

Appendix B: Environmental Overview



**Environmental Overview - Murray
Small Urban Area (SUA) Study**

KYTC Item No. N/A

January 12, 2022

Prepared for:

Kentucky Transportation Cabinet
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Abbreviations

| | |
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| AQ | Aquatic Life |
| AST | Above Ground Storage Tanks |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| EDR | Environmental Data Resources |
| EO | Environmental Overview |
| EPA | Environmental Protection Agency |
| FEMA | Federal Emergency Management Agency |
| IPaC | Information for Planning and Consultation |
| KDFWR | Kentucky Department of Fish and Wildlife Resources |
| KDOW | Kentucky Division of Water |
| KYTC | Kentucky Transportation Cabinet |
| LWCF | Land and Water Conservation Fund |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NFHL | National Flood Hazard Layer |
| NFRAP | No Further Remedial Action Planned |
| NRCS | National Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NS | Not Supporting |
| NWI | National Wetlands Inventory |
| OSA | Kentucky Office of State Archaeology |
| PCR | Primary Contact Recreation |
| PDR | Purchase Development Rights |
| PS | Partially Supporting |
| RCRA | Resource Conservation Recovery Act |



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| SHF/LF | Solid Waste Facilities and Landfill List |
| SEMS | Superfund Enterprise Management System |
| USDA | United States Department of Agriculture |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| UST | Underground Storage Tanks |



Executive Summary

This Environmental Overview (EO) has been prepared for the Murray Small Urban Area (SUA) Study for the Kentucky Transportation Cabinet (KYTC). The objective is to identify and examine transportation issues related to safety and congestion within the study area and to develop strategies to address these issues. The study will identify and evaluate potential improvement options to increase mobility and connectivity in Calloway County around Murray, Kentucky. The objective of this EO is to identify environmental resources of significance, potential jurisdictional features, and other environmental areas of concern that need to be considered in the development of improvement concepts. Natural and human environmental resources within the study area were identified from secondary source information including available electronic databases, data files, and published data that may be publicly available or restricted to subject matter experts. Based on this information, key environmental features within the study area include:

Wetlands: There are 314 National Wetland Inventory (NWI) features mapped within the study area. Of those 314 features, 14 (6.9 ac) are classified as Fresh Water Emergent (PEM) wetland, 51 (1400.7 ac) are Freshwater Forested/Shrub wetland (PSS), 82 (37.2 ac) are Freshwater Ponds (PUB) and 167 (216.3 ac) are Riverine (R) for a total of 1661.3 acres NWI features.

Threatened and Endangered Species: Two federally listed endangered species and two federally listed threatened species have the potential to occur within the study area according to U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC). Final critical habitat has been designated for the federally endangered Indiana Bat (*Myotis sodalis*) habitat within the study area. The federally endangered gray bat (*Myotis grisescens*), federally threatened northern long-eared bat (*Myotis septentrionalis*), and the federally threatened plant, Princes potato-bean (*Apios priceana*) have the potential to occur within the study area. Suitable habitat for all three listed bat species is located on the eastern and southern boundary of the study area in wooded areas. Princes potato-bean prefers lightly disturbed areas such as forest openings, wood edges and where bluffs descend to streams. It is also known to grow along highway rights-of-way and powerline corridors. Princes potato-bean's suitable habitat in the study area would be primarily around the wooded stream corridors near the eastern and southern boundary of the study area.

Groundwater: Within the study area 558 state water wells occur at 229 unique areas, most of which are listed as agricultural use, monitoring wells, remediation use, and domestic-single household use. There are 19 federal wells within the study area and five public water supply systems. There is one wellhead protection area in the study area. It is located in downtown Murray and borders the eastern boundary of the Clark River.

Karst: The majority of the study area is underlain with bedrock with limited to no potential for karst development. There are no sinkholes identified within the study area.

Farmland: Approximately 71.2% of the soils in the study area are identified as Prime Farmland and Farmland of Statewide Importance.



Hazardous Materials Concerns: The EDR report provided 1,491 database records within and surrounding the study area. These database records identified 537 KY spills.

Additionally, the following features are a portion of the records that were identified in the database search: one Federal CERCLIS: SEMS record, two Federal CERCLIS NFRAP: SEMS, Archive records, one RCRA CORRACTS facility, one RCRA non-CORRACTS TSD facility, two RCRA Large Quantity Generator records, five RCRA Small Quantity Generator records, six RCRA Very Small Quantity Generator records, one US INST CONTROLS record, twenty Federal ERNS list records, twenty-eight (28) KY SHWS: State Leads records, six KY SWF/LF: Solid Waste Facilities List records, six KY PSTEAF: Facility Rankings List Records, twelve KY SB193 list records, 99 KY UST: Underground Storage Tank records, 42 KY AST: Above Ground Storage Tank records, one KY INST CONTROL: State Superfund Database record, six KY HIST LF: Historical Landfill records, one KY SWRCY: Recycling Facilities record, seven KY CDL: Clandestine Drug Lab Location Listing records, one KY PFAS: PFAS Detection Site Listing record, one HMIRS: Hazardous Materials Information Reporting System record, 537 KY SPILLS: State spills records, thirty RCRA Non-Gen/NLR records. Potential hazardous materials concerns are associated throughout the study area. For additional information on specific hazardous materials concerns in and around the surrounding study area, please reference the full EDR report (provided separately).

Oil and Gas Wells: There are no reported active oil and gas wells currently in the study area according to KGS. There are two old oil and gas wells within the one-mile buffer of the EDR report. One well is to the northwest and the other is in the southeast of the study area.

Cultural and Historic Resources: Based on the review of National Register of Historic Places (NRHP) there are 24 historic places and two historic districts (partially) located within the study area vicinity. The Kentucky Office of State Archaeology (OSA) preliminary records review indicated 15 recorded archaeological sites, three preliminary sites and two unconfirmed sites within the study area and its immediate vicinity. Due to the sensitive nature of this information, specific site information was not provided.

Community Resources: Community resources and sensitive noise receptors in the study area include single family residential neighborhoods and houses. Thirteen houses of worship, at least five cemeteries, seven schools, and three parks. Five public service facilities are located within the study area. Utility infrastructure in the study area includes one gas pipeline crossings, five electrical transmission corridors, and one wastewater treatment plant.



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1.0 ENVIRONMENTAL OVERVIEW

Stantec Consulting Services has prepared this Environmental Overview (EO) as part of the Murray SUA Study for the Kentucky Transportation Cabinet (KYTC). This overview identifies known natural and human features which occur within the study area that should be considered during the development and advancement of improvement concepts and avoidance or minimization of impacts.

1.1 PROJECT DESCRIPTION

The study area under review includes a study area of 27.5 square miles with Calloway County, Kentucky (**Figure 1**). The objective is to identify and examine transportation issues related to safety and congestion within the study area and to develop strategies to address these issues. The study will identify and evaluate potential improvement options to increase mobility and connectivity in Calloway County.

1.2 RECORDS REVIEW

A review of agency databases and secondary sources was conducted to document known environmental resources including, but not limited to:

- Ecological resources:
 - United States Geological Survey (USGS) streams
 - IPaC Threatened and endangered species list
- FEMA National Flood Hazard Layer (NFHL) Data and National Wetland Inventory (NWI) wetlands (**Figure 2**)
- Farmland Classification of Soils (**Figure 3**)
- Human Environment (**Figure 4**)
- Cultural, historic, and archaeological resources (**Figure 5 – Contains sensitive information. Not available for public use.**)
- Water wells (**Figure 2**)
- Hazardous materials records (**Figure 4**)
- Air quality and noise issues
- Geologic and karst features

Table 1 below provides a summary of the features that were identified within the study area. Project location and aerial features are identified in **Figure 1**. This information provides an overview of resources of



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significance within the study area as well as other environmental issues of potential concern. More detailed environmental studies may be required as individual actions are further developed in accordance with the National Environmental Policy Act (NEPA).

Table 1. Environmental Resources/Features in Murray SUA Study Area, Calloway County, Kentucky

| Environmental Category | Resource/Feature | Source/Information |
|------------------------|---|---|
| USGS Streams | <p>There are seven USGS named streams (Clarks River, UT of Clarks River, Bee Creek, Claytons Creek, Middle Fork/Clarks River, Farley Branch, East Fork Rockhouse Creek) and 198 unnamed stream resources mapped within the study area (most are stream tributaries).</p> <p>Water Health Status for the following creeks have been designated by Kentucky Division of Water (KDOW):</p> <ul style="list-style-type: none"> • <u>Clarks River</u>- Mile 55.0 to 64.4 partially supports (PS) aquatic life (AQ), does not support (NS) primary contact recreation (PCR). Mile 64.4 to 66.5 PS AQ, NS PCR. • <u>UT of Clarks River</u>- Mile 0.0 to 3.3, NS AQ. • <u>Bee Creek</u>- Mile 0.7 to 2.0 fully supports (FS) AQ, 0.0 to 0.7 NS AQ. • <u>Claytons Creek</u>- Mile 0.0 to 1.2 supports PCR. • <u>Middle Fork Clarks River</u>- Mile 0.0 to 2.7, FS AQ and PCM. Mile 2.7 to 4.8, PS AQ and NS PCR. • <u>Farley Branch</u>- Mile 0.0 to 2.2, PS AQ and NS PCR. • <u>East Fork Rockhouse Creek</u>- No Rating. <p>Watersheds in the study area are in the Lower Tennessee HUC-6: 060400. The study area does not contain any "Special Waters" as defined by KDOW.</p> <p>Please refer to digital Attachment 5 for more information regarding KDOW data.</p> | <p>Source: KDOW Special Waters tables, KDOW 305(b) and 303(d) tables (2016), USFWS NWI, USGS National Map, KY Water Health Portal</p> |
| Other Streams | <p>Additional surface streams are likely present in the study area, mainly consisting of small, headwater streams or springs and roadside drainage features not indicated on traditional mapping.</p> | <p>Source: USGS maps, ESRI topo maps</p> |
| Wetlands | <p>There are 314 National Wetland Inventory (NWI) features mapped within the study area. Of those 314 features, 14 (6.9 ac) are classified as Fresh Water Emergent (PEM) wetland, 51 (1400.7 ac) are Freshwater Forested/Shrub wetland (PSS), 82 (37.2 ac) is a Freshwater Pond (PUB) and 167 (216.3 ac) are Riverine (R) for a total of 1661.3 acres NWI features.</p> | <p>Source: USFWS NWI, USGS National Map</p> |
| Ponds | <p>The NWI dataset indicates there are 82 freshwater pond features in the study area for a total of 37.2 acres. Almost all ponds are PUBHh, Palustrine Unconsolidated bottom that hold water permanently.</p> | <p>Source: USFWS NWI, USGS National Map</p> |



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| <p>USFWS Species List</p> | <p>The United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) resource list indicated the following four species were of concern for the study area:</p> <ul style="list-style-type: none"> • Northern long-eared bat (<i>Myotis septentrionalis</i>)-Threatened • Gray bat (<i>Myotis grisescens</i>)-Endangered • Indiana bat (<i>Myotis sodalis</i>)- Endangered • Prices Potato-bean (<i>Apios priceana</i>)- Threatened <p>Please refer to Attachment 1 for more information regarding species data.</p> | <p>Source: USFWS IPaC Trust Resource Report (2021), USFWS Kentucky Ecological Field Office (2019)</p> |
| <p>KDFWR Species List</p> | <p>Kentucky Department of Fish and Wildlife Resources (KDFWR) lists 66 additional State Threatened, Endangered, and Special Concern Species as occurring (either recently or historically) in Calloway County. These include:</p> <ul style="list-style-type: none"> • 24 state endangered species (twelve birds, two mammal, two amphibian, one reptile, four fish, one insect, two mussels) • 21 state threatened species (ten birds, two reptile, two mammal, one amphibian, three fish, two crayfish) • 21 state concern species (twelve birds, one mammal, two amphibian, one reptile, one fish, one lamprey) <p>Please refer to Attachment 1 for more information regarding species data.</p> | <p>Source: KDFWR – Species List for Calloway County (2021)</p> |



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| <p>OKNP Species Database</p> | <p>The Office of Kentucky Nature Preserves (OKNP) provided 19 records including 13 species for which species occurrence records have been noted either in or within one mile of the study area.</p> <p>Within one mile of the study area there are four federally listed endangered species; Prickly Bog Sedge (<i>Carex howei</i>), Virginia Bunchflower (<i>Melanthium virginicum</i>), Ovate Fiddleleaf (<i>Hydrolea ovata</i>) and Possumhaw (<i>Viburnum nudum</i>).</p> <p>There are three federally listed threatened species; Little Brown Bat (<i>Myotis lucifugus</i>), Tricolored Bat (<i>Perimyotis subflavus</i>), Compassplant (<i>Silphium laciniatum</i>),</p> <p>There are also four federal species of management concern: Chain Pickerel (<i>Esox niger</i>), Eastern Ribbon Snake (<i>Thamnophis sauritus sauritus</i>), Northern Crawfish Frog (<i>Lithobates areolatus circulosus</i>), Loggerhead Strike (<i>Lanius ludocivianus</i>)</p> <p>OKNP listed the following areas of concern within one mile of the study area:</p> <ul style="list-style-type: none"> • One managed area- Murray State University Campus <p>The OKNP Natural Heritage Database report summarizes the existing information known to the program at the time of the request for the study area provided. These biological elements or locations in question should not be regarded as final statements nor should they be substituted for on-site surveys required for environmental assessments. Due to the sensitive nature of this data, the specific species locations have been redacted.</p> <p>Please refer to Attachment 1 for more information regarding species data.</p> | <p>Source: OKNP Natural Heritage Database response (August 04, 2021)</p> |
| <p>Groundwater</p> | <p>The Kentucky Watershed Viewer, the EDR report and Water Protection Viewer found 558 state water wells occur at 229 unique areas within the study area, which are listed as agricultural use, monitoring wells, remediation use, and domestic-single household use. There are 19 federal wells within the study area and five public water supply systems.</p> <p>There is one wellhead protection area occurs in the study area. It is located in downtown Murray and bordered the eastern bank of the Clark River.</p> <p>Please refer to Attachment 5 for more information regarding groundwater data.</p> | <p>Source: Kentucky Watershed Viewer (2021), EDR DataMap Well Search Report (August 3, 2021), and Water Protection Viewer (2021)</p> |



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| Karst Areas | The Karst Occurrence map and OKNP database search found that the majority of the study area is underlain with bedrock with limited or no potential for karst development. There were no sinkholes identified within the study area. | Source: Karst Occurrence in Kentucky map (Paylor and Currens 2002), OKNP database response (August 04, 2021) |
| Floodplain | <p>FEMA 100-Year floodplain occurs primarily along the eastern side of the Study area. The Clarks River floodplain is located on the eastern and southern border of the study area. The Bee Creek and other unnamed tributaries of the Clark River have a surrounding FEMA 100-Year floodplain. The Clark River, and its 100-Year floodplain, leaves the study area in the southwestern part of the study area.</p> <p>In the Northwest portion of the study area the East Fork Rockhouse Creek has a 100-Year floodplain as well.</p> <p>Total 100-Year Floodplain acreage is 2025.</p> | Source: FEMA NFHL (2017) |
| Floodway | <p>FEMA designated floodways occur in the eastern portion of the study area along the Clark River and on one of its tributaries, Bee Creek.</p> <p>Total area of floodway within the study area is 1300 acres.</p> | Source: FEMA NFHL (2017) |
| Farmlands | <p>Approximately 71.20% of the soils in the study area are identified as Prime Farmland (46%), Farmland of Statewide Importance (11%), and Prime Farmland if drained, or protected from flooding (14.2%).</p> <p>Please refer to Attachment 4 for the full USDA NRCS Soil Survey Report.</p> | Source: NRCS Web Soil Survey Map Data (2021) |



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| <p>Hazardous Materials</p> | <p>The EDR report provided 1,491 database records within and surrounding the study area. Of which, these database records identified 537 KY spills.</p> <p>Additionally, the following features are a portion of the records that were identified in the database search:</p> <ol style="list-style-type: none"> 1 one Federal CERCLIS: SEMS record- (Calloway dump, Doctor Douglas Road) 2 two Federal CERCLIS NFRAP: SEMS-Archive records- (Vanderbilt Chemicals, 396 Pella Way) and (Tappan Co The/Murray, East Main St) 3 one RCRA CORRACTS facility 4 one RCRA non-CORRACTS TSD facility 5 two RCRA Large Quantity Generator records 6 five RCRA Small Quantity Generator records 7 six RCRA Very Small Quantity Generator records 8 one US INST CONTROLS record 9 20 Federal ERNS list records 10 28 KY SHWS: State Leads records 11 six KY SWF/LF: Solid Waste Facilities List records 12 six KY PSTEAF: Facility Rankings List Records 13 12 KY SB193 list records 14 99 KY UST: Underground Storage Tank records 15 42 KY AST: Above Ground Storage Tank records 16 one KY INST CONTROL: State Superfund Database record 17 six KY HIST LF: Historical Landfill records 18 one KY SWRCY: Recycling Facilities record 19 seven KY CDL: Clandestine Drug Lab Location Listing records 20 one KY PFAS: PFAS Detection Site Listing record 21 one HMIRS: Hazardous Materials Information Reporting System record 22 537 KY SPILLS: State spills records 23 30 RCRA NonGen/NLR records <p>Other Ascertainable Records:</p> <ol style="list-style-type: none"> 24 one US FIN ASSUR record 25 three TSCA records 26 four TRIS records 27 five SSTS records 28 13 RMP records 29 one RAATS record 30 three PRP records 31 one PADS record 32 seven ICIS records 33 four FTTS records 34 four HIST FTTS records 35 five US AIRS records 36 one US MINES record 37 177 FINDS records 38 116 ECHO records 39 17 KY AIRS records 40 49 KY ASBESTOS records 41 one KY DRYCLEANERS record 42 34 KY Financial Assurance 43 three KY LEAD records 44 one WI MANIFEST record | <p>Source: Environmental Data Resources Area/Corridor Report (EDR 2021)</p> |
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| | <p>45 one NY MANIFEST record 46 117 NPDES records 47 one MINES MRDS record</p> <p>The following are EDR high risk historical record:</p> <ul style="list-style-type: none"> • 58 EDR HIST AUTO • 12 EDR HIS CLEANER <p>The following are exclusive recovered Govt. Archies:</p> <ul style="list-style-type: none"> • 20 KY RGA HWS • 13 KY RGA LF <p>Potential hazardous materials concerns are associated throughout the study area.</p> <p>For additional information on specific hazardous materials concerns in and around the surrounding study area, please reference the full EDR report.</p> <p>Please refer to digital Attachment 6 for more information regarding EDR data.</p> | |
| Oil and Gas Wells | <p>There are no reported active oil and gas wells currently in the study area according to KGS. The two old oil and gas wells are within the one-mile buffer of the EDR report. One well is to the northwest and the other is in the southeast of the study area.</p> <p>Please refer to digital Attachment 5 for more information regarding EDR well data.</p> | <p>Source: EDR DataMap Well Search Report (August 03, 2021), KGS (2021)</p> |
| Section 4(f) | <p>There are multiple public parks located in the study area including: Central Park, Bee Creek Park and Chestnut Park.</p> <p>There are no Wildlife Management Areas or Federal Public Lands located within the study area.</p> | <p>Source: KDFWR (2021), Murray-Calloway (2021), Google Earth Pro Maps, ESRI topo maps</p> |
| Section 6(f) | <p>Based on Land and Water Conservation Fund (LWCF) records, multiple LWCF properties are present in the study area within and around Calloway County: Murray/Calloway County Park, Hazel Park, Murray Tennis Courts, Central Park Playground, Murray Depot Renovation</p> | <p>Source: The Wilderness Society LWCF Federal and State Funding Map Data (2014)</p> |
| Air Quality | <p>The study area is not located in a Non-attainment Area for 8-hour ozone (2015 standard) or a Maintenance area for PM 2.5 (2012 standard) for transportation-related criteria pollutants for which the EPA has established National Ambient Air Quality Standards (NAAQS). Nineteen USEPA air emissions facilities are located within the study area. These facilities are spread across the study area with the majority being located near downtown Murray.</p> <p>Please refer to digital Attachment 2 for more information regarding air quality data.</p> | <p>Source: KYTC Air Quality Maps (2015), USEPA Green Book (2015), USEPA Envirofacts (2018)</p> |



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| <p>Noise</p> | <p>Noise sensitive land use areas are located throughout the study area (Activity Categories “B”, “C”, “D”, and “E”), including residential neighborhoods, cemeteries, places of worship, schools, hotels, and restaurants with exterior uses.</p> <p>Approximately 60% of the study area is urbanized, about two thirds of which includes moderate density residential housing (single-family home developments).</p> | <p>Source: KYTC Noise Policy (2015)</p> |
| <p>Cultural- Archaeology</p> | <p>The Kentucky Office of State Archaeology (OSA) preliminary records review indicated 15 previously recorded archaeological resources, two unconfirmed sites, and three preliminary sites within the study area and its immediate vicinity. Due to the sensitive nature of this information, specific site information was not provided.</p> <p>Please refer to Figure 5 for more information regarding cultural- archeology data.</p> | <p>Source: KY OSA report (2021)</p> |
| <p>Cultural- Historic</p> | <p>Based on the review of National Register of Historic Places (NRHP) there are twenty-four (24) historic places located in the Study Area. These include:</p> <ul style="list-style-type: none"> • 3 Historic Districts <ul style="list-style-type: none"> ○ Main Street Historic District ○ Murray Commercial Historic District ○ Murray State University Historic Buildings <p>There are 75 contributing resources within the three historic districts and three historic buildings outside of the historic districts in the same vicinity.</p> <p>Please refer to Figure 4 for more information regarding NRHP sites.</p> | <p>Source: National Register of Historic Places Map (2020)</p> |
| <p>Houses of Worship</p> | <p>Thirteen houses of worship (church, mosque, synagogue, etc.) were identified in the study area from current mapping resources.</p> | <p>Source: Google Earth Pro Maps, ESRI topo maps</p> |
| <p>Schools</p> | <p>Seven school facilities were identified in the study area, including Murray State University, Murray High school and several other elementary and middle schools all within city limits. The only school outside of Murray in the study area is North Calloway Elementary School which is in the north central portion of the study area.</p> | <p>Source: Google Earth Pro Maps, ESRI topo maps</p> |



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| <p>Cemeteries</p> | <p>There are five cemeteries within the study area:</p> <ul style="list-style-type: none"> ○ England Cemetery ○ Murray Cemetery ○ Bowman Cemetery ○ Bogard Cemetery ○ Murray Memorial Cemetery <p>There may be additional private, or family cemeteries present in the study area that have not been previously mapped or located. The Kentucky Historical Society has 211 listed cemeteries in Calloway County, but all have no graves listed except for the Old Concord Cemetery on Crosland Road, which has 48 listed.</p> <p>A list of additional cemeteries that are suspected to be in the study area can be found in Attachment 3.</p> | <p>Source: KY Historical Society (2008), Google Earth Pro Maps, ESRI topo maps</p> |
| <p>Public Services</p> | <p>There are multiple public service facilities in the project study area, including:</p> <ul style="list-style-type: none"> • US Post Office • Calloway County Jail • Calloway County Health Center • Calloway County Public Library • City of Murray Police Department <p>Utilities:</p> <ul style="list-style-type: none"> • One gas transmission line runs from northeast of the study area to the southwest of the study area. • Five electrical transmission line corridors, two are coming in from the west toward Murray then circle the city. Two are coming from the north from the direct of Alamo, KY. One of these connects up the Murray grid and the other heads southeastward outside of the study area. One exits the Murray grid and heads east, overlapping the southward transmission line around Clayton Creek/East Fork Nexus, and ends in residential agriculture. • One Wastewater Treatment Plant located in the south-eastern part of the project area just outside of the town of Murray. | <p>Source: U.S. Department of Homeland Security Infrastructure data (2021). Google Earth Pro Maps, National Pipeline Mapping Systems Public Viewer</p> |
| <p>Residences and Businesses</p> | <p>Residential land use comprises approximately 50% of the study area, predominately as single-family residential dwellings with adjoining pasture or farmland and some single-family residential developments.</p> <p>Commercial and Industrial land use comprises approximately 20% of the study area and includes downtown Murray, primarily in the eastern portion of the study area.</p> | <p>Source: Google Earth Pro Maps, ESRI topo maps</p> |



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ENVIRONMENTAL OVERVIEW - MURRAY SMALL URBAN AREA (SUA) STUDY

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ENVIRONMENTAL OVERVIEW - MURRAY SMALL URBAN AREA (SUA) STUDY

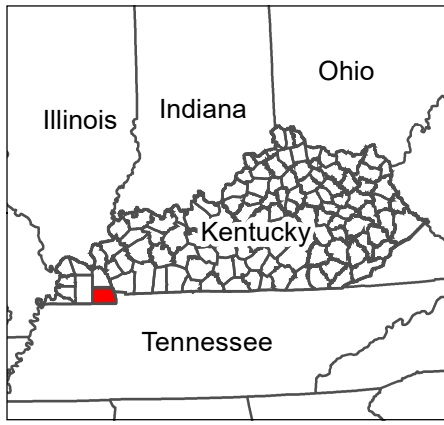
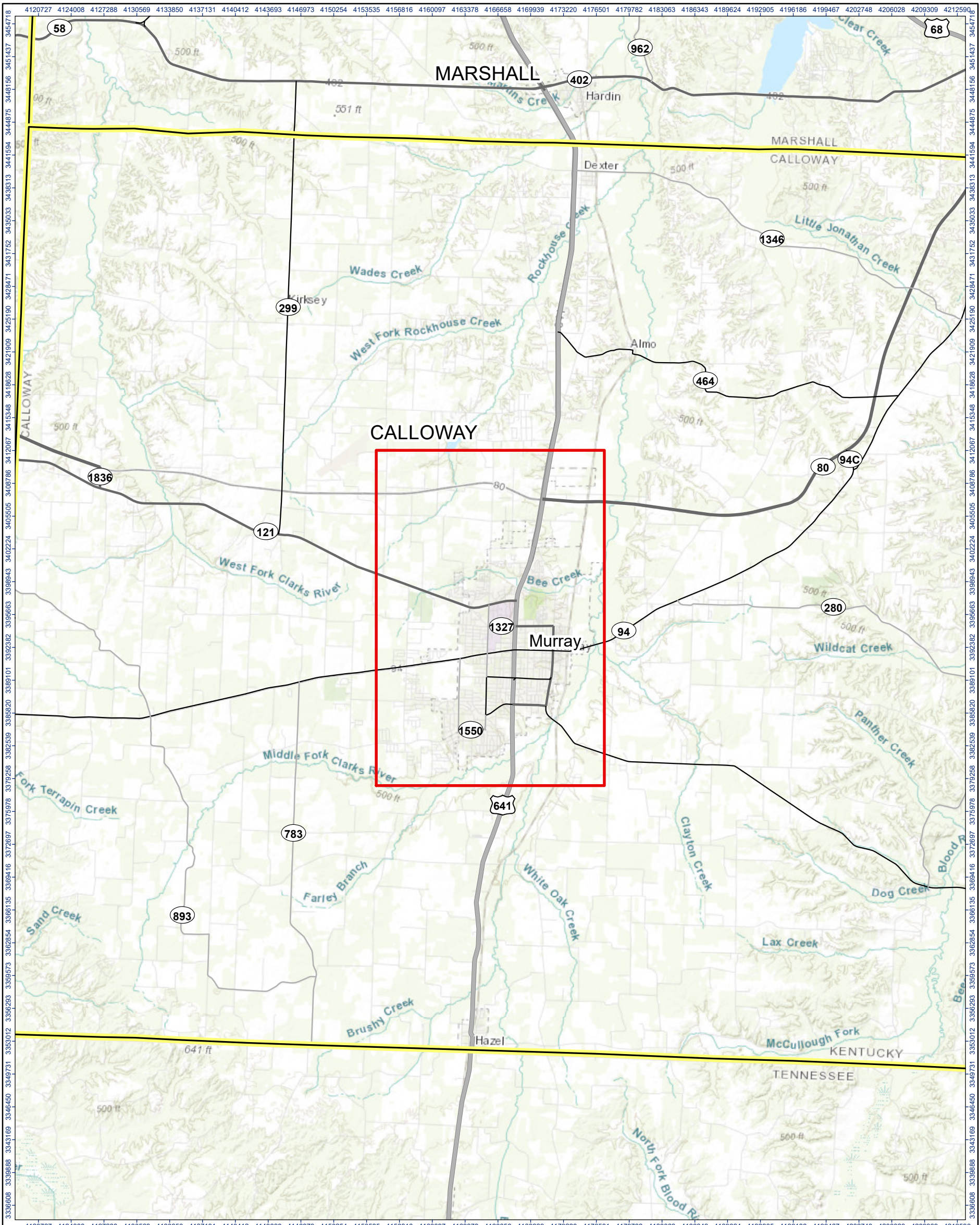
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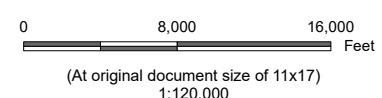


Figures

FIGURES



Study Area
 County



Project Location: Calloway County, KY
 Prepared by JRW on 2021-08-16
 TR by SPK on 2021-08-16
 IR Review by JA on 2021-08-18

Client/Project: Kentucky Transportation Cabinet
 Murray Small Urban Area
 Environmental Overview
 178567021

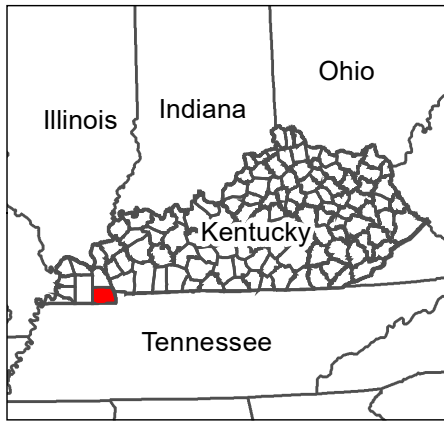
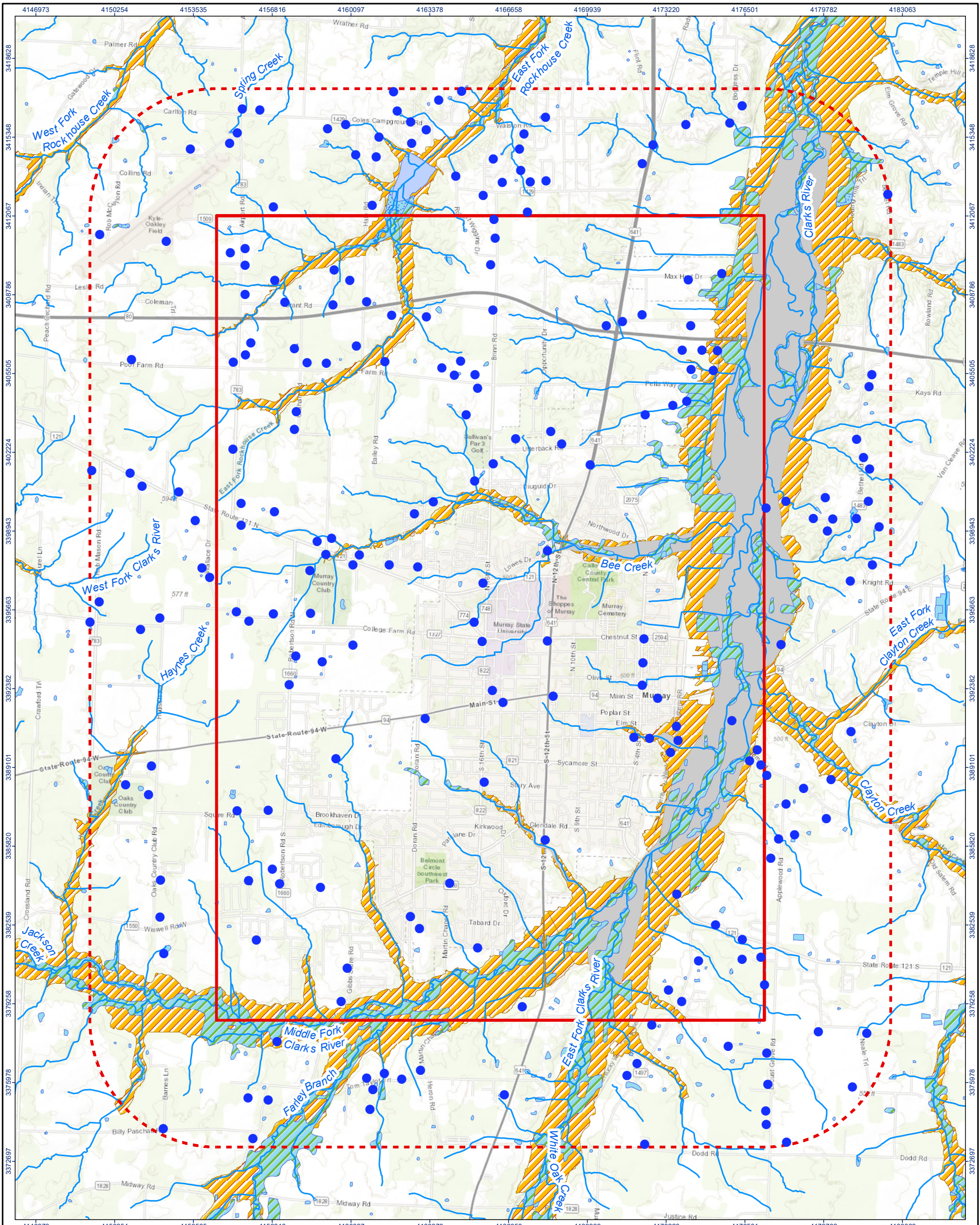
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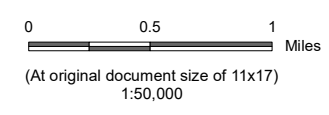
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 3. Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.



- Study Area
- 1-Mile Buffer
- Floodway
- 100-Year Floodplain
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Streams
- Water Wells



Project Location
Calloway County, KY

Client/Project
Kentucky Transportation Cabinet
Murray Small Urban Area
Environmental Overview

Figure No.
2

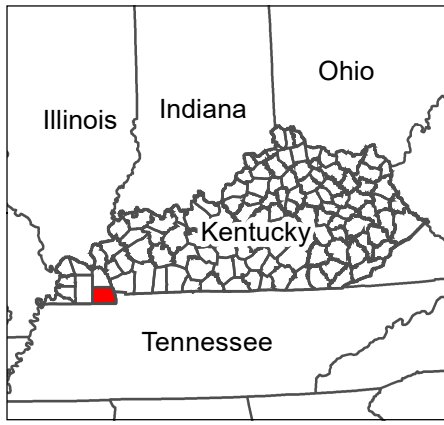
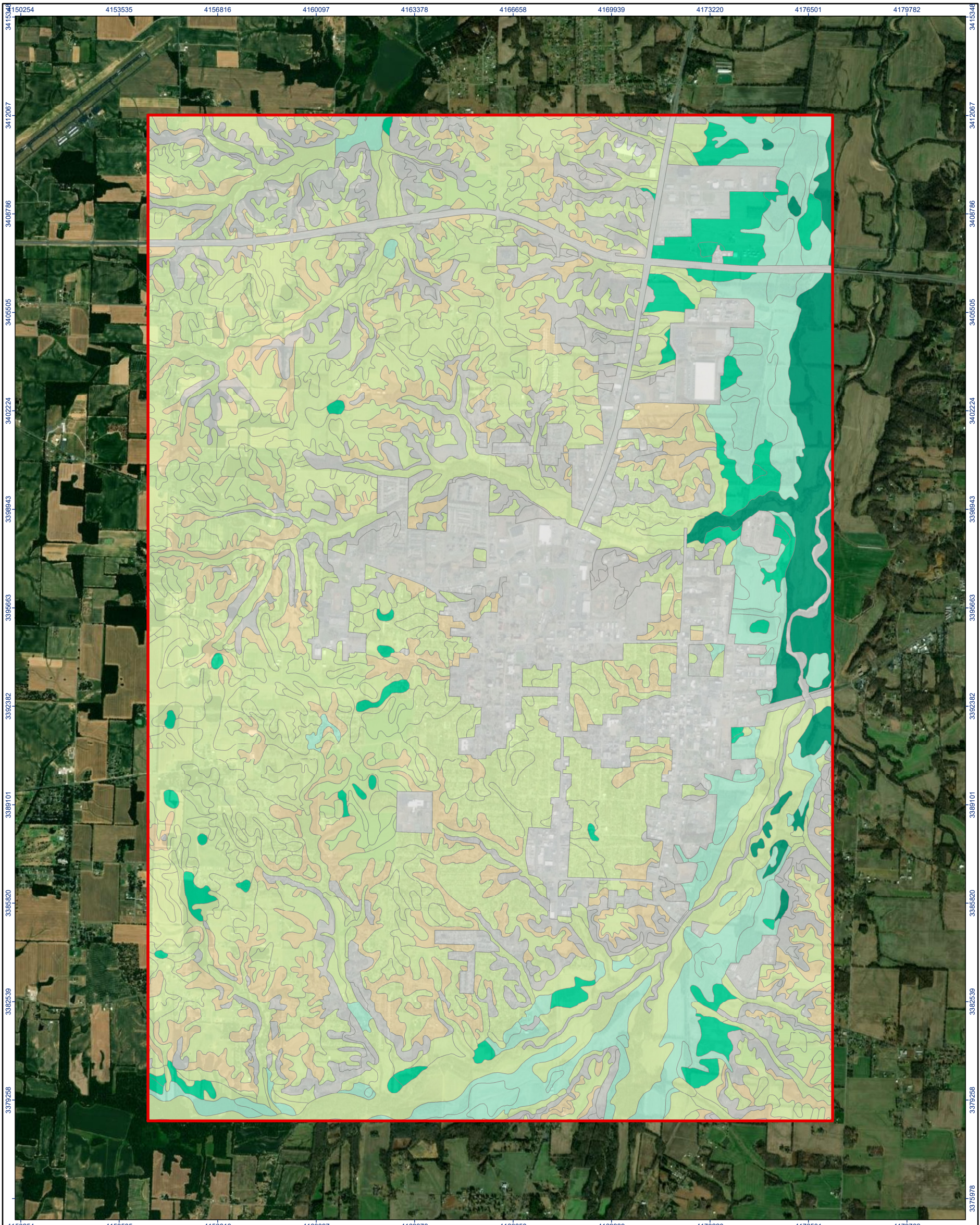
Title
Water Resources

Notes

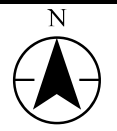
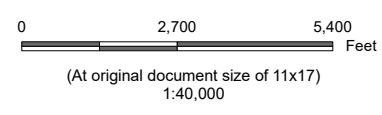
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2. Data Sources: ESRI Topo, USGS Streams (2020), FEMA National Flood Hazard (2010), USFWS National Wetlands Inventory System (2021), EDR Area/Corridor Report (2021)
3. Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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- Study Area
- Prime Farmland (47.1%)
- Not Prime Farmland (27.5%)
- Farmland of Statewide Importance (11.0%)
- Prime Farmland if Drained and Protected from Flooding (8.3%)
- Prime Farmland if Drained (3.2%)
- Prime Farmland if Protected from Flooding (3.0%)



Project Location: Calloway County, KY
 Prepared by JRW on 2021-08-16
 TR by SPK on 2021-08-18
 IR Review by JJA on 2021-08-18

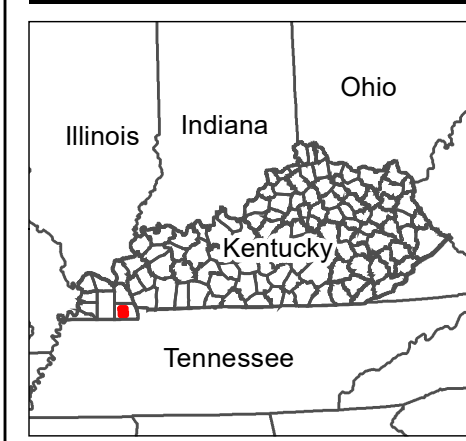
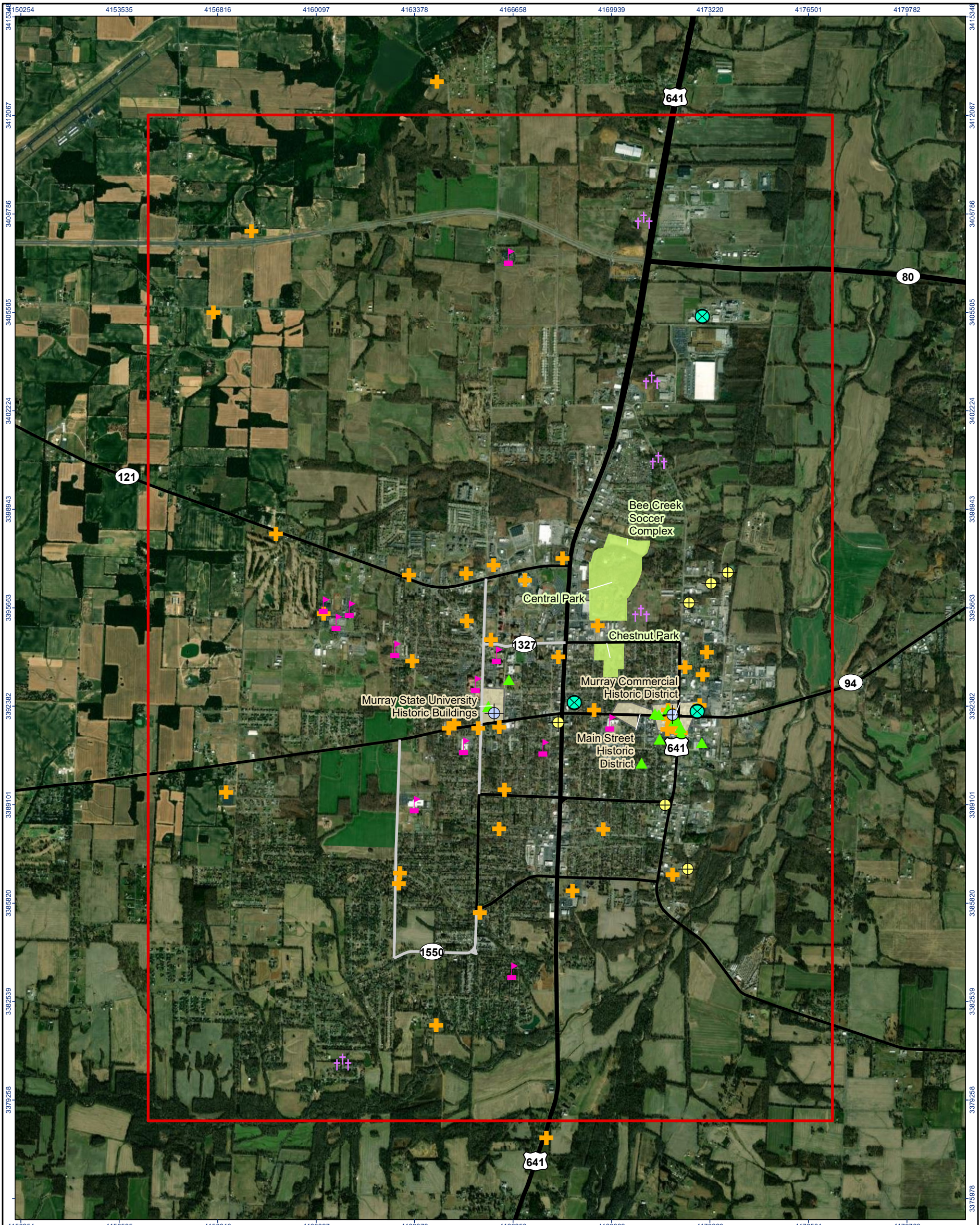
Client/Project: Kentucky Transportation Cabinet
 Murray Small Urban Area
 Environmental Overview
 178567021

Figure No. **3**

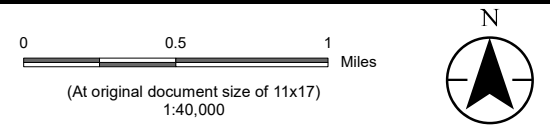
Title: **Farmland Classification of Soils**

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- Study Area
- ✚ School
- ✚ Place of Worship
- ✚✚ Cemetery
- ▲ Historic Places
- Primary Road
- Secondary Road
- Important Local Road
- Historic Solid Waste Facilities/Landfill
- Solid Waste Facilities/Landfill
- Federal CERCLIS - Superfund Site
- Historic Districts
- Protected Lands
 - Local



Project Location: Calloway County, KY
 Prepared by JRW on 2021-08-16
 TR by SPK on 2021-08-18
 IR Review by JJA on 2021-08-18

Client/Project: Kentucky Transportation Cabinet
 Murray Small Urban Area
 Environmental Overview
 178567021

Figure No.: 4

Human Environment

Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Data Sources: ESRI Aerial, USGS Gap Analysis Project (PAD-US; 2020), Google Maps (2021), ESRI USA Major Roads (2019), National Park Service (2021), EDR Area/Corridor Report (2021)
 3. Background: Sources: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 5 Intentional Left Blank

Contains sensitive archaeological site location information.

Not available for public use.

ATTACHMENTS

- 1. Threatened and Endangered Species**
- 2. Areas of Air Quality Concern in Kentucky**
- 3. Cemetery Locations in Calloway County**
- 4. USDA Soil Resource Report**
- 5. Water Resources**
- 6. EDR Report (provided in separate digital format due to size)**



ATTACHMENT 1

Threatened and Endangered Species

- a. USFWS IPaC Trust Resource Report
- b. USFWS Map of Known Northern Long-eared Bat Habitat
- c. USFWS Map of Known Indiana Bat Habitat
- d. KDFWR State-Listed Species, Calloway County
- e. OKNP Natural Heritage Database Response (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

Calloway 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 and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

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. IPaC only shows species that are regulated by USFWS (see FAQ).
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

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

Mammals

NAME

STATUS

Gray Bat *Myotis grisescens*

Endangered

Wherever found

This species only needs to be considered if the following condition applies:

- The project area includes potential gray bat habitat.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/6329>

Indiana Bat *Myotis sodalis*

Endangered

Wherever found

This species only needs to be considered if the following condition applies:

- The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species.

There is **final** critical habitat for this species. The location of the critical habitat is not available.

<https://ecos.fws.gov/ecp/species/5949>

Northern Long-eared Bat *Myotis septentrionalis*

Threatened

Wherever found

This species only needs to be considered if the following condition applies:

- The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/9045>

Flowering Plants

NAME

STATUS

Prices Potato-bean *Apios priceana*

Threatened

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/7422>

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 person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

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>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE.

"BREEDS ELSEWHERE" INDICATES
THAT THE BIRD DOES NOT LIKELY
BREED IN YOUR PROJECT AREA.)

American Kestrel *Falco sparverius paulus*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/9587>

Breeds Apr 1 to Aug 31

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Sep 1 to Jul 31

Cerulean Warbler *Dendroica cerulea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/2974>

Breeds Apr 26 to Jul 20

Golden Eagle *Aquila chrysaetos*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Breeds elsewhere

Kentucky Warbler *Oporornis formosus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 20 to Aug 20

Le Conte's Sparrow *Ammodramus leconteii*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Breeds elsewhere

Lesser Yellowlegs *Tringa flavipes*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9679>

Breeds elsewhere

Prothonotary Warbler *Protonotaria citrea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 1 to Jul 31

Red-headed Woodpecker *Melanerpes erythrocephalus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 10 to Sep 10

Rusty Blackbird *Euphagus carolinus*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush *Hylocichla mustelina*

Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Golden Eagle
Non-BCC
Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Kentucky Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Le Conte's Sparrow
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



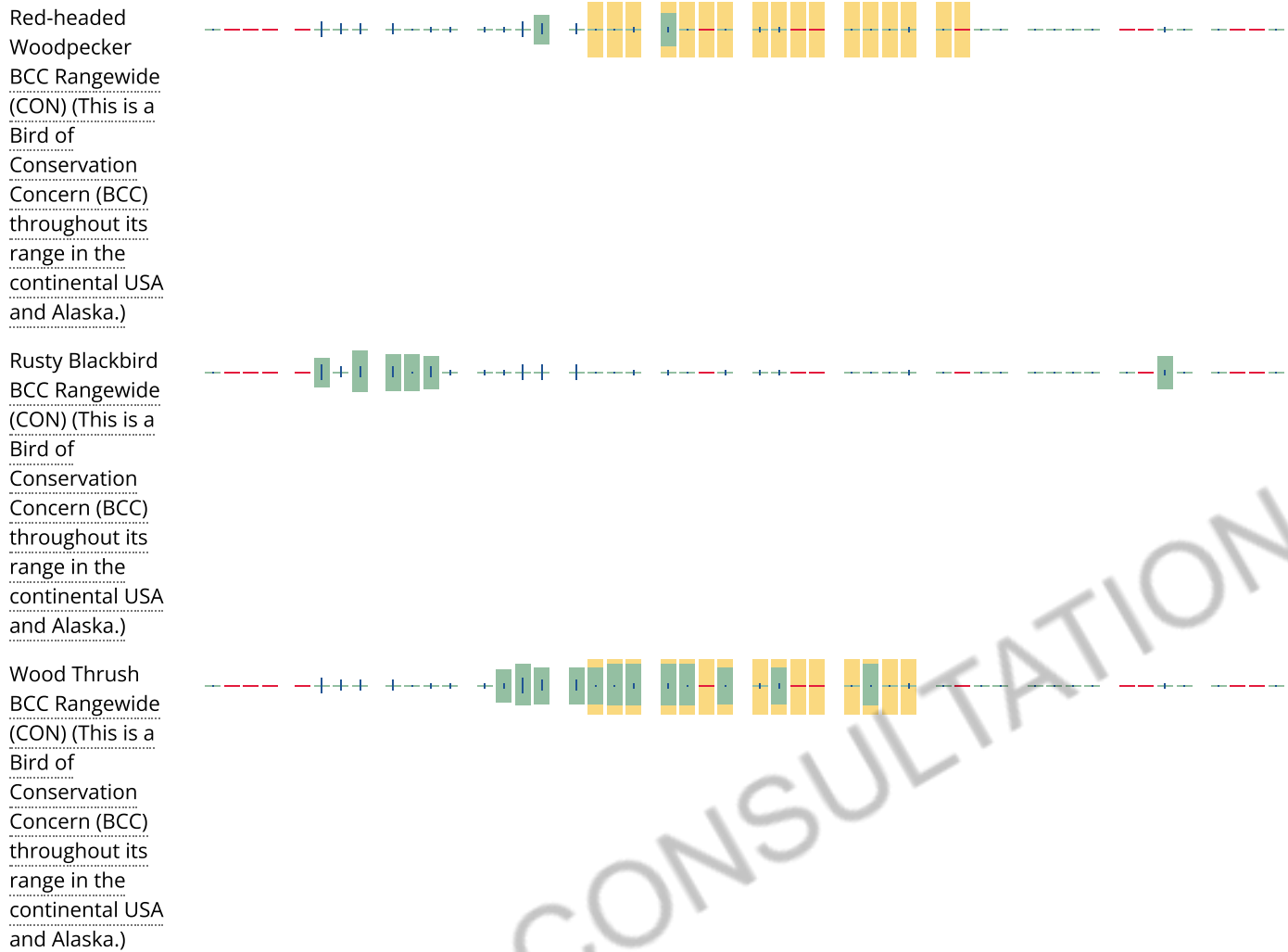
Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



NOT FOR CONSULTATION



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

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

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

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](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view 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.

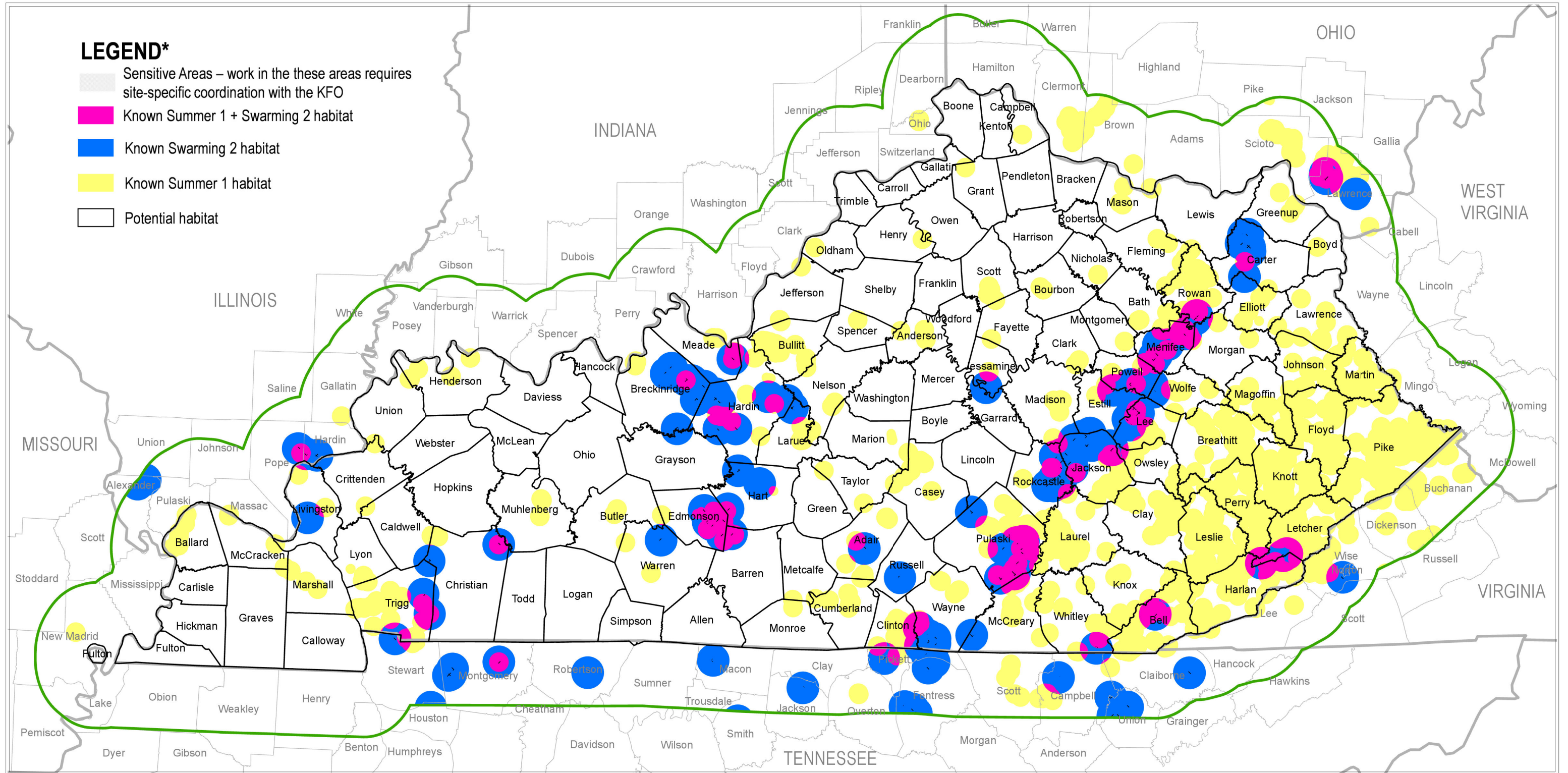
Data precautions

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.

NOT FOR CONSULTATION



Known northern long-eared bat habitat in Kentucky and within 20 miles (August 2019)



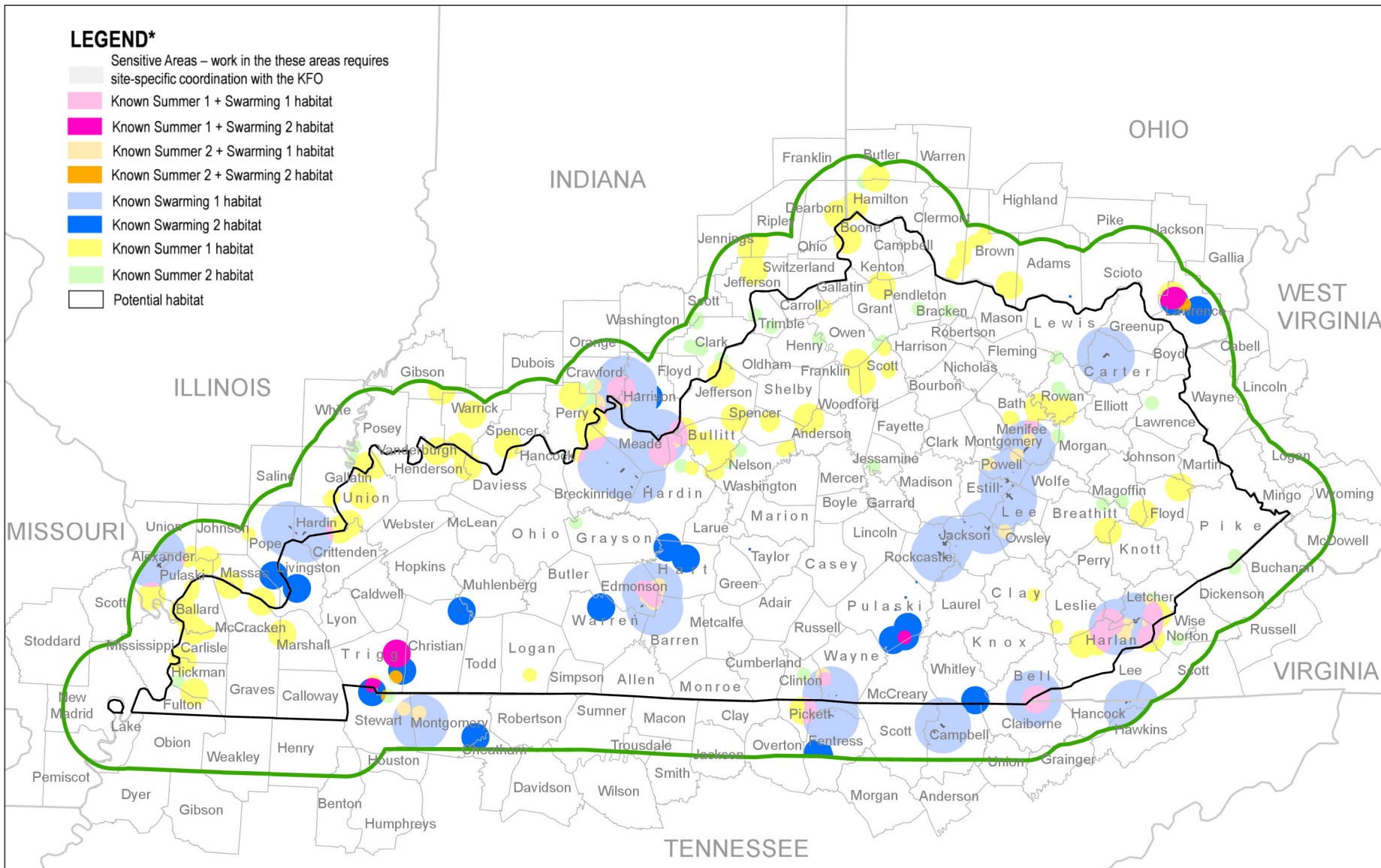
NOTE: This map is based on species occurrence information and is subject to change as new data become available. Please contact our office at 502/695-0468 to ensure you are working with the most current version.
 *For an explanation of terms, please see the Conservation Strategy for Forest-Dwelling Bats 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.



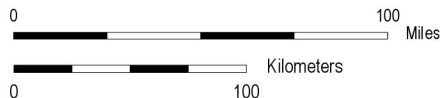


Known Indiana bat habitat in Kentucky and within 20 miles (August 2019)



NOTE: This map is based on species occurrence information and is subject to change as new data becomes 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.



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Datum: NAD 83



Species Information

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

Linked life history provided courtesy of NatureServe Explorer .

Records may include both recent and historical observations.

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

List State Threatened, Endangered, and Special Concern Species observations in 1 selected county.

Selected county is: Calloway.

| Scientific Name and Life History | Common Name and Pictures | Class | County | US Status | KY Status | WAP | Reference |
|----------------------------------|---------------------------|----------------|----------|-----------|-----------|-----|---------------------------|
| <i>Macrochelys temminckii</i> | Alligator Snapping Turtle | Reptilia | Calloway | N | E | Yes | Reference |
| <i>Fulica americana</i> | American Coot | Aves | Calloway | N | E | | Reference |
| <i>Peucaea aestivalis</i> | Bachman's Sparrow | Aves | Calloway | N | E | Yes | Reference |
| <i>Haliaeetus leucocephalus</i> | Bald Eagle | Aves | Calloway | N | S | Yes | Reference |
| <i>Riparia riparia</i> | Bank Swallow | Aves | Calloway | N | S | Yes | Reference |
| <i>Tyto alba</i> | Barn Owl | Aves | Calloway | N | S | Yes | Reference |
| <i>Vireo bellii</i> | Bell's Vireo | Aves | Calloway | N | S | Yes | Reference |
| <i>Thryomanes bewickii</i> | Bewick's Wren | Aves | Calloway | N | H | Yes | Reference |
| <i>Nycticorax nycticorax</i> | Black-crowned Night-heron | Aves | Calloway | N | T | Yes | Reference |
| <i>Faxonius burri</i> | Blood River Crayfish | Malacostraca | Calloway | N | T | Yes | Reference |
| <i>Erimystax insignis</i> | Blotched Chub | Actinopterygii | Calloway | N | E | Yes | Reference |
| <i>Spatula discors</i> | Blue-winged Teal | Aves | Calloway | N | T | | Reference |
| <i>Certhia americana</i> | Brown Creeper | Aves | Calloway | N | T | Yes | Reference |
| <i>Bubulcus ibis</i> | Cattle Egret | Aves | Calloway | N | S | | Reference |

| | | | | | | | |
|---|--------------------------|--------------------|----------|---|---|-----|-----------|
| <i>Umbra limi</i> | Central Mudminnow | Actinopterygii | Calloway | N | T | Yes | Reference |
| <i>Esox niger</i> | Chain Pickerel | Actinopterygii | Calloway | N | S | | Reference |
| <i>Ichthyomyzon castaneus</i> | Chestnut Lamprey | Cephalaspidomorphi | Calloway | N | S | Yes | Reference |
| <i>Eumeces anthracinus</i> | Coal Skink | Reptilia | Calloway | N | E | Yes | Reference |
| <i>Peromyscus gossypinus</i> | Cotton Mouse | Mammalia | Calloway | N | T | Yes | Reference |
| <i>Etheostoma proeliare</i> | Cypress Darter | Actinopterygii | Calloway | N | T | Yes | Reference |
| <i>Junco hyemalis</i> | Dark-eyed Junco | Aves | Calloway | N | S | | Reference |
| <i>Lacunicambarus chimera</i> | Devil Crayfish | Malacostraca | Calloway | N | S | | Reference |
| <i>Lepomis marginatus</i> | Dollar Sunfish | Actinopterygii | Calloway | N | E | Yes | Reference |
| <i>Phalacrocorax auritus</i> | Double-crested Cormorant | Aves | Calloway | N | S | | Reference |
| <i>Cryptobranchus alleganiensis alleganiensis</i> | Eastern Hellbender | Amphibia | Calloway | N | S | Yes | Reference |
| <i>Perimyotis subflavus</i> | Eastern Pipistrelle | Mammalia | Calloway | N | T | | Reference |
| <i>Thamnophis sauritus sauritus</i> | Eastern Ribbon Snake | Reptilia | Calloway | N | S | Yes | Reference |
| <i>Elliptio crassidens</i> | Elephantear | Bivalvia | Calloway | N | S | Yes | Reference |
| <i>Corvus ossifragus</i> | Fish Crow | Aves | Calloway | N | S | | Reference |
| <i>Vermivora chrysoptera</i> | Golden-winged Warbler | Aves | Calloway | N | E | Yes | Reference |
| <i>Etheostoma parvipinne</i> | Goldstripe Darter | Actinopterygii | Calloway | N | E | Yes | Reference |
| <i>Myotis grisescens</i> | Gray Myotis | Mammalia | Calloway | E | T | Yes | Reference |
| <i>Ardea alba</i> | Great Egret | Aves | Calloway | N | T | Yes | Reference |

| | | | | | | | |
|--|------------------------|----------------|----------|---|---|-----|-----------|
| <i>Centronyx henslowii</i> | Henslow's Sparrow | Aves | Calloway | N | S | Yes | Reference |
| <i>Lophodytes cucullatus</i> | Hooded Merganser | Aves | Calloway | N | T | Yes | Reference |
| <i>Myotis sodalis</i> | Indiana Bat | Mammalia | Calloway | E | E | Yes | Reference |
| <i>Sternula antillarum athalassos</i> | Interior Least Tern | Aves | Calloway | E | E | Yes | Reference |
| <i>Chondestes grammacus</i> | Lark Sparrow | Aves | Calloway | N | S | Yes | Reference |
| <i>Egretta caerulea</i> | Little Blue Heron | Aves | Calloway | N | E | Yes | Reference |
| <i>Myotis lucifugus</i> | Little Brown Bat | Mammalia | Calloway | N | T | | Reference |
| <i>Lanius ludovicianus</i> | Loggerhead Shrike | Aves | Calloway | N | S | Yes | Reference |
| <i>Ictinia mississippiensis</i> | Mississippi Kite | Aves | Calloway | N | S | Yes | Reference |
| <i>Menidia audens</i> | Mississippi Silverside | Actinopterygii | Calloway | N | T | Yes | Reference |
| <i>Rana areolata circulosa</i> | Northern Crawfish Frog | Amphibia | Calloway | N | S | Yes | Reference |
| <i>Circus hudsonius</i> | Northern Harrier | Aves | Calloway | N | T | Yes | Reference |
| <i>Myotis septentrionalis</i> | Northern Myotis | Mammalia | Calloway | T | E | | Reference |
| <i>Pituophis melanoleucus melanoleucus</i> | Northern Pine Snake | Reptilia | Calloway | N | E | Yes | Reference |
| <i>Cemophora coccinea copei</i> | Northern Scarlet Snake | Reptilia | Calloway | N | S | Yes | Reference |
| <i>Spatula clypeata</i> | Northern Shoveler | Aves | Calloway | N | E | | Reference |
| <i>Papaipema speciosissima</i> | Osmunda Borer Moth | Insecta | Calloway | N | T | | Reference |
| <i>Pandion haliaetus</i> | Osprey | Aves | Calloway | N | S | Yes | Reference |

| | | | | | | | |
|---|----------------------------|--------------------|----------|---|---|-----|-----------|
| <i>Falco peregrinus</i> | Peregrine Falcon | Aves | Calloway | N | E | Yes | Reference |
| <i>Podilymbus podiceps</i> | Pied-billed Grebe | Aves | Calloway | N | E | Yes | Reference |
| <i>Lampsilis ovata</i> | Pocketbook | Bivalvia | Calloway | N | E | Yes | Reference |
| <i>Toxolasma lividum</i> | Purple Lilliput | Bivalvia | Calloway | N | E | Yes | Reference |
| <i>Sitta canadensis</i> | Red-breasted Nuthatch | Aves | Calloway | N | E | Yes | Reference |
| <i>Pheucticus ludovicianus</i> | Rose-breasted Grosbeak | Aves | Calloway | N | S | Yes | Reference |
| <i>Faxonius rafinesquei</i> | Rough River Crayfish | Malacostraca | Calloway | N | S | | Reference |
| <i>Faxonius durrelli</i> | Saddle Crayfish | Malacostraca | Calloway | N | S | | Reference |
| <i>Passerculus sandwichensis</i> | Savannah Sparrow | Aves | Calloway | N | S | Yes | Reference |
| <i>Lampropeltis triangulum elapsoides</i> | Scarlet Kingsnake | Reptilia | Calloway | N | E | Yes | Reference |
| <i>Accipiter striatus</i> | Sharp-shinned Hawk | Aves | Calloway | N | S | Yes | Reference |
| <i>Aspidoscelis sexlineata</i> | Six-lined Racerunner | Reptilia | Calloway | N | S | Yes | Reference |
| <i>Noturus exilis</i> | Slender Madtom | Actinopterygii | Calloway | N | E | Yes | Reference |
| <i>Egretta thula</i> | Snowy Egret | Aves | Calloway | N | E | | Reference |
| <i>Tantilla coronata</i> | Southeastern Crowned Snake | Reptilia | Calloway | N | T | Yes | Reference |
| <i>Ichthyomyzon gagei</i> | Southern Brook Lamprey | Cephalaspidomorphi | Calloway | N | E | | Reference |
| <i>Actitis macularius</i> | Spotted Sandpiper | Aves | Calloway | N | E | Yes | Reference |
| <i>Eurycea guttolineata</i> | Three-lined Salamander | Amphibia | Calloway | N | T | Yes | Reference |
| <i>Amphiuma tridactylum</i> | Three-toed Amphiuma | Amphibia | Calloway | N | E | Yes | Reference |

| | | | | | | | |
|--------------------------------------|----------------------------|--------------|----------|---|---|-----|-----------|
| <i>Bartramia longicauda</i> | Upland Sandpiper | Aves | Calloway | N | H | Yes | Reference |
| <i>Procambarus viaeviridis</i> | Vernal Crayfish | Malacostraca | Calloway | N | T | Yes | Reference |
| <i>Poocetes gramineus</i> | Vesper Sparrow | Aves | Calloway | N | E | Yes | Reference |
| <i>Farancia abacura reinwardtii</i> | Western Mud Snake | Reptilia | Calloway | N | S | Yes | Reference |
| <i>Sistrurus miliarius streckeri</i> | Western Pygmy Rattlesnake | Reptilia | Calloway | N | E | Yes | Reference |
| <i>Nyctanassa violacea</i> | Yellow-crowned Night-heron | Aves | Calloway | N | T | Yes | Reference |

76 species are listed



ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

ENERGY AND ENVIRONMENT CABINET
OFFICE OF KENTUCKY NATURE PRESERVES

ZEB WEESE
EXECUTIVE DIRECTOR

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
TELEPHONE: 502-573-2886
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August 4, 2021

Chris Knabel
Stantec
848 west high st
lexington, KY 40508

Project: Murray SUA North; 178567021
Project ID: 22-0024
Project Type: Standard (*customers will be invoiced), 1 mile buffer
(\$120 fee)
Site Acreage: 8,764.57
Site Lat/Lon: 36.642179 / -88.324499
County: Calloway
USGS Quad: DEXTER; MURRAY
Watershed HUC12: Almo-Clarks River; Clayton Creek-Clarks River; Middle
Fork Clarks River; Rockhouse Creek

Dear Chris Knabel,

This letter is in response to your data request for the project referenced above. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Office of Kentucky Nature Preserves occur within your general project area. Your project does pose a concern at this time, therefore please see the attached reports and [report key](#) for more detailed information.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Office of Kentucky Nature Preserves, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Office of Kentucky Nature Preserves." The exact location of plants, animals, and natural communities, if released by the Office of Kentucky Nature Preserves, 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 Biological Assessment Branch (300 Sower Blvd - 4th Floor, Frankfort, KY, 40601. Phone: 502-782-7828).

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

Project ID: 22-0024

August 4, 2021

Page 2

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,

Nour Salam

Geoprocessing Specialist

Standard Occurrence Report
KNP monitored species within 1 Miles of Project Area

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|-------|--|------------------------|-------|-----------|-------|-------|------|---------------|-----------|---------|-----------|-----------------|---|
| 464 | <i>Carex howei</i> | Prickly Bog Sedge | G5T5? | S1S2 | E | | | 1990-04-19 | G | B | | | Bogs and seepages (Weakley 2011); in KY, wooded acid seeps. |
| 6777 | <i>Esox niger</i> | Chain Pickerel | G5 | S3 | S | | | 1965-11-05 | M | H | | | Coastal Plain wetlands, streams, and vegetated oxbow lake shorelines, and it also tolerates reservoir conditions (Burr and Warren 1986, Etnier and Starnes 1993). |
| 15847 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S4N | S | SOMC | Y | 1987 | Q | E | | | |
| 15848 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S4N | S | SOMC | Y | 1987 | Q | NR | | | |
| 15864 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S4N | S | SOMC | Y | 1987 | Q | NR | | | |
| 15865 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S4N | S | SOMC | Y | 1987 | Q | NR | | | |
| 2649 | <i>Lithobates areolatus circulosus</i> | Northern Crawfish Frog | G4T4 | S3 | S | | Y | 1970-05-28 | M | H | | | Breeds in ponds in farmland and edge. Remains underground throughout most of the year, using crayfish burrows in moist grasslands and meadows. |
| 2361 | <i>Melanthium virginicum</i> | Virginia Bunchflower | G5 | S1 | E | | | 1842 | C | H | | Calloway County | Wet acidic seepages and meadows. |
| 21980 | <i>Myotis lucifugus</i> | Little Brown Bat | G3 | S2 | T | | | 2006-06-20 | S | F? | | | |
| 15096 | <i>Perimyotis subflavus</i> | Tricolored Bat | G2G3 | S2 | T | | | 2014-07-22 | S | F? | | | |
| 21979 | <i>Perimyotis subflavus</i> | Tricolored Bat | G2G3 | S2 | T | | | 2006-06-20 | S | F? | | | |
| 16683 | <i>Silphium integrifolium</i> | Rosinweed | G5 | S3S4 | N | | | 1965-07-19 | G | NR | | | |
| 9806 | <i>Silphium laciniatum</i> | Compassplant | G5 | S2 | T | | | 1991-07-11 | S | C | | | Prairies and barrens. |

Redacted

Standard Occurrence Report
KNP monitored species within 1 Miles of Project Area

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USES A | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|-------|-------------------------------------|---------------------------|-------|-------|-------|--------|------|---------------|-----------|---------|-----------|------------|--|
| 10762 | <i>Thamnophis sauritus sauritus</i> | Eastern Ribbon Snake | G5T5 | S3 | S | | Y | 2013-05-06 | M | E | | | Variety of semi-open habitats, generally in weedy or brushy growth along the margins of sloughs, marshes and other aquatic habitats. |
| 10774 | <i>Thryomanes bewickii</i> | Bewick's Wren | G5 | SHB | H | SOMC | Y | 1972-07-01 | G | H | | | Brushy areas, thickets and scrub in open country, open and riparian woodland. Found in rural towns and farmsteads. |
| 6646 | <i>Viburnum nudum</i> | Possumhaw | G5 | S1 | E | | | 1974-06-11 | S | F | | | Bottomland hardwood swamps. |
| 14555 | <i>Xyris torta</i> | Twisted Yellow-eyed-grass | G5 | S3S4 | N | | | 1972-08-09 | S | E | | | WET MEADOWS AND OPEN MOSTLY HERB/GRASS DOMINATED SEEPS, ACID SOILS. |

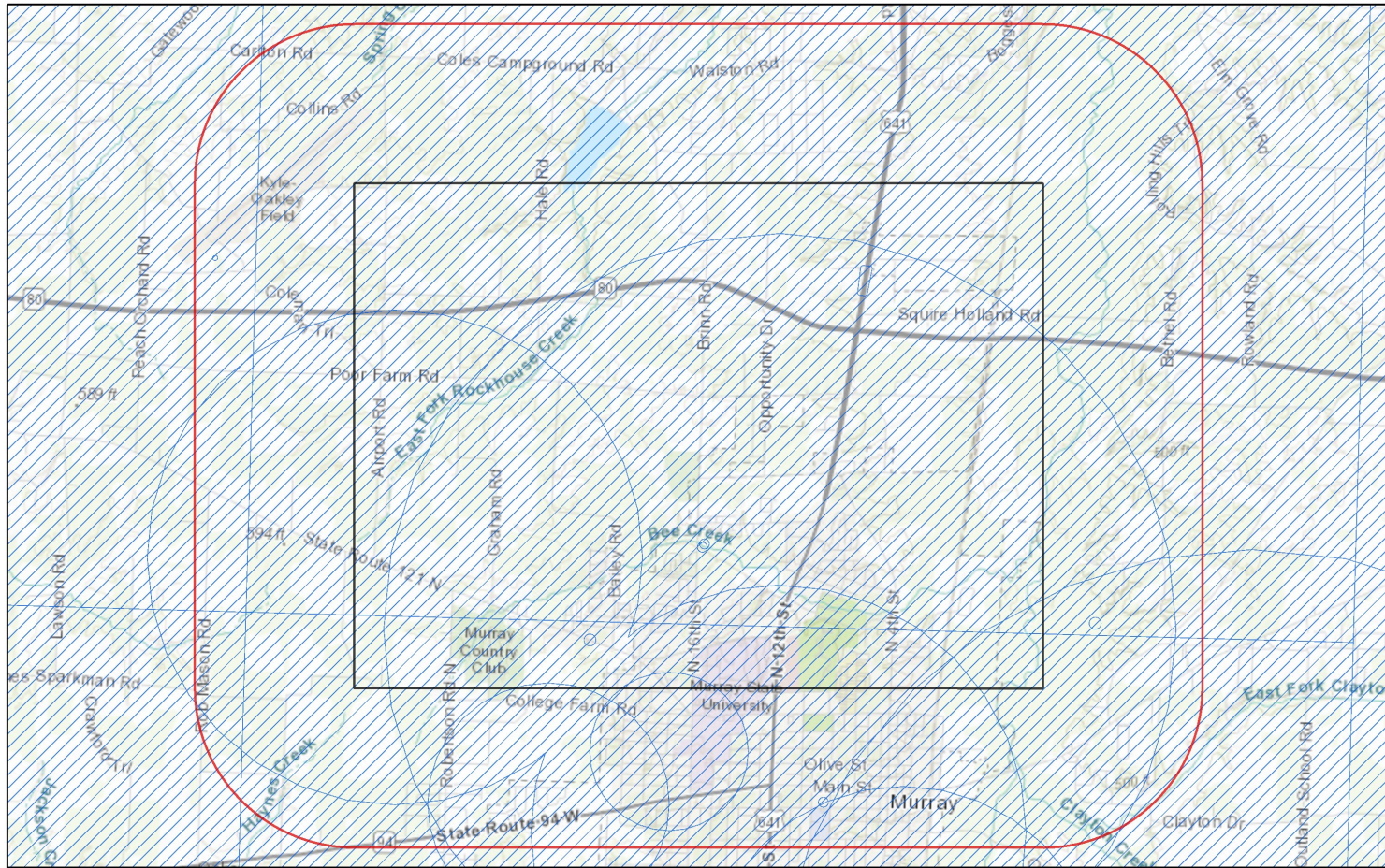
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Managed Areas within 1 Miles of Project Area

| MA ID | Managed Area Name | Unit Type | Owner Name | Managing Institution |
|-------|---------------------------------------|-----------------------|-------------------------|-------------------------|
| 1090 | <i>Murray State University Campus</i> | Other University Land | Murray State University | Murray State University |

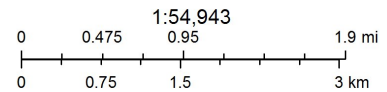
THESE DATA ARE VALID ONLY ON THE DATE ON WHICH THE REPORT WAS GENERATED.
 THESE DATA MAY ONLY BE USED FOR THE PROJECT NAMED ABOVE.

Murray SUA North



August 4, 2021

- Project Boundary
- Buffered Project Boundary
- Element Occurrences



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



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August 4, 2021

Chris Knabel
Stantec
848 west high st
lexington, KY 40508

Project: Murray SUA South; 178567021
Project ID: 22-0025
Project Type: Standard (*customers will be invoiced), 1 mile buffer
(\$120 fee)
Site Acreage: 8,786.12
Site Lat/Lon: 36.596167 / -88.322930
County: Calloway
USGS Quad: MURRAY
Watershed HUC12: Clayton Creek-Clarks River; East Fork Clarks River;
Middle Fork Clarks River

Dear Chris Knabel,

This letter is in response to your data request for the project referenced above. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Office of Kentucky Nature Preserves occur within your general project area. Your project does pose a concern at this time, therefore please see the attached reports and [report key](#) for more detailed information.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Office of Kentucky Nature Preserves, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Office of Kentucky Nature Preserves." The exact location of plants, animals, and natural communities, if released by the Office of Kentucky Nature Preserves, 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 Biological Assessment Branch (300 Sower Blvd - 4th Floor, Frankfort, KY, 40601. Phone: 502-782-7828).

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

Project ID: 22-0025

August 4, 2021

Page 2

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,

Nour Salam

Geoprocessing Specialist

Standard Occurrence Report
KNP monitored species within 1 Miles of Project Area

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USES A | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|-------|--|------------------------|-------|---------------|-------|--------|------|---------------|-----------|---------|-----------|------------|---|
| 464 | <i>Carex howei</i> | Prickly Bog Sedge | G5T5? | S1S2 | E | | | 1990-04-19 | G | B | | | Bogs and seepages (Weakley 2011); in KY, wooded acid seeps. |
| 6777 | <i>Esox niger</i> | Chain Pickerel | G5 | S3 | S | | | 1965-11-05 | M | H | | | Coastal Plain wetlands, streams, and vegetated oxbow lake shorelines, and it also tolerates reservoir conditions (Burr and Warren 1986, Etnier and Starnes 1993). |
| 15596 | <i>Hydrolea ovata</i> | Ovate Fiddleleaf | G5 | S1 | E | | | 2018-09-20 | S | E | | | Swamps and wet woods. |
| 15847 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S 4N | S | SOMC | Y | 1987 | Q | E | | | |
| 15848 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S 4N | S | SOMC | Y | 1987 | Q | NR | | | |
| 15864 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S 4N | S | SOMC | Y | 1987 | Q | NR | | | |
| 15865 | <i>Lanius ludovicianus</i> | Loggerhead Shrike | G4 | S3S4B,S 4N | S | SOMC | Y | 1987 | Q | NR | | | |
| 2649 | <i>Lithobates areolatus circulosus</i> | Northern Crawfish Frog | G4T4 | S3 | S | | Y | 1970-05-28 | M | H | | | Breeds in ponds in farmland and edge. Remains underground throughout most of the year, using crayfish burrows in moist grasslands and meadows. |
| 5948 | <i>Lithobates areolatus circulosus</i> | Northern Crawfish Frog | G4T4 | S3 | S | | Y | 1991-10-pre | M | H | | | Breeds in ponds in farmland and edge. Remains underground throughout most of the year, using crayfish burrows in moist grasslands and meadows. |
| 2361 | <i>Melanthium virginicum</i> | Virginia Bunchflower | G5 | S1 | E | | | 1842 | C | H | | | Wet acidic seepages and meadows. |
| 21980 | <i>Myotis lucifugus</i> | Little Brown Bat | G3 | S2 | T | | | 2006-06-20 | S | F? | | | |

Redacted

**Standard Occurrence Report
KNP monitored species within 1 Miles of Project Area**

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USES A | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|-------|-------------------------------------|----------------------|-------|-------|-------|--------|------|---------------|-----------|---------|-----------|------------|--|
| 21979 | <i>Perimyotis subflavus</i> | Tricolored Bat | G2G3 | S2 | T | | | 2006-06-20 | S | F? | | | |
| 16683 | <i>Silphium integrifolium</i> | Rosinweed | G5 | S3S4 | N | | | 1965-07-19 | G | NR | | | |
| 9806 | <i>Silphium laciniatum</i> | Compassplant | G5 | S2 | T | | | 1991-07-11 | S | C | | | Prairies and barrens. |
| 10762 | <i>Thamnophis sauritus sauritus</i> | Eastern Ribbon Snake | G5T5 | S3 | S | | Y | 2013-05-06 | M | E | | | Variety of semi-open habitats, generally in weedy or brushy growth along the margins of sloughs, marshes and other aquatic habitats. |
| 10774 | <i>Thryomanes bewickii</i> | Bewick's Wren | G5 | SHB | H | SOMC | Y | 1972-07-01 | G | H | | | Brushy areas, thickets and scrub in open country, open and riparian woodland. Found in rural towns and farmsteads. |
| 6646 | <i>Viburnum nudum</i> | Possumhaw | G5 | S1 | E | | | 1974-06-11 | S | F | | | Bottomland hardwood swamps. |

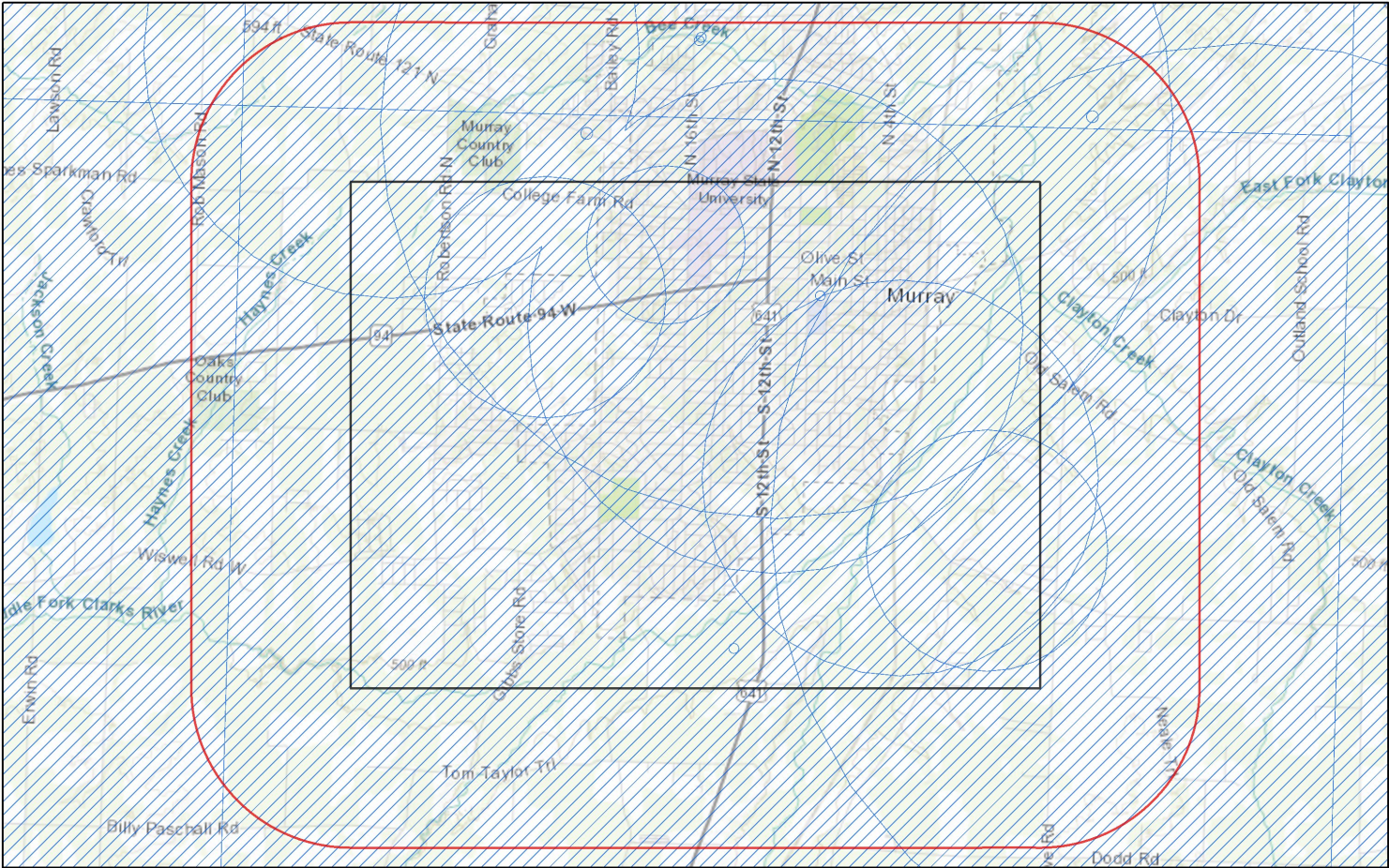
Redacted

Managed Areas within 1 Miles of Project Area

| MA ID | Managed Area Name | Unit Type | Owner Name | Managing Institution |
|-------|---------------------------------------|-----------------------|-------------------------|-------------------------|
| 1090 | <i>Murray State University Campus</i> | Other University Land | Murray State University | Murray State University |

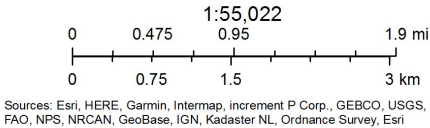
THESE DATA ARE VALID ONLY ON THE DATE ON WHICH THE REPORT WAS GENERATED.
THESE DATA MAY ONLY BE USED FOR THE PROJECT NAMED ABOVE.

Murray SUA South



August 4, 2021

- Project Boundary
- Buffered Project Boundary
- Element Occurrences



Attachments

ATTACHMENT 2

Areas of Air Quality Concern in Kentucky



Areas of Air Quality Concern in KY

2015 8-hour ozone**:



Nonattainment Area



Attainment/Unclassifiable Area

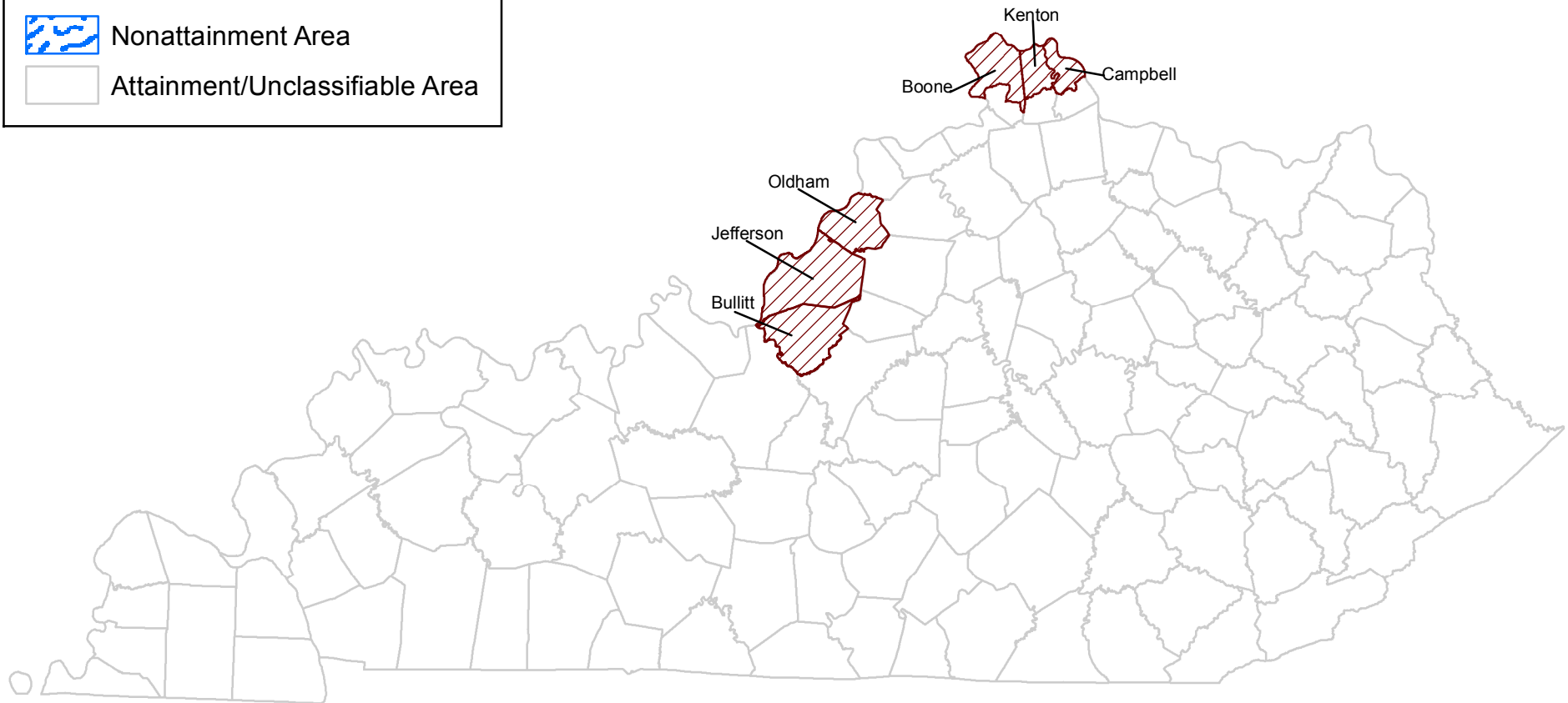
2012 PM2.5:



Nonattainment Area



Attainment/Unclassifiable Area



**The 2015 8-hour ozone NAAQS includes the counties of Jefferson, Oldham, Bullitt, and partial counties of Boone, Kenton, and Campbell .

As of March 2019

KENTUCKY'S AIR QUALITY DESIGNATIONS FOR TRANSPORTATION CONFORMITY PURPOSES (Updated 03/15/2019)

| AIRSHEDS | 1-Hour Ozone Vacated (1979 NAAQS) | 8-Hour Ozone Vacated (1997 NAAQS) | 8-Hour Ozone Implemented (2008 NAAQS) | 8-Hour Ozone Implemented (2015 NAAQS) | PM2.5 Annual Vacated (1997 NAAQS) | PM2.5 Annual Implemented (2012 NAAQS) |
|--|--|--|--|--|--|--|
| Cincinnati - Hamilton (OH, KY, IN) | | | | | | |
| Boone Co, KY* | Vacated | Vacated | Maintenance (P) | Nonattainment (P) | Vacated | Attainment/Unclassifiable |
| Campbell Co, KY* | Vacated | Vacated | Maintenance (P) | Nonattainment (P) | Vacated | Attainment/Unclassifiable |
| Kenton Co, KY* | Vacated | Vacated | Maintenance (P) | Nonattainment (P) | Vacated | Attainment/Unclassifiable |
| Louisville (KY, IN) | | | | | | |
| Bullitt Co, KY* | Vacated (P) | Vacated | Attainment/Unclassifiable | Nonattainment | Vacated | Attainment/Unclassifiable |
| Jefferson Co, KY* | Vacated | Vacated | Attainment/Unclassifiable | Nonattainment | Vacated | Attainment/Unclassifiable |
| Oldham Co, KY* | Vacated (P) | Vacated | Attainment/Unclassifiable | Nonattainment | Vacated | Attainment/Unclassifiable |
| Huntington - Ashland (WV, KY) | | | | | | |
| Boyd Co, KY* | N/A | Vacated | Attainment/Unclassifiable | Attainment/Unclassifiable | Vacated | Attainment/Unclassifiable |
| Greenup Co, KY** | Vacated (P) | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | Vacated | Attainment/Unclassifiable |
| Lawrence Co, KY** | N/A | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | Vacated (P) | Attainment/Unclassifiable |
| Clarksville - Hopkinsville (TN, KY) | | | | | | |
| Christian Co, KY* | N/A | Vacated | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Muhlenberg, TN (P) | N/A | Vacated | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Lexington | | | | | | |
| Fayette Co, KY* | Vacated | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Scott Co, KY* | Vacated | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Owensboro | | | | | | |
| Daviess Co, KY* | Vacated | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Hancock Co, KY** | Vacated (P) | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Paducah | | | | | | |
| Livingston Co, KY** | Vacated (P) | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Marshall Co, KY* | Vacated | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| Other | | | | | | |
| Edmondson, Co, KY* | Vacated | N/A | Attainment/Unclassifiable | Attainment/Unclassifiable | N/A | Attainment/Unclassifiable |
| National Ambient Air Quality Standards (NAAQS), Particulate Matter (PM), Partial (P) | | | | | | |
| (*) indicates entire counties eligible for CMAQ. (**) indicates partial counties eligible for CMAQ | | | | | | |

Attachments

ATTACHMENT 3

Cemetery Locations in Calloway County



Calloway County

Note: Additional information may be found in the county files in the library of the Kentucky Historical Society

| Cemetery Name | Address | City | Zip | # of graves | Notes |
|-----------------------|----------------|-------------|------------|--------------------|---|
| A FERGUSON | | | | 0 | |
| ADAMS | | | | 0 | |
| ALMO | | | | 0 | |
| ASBURY | | | | 0 | |
| AYERS | | | | 0 | |
| BAILEY | | | | 0 | |
| BAILEY/POOLE/MARTIN | | | | 0 | |
| BANNER | | | | 0 | |
| BARBER | | | | 0 | |
| BARNETT | | | | 0 | |
| BARNETT 1 | | | | 0 | |
| BARNETT 2 (SAGE HILL) | | | | 0 | |
| BAZZELL | | | | 0 | |
| BEAN | | | | 0 | |
| BELCHER | | | | 0 | |
| BETHEL | | | | 0 | |
| BLOOD RIVER | | | | 0 | |
| BLYTHE CEMETERY | | | | 0 | GENEOLOGICAL SOCIETY TRACED THE BLYTHE'S TO THE ANCESTERY OF FORMER PRESIDENT CLINTON. PRES. CLINTON SENT FLOWERS FOR THE REDEDICATION OF THE CEMETERY. |
| BOGARD | | | | 0 | |

| | | | | | |
|----------------------------|--------------|-------|--|---|--|
| BONNER | | | | 0 | |
| BOWMAN | | | | 0 | |
| BOWMAN CEMETERY | NORTH 4TH ST | MURAY | | 0 | VETERANS OF CIVIL WAR AND WWII. NANTHAN STUBBLEFIELD - INVENTOR OF WIRELESS TELEPHONE; PIONEER FAMILIES |
| BOYD | | | | 0 | |
| BRANDON | | | | 0 | |
| BRIDGES | | | | 0 | |
| BROOKS CHAPEL (GORDON) | | | | 0 | |
| BRUSH ISLAND | | | | 0 | |
| BUCY | | | | 0 | |
| BUTLER | | | | 0 | |
| BUTTERWORTH | | | | 0 | |
| CAIN | | | | 0 | |
| CALHOUN (STUBBLEFIELD) | | | | 0 | |
| CENTER RIDGE | | | | 0 | |
| Clark | | | | 0 | |
| COCHRUM | | | | 0 | |
| COLDWATER BAPTIST | | | | 0 | |
| COLDWATER CHURCH OF CHRIST | | | | 0 | |
| COLEMAN | | | | 0 | |
| COLES CAMPGROUND | | | | 0 | |
| COLLIE | | | | 0 | |
| COOK | | | | 0 | |

| | | | | | |
|---------------------|--|--|--|---|--|
| COPELAND | | | | 0 | |
| COUNTY POOR FARM | | | | 0 | |
| CRAIG | | | | 0 | |
| CRISP (BYARS) | | | | 0 | |
| CURD 1 (MCKEEL) | | | | 0 | |
| CURD 2 | | | | 0 | |
| CURD 3 | | | | 0 | |
| DALE | | | | 0 | |
| DALTON | | | | 0 | |
| DAUGHERTY | | | | 0 | |
| DODDS | | | | 0 | |
| DOORES (WATERFIELD) | | | | 0 | |
| DUNN | | | | 0 | |
| DUNN (BYARS) | | | | 0 | |
| EDWARDS | | | | 0 | |
| ELM GROVE | | | | 0 | |
| ENGLAND | | | | 0 | |
| EVANS 1 (KIMBRO) | | | | 0 | |
| EVANS 2 | | | | 0 | |
| EZELL | | | | 0 | |
| FAIR | | | | 0 | |
| FAKES | | | | 0 | |
| FAKES 2 | | | | 0 | |

| | | | | | |
|---------------------|--|--|--|---|--|
| FOLWELL | | | | 0 | |
| FORRESTER | | | | 0 | |
| FOX | | | | 0 | |
| FRIENDSHIP | | | | 0 | |
| FRIZZELL (PETERSON) | | | | 0 | |
| GARDNER | | | | 0 | |
| GOSHEN | | | | 0 | |
| GRAHAM | | | | 0 | |
| GREEN | | | | 0 | |
| GREEN PLAINS | | | | 0 | |
| GRIFFITH | | | | 0 | |
| GROGAN | | | | 0 | |
| GUTHRIE | | | | 0 | |
| HARDING | | | | 0 | |
| HARMONY | | | | 0 | |
| HARRIS 1 | | | | 0 | |
| HARRIS 2 | | | | 0 | |
| HATCHER | | | | 0 | |
| HAYNES | | | | 0 | |
| HAZEL | | | | 0 | |
| HENSLEY | | | | 0 | |
| HERNDON | | | | 0 | |
| HICKS | | | | 0 | |

| | | | | | |
|--------------------|--|--|--|---|--|
| HOLLAND 1 (CRAIG) | | | | 0 | |
| HOLLAND 2 | | | | 0 | |
| HOOPER | | | | 0 | |
| HUBBS | | | | 0 | |
| IRVIN | | | | 0 | |
| IVIE | | | | 0 | |
| JACKSON | | | | 0 | |
| JEFFERY | | | | 0 | |
| JOHN DARNELL | | | | 0 | |
| JONES | | | | 0 | |
| KIRKSEY | | | | 0 | |
| LASSITER 1 | | | | 0 | |
| LASSITER 2 | | | | 0 | |
| LASSITER 3 | | | | 0 | |
| LASSITER 4 | | | | 0 | |
| LASSITER 5 | | | | 0 | |
| LASSITER 6 | | | | 0 | |
| LAWRENCE | | | | 0 | |
| LAWSON | | | | 0 | |
| LAX FERGUSON | | | | 0 | |
| LEDBETTER | | | | 0 | |
| LOCUST GROVE | | | | 0 | |
| LONE OAK (NEWBERG) | | | | 0 | |

| | | | | | |
|----------------------|--|--|--|---|--|
| MACEDONIA | | | | 0 | |
| MALLORY | | | | 0 | |
| MANNING | | | | 0 | |
| MARTIN 1 | | | | 0 | |
| MARTIN 2 | | | | 0 | |
| MARTINS CHAPEL | | | | 0 | |
| MCCUISTON 1 | | | | 0 | |
| MCCUISTON 2 (STILEY) | | | | 0 | |
| MCCUISTON 3 | | | | 0 | |
| MCDANIEL | | | | 0 | |
| MCDANIEL 2 | | | | 0 | |
| MILLER | | | | 0 | |
| MILLER 1 | | | | 0 | |
| MILLER 3 | | | | 0 | |
| MILLSTEAD | | | | 0 | |
| MINTER | | | | 0 | |
| MOODY 1 | | | | 0 | |
| MOODY 2 | | | | 0 | |
| MOORE 1 | | | | 0 | |
| MOORE 2 | | | | 0 | |
| MORRIS | | | | 0 | |
| MORTON | | | | 0 | |
| MT CARMEL | | | | 0 | |

| | | | | | |
|-------------------------|--------------|--------|--|----|---|
| MT OLIVE | | | | 0 | |
| MT ZION | | | | 0 | |
| MT ZION EAST | | | | 0 | |
| MURRAY | | | | 0 | |
| MURRAY | | | | 0 | |
| MURRAY MEMORIAL GARDENS | | | | 0 | |
| MYSHANTER | | | | 0 | |
| NEALE | | | | 0 | |
| NEW CONCORD | | | | 0 | |
| NEW JENNY RIDGE | | | | 0 | |
| NEW PROVIDENCE | | | | 0 | |
| NORTH PLEASANT GROVE | | | | 0 | |
| NUCKOLS | | | | 0 | |
| OAK LEVEL | | | | 0 | |
| OBERT | | | | 0 | |
| OLD CONCORD | CROSLAND RD | | | 48 | EARLY PIONEERS OF COUNTY BURIED HERE; OBEDIAH COLE, VETERAN OF WAR OF 1812 (NO RECOGNITION) |
| OLD SALEM | Old Salem Rd | Murray | | 0 | One of the oldest Cemeteries in Area |
| Old Salem Cemetery | Old Salem Rd | Murray | | 0 | one of oldest cemeteries in area |
| OUTLAND 1 | | | | 0 | |
| OUTLAND 2 | | | | 0 | |
| OUTLAND 3 | | | | 0 | |
| OWING | | | | 0 | |
| PALESTINE | | | | 0 | |

| | | | | | |
|--------------------------|--|--|--|---|--|
| PARKER (OAK HILL) | | | | 0 | |
| PARKER 2 | | | | 0 | |
| PARRISH | | | | 0 | |
| PLEASANT HILL | | | | 0 | |
| POGUE | | | | 0 | |
| ROBERTS 1 | | | | 0 | |
| ROLFE (BOYD) | | | | 0 | |
| ROSE | | | | 0 | |
| ROSS | | | | 0 | |
| RUSSELL CHAPEL (FAWCETT) | | | | 0 | |
| S PLEASANT GROVE | | | | 0 | |
| SALEM | | | | 0 | |
| SCHERFFIUS | | | | 0 | |
| SCHROADER (PEELER) | | | | 0 | |
| Scott | | | | 0 | |
| SCOTTS GROVE | | | | 0 | |
| SELF | | | | 0 | |
| SHACKLEFORD | | | | 0 | |
| SHILOH | | | | 0 | |
| SINKING SPRINGS | | | | 0 | |
| SKINNER | | | | 0 | |
| SMITH | | | | 0 | |
| SMITH | | | | 0 | |

| | | | | | |
|---------------------|--|--|--|---|--|
| SMITHSON | | | | 0 | |
| SMOTHERMAN | | | | 0 | |
| SPRING CREEK | | | | 0 | |
| STEWART | | | | 0 | |
| STOKES | | | | 0 | |
| STORYS CHAPEL | | | | 0 | |
| STUBBLEFIELD | | | | 0 | |
| SUGAR CREEK | | | | 0 | |
| TEMPLE HILL | | | | 0 | |
| TREVATHAN | | | | 0 | |
| TUCKER | | | | 0 | |
| TURNER | | | | 0 | |
| UNKNOWN 1 | | | | 0 | |
| UNKNOWN 2 | | | | 0 | |
| UNKNOWN 3 | | | | 0 | |
| UNKNOWN 4 | | | | 0 | |
| UNKNOWN 5 | | | | 0 | |
| WADE | | | | 0 | |
| WALKER | | | | 0 | |
| WALL | | | | 0 | |
| WATERS (WALTERS) | | | | 0 | |
| WATKINS 1 (RUSSELL) | | | | 0 | |
| WATKINS 2 (SNOW) | | | | 0 | |

| | | | | | |
|------------|--|--|--|---|--|
| WATSON | | | | 0 | |
| WEST FORK | | | | 0 | |
| WILCOX | | | | 0 | |
| WILLIAMS | | | | 0 | |
| WINCHESTER | | | | 0 | |
| WINTERS | | | | 0 | |
| WYATT | | | | 0 | |
| YANDELL | | | | 0 | |
| YOUNG | | | | 0 | |

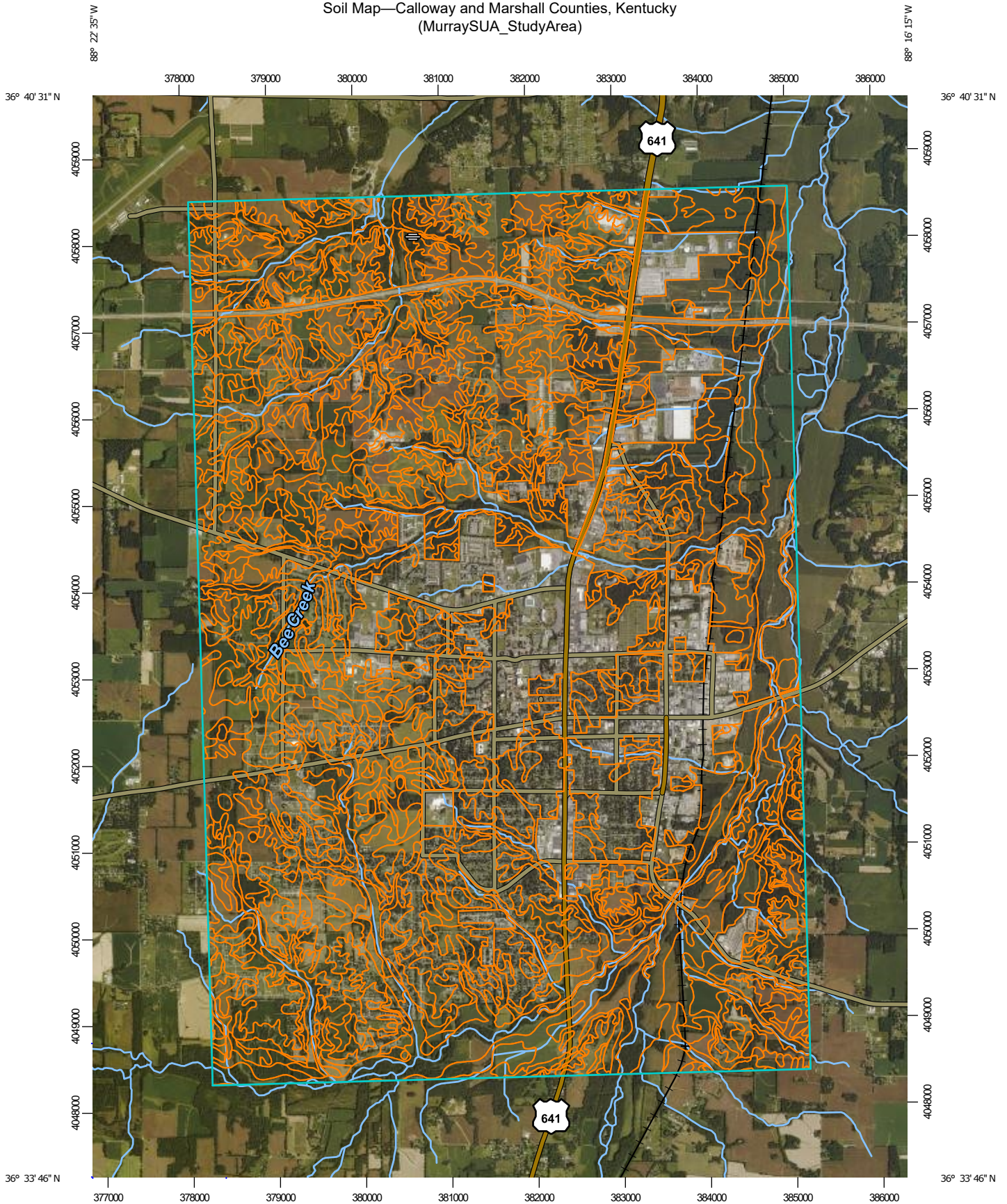
Attachments

ATTACHMENT 4

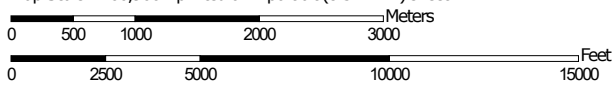
USDA Soil Resource Report



Soil Map—Calloway and Marshall Counties, Kentucky
(MurraySUA_StudyArea)



Map Scale: 1:60,900 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

8/2/2021
Page 1 of 5

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Calloway and Marshall Counties, Kentucky
Survey Area Data: Version 15, May 28, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 21, 2019—Sep 4, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|-----------------|--|--------------|----------------|
| BnC2 | Brandon silt loam, 6 to 12 percent slopes, eroded | 171.0 | 1.0% |
| BnD2 | Brandon silt loam, 12 to 20 percent slopes, eroded | 195.7 | 1.1% |
| BpD3 | Brandon-Purchase-Lax complex, 12 to 20 percent slopes, severely eroded | 141.9 | 0.8% |
| BsE2 | Brandon-Saffell-Smithdale complex, 20 to 35 percent slopes, eroded | 13.4 | 0.1% |
| CaB | Calloway silt loam, 2 to 6 percent slopes | 674.5 | 3.8% |
| CaB2 | Calloway silt loam, 2 to 6 percent slopes, eroded | 253.0 | 1.4% |
| CeA | Center silt loam, 0 to 2 percent slopes | 83.7 | 0.5% |
| CeB | Center silt loam, 2 to 5 percent slopes | 123.8 | 0.7% |
| Ci | Collins-luka complex, 0 to 2 percent slopes, frequently flooded | 522.7 | 3.0% |
| Cu | Collins-luka complex, 0 to 2 percent slopes, occasionally flooded | 1,267.6 | 7.2% |
| CwA | Calloway-Kurk complex, 0 to 2 percent slopes | 653.7 | 3.7% |
| Ef | Enville-Falaya complex, 0 to 2 percent slopes, occasionally flooded | 407.1 | 2.3% |
| Ff | Falaya silt loam, 0 to 2 percent slopes, frequently flooded | 928.0 | 5.3% |
| GrA | Grenada silt loam, 0 to 2 percent slopes | 1,505.0 | 8.6% |
| GrB2 | Grenada silt loam, 2 to 6 percent slopes, eroded | 2,835.6 | 16.2% |
| GrB3 | Grenada silt loam, 4 to 6 percent slopes, severely eroded | 1,756.4 | 10.0% |
| GrC3 | Grenada silt loam, 6 to 12 percent slopes, severely eroded | 2.6 | 0.0% |
| HgF | Hapludults-Gullied land complex, 6 to 60 percent slopes | 14.2 | 0.1% |
| KrA | Kurk silt loam, 0 to 3 percent slopes | 70.0 | 0.4% |

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|-----------------|---|--------------|----------------|
| KuA | Kurk silt loam, 0 to 3 percent slopes, rarely flooded | 370.6 | 2.1% |
| LIC2 | Lax-Loring-Feliciania complex, 2 to 12 percent slopes, eroded | 13.1 | 0.1% |
| LoB2 | Loring silt loam, 2 to 6 percent slopes, eroded | 223.5 | 1.3% |
| LpC3 | Lax-Purchase-Providence complex, 6 to 12 percent slopes, severely eroded | 321.1 | 1.8% |
| Lv | Lobelville silt loam, 0 to 3 percent slopes, occasionally flooded | 40.8 | 0.2% |
| Pg | Pits, gravel-Alfic Udarents complex | 12.5 | 0.1% |
| PIB3 | Purchase-Lax-Brandon complex, 4 to 6 percent slopes, severely eroded | 51.5 | 0.3% |
| PIC2 | Purchase-Lax-Brandon complex, 6 to 12 percent slopes, eroded | 389.4 | 2.2% |
| PIC3 | Purchase-Lax-Brandon complex, 6 to 12 percent slopes, severely eroded | 771.6 | 4.4% |
| Pr | Pruittton-Riverby complex, 0 to 3 percent slopes, occasionally flooded | 17.2 | 0.1% |
| PuC3 | Purchase-Loring complex, 6 to 12 percent slopes, severely eroded | 20.9 | 0.1% |
| RB | Rosebloom and Bibb soils, 0 to 2 percent slopes, frequently flooded | 497.1 | 2.8% |
| RtA | Routon silt loam, 0 to 2 percent slopes | 75.4 | 0.4% |
| RuA | Routon silt loam, 0 to 2 percent slopes, rarely flooded | 39.0 | 0.2% |
| SaC | Saffell gravelly sandy loam, 2 to 12 percent slopes | 8.6 | 0.0% |
| SbD2 | Saffell-Brandon complex, 12 to 25 percent slopes, eroded | 38.0 | 0.2% |
| SsF | Saffell-Smithdale-Brandon complex, 20 to 60 percent slopes | 25.6 | 0.1% |
| SsF3 | Saffell-Smithdale-Brandon complex, 20 to 60 percent slopes, severely eroded | 10.8 | 0.1% |
| STF | Smithdale, Toinette and Luverne soils, 25 to 60 percent slopes | 0.1 | 0.0% |

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|------------------------------------|--|-----------------|----------------|
| UaB | Urban land-Alfic Udarents complex, 0 to 8 percent slopes | 2,480.1 | 14.1% |
| UuD | Udorthents-Urban land complex, 0 to 25 percent slopes | 201.9 | 1.2% |
| Vb | Vicksburg silt loam, 0 to 2 percent slopes, occasionally flooded | 139.2 | 0.8% |
| Vo | Vicksburg-Ochlockonee complex, 0 to 3 percent slopes, rarely flooded | 32.3 | 0.2% |
| W | Water | 112.8 | 0.6% |
| We | Waverly silt loam, 0 to 2 percent slopes, frequently flooded | 31.8 | 0.2% |
| Totals for Area of Interest | | 17,545.7 | 100.0% |

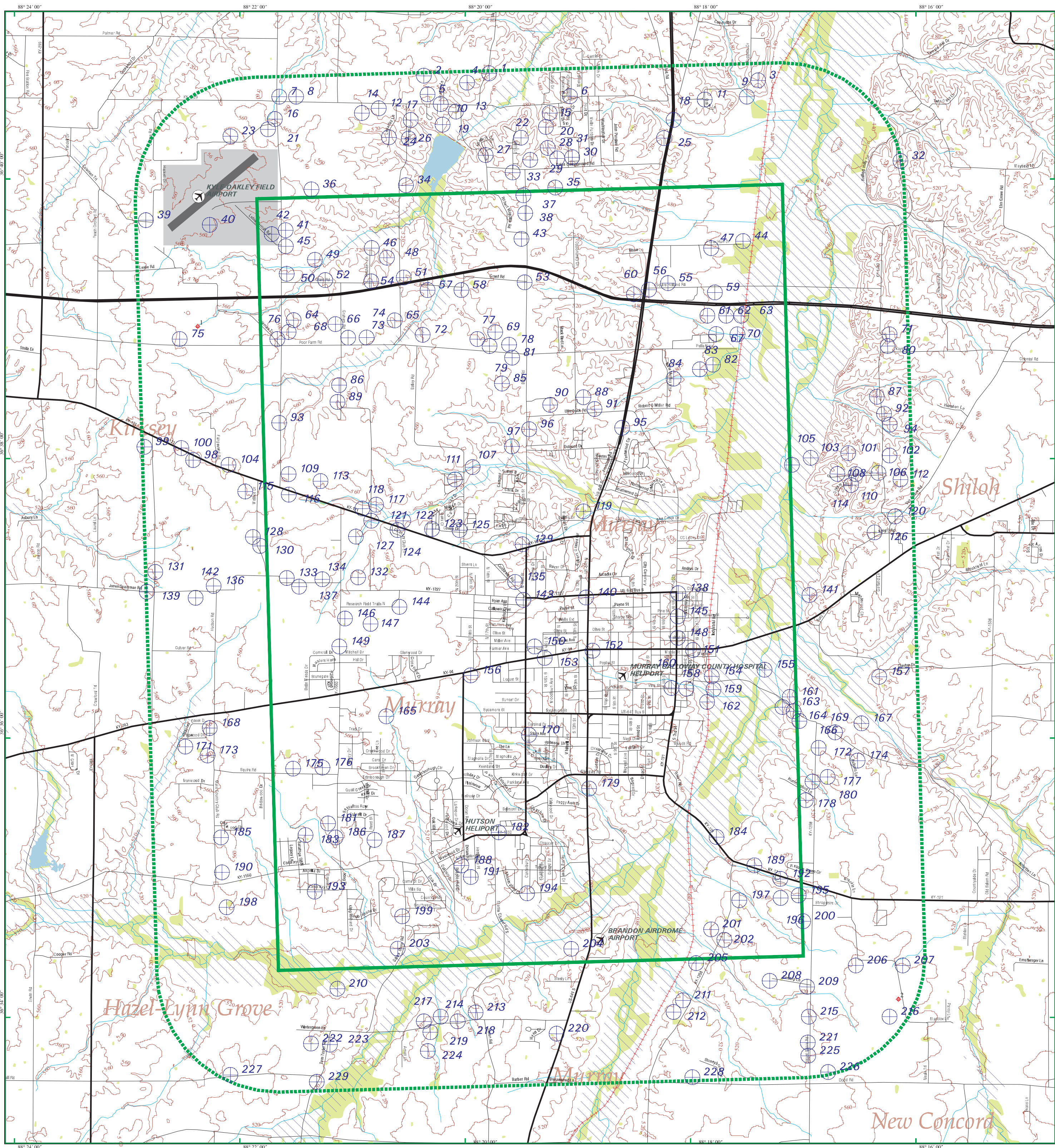
Attachments

ATTACHMENT 5

Water Resources

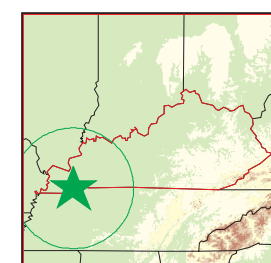
- a. EDR DataMap Well Search Report and Map
- b. 2016 Kentucky 305(b) list (provided in separate digital format due to size)
- c. 2016 Kentucky 303(d) list (provided in separate digital format due to size)





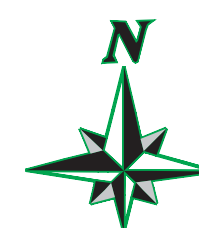
EDR DataMap® - Well Search

Murray SUA, SW Planning



Murray, KY

- | | | | |
|--------------------|---------------|--------------------|----------|
| Listed Water Wells | Major Roads | Fault Lines | Wetlands |
| Oil & Gas Wells | Waterways | Water | |
| Study Boundary | Railroads | Superfund Sites | |
| Roads | Contour Lines | 100-Yr Flood Zones | |



Attachments

ATTACHMENT 6

EDR Report (provided in separate digital format due to size)

