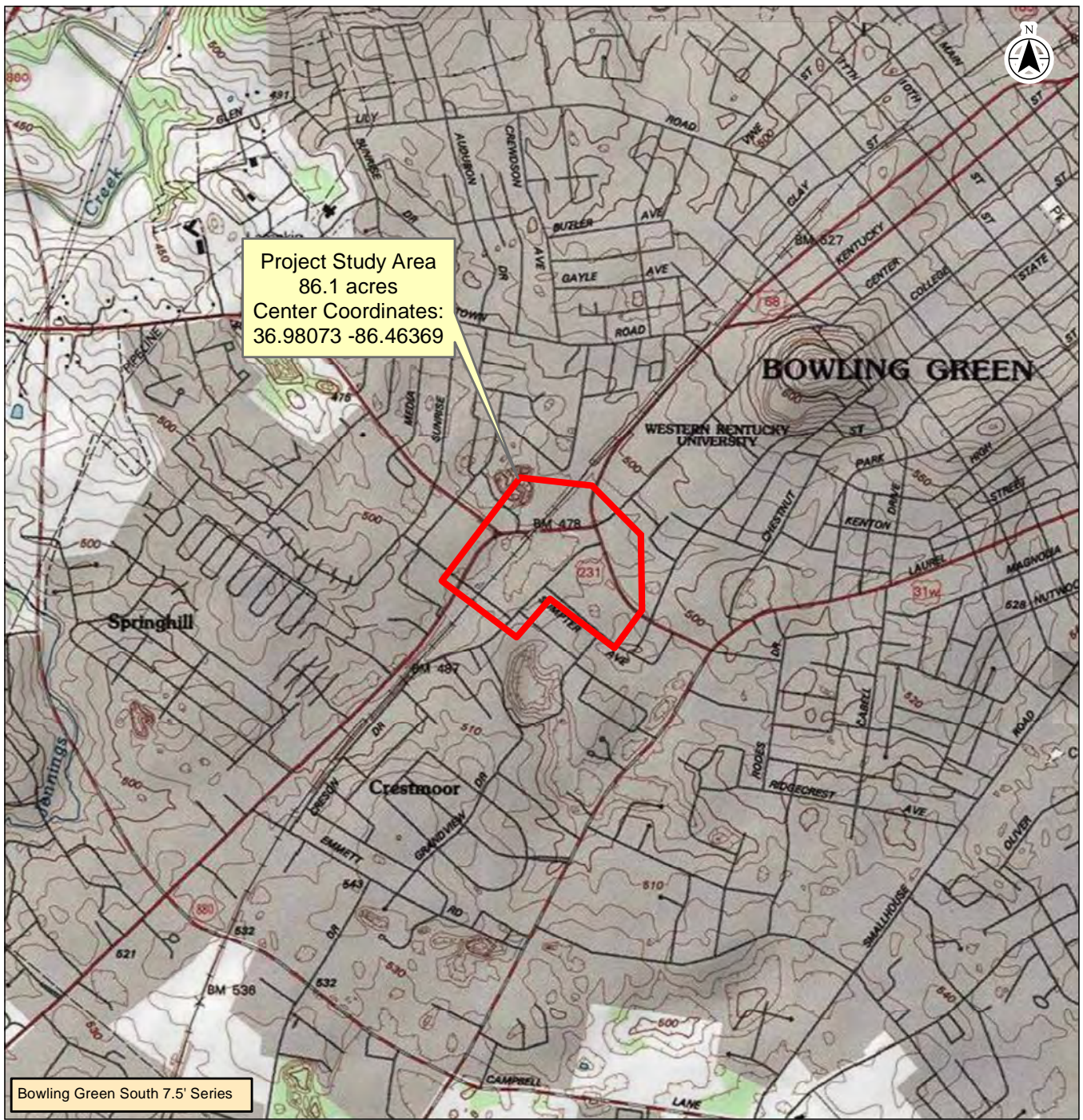
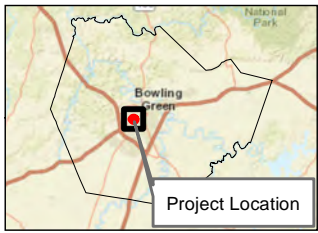
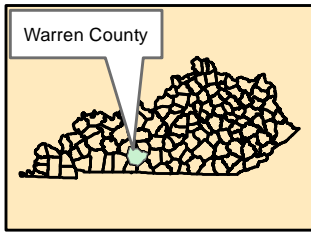
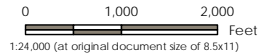


Figure 1: Study Area for the US 68X and US 231X Planning Study



Project Study Area
86.1 acres
Center Coordinates:
36.98073 -86.46369

Bowling Green South 7.5' Series



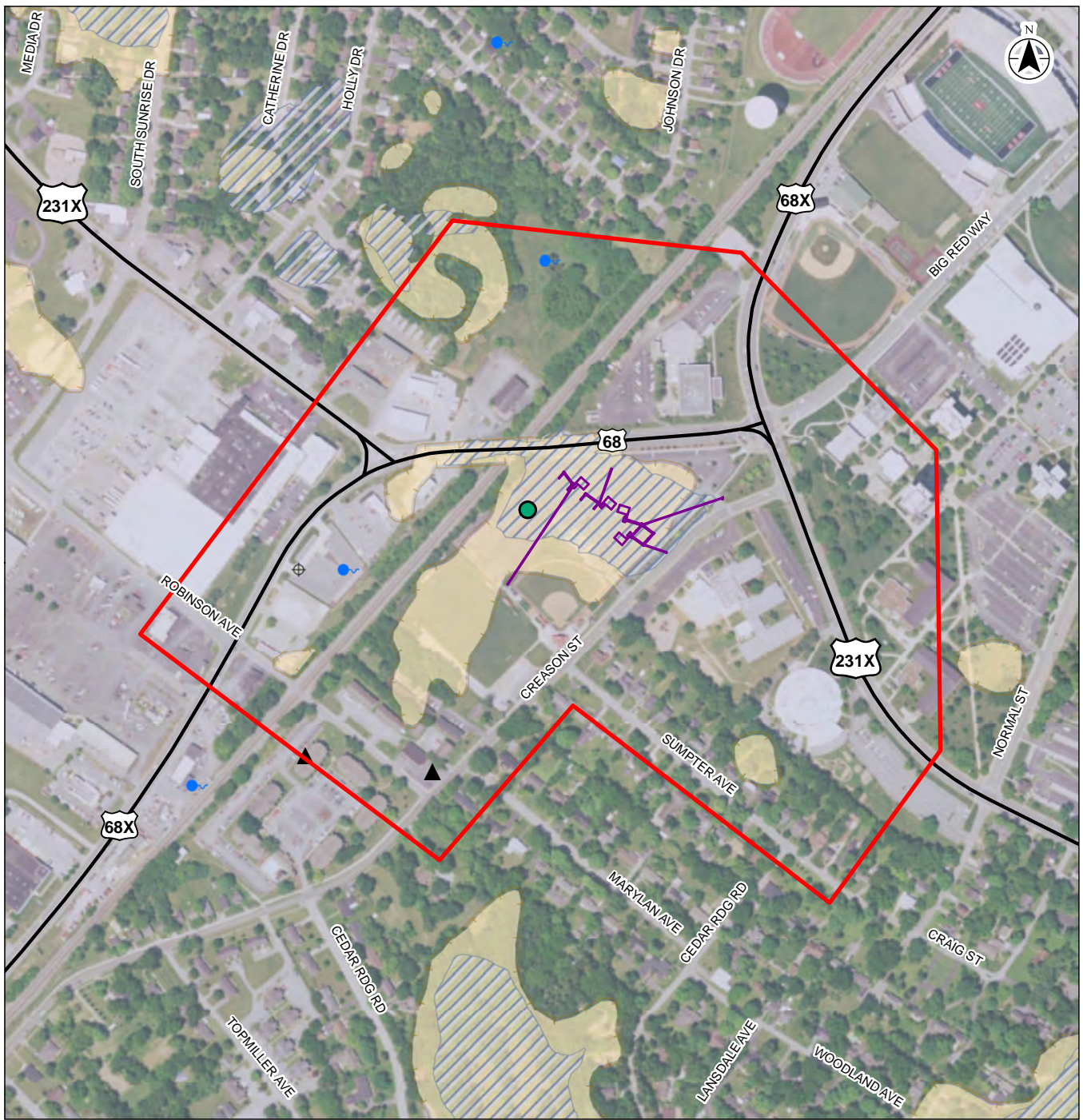
Project Location 178556010
US 68X and US 231X Planning Study Prepared by BL on 2017-07-20
Warren County
Bowling Green, Kentucky

Client/Project
KYTC-DEA, KYTC District 3
Environmental Red Flag Summary
US 68X / US 231X Planning Study, KYTC Item No. N/A

Figure No.
2

Title
Project Location Map

Notes
1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Base features produced from project design elements.
3. Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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- Legend**
- Study Area
 - Streams (NHD)
 - Spring (KDOW)
 - 100-Year Floodplain (FEMA)
 - Sinkhole (KGS)
 - Vortechs Stormwater System
 - ▲ Cave Entry (sealed; KSS)
 - KNSPC Record
 - + Water Well (KDOW)
 - + Domestic Use
 - ⊕ Other



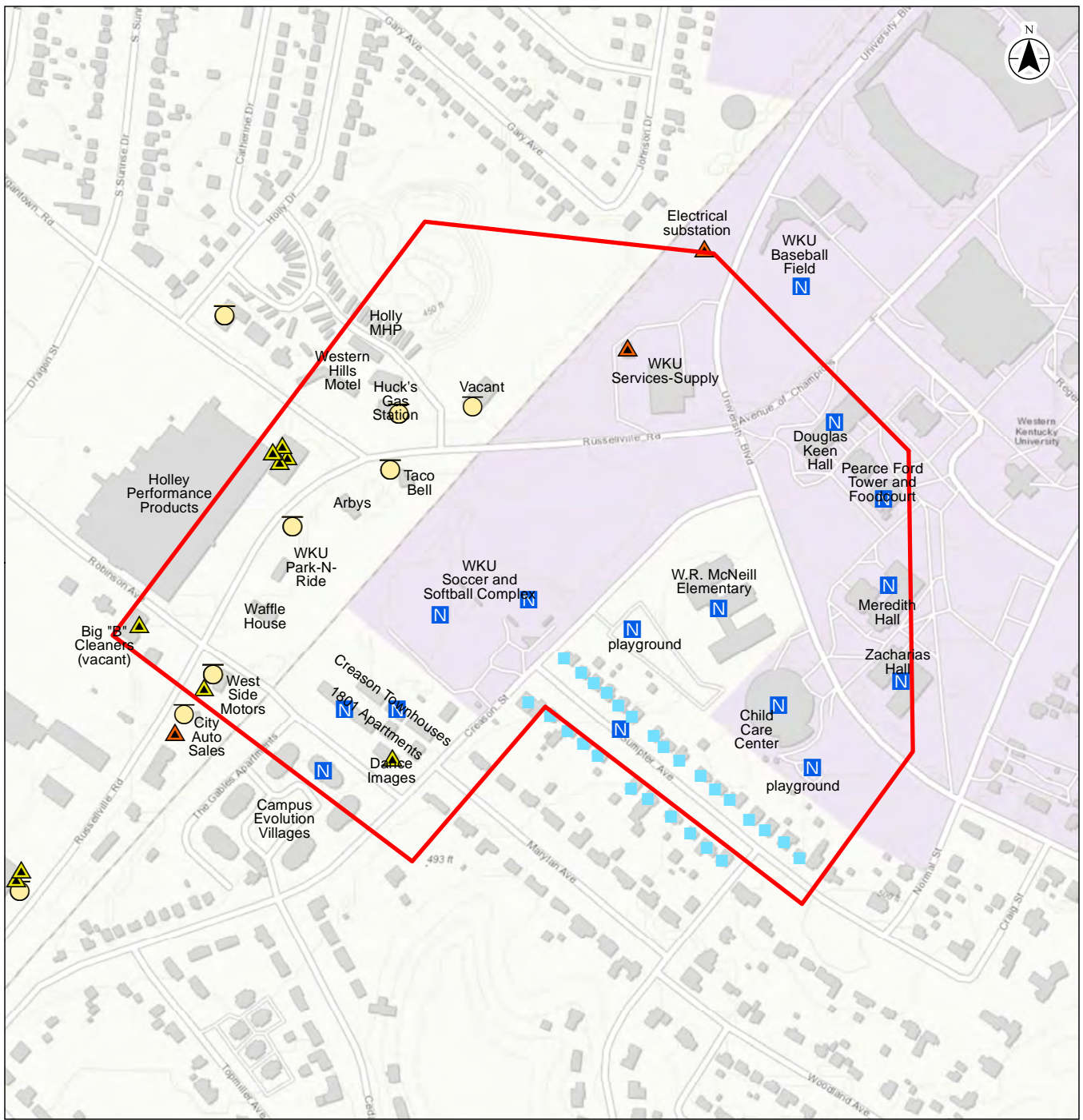
Project Location: US 68X and US 231X Planning Study, Warren County, Bowling Green, Kentucky
 178556010
 Prepared by BL on 2017-08-28

Client/Project: KYTC-DEA, KYTC District 3
 Environmental Red Flag Summary
 US68X / US231X Planning Study, KYTC Item No. N/A

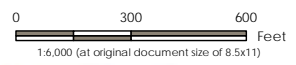
Figure No.: 3.1
 Title:

**Environmental Footprint:
 Natural Environment**

Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Base features: see Sources and References.
 3. Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



- Legend**
- Study Area
 - Potential Historic Resource (KHC)
 - N Noise Sensitive Receptor
 - HazMat Record (USEPA)
 - Potential HazMat Site
 - UST Site (KYDWM)



Project Location: US 68X and US 231X Planning Study, Warren County, Bowling Green, Kentucky
 178556010
 Prepared by BL on 2017-08-28

Client/Project: KYTC-DEA, KYTC District 3
 Environmental Red Flag Summary
 US68X / US231X Planning Study, KYTC Item No. N/A

Figure No. 3.2

**Environmental Footprint:
Human Environment**

Notes

- Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
- Base features: see Sources and References.
- Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
 Sources: Esri, DeLorme, HERE, TomTom, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

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ATTACHMENTS

- A. Photo Log
 - Photograph Log
 - Photograph Index Maps, with labelled features



Photo 1: Overview of study area, showing built-up nature of the environment; facing towards Western Kentucky University campus, east.



Photo 2: Limited potential habitat for Indiana bat and Northern long-eared bat, wooded habitat in study area; facing north.



Photo 3: Potential habitat for Price's potato-bean (federal-threatened plant) in power-line clearing adjacent to wooded habitat; facing southeast.



Photo 4: View towards location of KSNPC prior occurrence records for two state-listed plant species, showing developed nature of habitat and likely absence of suitable natural habitat; facing southwest.



Photo 5: Representative photo of mapped sinkhole within study area, indicating presence of karst bedrock; facing west.

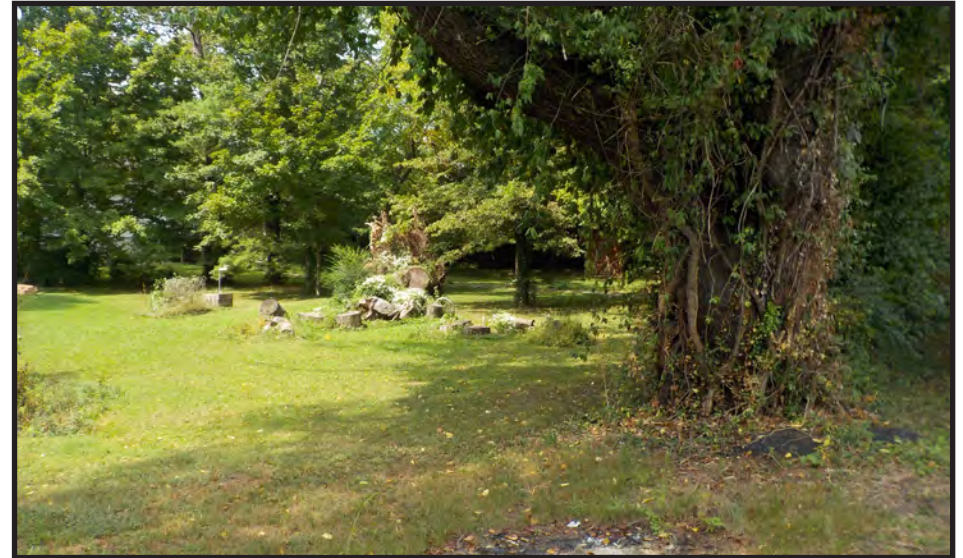


Photo 6: View of mapped sinkhole between Sumpter Ave and US 231; residential land use in low-lying area; facing southwest.



Photo 7: Representative view of low-lying area within mapped 100-year floodplain, parking lot and garage on Western Kentucky University campus; facing west.



Photo 8: Huck's #395 gas station, UST record site (active), 306 Morgantown Road; potential hazardous materials site; facing northwest.



Photo 9: Holley Performance Products, USEPA records (RCRA, AIRS, TRI, BR), 1801 Russellville Road; potential hazardous materials site; facing southwest.



Photo 10: West Side Motors, former Chevron 0042421 with USEPA Envirofacts record (RCRA) and UST records, 1902 Russellville Road; automotive service and sales business; potential hazardous materials site; facing east.



Photo 11: Representative view of a former (non-active) UST site; WKU Park & Ride, 1840 Russellville Road; potential hazardous materials concern site; facing west.



Photo 12: Electrical substation, field identified potential hazardous materials site, University Boulevard; facing north.



Photo 13: Western Kentucky University Supply-Services Out-building; field identified potential hazardous materials site; "Hazardous Waste" placard posted on door; facing northeast.



Photo 14: Sensitive noise receptor (Category D, interior), W.R. McNeill Elementary School; facing southeast.



Photo 15: Sensitive noise receptor (Category C, exterior), playground outside Western Kentucky University Child Care Center; facing south.



Photo 16: Sensitive noise receptor (Category C, exterior), Western Kentucky University soccer field sport facility; facing northwest.



Photo 17: Sensitive noise receptor (Category B), residential neighborhood on Sumpter Ave; facing southeast.



Photo 18: Sensitive noise receptor (Category B), Pearce Ford Tower residence hall and food court on Western Kentucky University campus; facing south.



Photo 19: Representative view of KHC Historic Resources, residential structures located on Sumpter Ave with study area; facing north.



Photo 20: Western Kentucky University campus at intersection of US 68, US 231, University Boulevard and Avenue of Champions; one of two schools in the study area; facing northeast.



Photo 21: CSX railroad bridge over US 68X / US 231X in study area; facing west.



Photo 22: CSX railroad at-grade crossing at Robinson Road; facing southeast.



Photo 23: Multi-family residential housing along Creason Street; 1801 Apartments and Creason Townhouses; facing northwest.



Photo 24: US 68X and US 231X intersection east junction from University Boulevard (US 68); facing southeast.



Photo 25: US 68X and US 231X intersection east junction from University Boulevard (US 231); facing northwest.



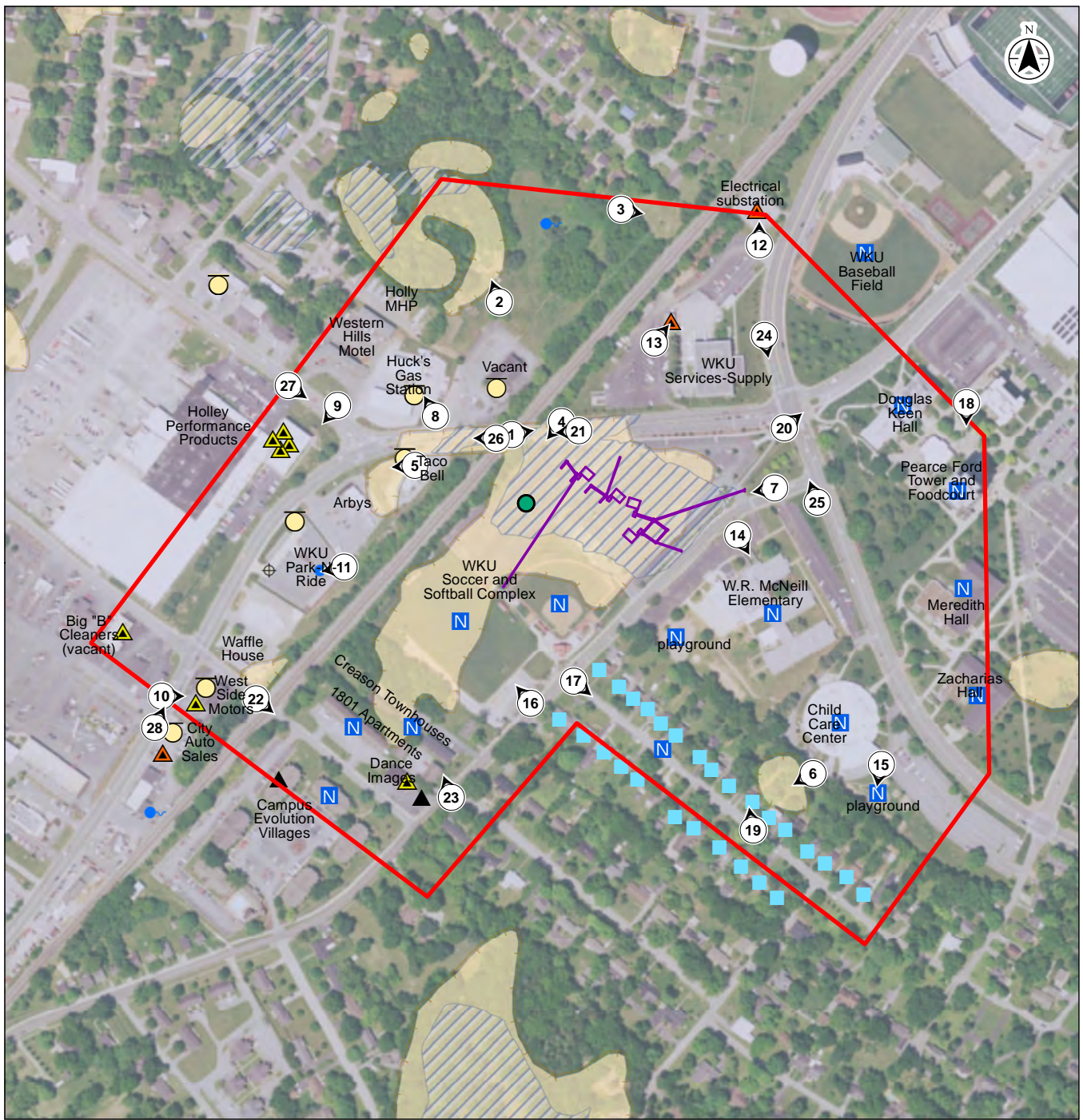
Photo 26: US 68X and US 231X intersection west junction; facing west.



Photo 27: US 68X and US 231X intersection west junction from Morgantown Road (US 231); facing southeast.



Photo 28: US 68X and Robinson Avenue intersection; general business district within the study area; facing northeast.



Legend

- Study Area
- 3 Photograph Number, Location and Direction
- Sinkhole (KGS)
- HazMat Record (USEPA)
- Potential HazMat Site
- UST Site (KYDWM)
- Cave Entry (sealed; KSS)
- Vortechs Stormwater System
- 100-Year Floodplain (FEMA)
- Noise Sensitive Receptor
- Potential Historic Resource (KHC)
- + Domestic Use
- + Other
- + Spring (KDOW)
- + KSNPC Record



Project Location: US 68X and US 231X Planning Study
 Warren County, Bowling Green, Kentucky
 178556010
 Prepared by BL on 2017-08-28

Client/Project: KYTC-DEA, KYTC District 3
 Environmental Red Flag Summary
 US68X / US231X Planning Study, KYTC Item No. N/A

Figure No.: Attachment A
 Title:

Photograph Index Map

Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Base features: see Sources and References.
 3. Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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SUPPORTING MATERIALS

1. Threatened and Endangered Species
2. Karst
3. Hazardous Materials Concerns
4. Air Quality - Transportation Related Pollutants
5. Environmental Justice
6. Cultural-Historic Resources

SUPPORTING MATERIALS 1

THREATENED AND ENDANGERED SPECIES

- USFWS IPaC Trust Resource Report
- USFWS Maps of Known Indiana and Northern Long-eared Bat Habitat
- KYTC Online Environmental Overview: Sensitive Resources in Project Vicinity
- KDFWR State-Listed Species, Bowling Green South USGS 7.5' Quadrangle
- KSNPC Natural Heritage Database Response, August 16, 2017 (redacted)

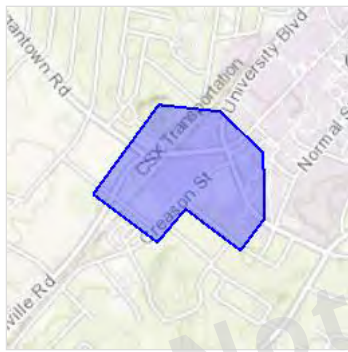
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Warren County, Kentucky



Local office

Kentucky Ecological Services Field Office

☎ (502) 695-0468

📅 (502) 695-1024

J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670

<http://www.fws.gov/frankfort/>

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.

5. Click REQUEST SPECIES LIST.

Listed species¹ are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service.

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Gray Bat <i>Myotis grisescens</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat <i>Myotis sodalis</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> This species only needs to be considered if the following condition applies: <ul style="list-style-type: none"> Incidental take of the northern long-eared bat at this location is excepted by the 4(d) rule and is, therefore, not prohibited under the ESA. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Clams

NAME	STATUS
Clubshell <i>Pleurobema clava</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3789	Endangered
Fanshell <i>Cyrogenia stegaria</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4822	Endangered
Northern Riffleshell <i>Epioblasma torulosa rangiana</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/527	Endangered
Orangefoot Pimpleback (pearlymussel) <i>Plethobasus cooperianus</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1132	Endangered
Pink Mucket (pearlymussel) <i>Lampsilis abrupta</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7829	Endangered
Purple Cat's Paw (=purple Cat's Paw Pearlymussel) <i>Epioblasma obliquata obliquata</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5602	Endangered
Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/5165	Threatened
Ring Pink (mussel) <i>Obovaria retusa</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4128	Endangered
Rough Pigtoe <i>Pleurobema plenum</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6894	Endangered

Sheepnose Mussel <i>Plethobasus cyphus</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6903	Endangered
Snuffbox Mussel <i>Epioblasma triquetra</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4135	Endangered
Spectaclecase (mussel) <i>Cumberlandia monodonta</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7867	Endangered

Crustaceans

NAME	STATUS
Kentucky Cave Shrimp <i>Palaemonias ganteri</i> There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/5008	Endangered

Flowering Plants

NAME	STATUS
Price's Potato-bean <i>Apios priceana</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7422	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service³. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data <http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#). To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
------	-----------

Bald Eagle	<i>Haliaeetus leucocephalus</i> https://ecos.fws.gov/ecp/species/1626	Year-round
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i> https://ecos.fws.gov/ecp/species/9399	Breeding
Blue-winged Warbler	<i>Vermivora pinus</i>	Breeding
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	Breeding
Dickcissel	<i>Spiza americana</i>	Breeding
Fox Sparrow	<i>Passerella iliaca</i>	Wintering
Henslow's Sparrow	<i>Ammodramus henslowii</i> https://ecos.fws.gov/ecp/species/3941	Breeding
Kentucky Warbler	<i>Oporornis formosus</i>	Breeding
Least Bittern	<i>Ixobrychus exilis</i> https://ecos.fws.gov/ecp/species/6175	Breeding
Loggerhead Shrike	<i>Lanius ludovicianus</i> https://ecos.fws.gov/ecp/species/8833	Year-round
Prairie Warbler	<i>Dendroica discolor</i>	Breeding
Prothonotary Warbler	<i>Protonotaria citrea</i>	Breeding
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Year-round
Rusty Blackbird	<i>Euphagus carolinus</i>	Wintering
Sedge Wren	<i>Cistothorus platensis</i>	Migrating
Short-eared Owl	<i>Asio flammeus</i> https://ecos.fws.gov/ecp/species/9295	Wintering
Wood Thrush	<i>Hylocichla mustelina</i>	Breeding
Worm Eating Warbler	<i>Helmitheros vermivorum</i>	Breeding

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAA/NCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAANCCOS models: the models were developed as part of the NOAANCCOS project: [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#). The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the [Northeast Ocean Data Portal](#), which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The [Avian Knowledge Network \(AKN\)](#) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest, survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the [Migratory Bird Programs AKN Histogram Tools](#) webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAANCCOS [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project](#) webpage.

Facilities

Wildlife refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

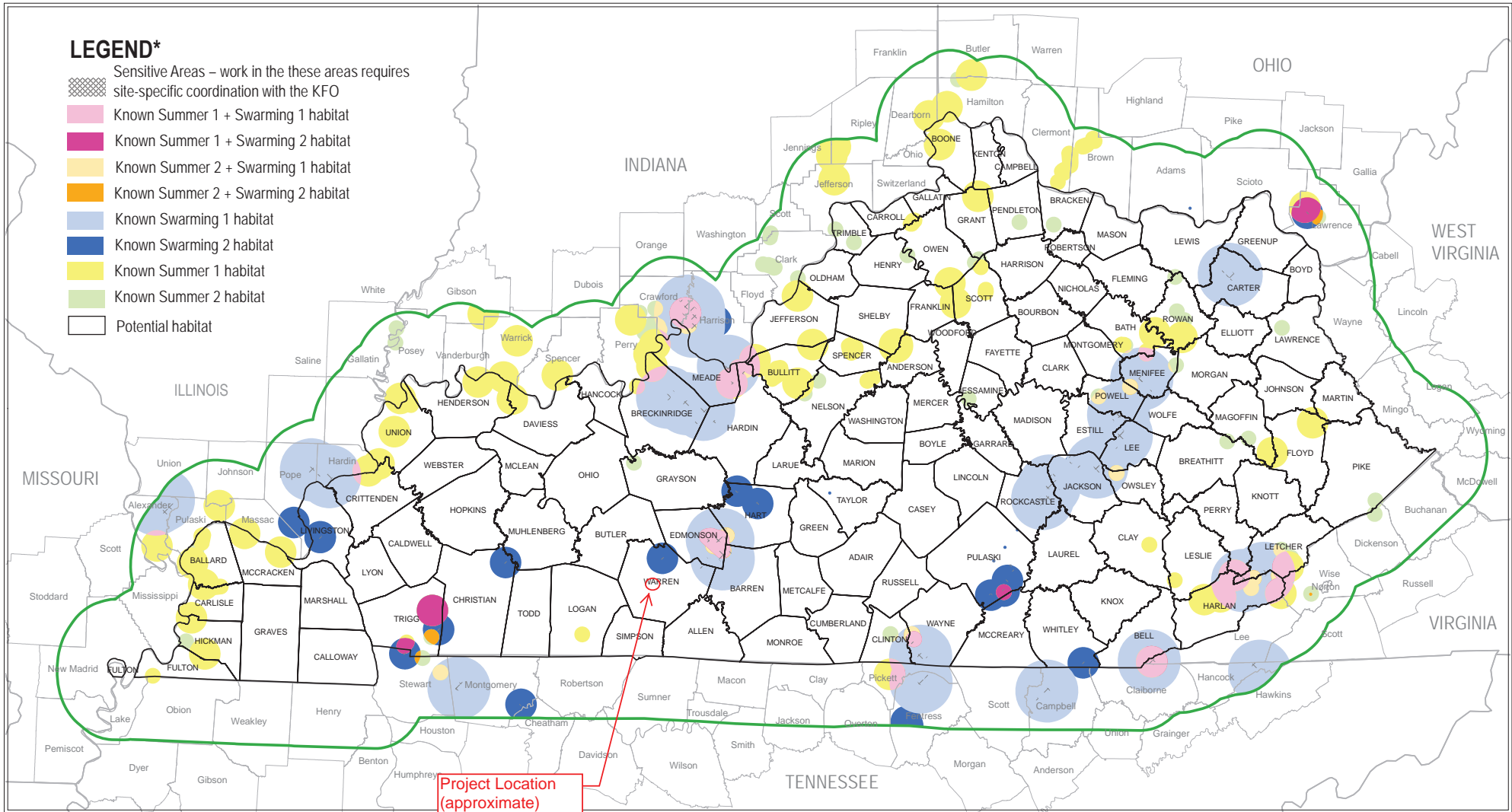
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.



Known Indiana bat habitat in Kentucky and within 20 miles (November 2016)



NOTE: This map is based on species occurrence information and is subject to change as new data become available. Please contact our office at 502/695-0468 to ensure you are working with the most current version.

*For an explanation of terms, please see the Conservation Strategy for Forest-Dwelling Bats in the Commonwealth of Kentucky.



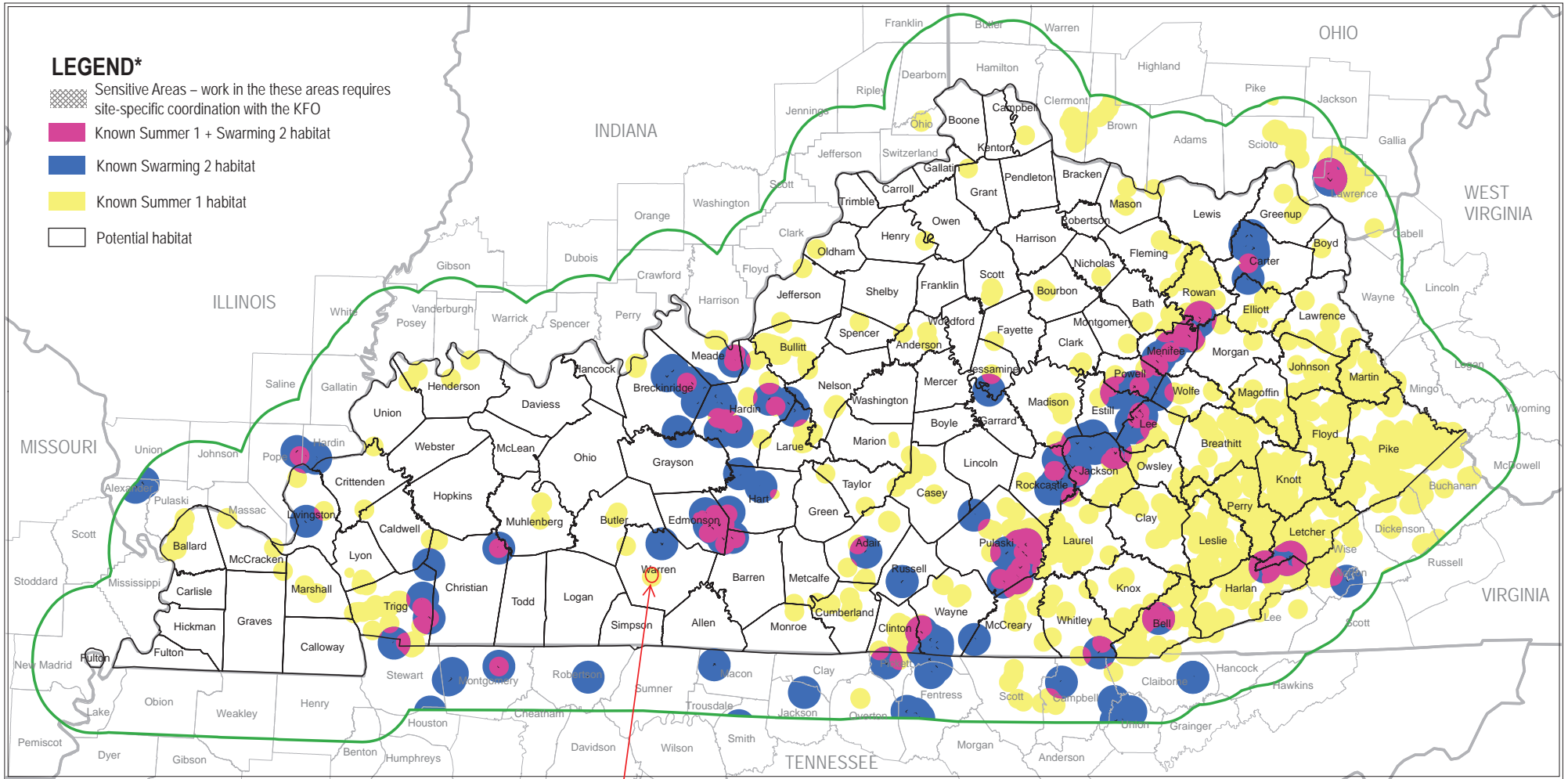
The USFWS makes no warranty for use of this map and cannot be held liable for actions or decisions based on map content. This map was produced as an appendix to the Conservation Strategy for Forest-Dwelling Bats in the Commonwealth of Kentucky and should only be used in the context of this Strategy.





U.S. Fish & Wildlife Service

Known northern long-eared bat habitat in Kentucky and within 20 miles (November 2016)



NOTE: This map is based on species occurrence information and is subject to change as new data become available. Please contact our office at 502/695-0468 to ensure you are working with the most current version.

*For an explanation of terms, please see the Conservation Strategy for Forest-Dwelling Bats in the Commonwealth of Kentucky.

Project Location (approximate)



The USFWS makes no warranty for use of this map and cannot be held liable for actions or decisions based on map content. This map was produced as an appendix to the Conservation Strategy for Forest-Dwelling Bats in the Commonwealth of Kentucky and should only be used in the context of this Strategy.

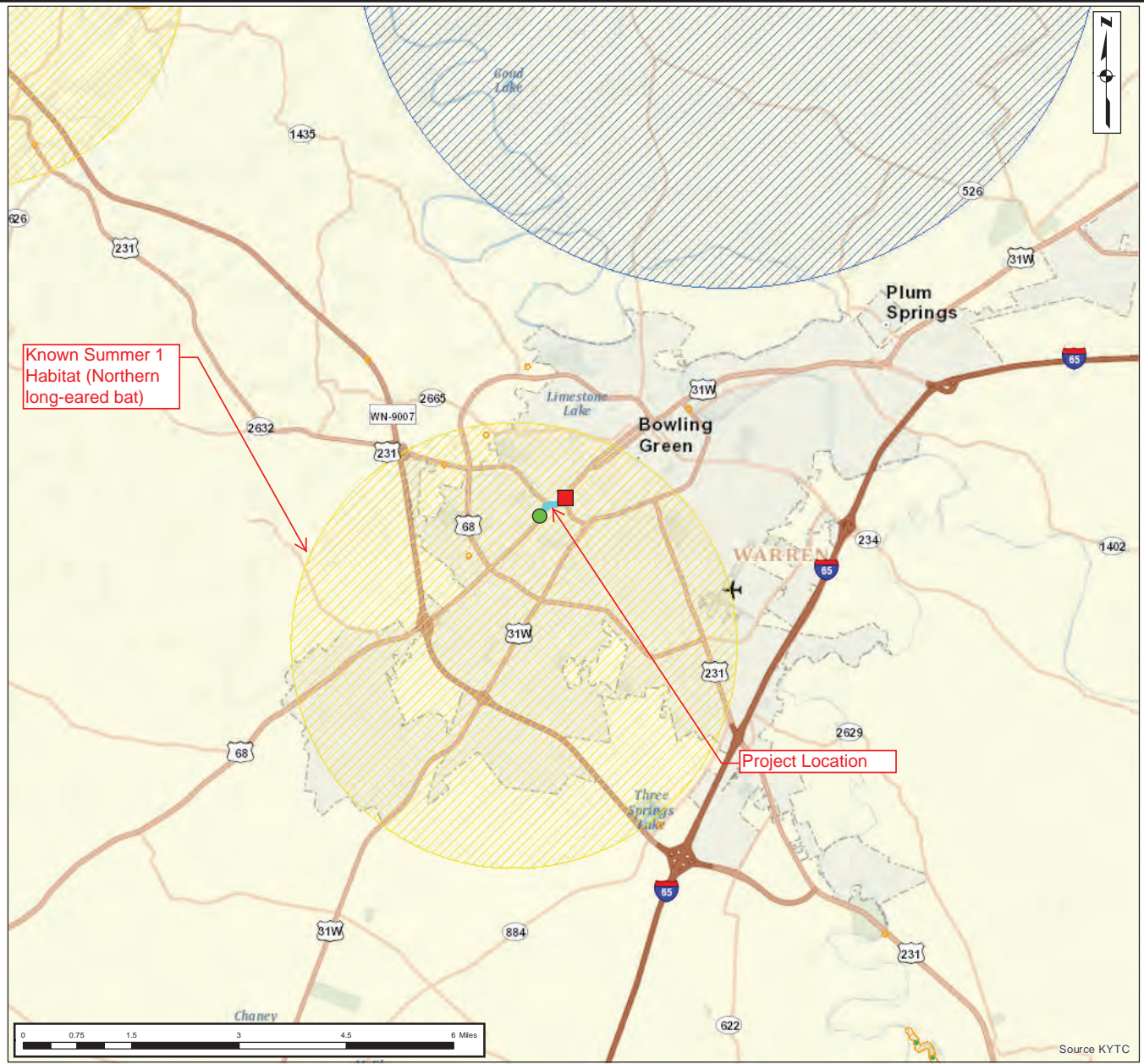
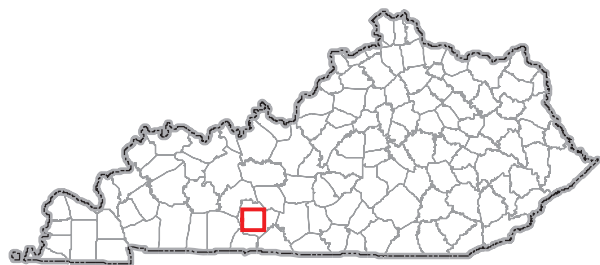


US68X and US 231X

Date: 8/4/2017



Kentucky Transportation Cabinet
200 Mero St, Suite W-5
Frankfort, KY 40601
Phone: (502) 564-4890



Source KYTC



Species Information

State Threatened, Endangered, and Special Concern Species observations for selected quads

Linked life history provided courtesy of [NatureServe Explorer](#).
 Records may include both recent and historical observations.
[US Status Definitions](#) [Kentucky Status Definitions](#)

List State Threatened, Endangered, and Special Concern Species observations in 1 selected quad.
 Selected quad is: Bowling Green South.

Scientific Name and Life History	Common Name and Pictures	Class	Quad	US Status	KY Status	WAP	Reference
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Aves	Bowling Green South	N	S	Yes	Reference
<i>Alasmidonta marginata</i>	Elktoe	Bivalvia	Bowling Green South	N	T	Yes	Reference
<i>Anas clypeata</i>	Northern Shoveler	Aves	Bowling Green South	N	E		Reference
<i>Anas discors</i>	Blue-winged Teal	Aves	Bowling Green South	N	T		Reference
<i>Ardea alba</i>	Great Egret	Aves	Bowling Green South	N	T	Yes	Reference
<i>Asio flammeus</i>	Short-eared Owl	Aves	Bowling Green South	N	E	Yes	Reference
<i>Bubulcus ibis</i>	Cattle Egret	Aves	Bowling Green South	N	S		Reference
<i>Cardellina canadensis</i>	Canada Warbler	Aves	Bowling Green South	N	S	Yes	Reference
<i>Certhia americana</i>	Brown Creeper	Aves	Bowling Green South	N	E	Yes	Reference
<i>Circus cyaneus</i>	Northern Harrier	Aves	Bowling Green South	N	T	Yes	Reference
<i>Cistothorus platensis</i>	Sedge Wren	Aves	Bowling Green South	N	S	Yes	Reference
<i>Cryptobranchus alleganiensis alleganiensis</i>	Eastern Hellbender	Amphibia	Bowling Green South	N	E	Yes	Reference
<i>Cyprogenia stegaria</i>	Fanshell	Bivalvia	Bowling Green South	E	E	Yes	Reference
<i>Dolichonyx oryzivorus</i>	Bobolink	Aves	Bowling Green South	N	S	Yes	Reference
<i>Empidonax minimus</i>	Least Flycatcher	Aves	Bowling Green South	N	E	Yes	Reference
<i>Epioblasma torulosa rangiana</i>	Northern Riffleshell	Bivalvia	Bowling Green South	E	E	Yes	Reference
<i>Epioblasma triquetra</i>	Snuffbox	Bivalvia	Bowling Green South	E	E	Yes	Reference
<i>Falco peregrinus</i>	Peregrine Falcon	Aves	Bowling Green South	N	E	Yes	Reference
<i>Fulica americana</i>	American Coot	Aves	Bowling Green South	N	E		Reference
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Aves	Bowling Green South	N	T	Yes	Reference
<i>Hybopsis amnis</i>	Pallid Shiner	Actinopterygii	Bowling Green South	N	E	Yes	Reference
<i>Ictinia mississippiensis</i>	Mississippi Kite	Aves	Bowling Green South	N	S	Yes	Reference
<i>Junco hyemalis</i>	Dark-eyed Junco	Aves	Bowling Green South	N	S		Reference
<i>Lampsilis ovata</i>	Pocketbook	Bivalvia	Bowling Green South	N	E	Yes	Reference
<i>Lophodytes cucullatus</i>	Hooded Merganser	Aves	Bowling Green South	N	T	Yes	Reference
<i>Myotis grisescens</i>	Gray Myotis	Mammalia	Bowling Green South	E	T	Yes	Reference
<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron	Aves	Bowling Green South	N	T	Yes	Reference
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	Aves	Bowling Green South	N	T	Yes	Reference
<i>Orconectes pellucidus</i>	Mammoth Cave Crayfish	Malacostraca	Bowling Green South	N	S	Yes	Reference
<i>Passerculus sandwichensis</i>	Savannah Sparrow	Aves	Bowling Green South	N	S	Yes	Reference
<i>Percina macrocephala</i>	Longhead Darter	Actinopterygii	Bowling Green South	N	E	Yes	Reference

<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Aves	Bowling Green South	N	T		Reference
<i>Phenacobius uranops</i>	Stargazing Minnow	Actinopterygii	Bowling Green South	N	S	Yes	Reference
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	Aves	Bowling Green South	N	S	Yes	Reference
<i>Pleurobema clava</i>	Clubshell	Bivalvia	Bowling Green South	E	E	Yes	Reference
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Aves	Bowling Green South	N	E	Yes	Reference
<i>Pseudanophthalmus transfluvialis</i>	A Cave Obligate Beetle	Insecta	Bowling Green South	N	S		Reference
<i>Rabdotus dealbatus</i>	Whitewashed Rabdotus	Gastropoda	Bowling Green South	N	T		Reference
<i>Setophaga fusca</i>	Blackburnian Warbler	Aves	Bowling Green South	N	T	Yes	Reference
<i>Sitta canadensis</i>	Red-breasted Nuthatch	Aves	Bowling Green South	N	E	Yes	Reference
<i>Thryomanes bewickii</i>	Bewick's Wren	Aves	Bowling Green South	N	S	Yes	Reference
<i>Toxolasma lividum</i>	Purple Lilliput	Bivalvia	Bowling Green South	N	E	Yes	Reference
<i>Typhlichthys subterraneus</i>	Southern Cavefish	Actinopterygii	Bowling Green South	N	S	Yes	Reference
<i>Tyto alba</i>	Barn Owl	Aves	Bowling Green South	N	S	Yes	Reference
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Aves	Bowling Green South	N	T	Yes	Reference
<i>Villosa lienosa</i>	Little Spectaclecase	Bivalvia	Bowling Green South	N	S	Yes	Reference
<i>Villosa ortmanni</i>	Kentucky Creekshell	Bivalvia	Bowling Green South	N	T	Yes	Reference
<i>Vireo bellii</i>	Bell's Vireo	Aves	Bowling Green South	N	S	Yes	Reference

48 species are listed.

Matthew G. Bevin
Governor



Charles G. Snaveley
Secretary
Energy and Environment Cabinet

Commonwealth of Kentucky
Kentucky State Nature Preserves Commission
Teton Trail
Frankfort, Kentucky 40601-1403
502-573-2886 Voice
502-573-2355 Fax

Jason L. Weese
Director
KSNPC

August 16, 2017

Bill Leopold
Stantec
11687 Lebanon Road
Cincinnati, OH 45241

Data Request 18-007

Dear Mr. Leopold,

This letter is in response to your data request of July 20, 2017 for the Planning Study of US 68X and 231X in Warren County, Kentucky. 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 the general area of study on the Bowling Green South USGS Quadrangle. Please see the **attached reports** for more information.

1-mile for all records – 22 records
5-mile for aquatic records – 44 records
5-mile for federally listed species – 22 records
10-mile for mammals and birds – 27 records

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 (801 Teton Trail, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage

Data Request 18-007

August 16, 2016

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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.

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

TAXONOMICGROUP	SNAME	COMMONNAME	SPROT	USESA	LASTOBS	HABITAT
Amphibians	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	E	SOMC	2007-08-12	Confined to running waters of fairly large streams and rivers, especially in stretches with large flat stones.
Breeding Birds	Aimophila aestivalis	Bachman's Sparrow	E	SOMC	1959-	Early successional areas with scattered saplings (often pines), bushes, or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles.
Breeding Birds	Anas clypeata	Northern Shoveler	E		1989-07-17	Nests occasionally in temporary karst lakes in open agricultural land.
Breeding Birds	Anas discors	Blue-winged Teal	T		1998-07-17	Marshes, ponds, sloughs, lakes and sluggish streams. In migration and when not breeding, in both freshwater and brackish situations (B83COM01NA).
Breeding Birds	Anas discors	Blue-winged Teal	T		2011-07-17	
Breeding Birds	Chondestes grammacus	Lark Sparrow	T		1968-06-09	Open situations with scattered bushes and trees, prairie, forest edge, cultivated areas, orchards, fields with bushy borders, and savanna (B83COM01NA).
Breeding Birds	Chondestes grammacus	Lark Sparrow	T		1998-07-23	
Breeding Birds	Chondestes grammacus	Lark Sparrow	T		1945-08-05	
Breeding Birds	Cistothorus platensis	Sedge Wren	S		1989-SU	Grasslands and savanna, especially where wet or boggy, sedge marshes, locally in dry cultivated grainfields. In migration and winter also in brushy grasslands. (B83COM01NA)
Breeding Birds	Fulica americana	American Coot	E		1950-SU	Freshwater lakes, ponds, marshes, and larger rivers, wintering also on brackish estuaries and bays. Also on land bordering these habitats.
Breeding Birds	Fulica americana	American Coot	E		1939	
Breeding Birds	Gallinula galeata	Common Gallinule	T		1935-08-06	Freshwater marshes, canals, quiet rivers, lakes, ponds, mangroves, primarily in areas of emergent vegetation and grassy borders; taro patches in HI.
Breeding Birds	Lophodytes cucullatus	Hooded Merganser	T		1997-06-05	Streams, lakes, swamps, marshes, and estuaries; winters mostly in freshwater but also regularly in estuaries and sheltered bays (B83COM01NA).
Breeding Birds	Nyctanassa violacea	Yellow-crowned Night-heron	T		1949-04-13	Marshes, swamps, lakes, lagoons, and mangroves.
Breeding Birds	Podilymbus podiceps	Pied-billed Grebe	E		2011-06-15	Lakes, ponds, sluggish streams, and marshes; also in brackish bays and estuaries in migration and when not breeding.
Breeding Birds	Podilymbus podiceps	Pied-billed Grebe	E		1989-07-04	
Breeding Birds	Thryomanes bewickii	Bewick's Wren	S	SOMC	1989-06-02	Brushy areas, thickets and scrub in open country, open and riparian woodland. Found in rural towns and farmsteads.
Breeding Birds	Thryomanes bewickii	Bewick's Wren	S	SOMC	1987-	
Breeding Birds	Tyto alba	Barn Owl	S		2004-06-09	Open and partly open country in a wide variety of situations, often around human habitation (B83COM01NA). In northern winter often roosts in dense conifers; also roosts in nest boxes if available (A85MAR01NA).
Crustaceans	Barbicambarus cornutus	Bottlebrush Crayfish	S		2004-10-04	Lives under or near large, flat cobbles or boulders in streams (Taylor and Schuster, 2004)
Crustaceans	Orconectes pellucidus	Mammoth Cave Crayfish	S	SOMC	1964-08-07	Subterranean waters (Hobbs 1976).
Fishes	Hypopsis amnis	Pallid Shiner	E	SOMC	1955-07-21	Sandy and silty pools of medium to large rivers (Page and Burr 1991). Clear, upland streams and rivers with moderate current, over clean substrates, often above and below riffles (Kuehne and Barbour 1983, Page 1983, Burr and Warren 1986).
Fishes	Percina macrocephala	Longhead Darter	E	SOMC	1890-	Inhabits medium-size streams to small rivers with high gradient, permanent flow, clear water, and pebble and gravel substrates (Burr and Warren 1986).
Fishes	Percina macrocephala	Longhead Darter	E	SOMC	1890-08-02	
Fishes	Phenacobius uranops	Stargazing Minnow	S		1890-08-01	Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P Occurs in large to medium size streams but more typical of smaller streams (Buchanan 1980, Goodrich and Van Der Schalie 1944, Oesch 1984, Parmalee 1967, Wilson and Clark 1914). Sometimes found in lakes connected to rivers. Parmalee (1967) reported the pre
Fishes	Phenacobius uranops	Stargazing Minnow	S		1890-08-02	
Fishes	Typhlichthys subterraneus	Southern Cavefish	S	SOMC	1969-10-24	Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P Occurs in large to medium size streams but more typical of smaller streams (Buchanan 1980, Goodrich and Van Der Schalie 1944, Oesch 1984, Parmalee 1967, Wilson and Clark 1914). Sometimes found in lakes connected to rivers. Parmalee (1967) reported the pre
Freshwater Mussels	Alasmidonta marginata	Elktoe	T	SOMC	1988-12-20-pre	Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).
Freshwater Mussels	Alasmidonta marginata	Elktoe	T	SOMC	1908-12-02	
Freshwater Mussels	Alasmidonta marginata	Elktoe	T	SOMC	1993-09-08	
Freshwater Mussels	Cyprogenia stegaria	Fanshell	E	LE	1989-01-16-pre	Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers (Clarke 1981, Watters 1987). Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water (Baker 1928, Buchanan 1980, Johnson 1978, Murray and Leonard 1962, Parmalee 1967). Often deeply buried in substrate and overlooked by coll
Freshwater Mussels	Cyprogenia stegaria	Fanshell	E	LE	1927-08-27	
Freshwater Mussels	Cyprogenia stegaria	Fanshell	E	LE	1924-08-11	
Freshwater Mussels	Cyprogenia stegaria	Fanshell	E	LE	1927-08-27	
Freshwater Mussels	Epioblasma torulosa rangiana	Northern Riffleshell	E	LE	1924-08-11	
Freshwater Mussels	Epioblasma torulosa rangiana	Northern Riffleshell	E	LE	1927-08-27	
Freshwater Mussels	Epioblasma torulosa rangiana	Northern Riffleshell	E	LE	1978-pre	
Freshwater Mussels	Epioblasma triquetra	Snuffbox	E	LE	1924-08-11	Gravel bars and deep pools in large rivers and large to medium-sized streams (Ahlstedt 1984, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967).
Freshwater Mussels	Epioblasma triquetra	Snuffbox	E	LE	1927-08-24	
Freshwater Mussels	Epioblasma triquetra	Snuffbox	E	LE	1964-07-17	
Freshwater Mussels	Fusconaia subrotunda	Longsolid	S		1927-	Considered a large river species (Clench and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976), but occurs in medium-sized streams in gravel, sand, or even mud (Parmalee 1967, Johnson 1970, Gordon and Layzer 1989). In the Lower Wabash and Ohio Rivers s
Freshwater Mussels	Fusconaia subrotunda	Longsolid	S		1908-11-30	
Freshwater Mussels	Lampsilis ovata	Pocketbook	E		1924-08-11	Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989).
Freshwater Mussels	Lampsilis ovata	Pocketbook	E		1908-11-30	
Freshwater Mussels	Lampsilis ovata	Pocketbook	E		1927-08-27	
Freshwater Mussels	Plethobasus cyphus	Sheepnose	E	LE	1989-pre	

Freshwater Mussels	Pleurobema clava	Clubshell	E	LE	1924-08-11	This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watte
Freshwater Mussels	Pleurobema clava	Clubshell	E	LE	1927-08-27	
Freshwater Mussels	Pleurobema clava	Clubshell	E	LE	1927-08-27	
Freshwater Mussels	Pleurobema clava	Clubshell	E	LE	1908-12-02	
Freshwater Mussels	Pleurobema clava	Clubshell	E	LE	19--	
Freshwater Mussels	Pleurobema plenum	Rough Pigtoe	E	LE	1988-04-15	Medium to large rivers in sand, gravel, and cobble substrates (Ahlstedt 1984, Bogan and Parmalee 1983, Clarke 1981, Neel and Allen 1964).
Freshwater Mussels	Quadrula cylindrica cylindrica	Rabbitsfoot	T	LT	1924-08-11	Small to large rivers with sand, gravel, and cobble and moderate to swift current, sometimes in deep water (Parmalee 1967, Bogan and Parmalee 1983).
Freshwater Mussels	Quadrula cylindrica cylindrica	Rabbitsfoot	T	LT	1927-08-27	
Freshwater Mussels	Villosa fabalis	Rayed Bean	X	LE	1984-pre	Occurs in small to medium-size rivers where it lives deeply buried in sand and gravel bound together by the roots of aquatic vegetation (Bogan and Parmalee 1983; Ortmann 1925, 1926; Parmalee 1967; Stansbery 1976). This small mussel is easy to overlook bec Inhabits small to medium-sized rivers, usually in shallow water on a sand/mud/detritus bottom (Parmalee 1967, Gordon and Layzer 1989).
Freshwater Mussels	Villosa lienosa	Little Spectaclecase	S		1964-07-17	
Freshwater Mussels	Villosa lienosa	Little Spectaclecase	S		1927-08-27	
Freshwater Mussels	Villosa lienosa	Little Spectaclecase	S		1927-08-27	
Freshwater Mussels	Villosa ortmanni	Kentucky Creekshell	T	SOMC	1964-08-17	Free-flowing, upland rivers that range in size from small (1st order) spring fed streams to the Green River (Cicerello 1994). Many flow permanently, but others sometimes have no flow. Substrates range from cobble and boulder with mixed gravel and sand ove
Freshwater Mussels	Villosa ortmanni	Kentucky Creekshell	T	SOMC	1924-08-11	
Freshwater Mussels	Villosa ortmanni	Kentucky Creekshell	T	SOMC	1927-08-27	
Freshwater Mussels	Villosa ortmanni	Kentucky Creekshell	T	SOMC	1927-08-27	
Insects	Pseudanopthalmus transfluvialis	A Cave Obligate Beetle	H		1985-pre	Cave obligate. Wet wood and damp mud banks (Barr 1995).
Insects	Pseudanopthalmus transfluvialis	A Cave Obligate Beetle	H		1949-09-26	
Insects	Pseudanopthalmus transfluvialis	A Cave Obligate Beetle	H		1985-pre	
Mammals	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	S	SOMC	1975-04-11	This bat uses a variety of sites for roosting including caves, protected sites along cliffines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc.
Mammals	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	S	SOMC	2013-01-30	
Mammals	Myotis grisescens	Gray Myotis	T	LE	2015-01-28	Primarily use caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females. Smaller colonies also occasionally roost under bridge structures.
Mammals	Myotis grisescens	Gray Myotis	T	LE	2005-07-18	
Mammals	Myotis grisescens	Gray Myotis	T	LE	2005-07-21	
Mammals	Myotis grisescens	Gray Myotis	T	LE	2007-08-07	
Mammals	Myotis septentrionalis	Northern Long-Eared Bat	E	LT	2012-02-15	In winter, Northern Long-eared bats use caves, mine portals, abandoned tunnels, protected sites along cliffines and similar situations that afford protection from cold. They are easily overlooked as they often wedge themselves back into cracks in the wal Primarily use caves for hibernacula, although they are occasionally found in old mine portals. During summer, colonies are found behind slabs of exfoliating bark of dead trees, often in bottomland or floodplain habitats, but also in upland situations.
Mammals	Myotis sodalis	Indiana Bat	E	LE	2015-01-28	The evening bat is a colonial species that roosts in trees and houses. It apparently migrates southward in winter.
Mammals	Nycticeius humeralis	Evening Bat	S		2005-07-18	
Snails	Rabdotus dealbatus	Whitewashed Rabdotus	T		1958-01-11	A calciphile and is found crawling on the ground or on low vegetation in wet weather (Hubricht 1985). Associated with glades.
Vascular Plants	Apios priceana	Price's Potato-bean	E	LT	1920-07-31	Rocky limestone open wooded slopes and floodplain edges among mixed hardwoods.
Vascular Plants	Delphinium carolinianum	Carolina Larkspur	T		1990-	Dry woods, prairies, sandhills (Gleason & Cronquist 1991); edges of cedar glades.
Vascular Plants	Delphinium carolinianum	Carolina Larkspur	T		1988-05-20	
Vascular Plants	Leavenworthia torulosa	Necklace Gladecress	T		1980-	Limestone glades and other thin-soil areas where limestone bedrock is at or near surface, holding water in spring.
Vascular Plants	Oenothera triloba	Stemless Evening-primrose	T		1969-05-05	Dry woods, barrens, and prairies, often calcareous; in KY, glades, dry limestone soil, rock outcrops in fields.
Vascular Plants	Trifolium reflexum	Buffalo Clover	E		1910-	Prairies and disturbed openings either associated with forests or opportunistically in fields or well-drained sites.

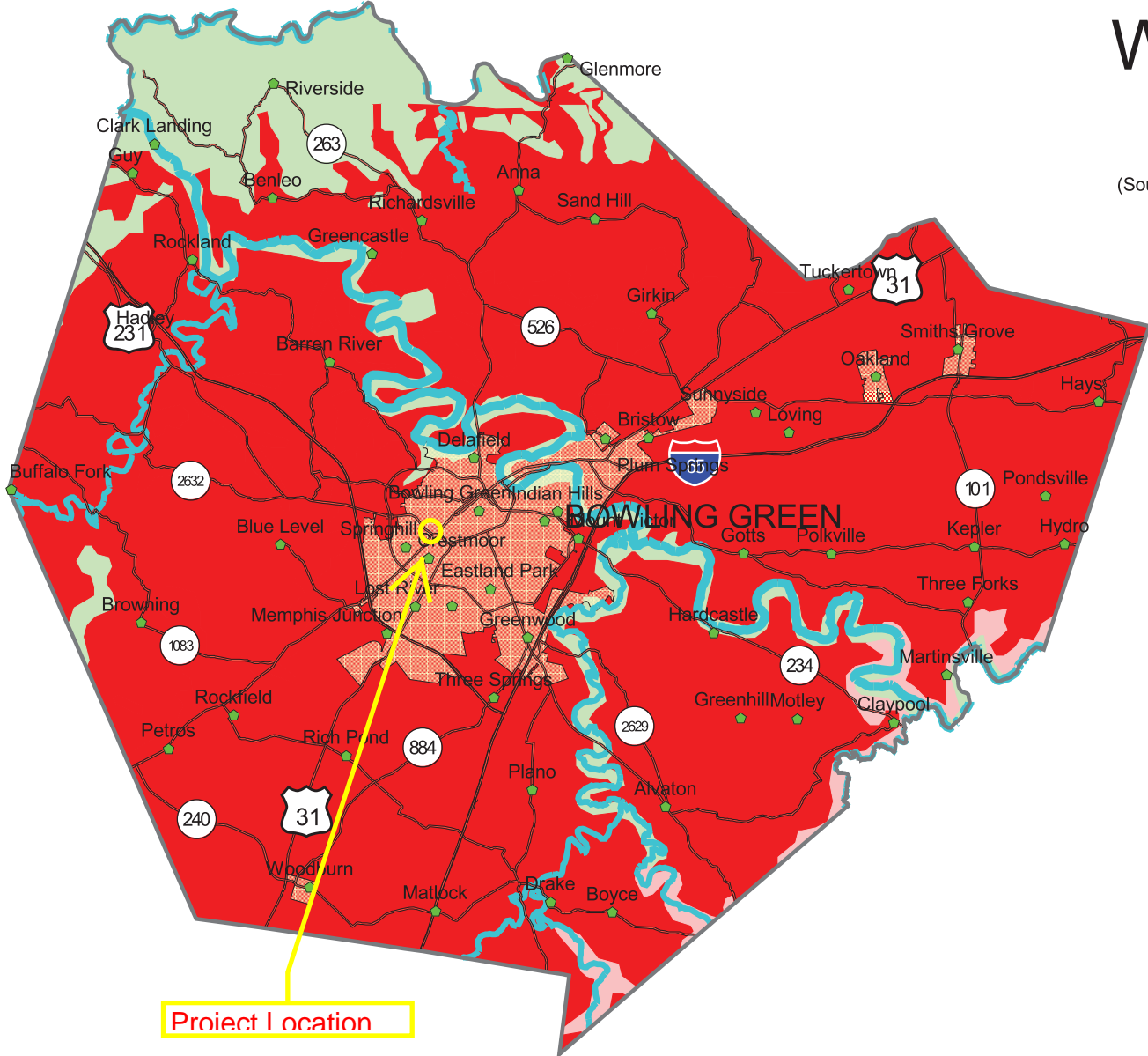
SUPPORTING MATERIALS 2

KARST

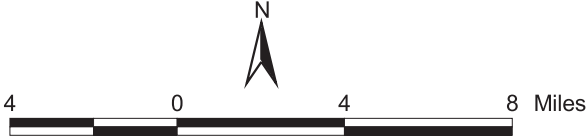
- Warren County Karst Areas Map
- KSS Cave Data Request Response (redacted)
- KSS Cave Map, Lost River Cave Group (excerpt)
- Dr. Christopher Groves communication regarding cave information

Warren County Karst Areas

(Source: Geologic Map of Kentucky, Scale, 1:500,000)

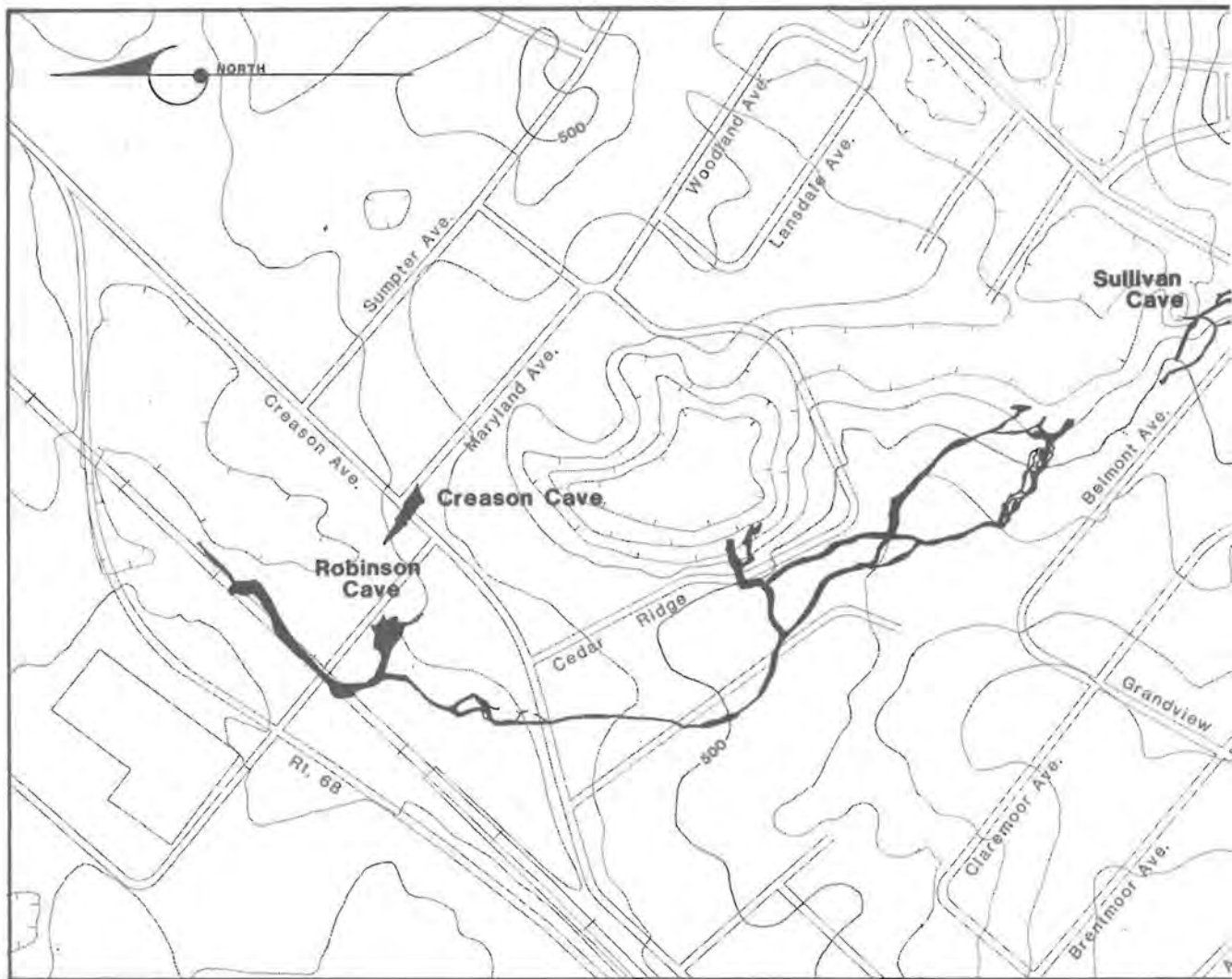


- Intense Karst
- Karst Prone
- Non-karst



Project Location

FID	Shape *	FID_	ID	DecLat	DecLong	CaveName	Accession
5068	Point			0		Lost River System	114-0004
5394	Point			0		Creason Cave	114-0327



LOST RIVER CAVE GROUP

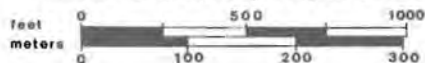
BOWLING GREEN, KENTUCKY

EXPLORED AND SURVEYED BY:

CENTER FOR CAVE AND KARST STUDIES, WESTERN KENTUCKY UNIVERSITY
AND THE
GREEN RIVER GROTTO OF THE NATIONAL SPELEOLOGICAL SOCIETY

For the
CITY OF BOWLING GREEN, KENTUCKY

Nicholas C. Crawford, Project Director



This map includes 9.31 miles of surveyed cave passage as of December, 1986. Exploration and survey continue.

Lost River Cave System

Includes Lost River, Smallhole, Big Bertha, Livingston, and Alexander Cave Entrances

34,327 feet of surveyed passage

Robinson Cave

7,583 feet of surveyed passage

Creason Cave

273 feet of surveyed passage

Sullivan Cave

1,664 feet of surveyed passage

Cold River Cave

169 feet of surveyed passage

State Troop

4,963 feet of surveyed passage

Cave survey plots: Chris Groves, Tim Shaftstall, Jim Webster, John Hoffelt, Frank Bogle

Cave survey data reduction computer program courtesy of Dr. Jay Sloan

cartography: Chris Groves

Leopold, Bill

From: Groves, Christopher <chris.groves@wku.edu>
Sent: Wednesday, August 02, 2017 1:59 PM
To: hkalnitz@fuse.net; Leopold, Bill
Cc: caverjoshbrewer23@gmail.com; currens@email.uky.edu; vanders33@yahoo.com; sarahmariecaver@gmail.com; Kambesis, Patricia; Bledsoe, Lee
Subject: Re: KSS Data Request by Bill Leopold

Hi!

Presuming from the email that this is ok from the KSS perspective (this all sounds like reasonable use to me) I can make some additional comments on the caves that Howard mentioned. I didn't see the defined area of interest. Lost River Cave is about 7 miles long with large rooms in places, and passes under much of BG. Creason Cave is a small horizontal cave about 30 feet below the level of Creason Drive in front of McNeill Elementary. It does not have a natural entrance and was located through geophysics in about 1986 as part of an investigation led by Nick Crawford into gasoline fumes in the unsaturated zone beneath Bowling Green. A 30" well allowed access to the cave and a group of us (I was a grad student of Nick's at the time) made 1-2 trips into the cave to explore and map it. The passage itself is more extensive than the map through filled with clay--the part we mapped was where the clay had been washed out by a small stream. Howard mentioned Robinson Cave which is very close to Creason Cave. It was also without a natural entrance and located by Nick through geophysics (microgravity) and entered with a 30" drill hole. It is a much more extensive cave (I seem to remember that the map is about 7,000') with several streams and one large room. The drilled entrance had a manhole cover but was subsequently forgotten and I think is now covered by an apartment building. I can't recall the name of the apartments right now but they are along Robinson Ave. between Russellville Road (behind the Waffle House) and Creason Drive. Howard also mentioned State Trooper Cave, a large and hydrologically but not humanly connected tributary to Lost River, and it is worth noting because this was the cave that collapsed to form the catastrophic Dishman Lane collapse in 2002. There are pictures of that one he internist and Pat published a paper about it in the mid-late 2000's.

This is just off the top of my head and I would be happy to try to answer any other questions. There are some old reports of Nick's that we likely have copies of up at WKU that have some information about these caves.

Take care,

Chris

Chris Groves, PhD
WKU Distinguished Professor of Hydrogeology and Director, Crawford Hydrology Laboratory
Associate Editor, Hydrogeology Journal
Dept. of Geography and Geology, Western Kentucky University Bowling Green, KY 42101 USA +1 270 745-5974
https://www.researchgate.net/profile/Christopher_Groves2

From: hkalnitz@fuse.net <hkalnitz@fuse.net>
Sent: Wednesday, August 2, 2017 11:44 AM

SUPPORTING MATERIALS 3

HAZARDOUS MATERIALS CONCERNS

- Table 2: US 68X and US 231X Hazardous Materials Concern Sites Identified Through Database Review and Site Visit

USEPA-Envirofacts Records

Site Number	NAME (Current Business)	REG_ID	ADDRESS	CITY	STATE	ZIPCODE	LATITUDE	LONGITUDE	database
1	Big B Cleaners 120 (Vacant)	110013906871	1901 RUSSELLVILLE RD	BOWLING GREEN	KY	42101	36.97915	-86.4682	AIRS
2	Chevron Usa (West Side Motors)	110003241046	1902 RUSSELLVILLE ROAD	BOWLING GREEN	KY	42101	36.97981	-86.46774	RCRA
3	Holley Performance Products (same)	110000380230	1801 RUSSELLVILLE RD	BOWLING GREEN	KY	42101	36.98155	-86.46586	AIRS, BR, RCRA, TRI
4	Southern Kentucky Rebuilders, Inc. (Dance Images)	110003223351	1803 CREASON DR.	BOWLING GREEN	KY	42101	36.978804	-86.465088	RCRA

KYDWM UST Records

Site Number	AI_NAME (Current Business)	AI_ID	ADDRESS_1				LAT_DD	LONG_DD	records
2	Chevron 0042421 (West Side Motors)	64685	1902 Russellville Rd	Bowling Green	KY	42101	36.979614	-86.467573	UST x 7
5	Fred Youngs Gulf (Taco Bell)	57798	1802 Russellville Rd	Bowling Green	KY	42101	36.981458	-86.465614	UST x 5
6	Hucks #395 (Huck's)	127151	306 Morgantown Rd	Bowling Green	KY	42101	36.981963	-86.465526	UST x 3
7	Jim Johnson Pontiac Nissan Inc (Vacant)	64274	302 Morgantown Rd	Bowling Green	KY	42101	36.982137	-86.465769	UST
8	Thelma & William Manning Property (City Auto Sales)	66089	1906 Russellville Rd	Bowling Green	KY	42101	36.979254	-86.467898	UST
9	WKU Park & Ride (same)	57718	1840 Russellville Rd	Bowling Green	KY	42101	36.981075	-86.466755	UST x 5

Field Survey Identified Sites

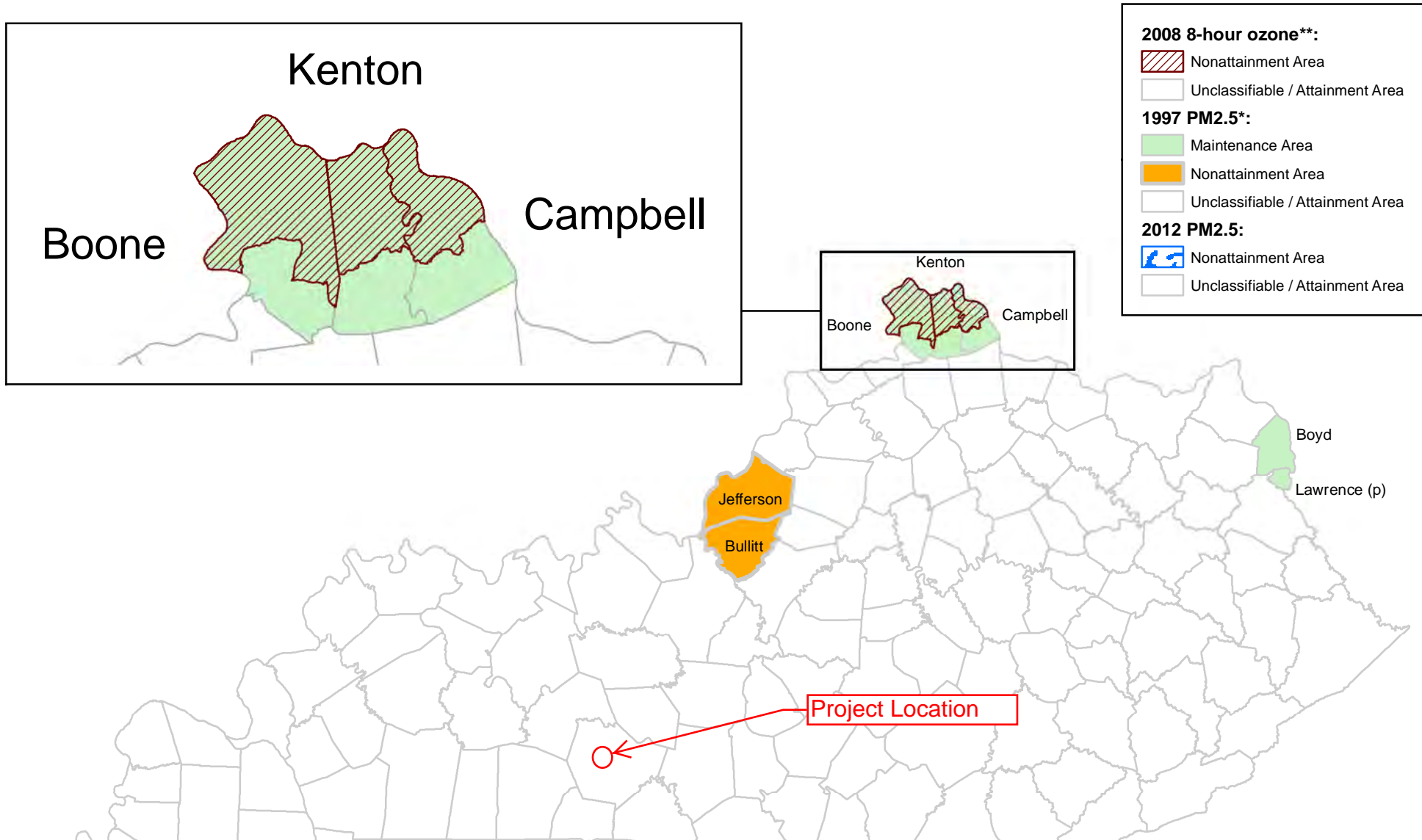
Site Number	Name	Address	Concern
10	WKU Supply-Services Out-building	Russellville Rd	"Hazardous Waste" placard posted on door
8	City Auto Sales	1906 Russellville Rd	automotive sales/service
2	West Side Motors	1902 Russellville Rd	automotive sales/service
11	Electrical Substation	University Blvd	high-voltage electrical equipment

SUPPORTING MATERIALS 4

AIR QUALITY - TRANSPORTATION RELATED POLLUTANTS

- Areas of Air Quality Concern in KY (October 2016)

Areas of Air Quality Concern in KY



*1997 PM2.5 standard to be revoked for Unclassifiable, Attainment, and Maintenance areas only on Oct. 24, 2016. Nonattainment areas must continue transportation conformity until redesignated by EPA at a later date.

**Boone, Kenton, and Campbell are partial counties in Nonattainment for the 2008 8-hour ozone standard.

SUPPORTING MATERIALS 5

ENVIRONMENTAL JUSTICE

- EJ Analysis
- 2010 Census – Census Tract Reference Map for Study Area and Vicinity

**US68X / US231X Environmental Red Flag Summary
Environmental Justice (EJ) Write-Up**

The project area includes portions of Census Tracts 103, 104, 109 and 110.01.

Based on the most recent American Community Survey (ACS; 2011-2015) data available, all four Tracts in the study area have a percentage minority population (15.8% - 45.4%) greater than the county average (15.7%) and the state average (12.0%).

Tract 109 is the only tract having a percentage low-income population (17.0%) less than the county (18%) and state (18.5%) levels. The remaining three tracts range from 38.3% (Tract 110.01) to 56.2% (Tract 104).

Environmental Justice Analysis

The following Environmental Justice Analysis was completed utilizing the socioeconomic data from the most recent U.S. Census American Community Survey (ACS). The most current data set is the 2011-2015 ACS.

Table 3. EJ Populations

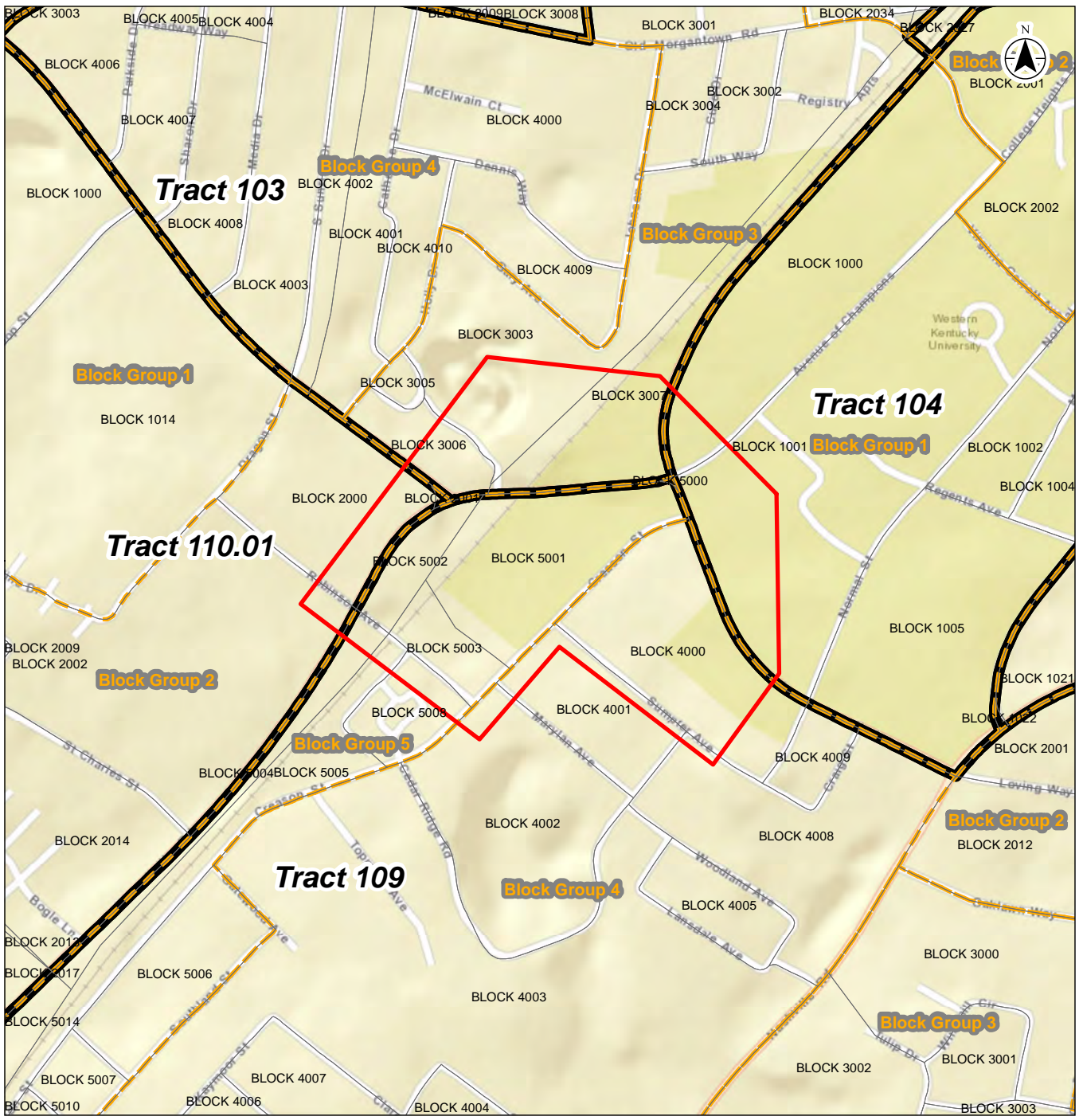
EJ Population	Kentucky	Warren County	Census Tract			
			103	104	109	110.01
Minority	12%	15.7%	45.4	22.2	15.8	30.7
Low-Income	18.5%	18.0%	50.4	56.2	17.0	38.3

Red Text = exceeds County level

Gray Shading = exceeds State of Kentucky level

Sources: US Census 2016, American Community Survey (ACS) 2011-2015 (Census Tract data) and QuickFacts July 1, 2016 estimates (V2016).

Prepared August 2017



- Legend**
- Study Area
 - Census Tract
 - Block Group
 - Block



Project Location: US 68X and US 231X Planning Study, Warren County, Bowling Green, Kentucky
 178556010
 Prepared by BL on 2017-08-28

Client/Project: KYTC-DEA, KYTC District 3
 Environmental Red Flag Summary
 US68X / US231X Planning Study, KYTC Item No. N/A

Figure No.: **Supporting Materials 6**

Title: **2010 Census-Census Tract Reference Map for Study Area and Vicinity**

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Base features: see Sources and References.
3. Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

VA:178556010 US68X US 231X Planning Study.mxd (2017-08-28) By: bblapold

SUPPORTING MATERIALS 6

CULTURAL-HISTORIC RESOURCES

- KOSA Preliminary Records Review (July 27, 2017)
- KHC Preliminary Site Check (August 1, 2017)

Kentucky Office of State Archaeology

University of Kentucky, 1020A Export Street, Lexington, KY 40506
Phone:859-257-1944 Fax:859-323-1698 email:ky-osa@lsv.uky.edu

**Confidential Information
Not for Public Release**

P156807

Planning study improvements US68X and US231X Intersection Bowling Green

Review Performed On: 07/27/2017

This report includes only previously recorded archaeological resources within your project area and its immediate vicinity and may not be exhaustive of all archaeological resources actually present. **This information does not constitute Section 106 consultation or 'clearance' from the KHC/SHPO.**

Review Results

There are no previously recorded archaeological sites or surveys within your project area or an additional 30 m buffer.

Kentucky Heritage Council

Site Identification Program

410 High Street, Frankfort, KY 40601

Confidential Information Not For Public Release

This information report includes only those historic resources within or near the project area that have been previously recorded with the Site Identification Program of the Kentucky Heritage Council and may not be exhaustive of all historic resources that are actually present. Note: this information report does not constitute Section 106 consultation or "clearance" from the KHC/SHPO.

KHC Historic Resources

NAME	LOCATION	NR STATUS
HOUSE	300 SUMPTER AVE BOWLING GREEN KY	UNDETERMINED
HOUSE	301 SUMPTER AVE BOWLING GREEN KY	UNDETERMINED
HOUSE	304 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	305 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	306 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	308 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	309 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	310 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	311 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	312 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	315 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	316 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	319 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	321 SUMPTER AVE BOWLING GREEN	UNDETERMINED

<i>NAME</i>	<i>LOCATION</i>	<i>NR STATUS</i>
HOUSE	325 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	322 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	324 SUMPTER AVE BOWLING GREEN KY	UNDETERMINED
HOUSE	326 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	328 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	329 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	332 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	333 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	334 SUMPTER AVE BOWLING GREEN KY	UNDETERMINED
HOUSE	335 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	402 SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	SUMPTER AVE BOWLING GREEN	UNDETERMINED
HOUSE	410 SUMPTER AVE BOWLING GREEN	UNDETERMINED

Please note that those resources for which National Register status is listed as 'undetermined' may include those that have been previously determined eligible for listing in the National Register of Historic Places as part of a consensus determination between the SHPO and a Federal agency, but for which the determination field has not yet been updated.