APPENDIX C: ENVIRONMENTAL OVERVIEW

Environmental Overview Narrative – US 460 Corridor Study Magoffin & Johnson Counties

KYTC Item No. 10-80101.00

December 16, 2022

Prepared for:

Kentucky Transportation Cabinet
Division of Planning
200 Mero Street, 4th Floor
Frankfort, KY 40622

Prepared by:

Stantec Consulting Services, Inc.
Lexington, KY

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Prepared by  _____
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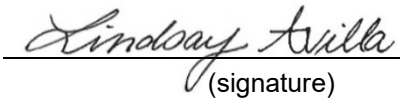
Lee Carolan, Associate, Senior Environmental Scientist

Reviewed by  _____
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Lindsay Avilla, Environmental Scientist

Approved by  _____
(signature)
Len Harper, Senior Associate

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Abbreviations

BMP	Best Management Practices
ECHO	Enforcement & Compliance History Online
EDR	Environmental Data Resources
EDR Hist Auto	EDR Exclusive Historical Auto Stations
EO	Environmental Overview
FEMA	Federal Emergency Management Agency
IPaC	Information for Planning and Consultation
KDAQ	Kentucky Department of Air Quality
KDFWR	Kentucky Department of Fish and Wildlife Resources
KDOW	Kentucky Division of Water
KHC	Kentucky Heritage Council
KSS	Kentucky Speleological Society
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
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OSA	Kentucky Office of State Archaeology
OKNP	Office of Kentucky State Nature Preserve
PADUS	Protected Areas Database of the United States
SHIFT	Strategic Highway Investment Formula for Tomorrow

USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Executive Summary

This Environmental Overview (EO) Narrative has been prepared for the US 460 Corridor Study between KY 114 in Salyersville and US 23 in Paintsville, located in Magoffin and Johnson Counties in Kentucky.

The objective of this EO Narrative 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 no National Wetlands Inventory (NWI) features mapped within the study area.

Threatened and Endangered Species: According to U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) there are sixteen federally listed endangered species, two federally listed threatened species and one federally listed candidate. All have the potential to occur within the study area.

Groundwater: The EDR well report found no public water supply systems, approximately 12 state water wells occur within the study area, which are listed as domestic use wells. The Kentucky Division of Water (KDOW) Water Protection Viewer shows part of the study area falls within the Paintsville Municipal Water Works source water protection area which is north of Mash Fork on the Johnson/Magoffin County lines which best management practices (bmps) will be followed if disturbance in the area of surface waters occurs. Subsurface flow is thought to flow southwest based on topography and contour lines. The Kentucky Watershed Viewer shows this part of this project falls within the Barnett's Creek-Paint Creek; Burning Fork-Licking River; Jennys Creek; Little Paint Creek; Mudlick Creek-Paint Creek watersheds (HUC12: 05070203140370) 05100205180) which is within the Lower Levisa watershed (HUC8 05070203).

Karst: The Karst Occurrence map found that the study area is underlain with bedrock with limited or no potential for karst. The Office of Kentucky Nature Preserves (OKNP) report came back stating that there were no caves within the study area and one mile buffer zone. The KSS database information regarding the study area via an email dated December 16, 2022, stated that there are no karst areas or caves.

Farmland: No prime farmland is found in the area.

Hazardous Materials Concerns: No information was found in the environmental data searches. However, several properties have old petroleum equipment, junk piles, auto junk yards, burn piles, etc. that could pose concerns during construction.

Oil and Gas Wells: There are approximately 104 listed oil and gas wells reported within the study area according to the EDR report.

Archaeological, Cultural and Historic Resources: Based on the review of National Register of Historic Places (NRHP) there were no historic sites outside of the town of Paintsville listed (pending the Kentucky

Heritage Council (KHC) report). The Kentucky Office of State Archaeology (OSA) preliminary records review indicated one cemetery eligible for the National Register and one open habitation without mounds not assessed for National Register status sites.

Community Resources: Community resources and sensitive noise receptors in the study area include single family houses, several businesses, a trailer park community and five houses of worship. Utility infrastructure in the area includes approximately two gas transmissions pipelines crossings US 460, Paintsville Municipal Water Works and one AC transmission line running through the project area.

1.0 ENVIRONMENTAL OVERVIEW

1.1 PROJECT DESCRIPTION

This Environmental Overview (EO) Narrative has been prepared for the US 460 Corridor Study between KY 114 in Salyersville and US 23 in Paintsville, located in Magoffin and Johnson Counties in Kentucky. The study area for this effort is shown in **Figure 1**.

The objective of this EO is to identify environmental resources of significance, potential jurisdictional features, and other environmental areas of concern that should be considered in the development of improvement concepts.

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 in Attachments 1-9:
    - USFWS IPaC threatened and endangered species list
    - Known northern long-eared bat habitat in Kentucky
    - Known Indiana bat habitat in Kentucky
    - Kentucky Department of Fish and Wildlife Resources (KDFWR) State species list
    - Office of Kentucky Nature Preserve (OKNP) Natural Heritage Database report
    - Kentucky Heritage Council (KHC) (No response)
    - Kentucky National Ambient Air Quality Standards (NAAQS) Map
    - National Resources Conservation Service (NRCS) Soils Report for Floyd and Jonson Counties and Magoffin and Morgan Counties in Kentucky
    - EDR DataMap Research Report
    - EDR Area/Corridor Report
    - Kentucky Office of State Archaeology (OSA) Preliminary Records Review
    - NWI and United States Geological Survey (USGS) Water Data Map for Kentucky

Environmental Overview

  - EDR Report Maps

- Project Overview (**Figure 1**)
- Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) Data and NWI wetlands (**Figure 2**)
- Farmland Classification of Soils (**Figure 3**)
- Human Environment, Cultural, and Historic (**Figures 4a & 4b)**
- Gas, Oil and Water wells (**Figure 4a & 4b**)
- Hazardous materials records (**Figures 4a & 4b**)
- Karst Data Map (**Figure 5**)

Table 1 below provides a summary of the features that were identified within the study area. This information provides an overview of resources of significance within the study area as well as other environmental issues of potential concern. More detailed environmental studies may be required as individual actions are further developed in accordance with the National Environmental Policy Act (NEPA).

Table 1. Environmental Resources/Features in US 460 Corridor Study Area, Johnson and Magoffin Counties, Kentucky

Environmental Category	Resource/Feature	Source/Information
USGS Streams	There are six USGS named streams and numerous unnamed stream resources within the study area. The Kentucky Watershed Viewer shows this part of this project falls within the Barnett's Creek-Paint Creek; Burning Fork-Licking River; Jennys Creek; Little Pint Creek; Mudlick Creek-Paint Creek watersheds (HUC12: 05070203140370) 05100205180) which is within the Lower Levisa watershed (HUC8 05070203).	Source: KDOW Special Waters tables, KDOW 305(b) and 303(d) tables (2016), USFWS NWI, USGS National Map, KY Water Health Portal
Other Streams	Surface streams potentially present in the study area. These would likely consist of small; headwater streams or springs and roadside drainage features not indicated on traditional mapping.	Source: USGS maps, ESRI topo maps
Wetlands	There are no NWI features mapped within the study area. There are two potential wetlands base on aerial review. Figure 2 Water Resources Map	Source: USFWS NWI, USGS National Map

Ponds	The NWI dataset indicates there is one freshwater pond (PUBHh) feature in the study area. Figure 2 Water Resources Map	Source: USFWS NWI, USGS National Map
USFWS Species List	The United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) resource list indicated the following 13 species were of concern for the study area: • Northern long-eared bat (*Myotis septentrionalis*)- Threatened (to be upgraded to Endangered in January 2023) • Gray bat (*Myotis grisescens*)-Endangered • Indiana bat (*Myotis sodalis*)- Endangered • Clubshell (*Pleurobema clava*)-Endangered • Fanshell (*Cyprogenia stegaria*)-Endangered • Littlewing Pearlymussel (*Pegias fabula*)-Endangered • Northern Riffleshell (*Epioblasma rangiana*)- Endangered • Pink Mucket (*Lampsilis abrupta)*- Endangered • Rabbitsfoot (*Quadrula cylindrica cylindrica*)- Threatened • Rough Pigtoe (*Pleurobema plenum*)-Endangered • Snuffbox Mussel (*Epioblasma triquetra*)- Endangered • Big Sandy Crayfish (*Cambarus callainus*)- Threatened • Monarch Butterfly (*Danaus plexippus*)- Candidate Please refer to Attachment 1 for more information regarding species data.	Source: USFWS IPaC Trust Resource Report (2022), USFWS Kentucky Ecological Field Office (2019)
KDFWR Species List	KDFWR lists 31 additional State Threatened, Endangered, and Special Concern Species as occurring (either recently or historically) in Magoffin and Johnson Counties with several species found in both counties. These include: • Nine state endangered species (six Aves, one and one Reptilia and two Mammalia) • Ten state threatened species (three Aves, three Mammalia, one Bivalvia and two Petromyzontida) • Eleven state sensitive species (Five Aves, one Bivalvia, two Mammalia, one Amphibia, and one Malacostraca) • One Bivalvia special concern species Please refer to Attachment 1 for more information regarding species data.	Source: KDFWR – Species List for Johnson and Magoffin Counties (2022)

Environmental Overview

OKNP Species Database	The OKNP provided one record including Summer 1 habitat and one State sensitive species for which species occurrence records have been noted either in or within one mile of the study area. Within one mile of the study area there is Summer 1 habitat for the Northern longed-eared bat (*Myotis septentrionalis*) Threatened but will be upgraded in January 2023 to Endangered. 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. Please refer to Attachment 1 for more information regarding species data.	Source: OKNP Natural Heritage Database response (December 5, 2022)
Groundwater	The EDR well report found no public water supply system, approximately 12 state water wells occur within the study area, which are listed domestic use wells. Subsurface flow is thought to flow southwest based on topography and contour lines. The Water Protection Viewer shows the part of the study area falls within the Paintsville Municipal Water Works source water protection area which is north of Mash Fork on the Johnson/Magoffin County lines. BMPs along areas of surface waters will need to be established prior to any disturbance. The Kentucky Watershed Viewer shows this part of this project falls within the Barnett's Creek-Paint Creek; Burning Fork-Licking River; Jennys Creek; Little Pint Creek; Mudlick Creek-Paint Creek watersheds (HUC12: 05070203140370) 05100205180) which is within the Lower Levisa watershed (HUC8 05070203). Please refer to Figures 4a &4b for more information regarding groundwater data.	Source: Kentucky Watershed Viewer (2022), EDR DataMap Well Search Report (2022), and Water Protection Viewer (2022)
Karst Areas	Kentucky Speleological Society (KSS) is still pending. The Karst Occurrence in Kentucky map indicated very few Karst features. Please refer to Figure 5 KARST database report.	Source: Karst Occurrence in Kentucky map (Paylor and Currens 2002), KSS database response (2022) OKNP database response (2022)

ENVIRONMENTAL OVERVIEW NARRATIVE – US 460 CORRIDOR STUDY MAGOFFIN & JOHNSON COUNTIES

Environmental Overview

Floodplain	There are seven FEMA 100-Year floodplains occurring within the study area according to NFHL data.	Source: FEMA NFHL (2022)
Floodway	There are seven FEMA designated floodways within the study area according to NFHL data Zones AE & A.	Source: FEMA NFHL (2022)
Farmlands	There are no Prime Farmlands or Farmlands of Statewide Importance within the study area. Non-prime farmland totals the entire project. Please refer to Attachment 4 for the full USDA NRCS Soil Survey Report.	Source: NRCS Web Soil Survey Map Data (2022)
Hazardous Materials	The EDR report provided no database records regarding potential hazardous materials concerns other than oil and gas wells. Potential hazardous materials concerns are found throughout the study area per aerial review of the entire corridor. The EPA Echo Report provided information regarding Clean Water Act (CWA) and one Clean Air Quality (KDAQ) issues only. Please refer to digital Attachment 6 for more information regarding EDR data.	Source: Environmental Data Resources Area/Corridor Report (EDR 2022)
Oil and Gas Wells	There are approximately 104 listed oil and gas wells reported within the study area corridor according to the EDR report. Please refer to digital Attachment 6 for more information regarding EDR well data.	Source: EDR DataMap Well Search Report (December 2, 2022)
Section 4(f)	There are no recreation areas. There are no Wildlife Management Areas or Federal Public Lands located within the study area. There is one Protected Areas Database of United States (PADUS) results within the study area; the Paintsville Municipal Water Works.	Source: KDFWR (2022), Google Earth Pro Maps, PADUS (2022)
Section 6(f)	Based on Land and Water Conservation Fund (LWCF) records map, there are no LWCF properties present in the study area.	Source: The Wilderness Society LWCF Federal and State Funding Map Data (2014)

ENVIRONMENTAL OVERVIEW NARRATIVE – US 460 CORRIDOR STUDY MAGOFFIN & JOHNSON COUNTIES

Environmental Overview

Air Quality	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 NAAQS. There are no USEPA air emissions facilities are located within the study area. Please refer to digital Attachment 2 for more information regarding air quality data.	Source: KYTC Air Quality Maps (2015), USEPA Green Book (2015), USEPA Envirofacts (2018)
Noise	Noise sensitive land use areas are located throughout the study area (Activity Categories “B”, “C”, “D”, “E”, and “F”), including agricultural, residential neighborhoods, cemeteries, places of worship, schools, hotels, and restaurants with exterior uses. The majority of the project corridor includes moderate density residential housing (B) (single-family home developments), cemeteries (C), and commercial buildings (D).	Source: KYTC Noise Policy (2020)
Cultural-Archaeology	Based on the review of NRHP, there were no historic sites outside of the town of Paintsville listed (pending the KHC report). The OSA preliminary records review indicated one cemetery eligible for the National Register and one open habitation without mounds not assessed for National Register status sites. Please refer to digital Attachments 4a & 4b for more information regarding cultural-archeology data.	Source: KY OSA report (2022)
Cultural- Historic	Based on the review of NRHP, there were no historic sites outside of the town of Paintsville listed (pending the KHC report). The OSA preliminary records review indicated one cemetery eligible for the National Register and one open habitation without mounds not assessed for National Register status sites. KHC Report is pending. Please refer to digital Figures 4a & 4b for more information regarding cultural-archeology data.	Source: NRHP (2020) KHC research 2022
Houses of Worship	Five houses of worship (church, mosque, synagogue, etc.) were identified in the study area from current mapping resources. Rock House Freewill Baptist Church, Fairview Freewill Baptist Church, Light of Christ Church, New Generation Church, and New Life Worship Center. Please refer to Figures 4a & 4b for more information regarding house of worship sites.	Source: Google Earth Pro Maps, ESRI topo maps
Schools	No schools were located in the study area.	Source: Google Earth Pro Maps, ESRI topo maps

ENVIRONMENTAL OVERVIEW NARRATIVE – US 460 CORRIDOR STUDY MAGOFFIN & JOHNSON COUNTIES

Environmental Overview

Cemeteries	There are six cemeteries within the study corridor area, appearing to be mostly family cemeteries. There may be additional private, or family cemeteries present in the study area that have not been previously mapped or located. Please refer to Figures 4a & 4b for more information regarding the cemetery.	Source: KY Historical Society (2008), Google Earth Pro Maps, ESRI topo maps
Public Services	There are two public service facilities in the project study area, including: • Rock House Fire Department • Johnson County Animal Shelter According to the U.S. Department of Homeland Security Infrastructure data there is one AC overhead transmission line that is owned by American Utilities CO, Inc. that runs north to southeast within the project boundary. The National Pipeline Mapping System Public Viewer indicated there are approximately two pipelines within the study area.	Source: U.S. Department of Homeland Security Infrastructure data (2022). Google Earth Pro Maps, National Pipeline Mapping Systems Public Viewer (2022)
Residences and Businesses	Land use in the study area, is rural with dispersed residential and mostly single-family homes with adjoining business. There is one trailer park.	Source: Google Earth Pro Maps, ESRI topo maps

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FIGURES

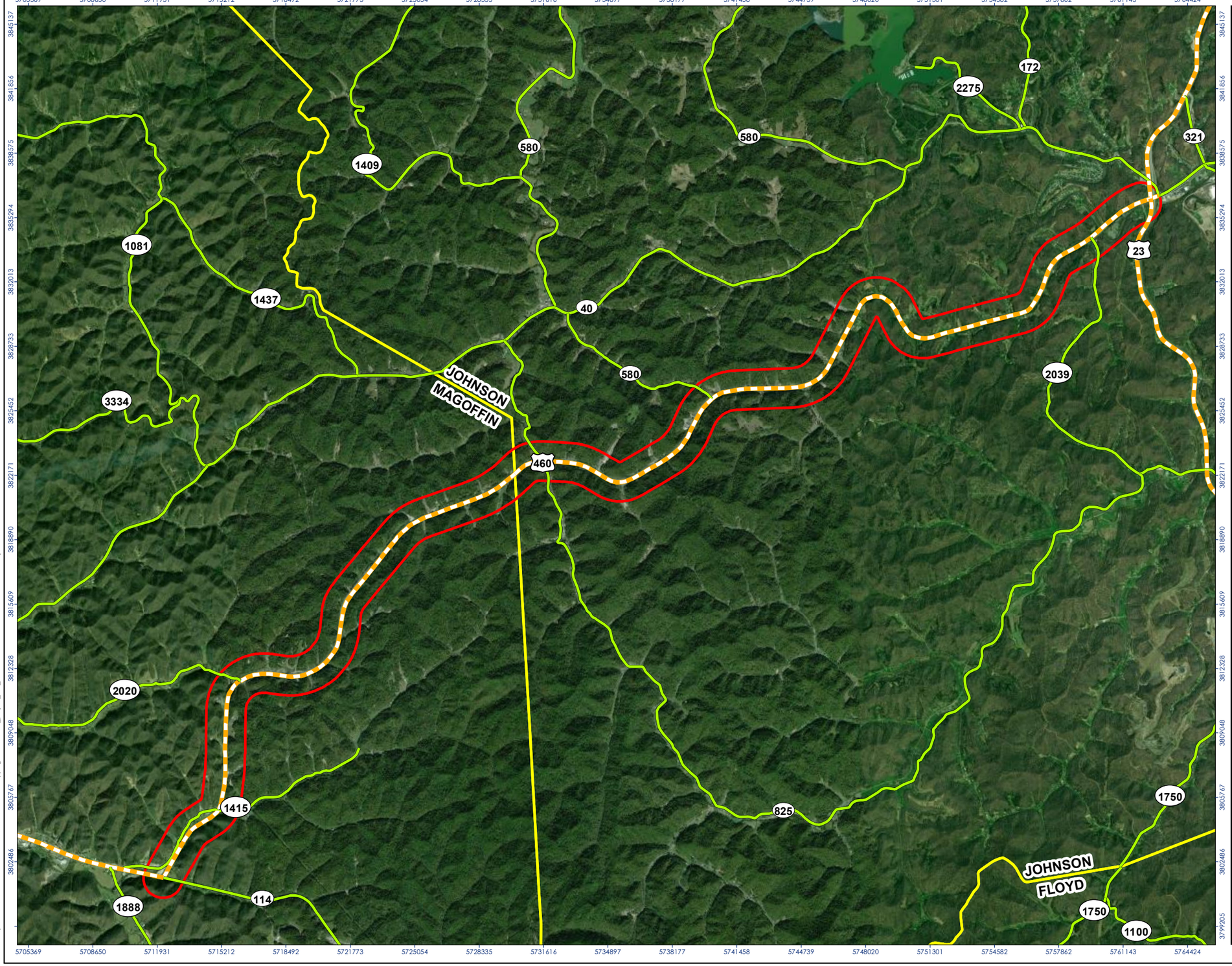

Figure No.

1

Title

Project Overview

Client/Project 178568101

Client: KYTC
Project: US 460
Report: Environmental Overview

Project Location
Johnson and Magoffin Counties
Kentucky

Prepared by TF on 2022-12-05
IR Review by LC on 2022-12-05

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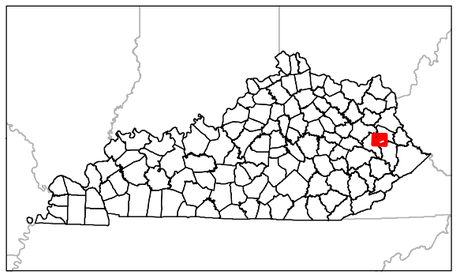
Legend

- Influence Area
- Kentucky Counties
- State Route
- US Highway



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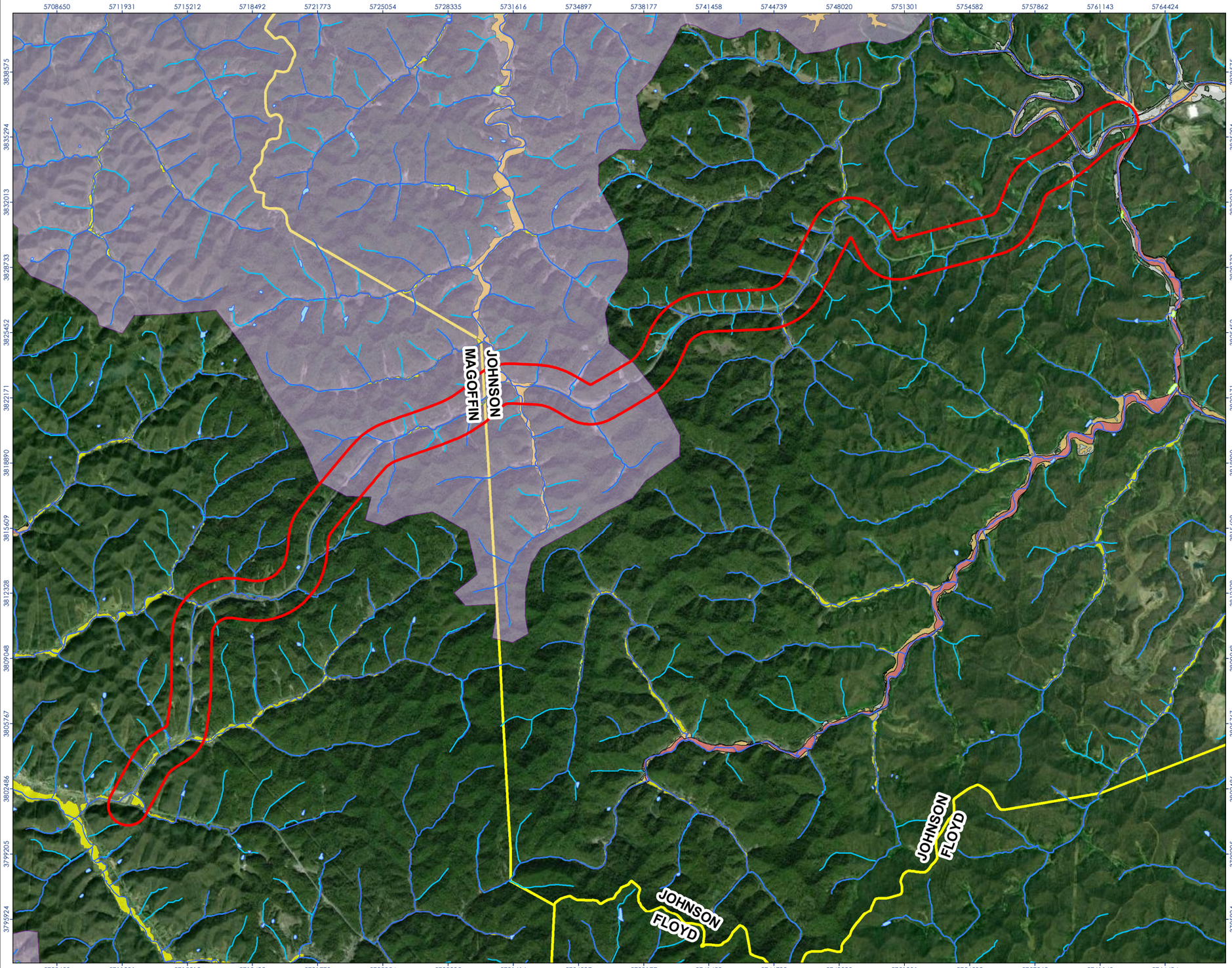

Figure No.

1

Title

Water Resources

Client/Project 178568101

Client: KYTC
Project: US 460
Report: Environmental Overview

Project Location
Johnson and Magoffin Counties
Kentucky

Prepared by TF on 2022-12-05
IR Review by LC on 2022-12-05

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Legend

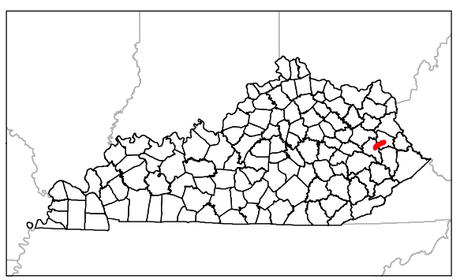
- Influence Area
- DOW Source Water Protection Areas
- Kentucky Counties

National Wetlands Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

National Flood Hazard Layer

- AE, Floodway
- AE, 1% Annual Chance Flood Hazard
- A, 1% Annual Chance Flood Hazard
- X, 0.2% Annual Chance Flood Hazard



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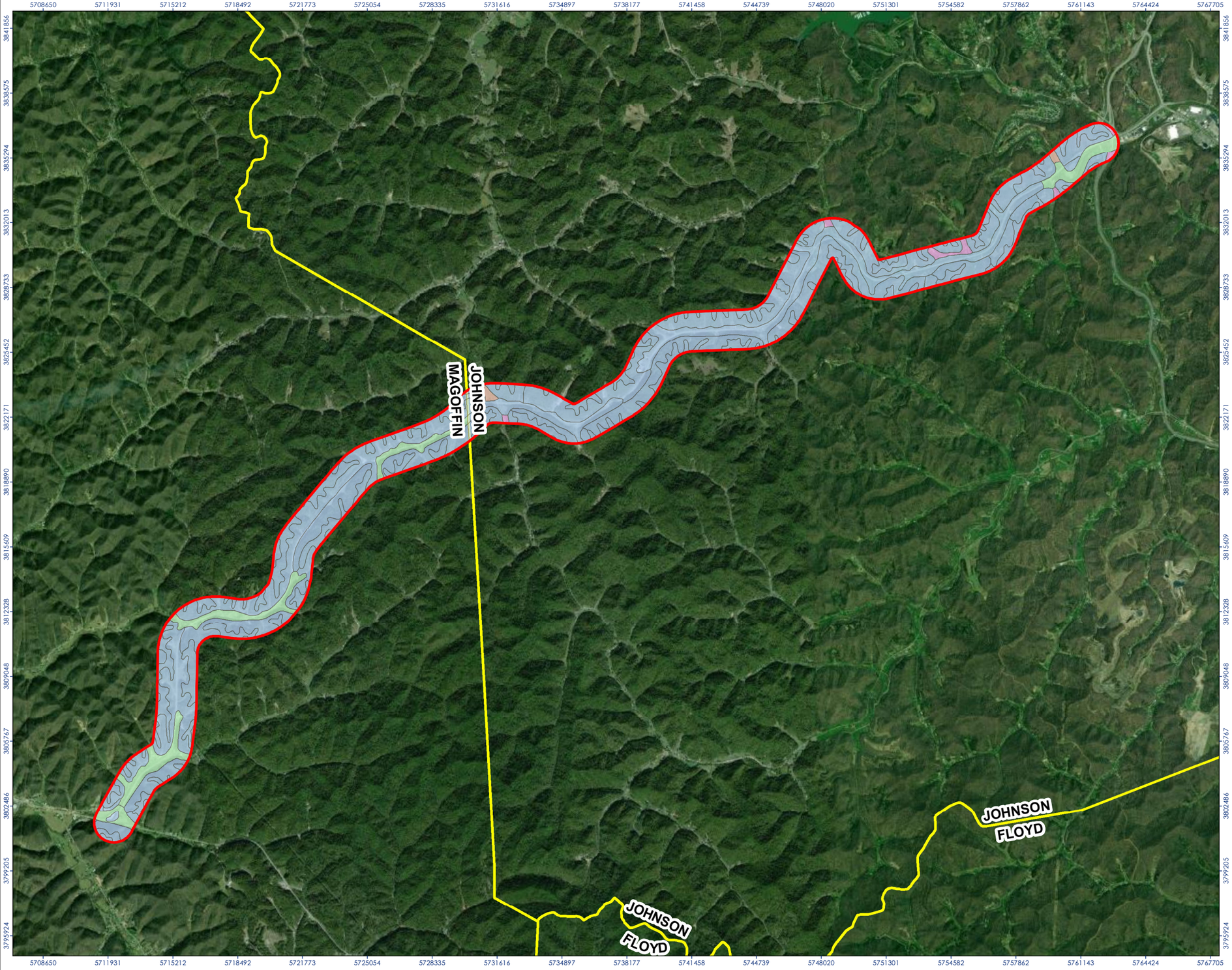

Figure No.

3

Title

Farmland Classification

Client/Project 178568101

Client: KYTC
Project: US 460
Report: Environmental Overview

Project Location
Johnson and Magoffin Counties
Kentucky

Prepared by TF on 2022-12-05
IR Review by LC on 2022-12-05

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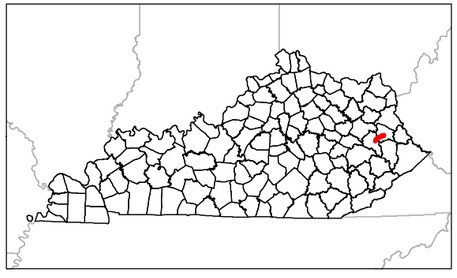
Legend

- Influence Area
- Kentucky Counties

Soil Classifications

Farmland Indicator

- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland
- Prime farmland if protected from flooding or not frequently flooded during the growing season



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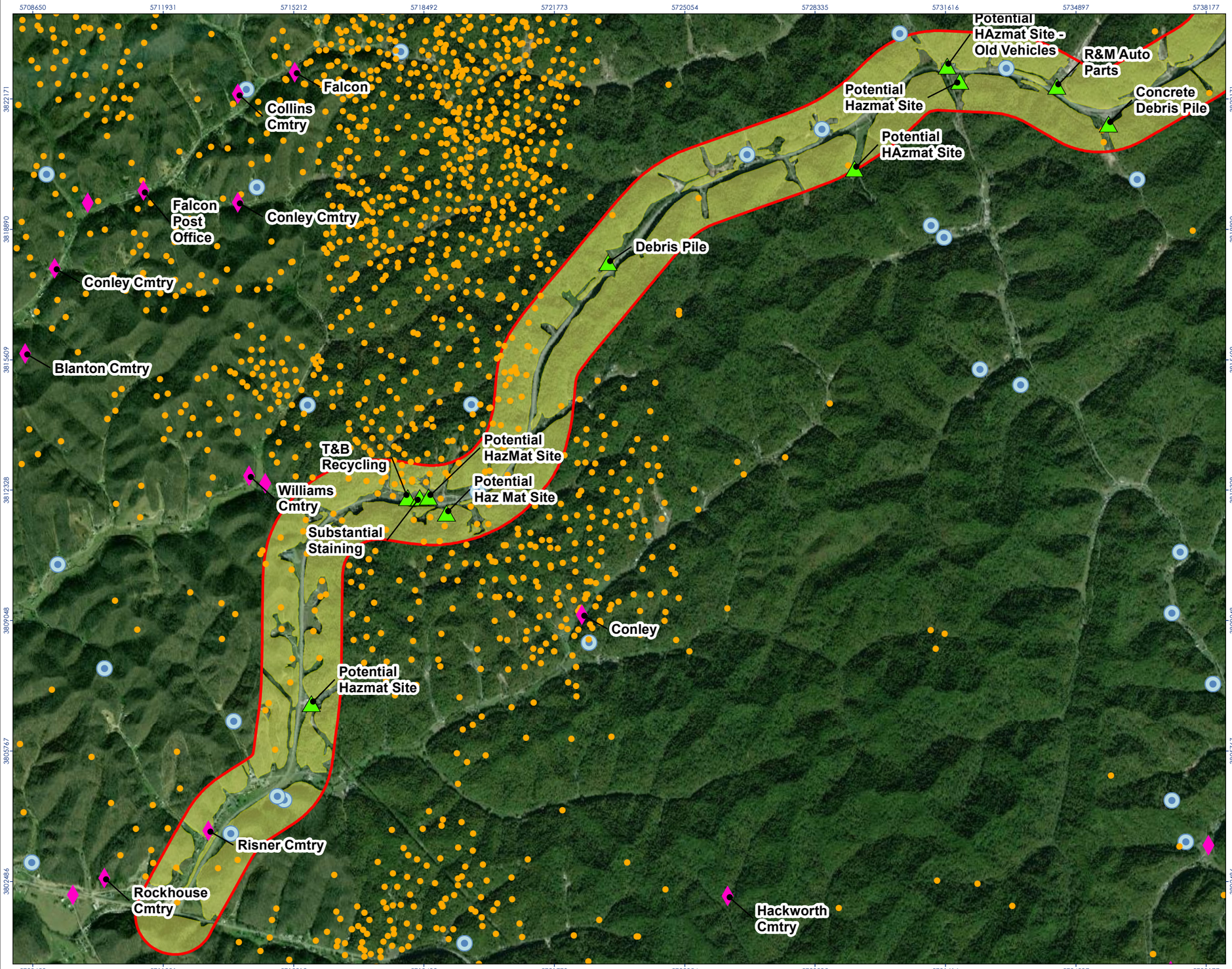

Figure No.

4a

Title

Human Environment

Client/Project 178568101

Client: KYTC
Project: US 460
Report: Environmental Overview

Project Location
Johnson and Magoffin Counties
Kentucky

Prepared by TF on 2022-12-05
IR Review by LC on 2022-12-05

N

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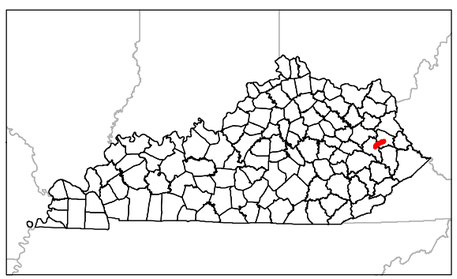
Legend

- Influence Area
- Landmarks and Cemeteries
- Other
- Oil and Gas Wells
- UKY Waterwells
- Potential Bat Habitat



Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Data Sources:
3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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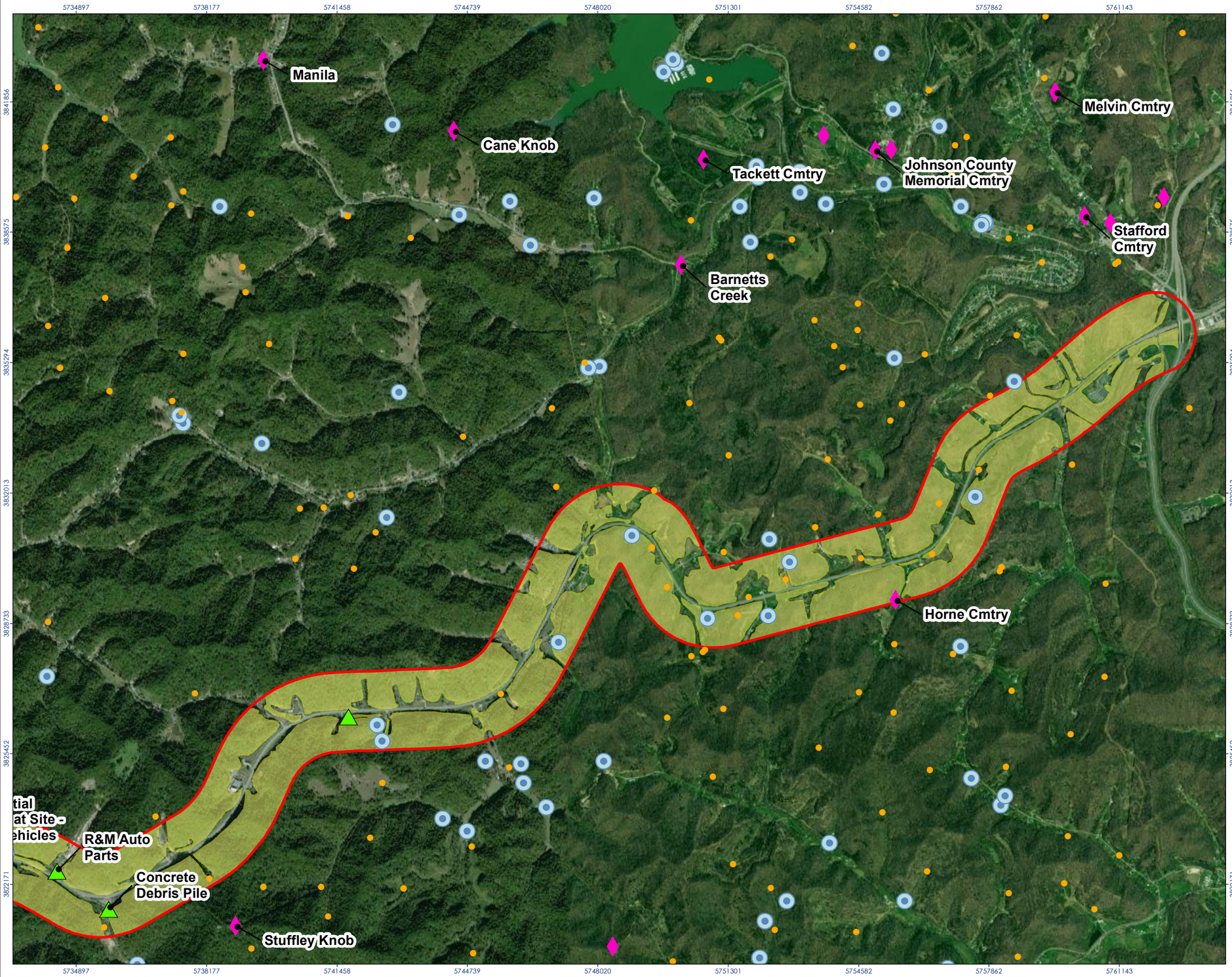

Figure No.

4b

Title

Human Environment

Client/Project 178568101

Client: KYTC
Project: US 460
Report: Environmental Overview

Project Location
Johnson and Magoffin Counties
Kentucky

Prepared by TF on 2022-12-05
IR Review by LC on 2022-12-05

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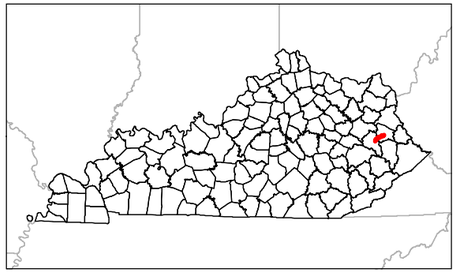

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KENTUCKY GEOLOGICAL SURVEY
James C. Cobb, State Geologist and Director
UNIVERSITY OF KENTUCKY, LEXINGTON

MAP AND CHART 33
Series XII, 2001

KARST OCCURRENCE IN KENTUCKY

Randall L. Paylor and
James C. Currens

This map was compiled from a digital version of the 1:500,000-scale geologic map of Kentucky (Noger, M.C., comp., 1988, Geologic map of Kentucky: U.S. Geological Survey). The areas of potential karst development were delineated using stratigraphic units mapped on the geologic map. The classification of the potential for karst development was based on the field experience of the authors and other data. A number of isolated carbonate units that would not have otherwise been differentiated on the geologic map were newly digitized for this map.

This karst map should not be used for evaluating karst geologic hazards or hydrogeology at scales larger than 1:500,000. The base geologic map was digitized at 1:500,000 scale and is limited in precision to that scale. Because of the small scale of the original geologic map, lithostratigraphic units were consolidated into thicker chronostratigraphic units to create an area large enough to delineate on the geologic map. In some cases, the consolidation resulted in carbonates (limestone or dolomite) and noncarbonates (sandstone or shale, for example) being grouped; these rocks are not redivided on this map. Although the potential for karst development can be predicted from lithology, other factors such as relief and length of time the rock is exposed are also important and were not considered in the making of this map. Finally, areas where the near-surface bedrock is insoluble and closely underlain by soluble rock are common, particularly in the Eastern Pennyroyal. Conduits that pirate drainage commonly extend through ridges capped with insoluble rocks. Therefore, some areas mapped as having limited potential that are adjacent to areas of higher potential are actually karst, but cannot be differentiated on this map.

Karst is a terrane that is generally underlain by limestone or dolomite, where the topography is formed chiefly by the dissolving of rock. Karst landscapes are commonly characterized by sinkholes, sinking streams, closed depressions, subterranean drainage, large springs, and caves.

Karst regions are susceptible to unique problems such as sinkhole collapse, sinkhole flooding, and rapid groundwater pollution. Springs in karst areas are an important, productive source of groundwater. Rare biologic communities and endangered species can be found in the fragile underground environments developed in karst landscapes.

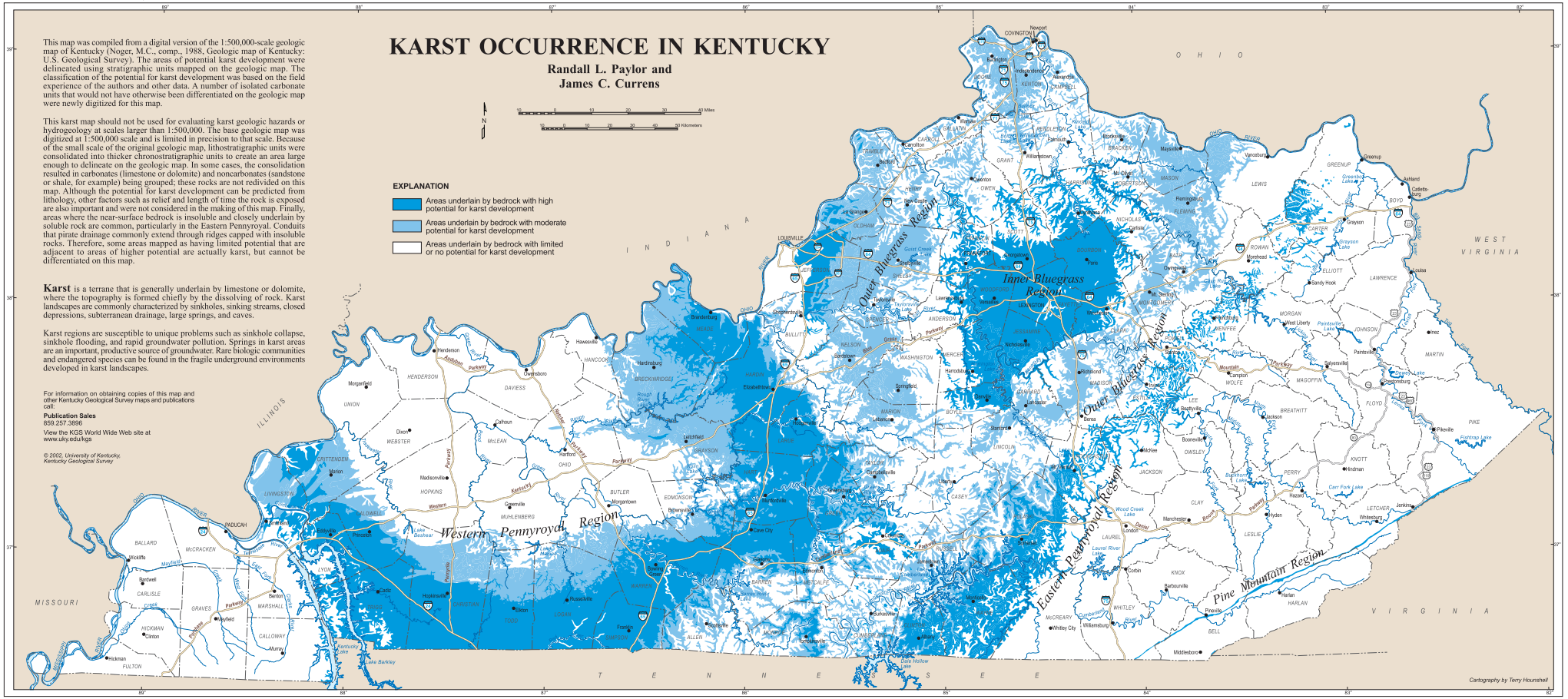
For information on obtaining copies of this map and other Kentucky Geological Survey maps and publications call:

Publication Sales
859.257.3896

View the KGS World Wide Web site at
www.uky.edu/kgs

EXPLANATION

- Areas underlain by bedrock with high potential for karst development
- Areas underlain by bedrock with moderate potential for karst development
- Areas underlain by bedrock with limited or no potential for karst development



ATTACHMENTS

1. **Threatened and Endangered Species**
2. **Areas of Air Quality Concern in Kentucky**
3. **Cultural and Archaeological Historic Resources (Contains sensitive information. Not available for public use.)**
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, Johnson and Magoffin Counties
e. OKNP Natural Heritage Database Response (For Internal Use Only. Not for Public Release.)
f. KSS database response (For Internal Use Only. Not for Public Release.)

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

Johnson and Magoffin counties, Kentucky

Local office

Kentucky Ecological Services Field Office

(502) 695-0468
(502) 695-1024
kentuckyes@fws.gov

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

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 species[1] 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 Fisheries[2]).

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.

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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 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	Endangered
Indiana Bat Myotis sodalis 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. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat Myotis septentrionalis 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	Threatened

Clams

NAME	STATUS

Clubshell *Pleurobema clava* — Endangered

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

- The species may be affected by projects that significantly impact the Licking River and/or its tributary, the South Fork Licking River.

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3789

Fanshell *Cyprogenia stegaria* — Endangered

Wherever found

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

- The species may be affected by projects that significantly impact the Licking River and/or its tributary, the South Fork Licking River.

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4822

Northern Riffleshell *Epioblasma rangiana* — Endangered

Wherever found

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

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio.

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/527

Pink Mucket (pearlymussel) *Lampsilis abrupta* — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7829

Rabbitsfoot Quadrula cylindrica cylindrica — Threatened

Wherever found

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

- The species may be affected by projects that significantly impact the Licking River and/or its tributary, the South Fork Licking River.

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/5165

Rough Pigtoe Pleurobema plenum — Endangered

Wherever found

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

- The species may be affected by projects that significantly impact the Licking River and/or its tributary, the South Fork Licking River.

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6894

Snuffbox Mussel Epioblasma triquetra — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4135

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus	Candidate

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Crustaceans

NAME	STATUS
Big Sandy Crayfish Cambarus callainus	Threatened

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/8285

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 Act[1] and the Bald and Golden Eagle Protection Act[2].

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

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

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
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 27 to Jul 20
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

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

Probability of Presence (■)

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

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

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted

Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

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

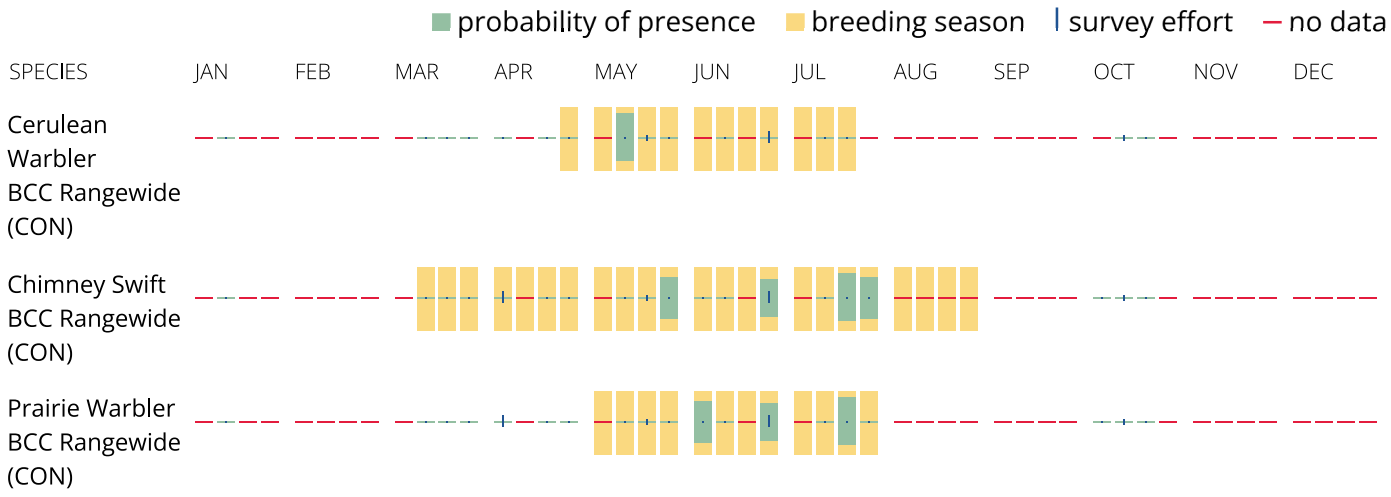
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

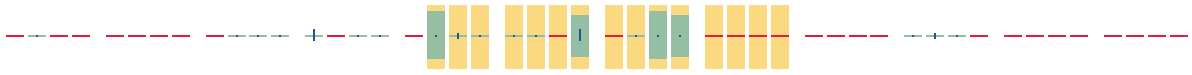
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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.





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

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

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

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

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

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

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

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

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

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird

on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

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

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

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

Details about birds that are potentially affected by offshore projects

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

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

What if I have eagles on my list?

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

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black

vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

Facilities

National Wildlife Refuge lands

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

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

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

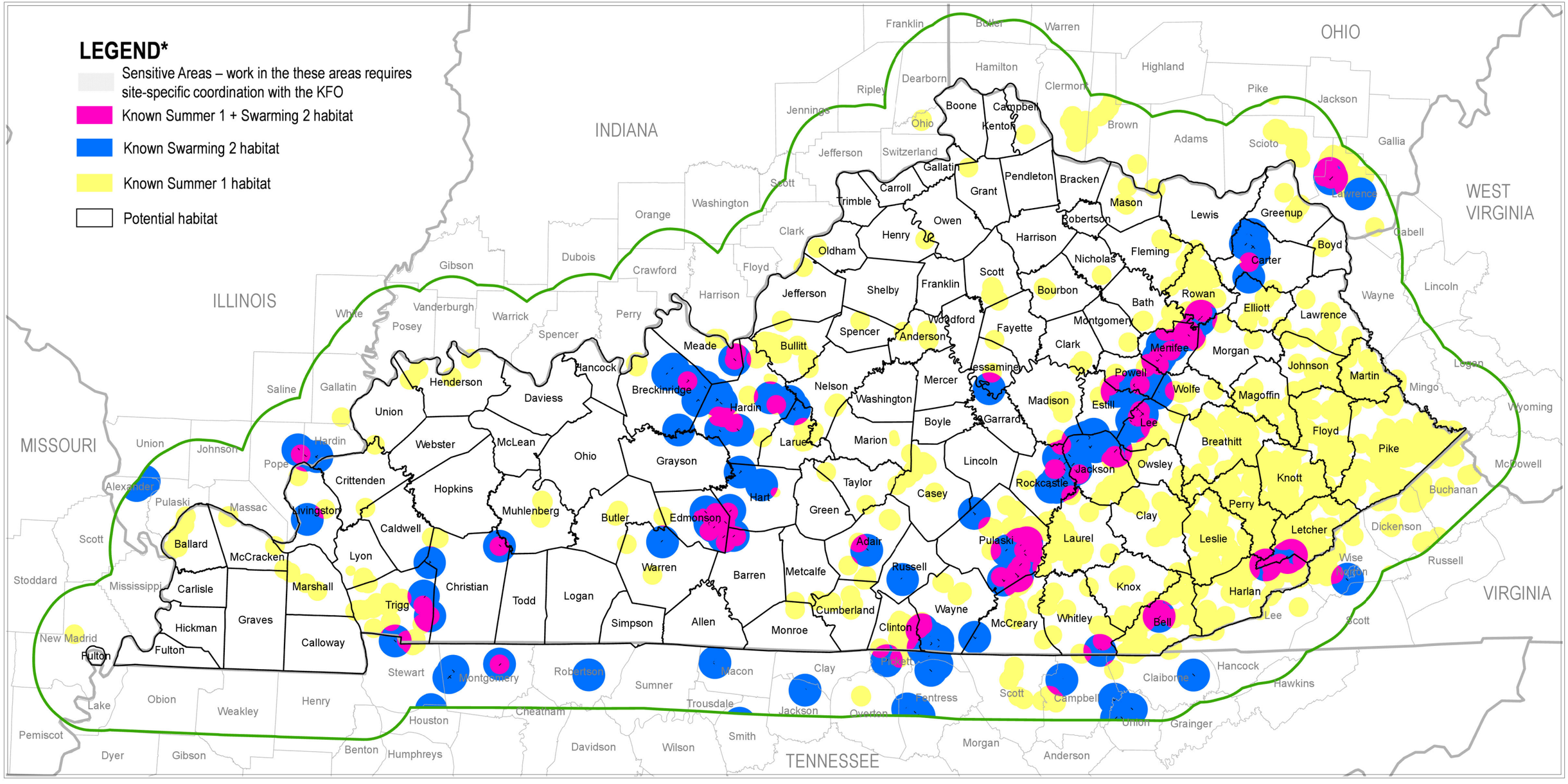
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid 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.

U.S. Fish & Wildlife Service

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.

0 10 20 40 60 80 100 Miles

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.

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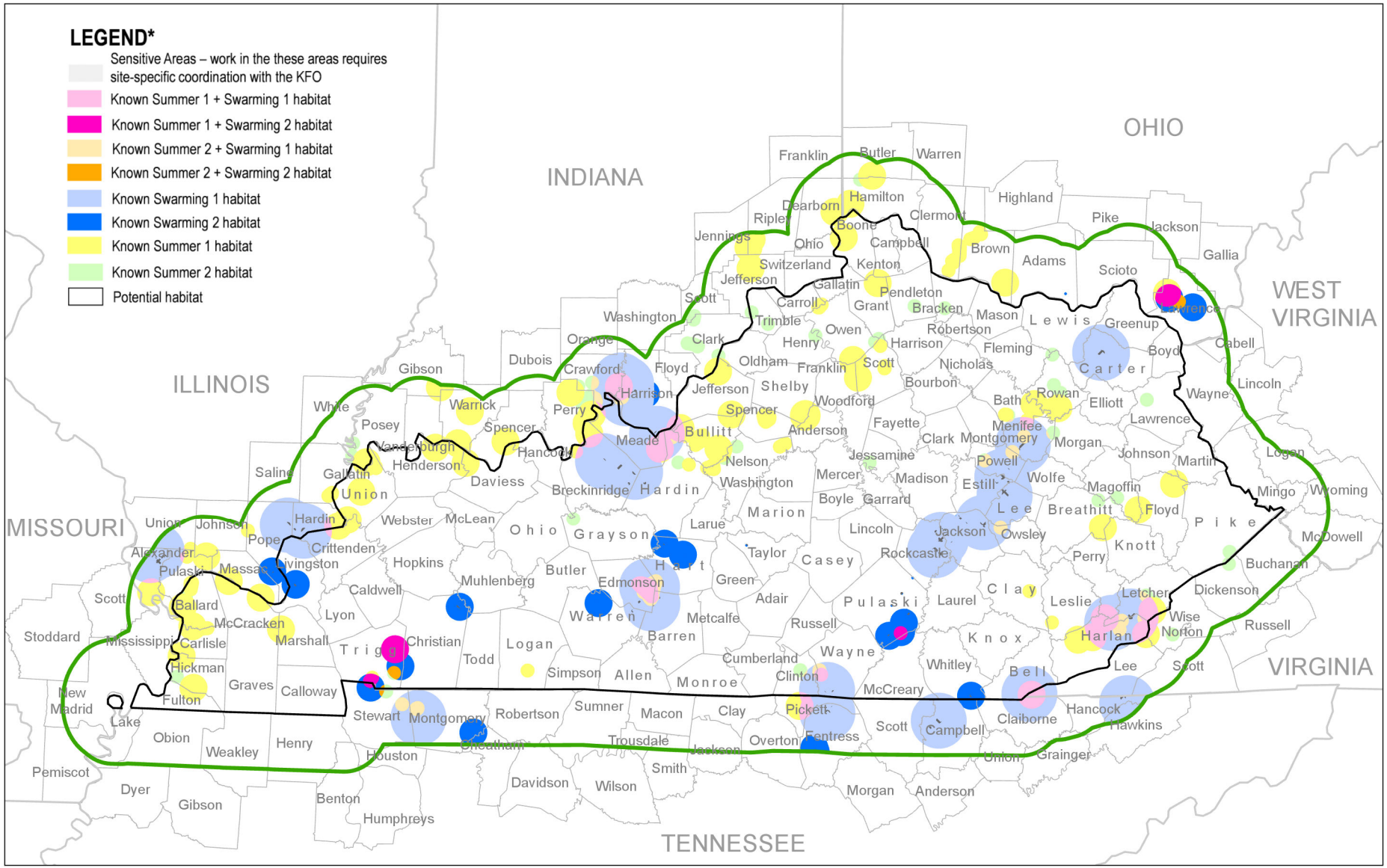
U.S. Fish & Wildlife Service

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.

0 100 Miles

0 100 Kilometers

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Datum: NAD 83

Species Information

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 Species observations in 2 selected counties.
Selected counties are: Johnson, Magoffin.

Scientific Name and Life History	Common Name and Pictures	Class	County	US Status	KY Status	WAP	Reference
Accipiter cooperii	Cooper's Hawk	Aves	Johnson	N	N		Reference
Accipiter cooperii	Cooper's Hawk	Aves	Magoffin	N	N		Reference
Accipiter striatus	Sharp-shinned Hawk	Aves	Johnson	N	S	Yes	Reference
Actinonaias ligamentina	Mucket	Bivalvia	Johnson	N	N		Reference
Actitis macularius	Spotted Sandpiper	Aves	Magoffin	N	E	Yes	Reference
Agelaius phoeniceus	Red-winged Blackbird	Aves	Magoffin	N	N		Reference
Agelaius phoeniceus	Red-winged Blackbird	Aves	Johnson	N	N		Reference
Agkistrodon contortrix	Eastern Copperhead	Reptilia	Johnson	N	N		Reference
Agkistrodon contortrix	Eastern Copperhead	Reptilia	Magoffin	N	N		Reference
Aix sponsa	Wood Duck	Aves	Magoffin	N	N		Reference
Aix sponsa	Wood Duck	Aves	Johnson	N	N		Reference
Alosa chrysochloris	Skipjack Herring	Actinopterygii	Johnson	N	N		Reference
Alosa chrysochloris	Skipjack Herring	Actinopterygii	Magoffin	N	N		Reference
Ambloplites rupestris	Rock Bass	Actinopterygii	Magoffin	N	N		Reference

Ambloplites rupestris	Rock Bass	Actinopterygii	Johnson	N	N		Reference
Ambystoma maculatum	Spotted Salamander	Amphibia	Johnson	N	N		Reference
Ambystoma maculatum	Spotted Salamander	Amphibia	Magoffin	N	N		Reference
Ameiurus melas	Black Bullhead	Actinopterygii	Magoffin	N	N		Reference
Ameiurus melas	Black Bullhead	Actinopterygii	Johnson	N	N		Reference
Ameiurus natalis	Yellow Bullhead	Actinopterygii	Johnson	N	N		Reference
Ameiurus natalis	Yellow Bullhead	Actinopterygii	Magoffin	N	N		Reference
Ameiurus nebulosus	Brown Bullhead	Actinopterygii	Magoffin	N	N		Reference
Ammocrypta pellucida	Eastern Sand Darter	Actinopterygii	Magoffin	N	N		Reference
Anas platyrhynchos	Mallard	Aves	Johnson	N	N		Reference
Anaxyrus americanus	American Toad	Amphibia	Johnson	N	N		Reference
Anaxyrus americanus	American Toad	Amphibia	Magoffin	N	N		Reference
Anaxyrus fowleri	Fowler's Toad	Amphibia	Magoffin	N	N		Reference
Anaxyrus fowleri	Fowler's Toad	Amphibia	Johnson	N	N		Reference
Aneides aeneus	Green Salamander	Amphibia	Johnson	N	N	Yes	Reference
Antrostomus vociferus	Eastern Whip-poor-will	Aves	Johnson	N	N	Yes	Reference
Apalone spinifera spinifera	Eastern Spiny Softshell	Chelonia	Magoffin	N	N		Reference
Aplodinotus grunniens	Freshwater Drum	Actinopterygii	Magoffin	N	N		Reference
Aplodinotus grunniens	Freshwater Drum	Actinopterygii	Johnson	N	N		Reference
Archilochus colubris	Ruby-throated Hummingbird	Aves	Johnson	N	N		Reference
Archilochus colubris	Ruby-throated Hummingbird	Aves	Magoffin	N	N		Reference
Ardea herodias	Great Blue Heron	Aves	Johnson	N	N		Reference
Aythya americana	Redhead	Aves	Johnson	N	N		Reference

Baeolophus bicolor	Tufted Titmouse	Aves	Johnson	N	N		Reference
Baeolophus bicolor	Tufted Titmouse	Aves	Magoffin	N	N		Reference
Blarina brevicauda	Northern Short-tailed Shrew	Mammalia	Magoffin	N	N		Reference
Blarina brevicauda	Northern Short-tailed Shrew	Mammalia	Johnson	N	N		Reference
Bombycilla cedrorum	Cedar Waxwing	Aves	Johnson	N	N		Reference
Bombycilla cedrorum	Cedar Waxwing	Aves	Magoffin	N	N		Reference
Bonasa umbellus	Ruffed Grouse	Aves	Magoffin	N	N	Yes	Reference
Bonasa umbellus	Ruffed Grouse	Aves	Johnson	N	N	Yes	Reference
Branta canadensis	Canada Goose	Aves	Johnson	N	N		Reference
Branta canadensis	Canada Goose	Aves	Magoffin	N	N		Reference
Bubo virginianus	Great Horned Owl	Aves	Johnson	N	N		Reference
Buteo jamaicensis	Red-tailed Hawk	Aves	Johnson	N	N		Reference
Buteo jamaicensis	Red-tailed Hawk	Aves	Magoffin	N	N		Reference
Buteo lineatus	Red-shouldered Hawk	Aves	Magoffin	N	N		Reference
Buteo lineatus	Red-shouldered Hawk	Aves	Johnson	N	N		Reference
Buteo platypterus	Broad-winged Hawk	Aves	Johnson	N	N		Reference
Buteo platypterus	Broad-winged Hawk	Aves	Magoffin	N	N		Reference
Butorides virescens	Green Heron	Aves	Magoffin	N	N	Yes	Reference
Butorides virescens	Green Heron	Aves	Johnson	N	N	Yes	Reference
Calidris pusilla	Semipalmated Sandpiper	Aves	Magoffin	N	N	Yes	Reference
Cambarus bartonii cavatus	Appalachian Brook Crayfish	Malacostraca	Magoffin	N	N	Yes	Reference
Cambarus distans	Boxclaw Crawfish	Malacostraca	Magoffin	N	N		Reference
Cambarus theepiensis	Coalfields Crayfish	Malacostraca	Magoffin	N	S		Reference

Cambarus theepiensis	Coalfields Crayfish	Malacostraca	Johnson	N	S		Reference
Campostoma anomalum	Ohio Stoneroller	Actinopterygii	Johnson	N	N		Reference
Campostoma anomalum	Ohio Stoneroller	Actinopterygii	Magoffin	N	N		Reference
Canis latrans	Coyote	Mammalia	Magoffin	N	N		Reference
Canis latrans	Coyote	Mammalia	Johnson	N	N		Reference
Cardinalis cardinalis	Northern Cardinal	Aves	Johnson	N	N		Reference
Cardinalis cardinalis	Northern Cardinal	Aves	Magoffin	N	N		Reference
Carphophis amoenus	Common Wormsnake	Reptilia	Magoffin	N	N		Reference
Carphophis amoenus	Common Wormsnake	Reptilia	Johnson	N	N		Reference
Carpiodes carpio	River Carpsucker	Actinopterygii	Johnson	N	N		Reference
Carpiodes cyprinus	Quillback	Actinopterygii	Johnson	N	N		Reference
Carpiodes cyprinus	Quillback	Actinopterygii	Magoffin	N	N		Reference
Carpiodes velifer	Highfin Carpsucker	Actinopterygii	Magoffin	N	N	Yes	Reference
Castor canadensis	American Beaver	Mammalia	Magoffin	N	N		Reference
Castor canadensis	American Beaver	Mammalia	Johnson	N	N		Reference
Cathartes aura	Turkey Vulture	Aves	Johnson	N	N		Reference
Cathartes aura	Turkey Vulture	Aves	Magoffin	N	N		Reference
Catharus guttatus	Hermit Thrush	Aves	Magoffin	N	N		Reference
Catharus guttatus	Hermit Thrush	Aves	Johnson	N	N		Reference
Catostomus commersonii	White Sucker	Actinopterygii	Johnson	N	N		Reference
Catostomus commersonii	White Sucker	Actinopterygii	Magoffin	N	N		Reference
Cervus elaphus	Elk	Mammalia	Magoffin	N	N		Reference
Cervus elaphus	Elk	Mammalia	Johnson	N	N		Reference
Chaetura pelagica	Chimney Swift	Aves	Johnson	N	N		Reference

Chaetura pelagica	Chimney Swift	Aves	Magoffin	N	N		Reference
Charadrius vociferus	Killdeer	Aves	Magoffin	N	N		Reference
Charadrius vociferus	Killdeer	Aves	Johnson	N	N		Reference
Chelydra serpentina	Snapping Turtle	Chelonia	Johnson	N	N		Reference
Chelydra serpentina	Snapping Turtle	Chelonia	Magoffin	N	N		Reference
Chordeiles minor	Common Nighthawk	Aves	Johnson	N	N		Reference
Chrosomus erythrogaster	Southern Redbelly Dace	Actinopterygii	Johnson	N	N		Reference
Chrosomus erythrogaster	Southern Redbelly Dace	Actinopterygii	Magoffin	N	N		Reference
Circus hudsonius	Northern Harrier	Aves	Johnson	N	T	Yes	Reference
Clinostomus funduloides	Rosyside Dace	Actinopterygii	Johnson	N	N		Reference
Coccyzus americanus	Yellow-billed Cuckoo	Aves	Johnson	N	N	Yes	Reference
Coccyzus americanus	Yellow-billed Cuckoo	Aves	Magoffin	N	N	Yes	Reference
Colaptes auratus	Northern Flicker	Aves	Magoffin	N	N		Reference
Colaptes auratus	Northern Flicker	Aves	Johnson	N	N		Reference
Colinus virginianus	Northern Bobwhite	Aves	Johnson	N	N	Yes	Reference
Colinus virginianus	Northern Bobwhite	Aves	Magoffin	N	N	Yes	Reference
Coluber constrictor	North American Racer	Reptilia	Magoffin	N	N		Reference
Coluber constrictor	North American Racer	Reptilia	Johnson	N	N		Reference
Columba livia	Rock Pigeon	Aves	Johnson	N	N		Reference
Columba livia	Rock Pigeon	Aves	Magoffin	N	N		Reference
Contopus virens	Eastern Wood-Pewee	Aves	Magoffin	N	N		Reference
Contopus virens	Eastern Wood-Pewee	Aves	Johnson	N	N		Reference

Corbicula fluminea	Asian Clam	Bivalvia	Johnson	N	N		Reference
Corbicula fluminea	Asian Clam	Bivalvia	Magoffin	N	N		Reference
Corvus brachyrhynchos	American Crow	Aves	Magoffin	N	N		Reference
Corvus brachyrhynchos	American Crow	Aves	Johnson	N	N		Reference
Corvus corax	Common Raven	Aves	Johnson	N	T	Yes	Reference
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Mammalia	Magoffin	N	S	Yes	Reference
Crotalus horridus	Timber Rattlesnake	Reptilia	Magoffin	N	N	Yes	Reference
Crotalus horridus	Timber Rattlesnake	Reptilia	Johnson	N	N	Yes	Reference
Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	Amphibia	Johnson	N	S	Yes	Reference
Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	Amphibia	Magoffin	N	S	Yes	Reference
Cyanocitta cristata	Blue Jay	Aves	Magoffin	N	N		Reference
Cyanocitta cristata	Blue Jay	Aves	Johnson	N	N		Reference
Cyclonaias pustulosa	Pimpleback	Bivalvia	Johnson	N	N		Reference
Cygnus olor	Mute Swan	Aves	Johnson	N	N		Reference
Cyprinella spiloptera	Spotfin Shiner	Actinopterygii	Johnson	N	N		Reference
Cyprinella spiloptera	Spotfin Shiner	Actinopterygii	Magoffin	N	N		Reference
Cyprinella whipplei	Steelcolor Shiner	Actinopterygii	Magoffin	N	N		Reference
Cyprinella whipplei	Steelcolor Shiner	Actinopterygii	Johnson	N	N		Reference
Cyprinus carpio	Common Carp	Actinopterygii	Johnson	N	N		Reference
Cyprinus carpio	Common Carp	Actinopterygii	Magoffin	N	N		Reference
Desmognathus fuscus	Northern Dusky Salamander	Amphibia	Magoffin	N	N	Yes	Reference
Desmognathus fuscus	Northern Dusky Salamander	Amphibia	Johnson	N	N	Yes	Reference

Desmognathus monticola	Seal Salamander	Amphibia	Johnson	N	N		Reference
Desmognathus monticola	Seal Salamander	Amphibia	Magoffin	N	N		Reference
Desmognathus welteri	Black Mountain Salamander	Amphibia	Magoffin	N	N	Yes	Reference
Diadophis punctatus edwardsii	Northern Ringneck Snake	Reptilia	Magoffin	N	N		Reference
Diadophis punctatus edwardsii	Northern Ringneck Snake	Reptilia	Johnson	N	N		Reference
Didelphis virginiana	Virginia Opossum	Mammalia	Johnson	N	N		Reference
Didelphis virginiana	Virginia Opossum	Mammalia	Magoffin	N	N		Reference
Dorosoma cepedianum	Gizzard Shad	Actinopterygii	Magoffin	N	N		Reference
Dorosoma cepedianum	Gizzard Shad	Actinopterygii	Johnson	N	N		Reference
Dryobates pubescens	Downy Woodpecker	Aves	Johnson	N	N		Reference
Dryobates pubescens	Downy Woodpecker	Aves	Magoffin	N	N		Reference
Dryobates villosus	Hairy Woodpecker	Aves	Magoffin	N	N		Reference
Dryobates villosus	Hairy Woodpecker	Aves	Johnson	N	N		Reference
Dryocopus pileatus	Pileated Woodpecker	Aves	Johnson	N	N		Reference
Dryocopus pileatus	Pileated Woodpecker	Aves	Magoffin	N	N		Reference
Dumetella carolinensis	Gray Catbird	Aves	Magoffin	N	N		Reference
Dumetella carolinensis	Gray Catbird	Aves	Johnson	N	N		Reference
Empidonax virescens	Acadian Flycatcher	Aves	Johnson	N	N		Reference
Empidonax virescens	Acadian Flycatcher	Aves	Magoffin	N	N		Reference
Eptesicus fuscus	Big Brown Bat	Mammalia	Magoffin	N	N		Reference
Eptesicus fuscus	Big Brown Bat	Mammalia	Johnson	N	N		Reference

Ericymba buccata	Silverjaw Minnow	Actinopterygii	Johnson	N	N		Reference
Ericymba buccata	Silverjaw Minnow	Actinopterygii	Magoffin	N	N		Reference
Erimystax dissimilis	Streamline Chub	Actinopterygii	Magoffin	N	N		Reference
Erimystax dissimilis	Streamline Chub	Actinopterygii	Johnson	N	N		Reference
Esox americanus	Grass Pickerel	Actinopterygii	Magoffin	N	N		Reference
Esox masquinongy	Muskellunge	Actinopterygii	Magoffin	N	N		Reference
Etheostoma blennioides	Greenside Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma blennioides	Greenside Darter	Actinopterygii	Johnson	N	N		Reference
Etheostoma caeruleum	Rainbow Darter	Actinopterygii	Johnson	N	N		Reference
Etheostoma caeruleum	Rainbow Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma flabellare	Fantail Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma flabellare	Fantail Darter	Actinopterygii	Johnson	N	N		Reference
Etheostoma kennicotti	Stripetail Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma nigrum	Johnny Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma nigrum	Johnny Darter	Actinopterygii	Johnson	N	N		Reference
Etheostoma spectabile	Orangethroat Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma variatum	Variegate Darter	Actinopterygii	Magoffin	N	N		Reference
Etheostoma variatum	Variegate Darter	Actinopterygii	Johnson	N	N		Reference
Etheostoma zonale	Banded Darter	Actinopterygii	Johnson	N	N		Reference
Etheostoma zonale	Banded Darter	Actinopterygii	Magoffin	N	N		Reference
Eurycea cirrigera	Southern Two-lined Salamander	Amphibia	Johnson	N	N		Reference
Eurycea longicauda	Long-tailed Salamander	Amphibia	Johnson	N	N		Reference
Falco sparverius	American Kestrel	Aves	Johnson	N	N	Yes	Reference

Faxonius cristavarius	Spiny Stream Crayfish	Malacostraca	Johnson	N	N		Reference
Faxonius cristavarius	Spiny Stream Crayfish	Malacostraca	Magoffin	N	N		Reference
Faxonius putnami	Phallic Crayfish	Malacostraca	Magoffin	N	N		Reference
Faxonius rusticus	Rusty Crayfish	Malacostraca	Magoffin	N	N	Yes	Reference
Fulica americana	American Coot	Aves	Johnson	N	E		Reference
Fundulus catenatus	Northern Studfish	Actinopterygii	Magoffin	N	N		Reference
Fusconaia flava	Wabash Pigtoe	Bivalvia	Magoffin	N	N		Reference
Fusconaia subrotunda	Longsolid	Bivalvia	Johnson	N	S	Yes	Reference
Gavia immer	Common Loon	Aves	Johnson	N	N		Reference
Geothlypis formosa	Kentucky Warbler	Aves	Johnson	N	N	Yes	Reference
Geothlypis formosa	Kentucky Warbler	Aves	Magoffin	N	N	Yes	Reference
Geothlypis trichas	Common Yellowthroat	Aves	Magoffin	N	N		Reference
Geothlypis trichas	Common Yellowthroat	Aves	Johnson	N	N		Reference
Glaucomys volans	Southern Flying Squirrel	Mammalia	Johnson	N	N		Reference
Gyrinophilus porphyriticus duryi	Kentucky Spring Salamander	Amphibia	Johnson	N	N		Reference
Haemorhous mexicanus	House Finch	Aves	Johnson	N	N		Reference
Haemorhous mexicanus	House Finch	Aves	Magoffin	N	N		Reference
Haemorhous purpureus	Purple Finch	Aves	Johnson	N	N		Reference
Haliaeetus leucocephalus	Bald Eagle	Aves	Johnson	N	S	Yes	Reference
Haliaeetus leucocephalus	Bald Eagle	Aves	Magoffin	N	S	Yes	Reference
Haplotrema concavum	Gray-foot Lancetooth	Gastropoda	Johnson	N	N		Reference

Haplotrema concavum	Gray-foot Lancetooth	Gastropoda	Magoffin	N	N		Reference
Helmitheros vermivorum	Worm-eating Warbler	Aves	Magoffin	N	N		Reference
Helmitheros vermivorum	Worm-eating Warbler	Aves	Johnson	N	N		Reference
Heterodon platirhinos	Eastern Hog-nosed Snake	Reptilia	Johnson	N	N		Reference
Heterodon platirhinos	Eastern Hog-nosed Snake	Reptilia	Magoffin	N	N		Reference
Hirundo rustica	Barn Swallow	Aves	Magoffin	N	N		Reference
Hirundo rustica	Barn Swallow	Aves	Johnson	N	N		Reference
Hyalella azteca	No Common Name (Hyalella azteca)	Malacostraca	Johnson	N	N		Reference
Hybopsis amblops	Bigeye Chub	Actinopterygii	Johnson	N	N		Reference
Hybopsis amblops	Bigeye Chub	Actinopterygii	Magoffin	N	N		Reference
Hyla chrysoscelis	Cope's Gray Treefrog	Amphibia	Magoffin	N	N		Reference
Hyla chrysoscelis	Cope's Gray Treefrog	Amphibia	Johnson	N	N		Reference
Hylocichla mustelina	Wood Thrush	Aves	Johnson	N	N	Yes	Reference
Hylocichla mustelina	Wood Thrush	Aves	Magoffin	N	N	Yes	Reference
Hypentelium nigricans	Northern Hog Sucker	Actinopterygii	Magoffin	N	N		Reference
Hypentelium nigricans	Northern Hog Sucker	Actinopterygii	Johnson	N	N		Reference
Ichthyomyzon bdellium	Ohio Lamprey	Petromyzontida	Magoffin	N	N		Reference
Ichthyomyzon fossor	Northern Brook Lamprey	Petromyzontida	Johnson	N	T	Yes	Reference
Ictalurus furcatus	Blue Catfish	Actinopterygii	Johnson	N	N		Reference
Ictalurus furcatus	Blue Catfish	Actinopterygii	Magoffin	N	N		Reference
Ictalurus punctatus	Channel Catfish	Actinopterygii	Magoffin	N	N		Reference

Ictalurus punctatus	Channel Catfish	Actinopterygii	Johnson	N	N		Reference
Icteria virens	Yellow-breasted Chat	Aves	Johnson	N	N		Reference
Icteria virens	Yellow-breasted Chat	Aves	Magoffin	N	N		Reference
Icterus spurius	Orchard Oriole	Aves	Johnson	N	N		Reference
Ictiobus bubalus	Smallmouth Buffalo	Actinopterygii	Johnson	N	N		Reference
Ictiobus cyprinellus	Bigmouth Buffalo	Actinopterygii	Johnson	N	N		Reference
Ictiobus cyprinellus	Bigmouth Buffalo	Actinopterygii	Magoffin	N	N		Reference
Inflectarius inflectus	Shagreen	Gastropoda	Johnson	N	N		Reference
Inflectarius rugeli	Deep-tooth Shagreen	Gastropoda	Magoffin	N	N		Reference
Junco hyemalis	Dark-eyed Junco	Aves	Magoffin	N	S		Reference
Junco hyemalis	Dark-eyed Junco	Aves	Johnson	N	S		Reference
Labidesthes sicculus	Brook Silverside	Actinopterygii	Johnson	N	N		Reference
Labidesthes sicculus	Brook Silverside	Actinopterygii	Magoffin	N	N		Reference
Lampetra aepyptera	Least Brook Lamprey	Petromyzontida	Magoffin	N	N		Reference
Lampetra aepyptera	Least Brook Lamprey	Petromyzontida	Johnson	N	N		Reference
Lampropeltis elapsoides	Scarlet Kingsnake	Reptilia	Johnson	N	E	Yes	Reference
Lampropeltis nigra	Eastern Black Kingsnake	Reptilia	Johnson	N	N		Reference
Lampropeltis nigra	Eastern Black Kingsnake	Reptilia	Magoffin	N	N		Reference
Lampropeltis triangulum	Eastern Milksnake	Reptilia	Magoffin	N	N		Reference
Lampropeltis triangulum	Eastern Milksnake	Reptilia	Johnson	N	N		Reference
Lampsilis cardium	Plain Pocketbook	Bivalvia	Johnson	N	N		Reference
Lampsilis siliquoidea	Fatmucket	Bivalvia	Magoffin	N	N		Reference

Larus delawarensis	Ring-billed Gull	Aves	Johnson	N	N		Reference
Lasionycteris noctivagans	Silver-haired Bat	Mammalia	Johnson	N	N	Yes	Reference
Lasionycteris noctivagans	Silver-haired Bat	Mammalia	Magoffin	N	N	Yes	Reference
Lasiurus borealis	Eastern Red Bat	Mammalia	Magoffin	N	N		Reference
Lasiurus borealis	Eastern Red Bat	Mammalia	Johnson	N	N		Reference
Leaunio lienosus	Little Spectaclecase	Bivalvia	Magoffin	N	T	Yes	Reference
Lepisosteus osseus	Longnose Gar	Actinopterygii	Magoffin	N	N		Reference
Lepisosteus osseus	Longnose Gar	Actinopterygii	Johnson	N	N		Reference
Lepomis auritus	Redbreast Sunfish	Actinopterygii	Johnson	N	N		Reference
Lepomis cyanellus	Green Sunfish	Actinopterygii	Johnson	N	N		Reference
Lepomis cyanellus	Green Sunfish	Actinopterygii	Magoffin	N	N		Reference
Lepomis gibbosus	Pumpkinseed	Actinopterygii	Magoffin	N	N		Reference
Lepomis gulosus	Warmouth	Actinopterygii	Magoffin	N	N		Reference
Lepomis gulosus	Warmouth	Actinopterygii	Johnson	N	N		Reference
Lepomis humilis	Orangespotted Sunfish	Actinopterygii	Magoffin	N	N		Reference
Lepomis macrochirus	Bluegill	Actinopterygii	Magoffin	N	N		Reference
Lepomis macrochirus	Bluegill	Actinopterygii	Johnson	N	N		Reference
Lepomis megalotis	Longear Sunfish	Actinopterygii	Johnson	N	N		Reference
Lepomis megalotis	Longear Sunfish	Actinopterygii	Magoffin	N	N		Reference
Lepomis microlophus	Redear Sunfish	Actinopterygii	Magoffin	N	N		Reference
Lepomis microlophus	Redear Sunfish	Actinopterygii	Johnson	N	N		Reference
Lethenteron appendix	American Brook Lamprey	Petromyzontida	Magoffin	N	T	Yes	Reference
Lithobates catesbeianus	American Bullfrog	Amphibia	Magoffin	N	N		Reference

Lithobates catesbeianus	American Bullfrog	Amphibia	Johnson	N	N		Reference
Lithobates clamitans	Green Frog	Amphibia	Johnson	N	N		Reference
Lithobates clamitans	Green Frog	Amphibia	Magoffin	N	N		Reference
Lithobates palustris	Pickerel Frog	Amphibia	Magoffin	N	N		Reference
Lithobates palustris	Pickerel Frog	Amphibia	Johnson	N	N		Reference
Lithobates sylvaticus	Wood Frog	Amphibia	Johnson	N	N		Reference
Lithobates sylvaticus	Wood Frog	Amphibia	Magoffin	N	N		Reference
Lontra canadensis	Northern River Otter	Mammalia	Magoffin	N	N		Reference
Lontra canadensis	Northern River Otter	Mammalia	Johnson	N	N		Reference
Luxilus chrysocephalus	Striped Shiner	Actinopterygii	Johnson	N	N		Reference
Luxilus chrysocephalus	Striped Shiner	Actinopterygii	Magoffin	N	N		Reference
Lynx rufus	Bobcat	Mammalia	Magoffin	N	N		Reference
Lynx rufus	Bobcat	Mammalia	Johnson	N	N		Reference
Lythrurus fasciolaris	Scarlet Shiner	Actinopterygii	Magoffin	N	N		Reference
Lythrurus umbratilis	Redfin Shiner	Actinopterygii	Magoffin	N	N		Reference
Macrhybopsis hyostoma	Shoal Chub	Actinopterygii	Magoffin	N	N	Yes	Reference
Macrhybopsis hyostoma	Shoal Chub	Actinopterygii	Johnson	N	N	Yes	Reference
Macrhybopsis storeriana	Silver Chub	Actinopterygii	Magoffin	N	N		Reference
Marmota monax	Woodchuck	Mammalia	Magoffin	N	N		Reference
Marmota monax	Woodchuck	Mammalia	Johnson	N	N		Reference
Megaceryle alcyon	Belted Kingfisher	Aves	Johnson	N	N		Reference
Megaceryle alcyon	Belted Kingfisher	Aves	Magoffin	N	N		Reference

Megascops asio	Eastern Screech-Owl	Aves	Johnson	N	N		Reference
Melanerpes carolinus	Red-bellied Woodpecker	Aves	Johnson	N	N		Reference
Melanerpes carolinus	Red-bellied Woodpecker	Aves	Magoffin	N	N		Reference
Melanerpes erythrocephalus	Red-headed Woodpecker	Aves	Johnson	N	N	Yes	Reference
Meleagris gallopavo	Wild Turkey	Aves	Johnson	N	N		Reference
Meleagris gallopavo	Wild Turkey	Aves	Magoffin	N	N		Reference
Melospiza georgiana	Swamp Sparrow	Aves	Johnson	N	N		Reference
Melospiza melodia	Song Sparrow	Aves	Johnson	N	N		Reference
Melospiza melodia	Song Sparrow	Aves	Magoffin	N	N		Reference
Mephitis mephitis	Striped Skunk	Mammalia	Magoffin	N	N		Reference
Mephitis mephitis	Striped Skunk	Mammalia	Johnson	N	N		Reference
Mesodon mitchellianus	Sealed Globelet	Gastropoda	Johnson	N	N		Reference
Mesodon thyroidus	White-lip Globe	Gastropoda	Johnson	N	N		Reference
Mesodon thyroidus	White-lip Globe	Gastropoda	Magoffin	N	N		Reference
Micropterus dolomieu	Smallmouth Bass	Actinopterygii	Magoffin	N	N		Reference
Micropterus dolomieu	Smallmouth Bass	Actinopterygii	Johnson	N	N		Reference
Micropterus punctulatus	Spotted Bass	Actinopterygii	Johnson	N	N		Reference
Micropterus punctulatus	Spotted Bass	Actinopterygii	Magoffin	N	N		Reference
Micropterus salmoides	Largemouth Bass	Actinopterygii	Magoffin	N	N		Reference
Micropterus salmoides	Largemouth Bass	Actinopterygii	Johnson	N	N		Reference
Microtus ochrogaster	Prairie Vole	Mammalia	Johnson	N	N		Reference
Microtus pennsylvanicus	Meadow Vole	Mammalia	Johnson	N	N		Reference

Mimus polyglottos	Northern Mockingbird	Aves	Johnson	N	N		Reference
Mimus polyglottos	Northern Mockingbird	Aves	Magoffin	N	N		Reference
Minytrema melanops	Spotted Sucker	Actinopterygii	Magoffin	N	N		Reference
Minytrema melanops	Spotted Sucker	Actinopterygii	Johnson	N	N		Reference
Mniotilta varia	Black-and-white Warbler	Aves	Johnson	N	N		Reference
Molothrus ater	Brown-headed Cowbird	Aves	Johnson	N	N		Reference
Molothrus ater	Brown-headed Cowbird	Aves	Magoffin	N	N		Reference
Morone chrysops	White Bass	Actinopterygii	Johnson	N	N		Reference
Moxostoma anisurum	Silver Redhorse	Actinopterygii	Johnson	N	N		Reference
Moxostoma anisurum	Silver Redhorse	Actinopterygii	Magoffin	N	N		Reference
Moxostoma breviceps	Smallmouth Redhorse	Actinopterygii	Magoffin	N	N		Reference
Moxostoma breviceps	Smallmouth Redhorse	Actinopterygii	Johnson	N	N		Reference
Moxostoma carinatum	River Redhorse	Actinopterygii	Johnson	N	N		Reference
Moxostoma duquesnei	Black Redhorse	Actinopterygii	Johnson	N	N		Reference
Moxostoma duquesnei	Black Redhorse	Actinopterygii	Magoffin	N	N		Reference
Moxostoma erythrurum	Golden Redhorse	Actinopterygii	Magoffin	N	N		Reference
Moxostoma erythrurum	Golden Redhorse	Actinopterygii	Johnson	N	N		Reference
Myiarchus crinitus	Great Crested Flycatcher	Aves	Johnson	N	N		Reference
Myotis leibii	Eastern Small-footed Myotis	Mammalia	Magoffin	N	T	Yes	Reference
Myotis lucifugus	Little Brown Bat	Mammalia	Magoffin	N	T	Yes	Reference
Myotis lucifugus	Little Brown Bat	Mammalia	Johnson	N	T	Yes	Reference

Myotis septentrionalis	Northern Myotis	Mammalia	Johnson	T	E	Yes	Reference
Myotis septentrionalis	Northern Myotis	Mammalia	Magoffin	T	E	Yes	Reference
Myotis sodalis	Indiana Bat	Mammalia	Magoffin	E	E	Yes	Reference
Napaeozapus insignis	Woodland Jumping Mouse	Mammalia	Magoffin	N	N		Reference
Napaeozapus insignis	Woodland Jumping Mouse	Mammalia	Johnson	N	N		Reference
Necturus maculosus	Mudpuppy	Amphibia	Johnson	N	N		Reference
Necturus maculosus	Mudpuppy	Amphibia	Magoffin	N	N		Reference
Neotoma magister	Allegheny Woodrat	Mammalia	Johnson	N	N	Yes	Reference
Neovison vison	American Mink	Mammalia	Johnson	N	N		Reference
Neovison vison	American Mink	Mammalia	Magoffin	N	N		Reference
Nerodia sipedon	Common Watersnake	Reptilia	Magoffin	N	N		Reference
Nerodia sipedon	Common Watersnake	Reptilia	Johnson	N	N		Reference
Nocomis micropogon	River Chub	Actinopterygii	Johnson	N	N		Reference
Nocomis micropogon	River Chub	Actinopterygii	Magoffin	N	N		Reference
Notophthalmus viridescens	Eastern Newt	Amphibia	Magoffin	N	N		Reference
Notophthalmus viridescens	Eastern Newt	Amphibia	Johnson	N	N		Reference
Notropis atherinoides	Emerald Shiner	Actinopterygii	Johnson	N	N		Reference
Notropis atherinoides	Emerald Shiner	Actinopterygii	Magoffin	N	N		Reference
Notropis photogenis	Silver Shiner	Actinopterygii	Magoffin	N	N		Reference
Notropis photogenis	Silver Shiner	Actinopterygii	Johnson	N	N		Reference
Notropis rubellus	Rosyface Shiner	Actinopterygii	Johnson	N	N		Reference
Notropis rubellus	Rosyface Shiner	Actinopterygii	Magoffin	N	N		Reference
Notropis stramineus	Sand Shiner	Actinopterygii	Magoffin	N	N		Reference
Notropis stramineus	Sand Shiner	Actinopterygii	Johnson	N	N		Reference

Notropis volucellus	Mimic Shiner	Actinopterygii	Johnson	N	N		Reference
Notropis volucellus	Mimic Shiner	Actinopterygii	Magoffin	N	N		Reference
Noturus flavus	Stonecat	Actinopterygii	Magoffin	N	N		Reference
Noturus miurus	Brindled Madtom	Actinopterygii	Magoffin	N	N		Reference
Noturus miurus	Brindled Madtom	Actinopterygii	Johnson	N	N		Reference
Ochrotomys nuttalli	Golden Mouse	Mammalia	Magoffin	N	N		Reference
Odocoileus virginianus	White-tailed Deer	Mammalia	Magoffin	N	N		Reference
Odocoileus virginianus	White-tailed Deer	Mammalia	Johnson	N	N		Reference
Oncorhynchus mykiss	Rainbow Trout	Actinopterygii	Johnson	N	N		Reference
Ondatra zibethicus	Muskrat	Mammalia	Johnson	N	N	Yes	Reference
Ondatra zibethicus	Muskrat	Mammalia	Magoffin	N	N	Yes	Reference
Opheodrys aestivus	Rough Greensnake	Reptilia	Magoffin	N	N		Reference
Opheodrys aestivus	Rough Greensnake	Reptilia	Johnson	N	N		Reference
Pandion haliaetus	Osprey	Aves	Johnson	N	S	Yes	Reference
Pantherophis spiloides	Gray Ratsnake	Reptilia	Johnson	N	N		Reference
Pantherophis spiloides	Gray Ratsnake	Reptilia	Magoffin	N	N		Reference
Parascalops breweri	Hairy-tailed Mole	Mammalia	Magoffin	N	N	Yes	Reference
Parascalops breweri	Hairy-tailed Mole	Mammalia	Johnson	N	N	Yes	Reference
Parkesia motacilla	Louisiana Waterthrush	Aves	Johnson	N	N	Yes	Reference
Parkesia motacilla	Louisiana Waterthrush	Aves	Magoffin	N	N	Yes	Reference
Passer domesticus	House Sparrow	Aves	Magoffin	N	N		Reference
Passer domesticus	House Sparrow	Aves	Johnson	N	N		Reference
Passerculus sandwichensis	Savannah Sparrow	Aves	Johnson	N	S	Yes	Reference
Passerella iliaca	Fox Sparrow	Aves	Johnson	N	N		Reference
Passerella iliaca	Fox Sparrow	Aves	Magoffin	N	N		Reference

Passerina caerulea	Blue Grosbeak	Aves	Johnson	N	N		Reference
Passerina cyanea	Indigo Bunting	Aves	Johnson	N	N		Reference
Passerina cyanea	Indigo Bunting	Aves	Magoffin	N	N		Reference
Patera appressa	Flat Bladetooth	Gastropoda	Johnson	N	N		Reference
Patera appressa	Flat Bladetooth	Gastropoda	Magoffin	N	N		Reference
Percina caprodes	Logperch	Actinopterygii	Magoffin	N	N		Reference
Percina caprodes	Logperch	Actinopterygii	Johnson	N	N		Reference
Percina copelandi	Channel Darter	Actinopterygii	Johnson	N	N		Reference
Percina copelandi	Channel Darter	Actinopterygii	Magoffin	N	N		Reference
Percina evides	Gilt Darter	Actinopterygii	Magoffin	N	N		Reference
Percina evides	Gilt Darter	Actinopterygii	Johnson	N	N		Reference
Percina maculata	Blackside Darter	Actinopterygii	Johnson	N	N		Reference
Percina maculata	Blackside Darter	Actinopterygii	Magoffin	N	N		Reference
Percina oxyrhynchus	Sharpnose Darter	Actinopterygii	Johnson	N	N		Reference
Percina phoxocephala	Slenderhead Darter	Actinopterygii	Magoffin	N	N		Reference
Percina sciera	Dusky Darter	Actinopterygii	Johnson	N	N		Reference
Percina shumardi	River Darter	Actinopterygii	Magoffin	N	N		Reference
Perimyotis subflavus	Eastern Pipistrelle	Mammalia	Magoffin	N	T	Yes	Reference
Perimyotis subflavus	Eastern Pipistrelle	Mammalia	Johnson	N	T	Yes	Reference
Peromyscus leucopus	White-footed Mouse	Mammalia	Johnson	N	N		Reference
Peromyscus leucopus	White-footed Mouse	Mammalia	Magoffin	N	N		Reference
Petrochelidon pyrrhonota	Cliff Swallow	Aves	Johnson	N	N		Reference
Phalacrocorax auritus	Double-crested Cormorant	Aves	Johnson	N	S		Reference
Phenacobius mirabilis	Suckermouth Minnow	Actinopterygii	Johnson	N	N		Reference

Phenacobius mirabilis	Suckermouth Minnow	Actinopterygii	Magoffin	N	N		Reference
Pheucticus ludovicianus	Rose-breasted Grosbeak	Aves	Johnson	N	S		Reference
Physa acuta	Pewter Physa	Gastropoda	Johnson	N	N		Reference
Physa gyrina	Tadpole Physa	Gastropoda	Johnson	N	N		Reference
Physa gyrina	Tadpole Physa	Gastropoda	Magoffin	N	N		Reference
Pimephales notatus	Bluntnose Minnow	Actinopterygii	Magoffin	N	N		Reference
Pimephales notatus	Bluntnose Minnow	Actinopterygii	Johnson	N	N		Reference
Pimephales promelas	Fathead Minnow	Actinopterygii	Johnson	N	N		Reference
Pimephales promelas	Fathead Minnow	Actinopterygii	Magoffin	N	N		Reference
Pimephales vigilax	Bullhead Minnow	Actinopterygii	Johnson	N	N		Reference
Pipilo erythrophthalmus	Eastern Towhee	Aves	Johnson	N	N		Reference
Pipilo erythrophthalmus	Eastern Towhee	Aves	Magoffin	N	N		Reference
Piranga olivacea	Scarlet Tanager	Aves	Magoffin	N	N		Reference
Piranga olivacea	Scarlet Tanager	Aves	Johnson	N	N		Reference
Piranga rubra	Summer Tanager	Aves	Johnson	N	N		Reference
Piranga rubra	Summer Tanager	Aves	Magoffin	N	N		Reference
Plestiodon fasciatus	Common Five-lined Skink	Reptilia	Magoffin	N	N		Reference
Plestiodon fasciatus	Common Five-lined Skink	Reptilia	Johnson	N	N		Reference
Plethodon glutinosus	Northern Slimy Salamander	Amphibia	Johnson	N	N		Reference
Plethodon glutinosus	Northern Slimy Salamander	Amphibia	Magoffin	N	N		Reference
Plethodon kentucki	Cumberland Plateau Salamander	Amphibia	Johnson	N	N	Yes	Reference
Plethodon richmondi	Southern Ravine Salamander	Amphibia	Johnson	N	N		Reference

Plethodon richmondi	Southern Ravine Salamander	Amphibia	Magoffin	N	N		Reference
Podilymbus podiceps	Pied-billed Grebe	Aves	Johnson	N	E	Yes	Reference
Poecile atricapillus	Black-capped Chickadee	Aves	Johnson	N	N		Reference
Poecile carolinensis	Carolina Chickadee	Aves	Johnson	N	N		Reference
Poecile carolinensis	Carolina Chickadee	Aves	Magoffin	N	N		Reference
Polioptila caerulea	Blue-gray Gnatcatcher	Aves	Magoffin	N	N		Reference
Polioptila caerulea	Blue-gray Gnatcatcher	Aves	Johnson	N	N		Reference
Pomoxis annularis	White Crappie	Actinopterygii	Johnson	N	N		Reference
Pomoxis annularis	White Crappie	Actinopterygii	Magoffin	N	N		Reference
Pomoxis nigromaculatus	Black Crappie	Actinopterygii	Johnson	N	N		Reference
Procyon lotor	Northern Raccoon	Mammalia	Johnson	N	N		Reference
Procyon lotor	Northern Raccoon	Mammalia	Magoffin	N	N		Reference
Progne subis	Purple Martin	Aves	Magoffin	N	N		Reference
Progne subis	Purple Martin	Aves	Johnson	N	N		Reference
Pseudacris brachyphona	Mountain Chorus Frog	Amphibia	Johnson	N	N		Reference
Pseudacris brachyphona	Mountain Chorus Frog	Amphibia	Magoffin	N	N		Reference
Pseudacris crucifer	Spring Peeper	Amphibia	Magoffin	N	N		Reference
Pseudacris crucifer	Spring Peeper	Amphibia	Johnson	N	N		Reference
Pseudosuccinea columella	Mimic Lymnaea	Gastropoda	Magoffin	N	N		Reference
Pseudotriton ruber	Red Salamander	Amphibia	Magoffin	N	N		Reference
Pseudotriton ruber	Red Salamander	Amphibia	Johnson	N	N		Reference
Pylodictis olivaris	Flathead Catfish	Actinopterygii	Johnson	N	N		Reference
Pylodictis olivaris	Flathead Catfish	Actinopterygii	Magoffin	N	N		Reference

Quiscalus quiscula	Common Grackle	Aves	Magoffin	N	N		Reference
Quiscalus quiscula	Common Grackle	Aves	Johnson	N	N		Reference
Regulus calendula	Ruby-crowned Kinglet	Aves	Johnson	N	N		Reference
Regulus satrapa	Golden-crowned Kinglet	Aves	Johnson	N	N		Reference
Regulus satrapa	Golden-crowned Kinglet	Aves	Magoffin	N	N		Reference
Rhinichthys obtusus	Western Blacknose Dace	Actinopterygii	Magoffin	N	N		Reference
Rhinichthys obtusus	Western Blacknose Dace	Actinopterygii	Johnson	N	N		Reference
Salmo trutta	Brown Trout	Actinopterygii	Johnson	N	N		Reference
Sander vitreus	Walleye	Actinopterygii	Johnson	N	N		Reference
Sayornis phoebe	Eastern Phoebe	Aves	Johnson	N	N		Reference
Sayornis phoebe	Eastern Phoebe	Aves	Magoffin	N	N		Reference
Scaphiopus holbrookii	Eastern Spadefoot	Amphibia	Magoffin	N	N	Yes	Reference
Scaphiopus holbrookii	Eastern Spadefoot	Amphibia	Johnson	N	N	Yes	Reference
Sceloporus undulatus	Eastern Fence Lizard	Reptilia	Johnson	N	N		Reference
Sceloporus undulatus	Eastern Fence Lizard	Reptilia	Magoffin	N	N		Reference
Scincella lateralis	Little Brown Skink	Reptilia	Magoffin	N	N		Reference
Scincella lateralis	Little Brown Skink	Reptilia	Johnson	N	N		Reference
Sciurus carolinensis	Eastern Gray Squirrel	Mammalia	Johnson	N	N		Reference
Sciurus carolinensis	Eastern Gray Squirrel	Mammalia	Magoffin	N	N		Reference
Sciurus niger	Eastern Fox Squirrel	Mammalia	Magoffin	N	N		Reference
Sciurus niger	Eastern Fox Squirrel	Mammalia	Johnson	N	N		Reference

Scolopax minor	American Woodcock	Aves	Johnson	N	N	Yes	Reference
Seiurus aurocapilla	Ovenbird	Aves	Johnson	N	N		Reference
Seiurus aurocapilla	Ovenbird	Aves	Magoffin	N	N		Reference
Semotilus atromaculatus	Creek Chub	Actinopterygii	Magoffin	N	N		Reference
Semotilus atromaculatus	Creek Chub	Actinopterygii	Johnson	N	N		Reference
Setophaga americana	Northern Parula	Aves	Johnson	N	N		Reference
Setophaga americana	Northern Parula	Aves	Magoffin	N	N		Reference
Setophaga cerulea	Cerulean Warbler	Aves	Johnson	N	N	Yes	Reference
Setophaga citrina	Hooded Warbler	Aves	Johnson	N	N		Reference
Setophaga citrina	Hooded Warbler	Aves	Magoffin	N	N		Reference
Setophaga coronata	Yellow-rumped Warbler	Aves	Magoffin	N	N		Reference
Setophaga coronata	Yellow-rumped Warbler	Aves	Johnson	N	N		Reference
Setophaga discolor	Prairie Warbler	Aves	Johnson	N	N	Yes	Reference
Setophaga discolor	Prairie Warbler	Aves	Magoffin	N	N	Yes	Reference
Setophaga dominica	Yellow-throated Warbler	Aves	Magoffin	N	N		Reference
Setophaga dominica	Yellow-throated Warbler	Aves	Johnson	N	N		Reference
Setophaga magnolia	Magnolia Warbler	Aves	Johnson	N	N		Reference
Setophaga petechia	Yellow Warbler	Aves	Johnson	N	N		Reference
Setophaga petechia	Yellow Warbler	Aves	Magoffin	N	N		Reference
Setophaga pinus	Pine Warbler	Aves	Magoffin	N	N		Reference
Setophaga pinus	Pine Warbler	Aves	Johnson	N	N		Reference
Setophaga ruticilla	American Redstart	Aves	Johnson	N	N		Reference
Setophaga ruticilla	American Redstart	Aves	Magoffin	N	N		Reference

Setophaga virens	Black-throated Green Warbler	Aves	Johnson	N	N	Yes	Reference
Sialia sialis	Eastern Bluebird	Aves	Johnson	N	N		Reference
Sialia sialis	Eastern Bluebird	Aves	Magoffin	N	N		Reference
Sitta canadensis	Red-breasted Nuthatch	Aves	Johnson	N	E		Reference
Sitta carolinensis	White-breasted Nuthatch	Aves	Johnson	N	N		Reference
Sitta carolinensis	White-breasted Nuthatch	Aves	Magoffin	N	N		Reference
Sorex fumeus	Smoky Shrew	Mammalia	Magoffin	N	N	Yes	Reference
Sorex fumeus	Smoky Shrew	Mammalia	Johnson	N	N	Yes	Reference
Spatula clypeata	Northern Shoveler	Aves	Johnson	N	E		Reference
Spatula discors	Blue-winged Teal	Aves	Johnson	N	T		Reference
Sphaerium simile	Grooved Fingernailclam	Bivalvia	Johnson	N	N		Reference
Sphaerium striatinum	Striated Fingernailclam	Bivalvia	Johnson	N	N	Yes	Reference
Sphyrapicus varius	Yellow-bellied Sapsucker	Aves	Johnson	N	N		Reference
Spilogale putorius	Eastern Spotted Skunk	Mammalia	Magoffin	N	S	Yes	Reference
Spinus tristis	American Goldfinch	Aves	Magoffin	N	N		Reference
Spinus tristis	American Goldfinch	Aves	Johnson	N	N		Reference
Spizella passerina	Chipping Sparrow	Aves	Johnson	N	N		Reference
Spizella passerina	Chipping Sparrow	Aves	Magoffin	N	N		Reference
Spizella pusilla	Field Sparrow	Aves	Magoffin	N	N	Yes	Reference
Spizella pusilla	Field Sparrow	Aves	Johnson	N	N	Yes	Reference
Spizelloides arborea	American Tree Sparrow	Aves	Johnson	N	N		Reference
Stelgidopteryx serripennis	Northern Rough-winged Swallow	Aves	Johnson	N	N		Reference

Stelgidopteryx serripennis	Northern Rough-winged Swallow	Aves	Magoffin	N	N		Reference
Storeria occipitomaculata	Red-bellied Snake	Reptilia	Magoffin	N	N		Reference
Storeria occipitomaculata	Red-bellied Snake	Reptilia	Johnson	N	N		Reference
Strix varia	Barred Owl	Aves	Johnson	N	N		Reference
Sturnella magna	Eastern Meadowlark	Aves	Johnson	N	N	Yes	Reference
Sturnella magna	Eastern Meadowlark	Aves	Magoffin	N	N	Yes	Reference
Sturnus vulgaris	European Starling	Aves	Magoffin	N	N		Reference
Sturnus vulgaris	European Starling	Aves	Johnson	N	N		Reference
Sylvilagus floridanus	Eastern Cottontail	Mammalia	Johnson	N	N		Reference
Sylvilagus floridanus	Eastern Cottontail	Mammalia	Magoffin	N	N		Reference
Tachycineta bicolor	Tree Swallow	Aves	Johnson	N	N		Reference
Tamias striatus	Eastern Chipmunk	Mammalia	Johnson	N	N		Reference
Tamias striatus	Eastern Chipmunk	Mammalia	Magoffin	N	N		Reference
Terrapene carolina	Eastern Box Turtle	Chelonia	Magoffin	N	N		Reference
Terrapene carolina	Eastern Box Turtle	Chelonia	Johnson	N	N		Reference
Thamnophis sirtalis	Common Gartersnake	Reptilia	Johnson	N	N		Reference
Thamnophis sirtalis	Common Gartersnake	Reptilia	Magoffin	N	N		Reference
Thryothorus ludovicianus	Carolina Wren	Aves	Magoffin	N	N		Reference
Thryothorus ludovicianus	Carolina Wren	Aves	Johnson	N	N		Reference
Toxostoma rufum	Brown Thrasher	Aves	Johnson	N	N		Reference
Toxostoma rufum	Brown Thrasher	Aves	Magoffin	N	N		Reference
Tritogonia verrucosa	Pistolgrip	Bivalvia	Johnson	N	N		Reference

Troglodytes aedon	House Wren	Aves	Johnson	N	N		Reference
Troglodytes aedon	House Wren	Aves	Magoffin	N	N		Reference
Troglodytes hiemalis	Winter Wren	Aves	Johnson	N	N		Reference
Turdus migratorius	American Robin	Aves	Johnson	N	N		Reference
Turdus migratorius	American Robin	Aves	Magoffin	N	N		Reference
Tyrannus tyrannus	Eastern Kingbird	Aves	Magoffin	N	N		Reference
Tyrannus tyrannus	Eastern Kingbird	Aves	Johnson	N	N		Reference
Urocyon cinereoargenteus	Gray Fox	Mammalia	Johnson	N	N	Yes	Reference
Urocyon cinereoargenteus	Gray Fox	Mammalia	Magoffin	N	N	Yes	Reference
Ursus americanus	American Black Bear	Mammalia	Magoffin	N	N		Reference
Ursus americanus	American Black Bear	Mammalia	Johnson	N	N		Reference
Vermivora chrysoptera	Golden-winged Warbler	Aves	Johnson	N	E	Yes	Reference
Vermivora cyanoptera	Blue-winged Warbler	Aves	Johnson	N	N	Yes	Reference
Vermivora cyanoptera	Blue-winged Warbler	Aves	Magoffin	N	N	Yes	Reference
Vireo flavifrons	Yellow-throated Vireo	Aves	Magoffin	N	N		Reference
Vireo flavifrons	Yellow-throated Vireo	Aves	Johnson	N	N		Reference
Vireo griseus	White-eyed Vireo	Aves	Johnson	N	N		Reference
Vireo griseus	White-eyed Vireo	Aves	Magoffin	N	N		Reference
Vireo olivaceus	Red-eyed Vireo	Aves	Magoffin	N	N		Reference
Vireo olivaceus	Red-eyed Vireo	Aves	Johnson	N	N		Reference
Vireo solitarius	Blue-headed Vireo	Aves	Johnson	N	N		Reference
Virginia valeriae valeriae	Eastern Earth Snake	Reptilia	Magoffin	N	N		Reference

Vulpes vulpes	Red Fox	Mammalia	Johnson	N	N		Reference
Zenaida macroura	Mourning Dove	Aves	Johnson	N	N		Reference
Zenaida macroura	Mourning Dove	Aves	Magoffin	N	N		Reference
Zonotrichia albicollis	White-throated Sparrow	Aves	Magoffin	N	N		Reference
Zonotrichia albicollis	White-throated Sparrow	Aves	Johnson	N	N		Reference
Zonotrichia leucophrys	White-crowned Sparrow	Aves	Johnson	N	N		Reference

558 species are listed

Andy Beshear
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
Office of Kentucky Nature Preserves
300 Sower Boulevard
Frankfort, Kentucky 40601
Phone: (502) 564-3350

Rebecca Goodman
SECRETARY

Sunni Carr
Executive Director

December 5, 2022

Tyler Newman
Stantec
304 Boone Way
Richmond, KY 40475

Project:	US 460 Corridor Study; 178568101
Project ID:	23-0137
Project Type:	Standard (*customers will be invoiced), 1 mile buffer ($120 fee)
Site Acreage:	3,323.38
Site Lat/Lon:	37.784436 / -82.933119
County:	Johnson; Magoffin
USGS Quad:	IVYTON; OIL SPRINGS; PAINTSVILLE; SALYERSVILLE NORTH; SALYERSVILLE SOUTH
Watershed HUC12:	Barnetts Creek-Paint Creek; Burning Fork-Licking River; Jennys Creek; Little Paint Creek; Mudlick Creek-Paint Creek

Dear Tyler Newman,

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 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,

Alexis R Schoenlaub
Geoprocessing Specialist

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

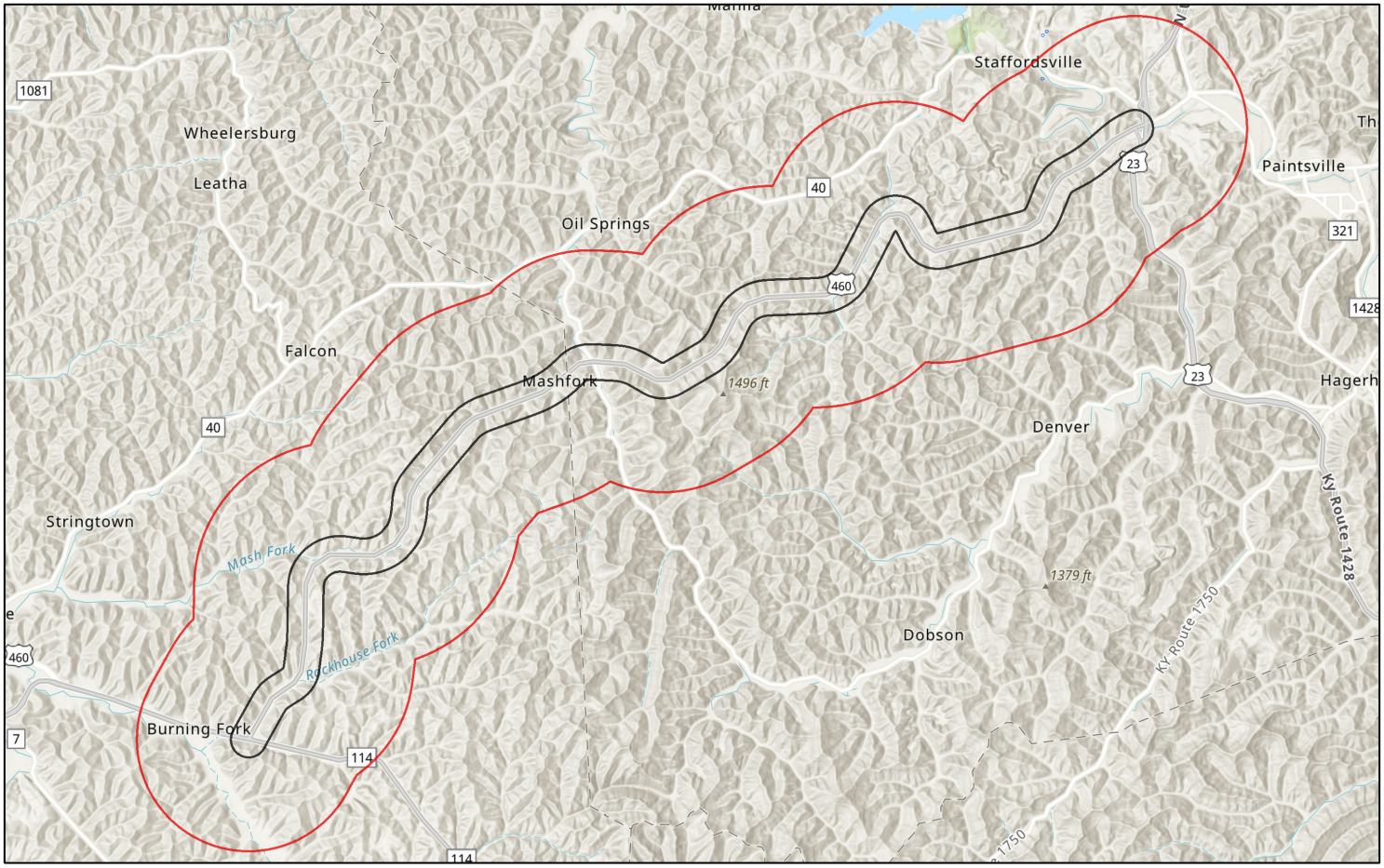
EO ID	Scientific Name	Common Name	GRank	SRank	SPROT	USESA	STWG	Last Obs Date	Precision	EO Rank	Lat / Lon	Directions	Habitat
11577	*Erythronium rostratum*	Yellow Troutlily	G5	S3	S			2006-06	S	D	37.8375 / -82.8551	Staffordsville area west of Paintsville, slope on east side of Little Mudlick Creek just before confluence of Mudlick Creek (028A northernmost, 028B nearest confluence), and in floodplain on South side of Paint Creek 1 mi downstream of confluence with Mud	Mesic ravine forests.

Bat Habitats within 1 Miles of Project Area

Habitat	Species	USFWS
SUMMER 1	*M. septentrionalis*	*Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov*

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.

US 460 Corridor Study



December 5, 2022

Element Occurences

Project Boundary

Buffered Project Boundary

1:92,714

0 0.75 1.5 3 mi

0 1.25 2.5 5 km

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA,

ATTACHMENT 2

Areas of Air Quality Concern in Kentucky

Areas of Air Quality Concern in KY

2015 8-hour ozone:**

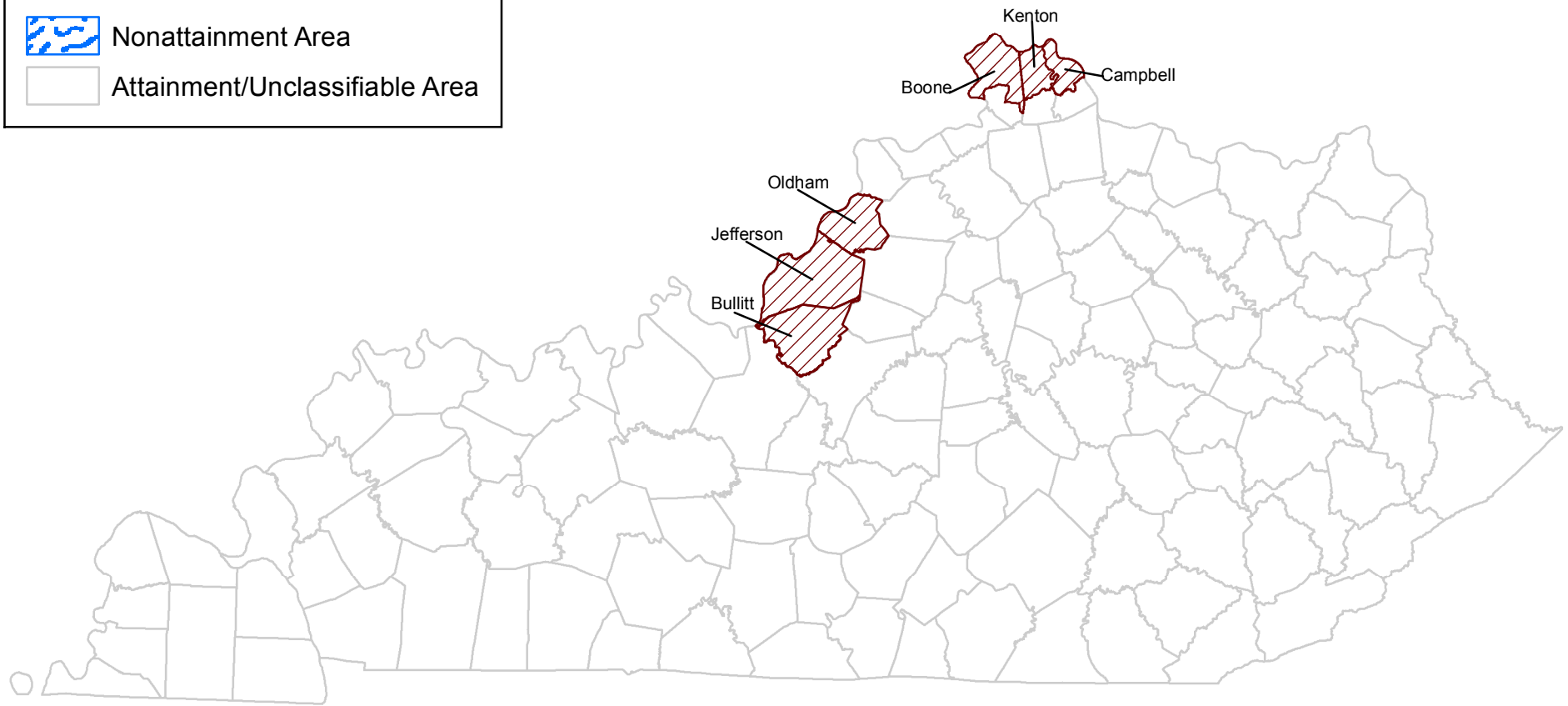
Nonattainment Area

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)**	**$PM_{2.5}$ Annual Vacated (1997 NAAQS)**	**$PM_{2.5}$ 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						

ATTACHMENT 4

USDA Soil Resource Report

United States Department of Agriculture

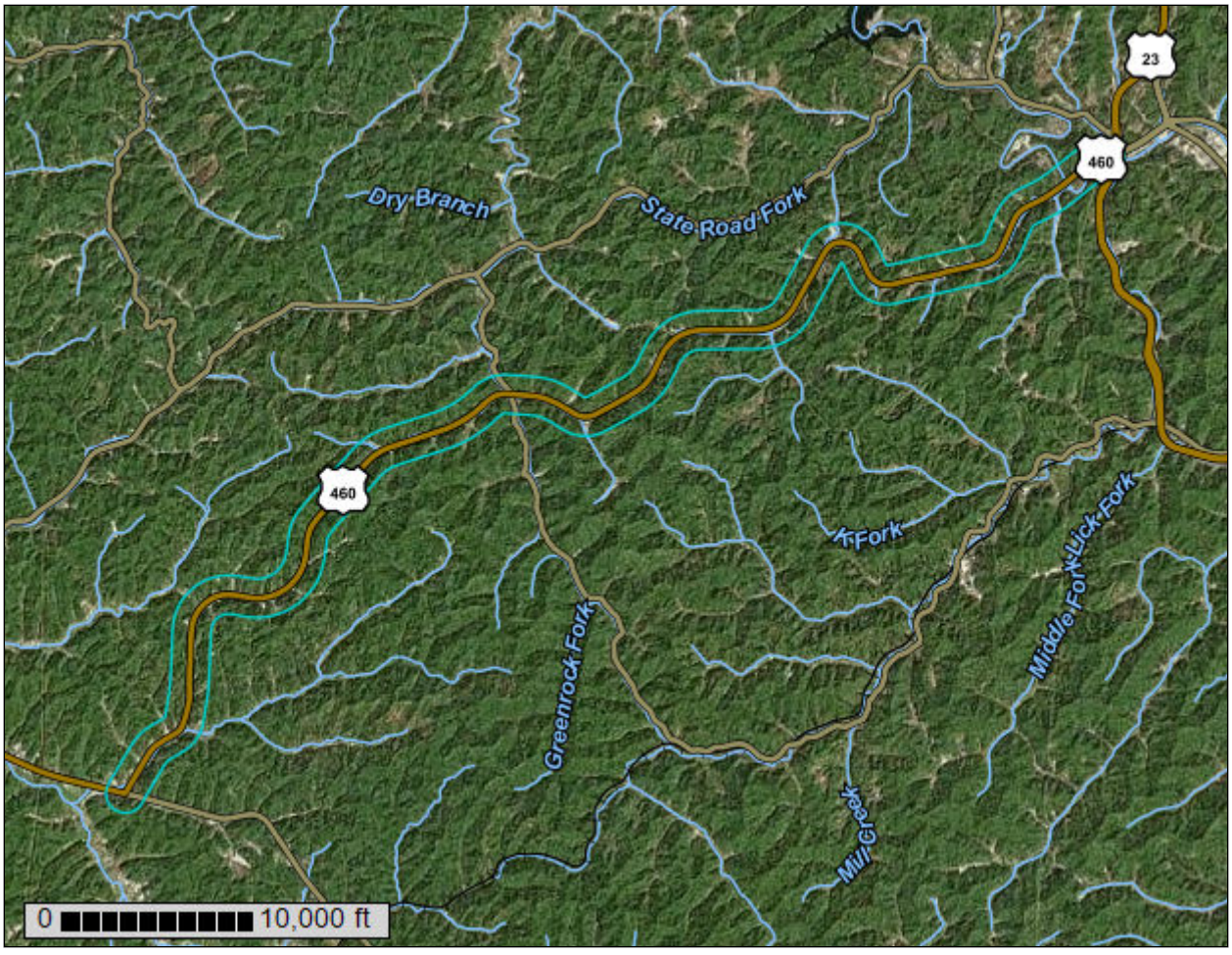
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Floyd and Johnson Counties, Kentucky, and Magoffin and Morgan Counties, Kentucky

US460 Study Area



November 16, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

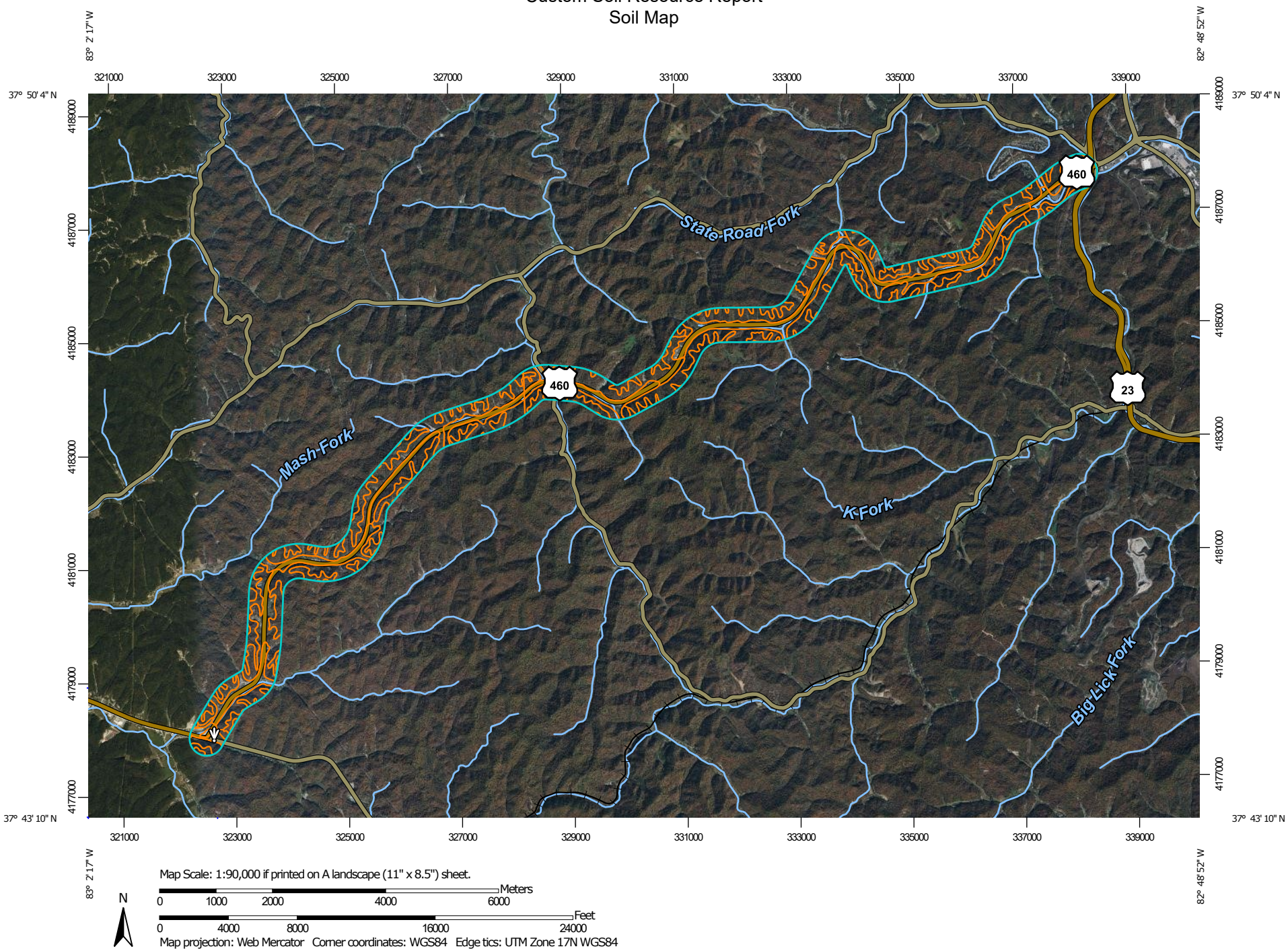
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



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 1:24,000.

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: Floyd and Johnson Counties, Kentucky
Survey Area Data: Version 19, Sep 2, 2022

Soil Survey Area: Magoffin and Morgan Counties, Kentucky
Survey Area Data: Version 18, Sep 2, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Oct 9, 2016—Dec 10, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
AbB	Allegheny loam, 2 to 6 percent slopes, rarely flooded	63.1	1.9%
FbF	Fairpoint and Bethesda soils, 20 to 70 percent slopes, stony	59.8	1.8%
FsF	Fedscreek-Shelocta complex, 20 to 50 percent slopes	6.6	0.2%
GfF	Gilpin-Fedscreek-Marrowbone complex, 20 to 60 percent slopes	146.5	4.4%
Gr	Grigsby fine sandy loam, 0 to 3 percent slopes, frequently flooded	14.2	0.4%
HkF	Hazleton-Fedscreek-Kimper complex, 30 to 80 percent slopes, very stony	238.3	7.2%
SeC	Shelocta loam, 6 to 15 percent slopes	16.9	0.5%
ShC	Shelocta-Grigsby-Stokly complex, 2 to 15 percent slopes	18.6	0.6%
uAdoC	Anthroportic Udorthents-Urban land complex, 0 to 15 percent slopes	369.9	11.1%
uHfsF	Handshoe-Fedscreek-Shelocta complex, 30 to 80 percent slopes, very stony	180.3	5.4%
uMgmF	Matewan-Gilpin-Marrowbone complex, 12 to 80 percent slopes, very rocky	174.7	5.3%
uShfF	Shelocta-Handshoe-Fedscreek complex, 30 to 60 percent slopes, stony	605.0	18.2%
Subtotals for Soil Survey Area		**1,893.9**	**57.0%**
Totals for Area of Interest		**3,324.0**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GnF	Gilpin-Latham-Marrowbone complex, 20 to 60 percent slopes	95.7	2.9%
Gr	Grigsby sandy loam, 0 to 4 percent slopes, occasionally flooded	192.6	5.8%
KbF	Kaymine, Bethesda, and Fiveblock soils, benched, 2 to 70 percent slopes, stony	1.4	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KfF	Kimper-Fedscreek complex, 30 to 80 percent slopes, stony	310.9	9.4%
RyB	Rowdy-Grigsby-Barbourville complex, 0 to 8 percent slopes	26.6	0.8%
ShD	Shelocta silt loam, 12 to 20 percent slopes	3.7	0.1%
uMgmF	Matewan-Gilpin-Marrowbone complex, 12 to 80 percent slopes, very rocky	267.5	8.0%
Ur	Udorthents, loamy, 0 to 6 percent slopes	4.9	0.1%
uShfF	Shelocta-Handshoe-Fedscreek complex, 30 to 60 percent slopes, stony	526.7	15.8%
Subtotals for Soil Survey Area		**1,430.1**	**43.0%**
Totals for Area of Interest		**3,324.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Floyd and Johnson Counties, Kentucky

AbB—Allegheny loam, 2 to 6 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: lh6j
Elevation: 550 to 2,300 feet
Mean annual precipitation: 41 to 55 inches
Mean annual air temperature: 39 to 66 degrees F
Frost-free period: 128 to 186 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Allegheny, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allegheny, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 42 inches: loam
H3 - 42 to 89 inches: fine sandy loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F125XY005WV - Low Stream Terrace Alluvium
Hydric soil rating: No

Minor Components

Cotaco

Percent of map unit: 5 percent
Landform: Stream terraces
Hydric soil rating: No

Chavies

Percent of map unit: 5 percent
Landform: Stream terraces
Hydric soil rating: No

FbF—Fairpoint and Bethesda soils, 20 to 70 percent slopes, stony

Map Unit Setting

National map unit symbol: 2tqhf
Elevation: 1,000 to 3,000 feet
Mean annual precipitation: 40 to 57 inches
Mean annual air temperature: 39 to 69 degrees F
Frost-free period: 163 to 231 days
Farmland classification: Not prime farmland

Map Unit Composition

Fairpoint, unstable fill, and similar soils: 50 percent
Bethesda, unstable fill, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fairpoint, Unstable Fill

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal coal extraction mine spoil derived from sandstone and shale

Typical profile

Ap - 0 to 11 inches: channery loam
C1 - 11 to 32 inches: very channery loam
C2 - 32 to 41 inches: extremely channery loam
C3 - 41 to 51 inches: extremely flaggy loam
C4 - 51 to 58 inches: extremely flaggy silt loam
C5 - 58 to 72 inches: extremely flaggy loam

Properties and qualities

Slope: 20 to 70 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Bethesda, Unstable Fill

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal coal extraction mine spoil derived from sandstone and shale

Typical profile

Ap - 0 to 12 inches: channery silt loam
C1 - 12 to 36 inches: very channery loam
C2 - 36 to 58 inches: very channery loam
C3 - 58 to 72 inches: very channery loam

Properties and qualities

Slope: 20 to 70 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Shelocta, very stony

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Gilpin, very stony

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Udorthents, unstable fill

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Urban land

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Dumps, mine (tailings & tipples)

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

FsF—Fedscreek-Shelocta complex, 20 to 50 percent slopes

Map Unit Setting

National map unit symbol: lh6v
Elevation: 550 to 2,300 feet
Mean annual precipitation: 41 to 55 inches
Mean annual air temperature: 39 to 66 degrees F
Frost-free period: 128 to 186 days
Farmland classification: Not prime farmland

Map Unit Composition

Fedscreek and similar soils: 40 percent
Shelocta and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fedscreek

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 48 inches: channery loam
H3 - 48 to 63 inches: very channery fine sandy loam
R - 63 to 73 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 50 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Shelocta

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy colluvium derived from shale and siltstone over residuum

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 47 inches: channery silt loam
H3 - 47 to 62 inches: very channery loam
R - 62 to 72 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 50 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 7 percent
Hydric soil rating: No

Gilpin

Percent of map unit: 6 percent
Hydric soil rating: No

Marrowbone

Percent of map unit: 6 percent
Hydric soil rating: No

Dekalb

Percent of map unit: 6 percent
Hydric soil rating: No

GfF—Gilpin-Fedscreek-Marrowbone complex, 20 to 60 percent slopes

Map Unit Setting

National map unit symbol: lh6w
Elevation: 550 to 2,300 feet
Mean annual precipitation: 41 to 55 inches
Mean annual air temperature: 39 to 66 degrees F
Frost-free period: 128 to 186 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin and similar soils: 40 percent
Fedscreek and similar soils: 20 percent
Marrowbone and similar soils: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 18 inches: loam
H3 - 18 to 28 inches: very channery loam
Cr - 28 to 38 inches: weathered bedrock

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Fedscreek

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 48 inches: channery loam
H3 - 48 to 63 inches: very channery fine sandy loam
R - 63 to 73 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Marrowbone

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 37 inches: fine sandy loam
R - 37 to 47 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 7 percent
Hydric soil rating: No

Rigley

Percent of map unit: 6 percent
Hydric soil rating: No

Shelocta
Percent of map unit: 6 percent
Hydric soil rating: No

Dekalb
Percent of map unit: 6 percent
Hydric soil rating: No

Gr—Grigsby fine sandy loam, 0 to 3 percent slopes, frequently flooded

Map Unit Setting
National map unit symbol: 2tqhr
Elevation: 600 to 1,800 feet
Mean annual precipitation: 28 to 55 inches
Mean annual air temperature: 39 to 68 degrees F
Frost-free period: 128 to 220 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition
Grigsby, frequently flooded, and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grigsby, Frequently Flooded

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile
Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 23 inches: fine sandy loam
Bw2 - 23 to 38 inches: fine sandy loam
Bw3 - 38 to 58 inches: fine sandy loam
C - 58 to 80 inches: loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 42 to 80 inches

Frequency of flooding: NoneFrequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F125XY004WV - Floodplain Alluvium
Hydric soil rating: No

Minor Components

Yeager, frequently flooded

Percent of map unit: 9 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Craigsville, frequently flooded

Percent of map unit: 8 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rowdy, occasionally flooded

Percent of map unit: 7 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Combs, occasionally flooded

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Holly, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Udorthents, unstable fill

Percent of map unit: 1 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

HkF—Hazleton-Fedscreek-Kimper complex, 30 to 80 percent slopes, very stony

Map Unit Setting

National map unit symbol: lh6y
Elevation: 550 to 2,300 feet
Mean annual precipitation: 41 to 55 inches
Mean annual air temperature: 39 to 66 degrees F
Frost-free period: 128 to 186 days
Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 30 percent
Fedscreek and similar soils: 25 percent
Kimper and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 38 inches: very channery sandy loam
H3 - 38 to 62 inches: very flaggy fine sandy loam
R - 62 to 72 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 80 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Kimper

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy colluvium derived from sandstone and siltstone over residuum

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 54 inches: very channery loam
H3 - 54 to 66 inches: very channery loam
R - 66 to 76 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 80 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Fedscreek

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 48 inches: channery loam
H3 - 48 to 63 inches: very channery fine sandy loam
R - 63 to 73 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 80 percent

Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Minor Components

Gilpin

Percent of map unit: 5 percent
Hydric soil rating: No

Dekalb

Percent of map unit: 5 percent
Hydric soil rating: No

Marrowbone

Percent of map unit: 5 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

SeC—Shelocta loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: lh7b
Elevation: 550 to 2,300 feet
Mean annual precipitation: 41 to 55 inches
Mean annual air temperature: 39 to 66 degrees F
Frost-free period: 128 to 186 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelocta and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy colluvium derived from shale and siltstone over residuum

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 47 inches: loam
H3 - 47 to 62 inches: very channery loam
R - 62 to 72 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Minor Components

Hazleton

Percent of map unit: 4 percent
Hydric soil rating: No

Allegheny

Percent of map unit: 3 percent
Hydric soil rating: No

Fedscreek

Percent of map unit: 3 percent
Hydric soil rating: No

ShC—Shelocta-Grigsby-Stokly complex, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: lh7c
Elevation: 550 to 2,300 feet
Mean annual precipitation: 41 to 55 inches
Mean annual air temperature: 39 to 66 degrees F
Frost-free period: 128 to 186 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelocta and similar soils: 55 percent
Grigsby, occasionally flooded, and similar soils: 30 percent
Stokly, occasionally flooded, and similar soils: 10 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy colluvium derived from shale and siltstone over residuum

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 47 inches: loam
H3 - 47 to 62 inches: very channery loam
R - 62 to 72 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium

Hydric soil rating: No

Description of Grigsby, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 42 inches: fine sandy loam
H3 - 42 to 62 inches: stratified fine sandy loam

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F125XY004WV - Floodplain Alluvium
Hydric soil rating: No

Description of Stokly, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 32 inches: fine sandy loam
H2 - 32 to 62 inches: fine sandy loam

Properties and qualities

Slope: 2 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 10 to 12 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F125XY004WV - Floodplain Alluvium
Hydric soil rating: No

Minor Components

Knowlton, rarely flooded

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Udorthents, unstable fill

Percent of map unit: 2 percent
Hydric soil rating: No

uAdoC—Anthroportic Udorthents-Urban land complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2x5hs
Elevation: 550 to 1,360 feet
Mean annual precipitation: 28 to 54 inches
Mean annual air temperature: 42 to 68 degrees F
Frost-free period: 140 to 222 days
Farmland classification: Not prime farmland

Map Unit Composition

Anthroportic udorthents, unstable fill, and similar soils: 55 percent
Urban land: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anthroportic Udorthents, Unstable Fill

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Loamy-skeletal mine spoil or earthy fill derived from interbedded sedimentary rock

Typical profile

^Ap - 0 to 5 inches: very channery silt loam
^C1 - 5 to 15 inches: very channery silt loam
^C2 - 15 to 24 inches: very channery silt loam
^C3 - 24 to 38 inches: extremely parachannery silt loam
^C4 - 38 to 55 inches: extremely parachannery silt loam
Cr - 55 to 65 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 45 to 60 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Hillslopes
Landform position (three-dimensional): Base slope

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Shelocta

Percent of map unit: 9 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Clifftop

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Handshoe

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Kimper

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

uHfsF—Handshoe-Fedscreek-Shelocta complex, 30 to 80 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2x5j1
Elevation: 550 to 1,850 feet
Mean annual precipitation: 28 to 58 inches
Mean annual air temperature: 39 to 67 degrees F
Frost-free period: 140 to 222 days
Farmland classification: Not prime farmland

Map Unit Composition

Handshoe, very stony, and similar soils: 30 percent
Fedscreek, very stony, and similar soils: 26 percent
Shelocta, very stony, and similar soils: 20 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Handshoe, Very Stony

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy-skeletal colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 2 inches: very channery slightly decomposed plant material
A - 2 to 9 inches: very channery loam
E - 9 to 16 inches: very channery loam
Bw1 - 16 to 34 inches: very channery sandy loam
Bw2 - 34 to 50 inches: very channery loam
Bw3 - 50 to 61 inches: channery loam
BC - 61 to 80 inches: very channery sandy loam

Properties and qualities

Slope: 30 to 80 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Fedscreek, Very Stony

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: channery slightly decomposed plant material
A - 1 to 4 inches: channery loam
BA - 4 to 8 inches: channery silt loam
Bw1 - 8 to 17 inches: channery loam
Bw2 - 17 to 30 inches: channery loam
Bw3 - 30 to 39 inches: channery loam
Bw4 - 39 to 48 inches: channery loam
C1 - 48 to 60 inches: very channery loam
C2 - 60 to 65 inches: channery silt loam
R - 65 to 75 inches: bedrock

Properties and qualities

Slope: 30 to 80 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 62 to 70 inches to lithic bedrock
Drainage class: Well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Shelocta, Very Stony

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: silt loam
BA - 3 to 7 inches: loam
Bt1 - 7 to 23 inches: channery silt loam
2Bt2 - 23 to 34 inches: channery silt loam
2Bt3 - 34 to 45 inches: very channery silt loam
2C - 45 to 59 inches: very parachannery silt loam
2Cr - 59 to 69 inches: bedrock

Properties and qualities

Slope: 30 to 80 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 48 to 65 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Minor Components

Marrowbone, very stony
Percent of map unit: 11 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Matewan, very stony
Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Clifftop, very stony
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Blairton, very stony
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

uMgmF—Matewan-Gilpin-Marrowbone complex, 12 to 80 percent slopes, very rocky

Map Unit Setting
National map unit symbol: 2yksr
Elevation: 800 to 2,300 feet
Mean annual precipitation: 28 to 55 inches
Mean annual air temperature: 39 to 67 degrees F
Frost-free period: 140 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Matewan, very stony, and similar soils: 30 percent
Gilpin, very stony, and similar soils: 25 percent
Marrowbone, very stony, and similar soils: 15 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Matewan, Very Stony

Setting

Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy-skeletal residuum weathered from sandstone

Typical profile

Oi - 0 to 1 inches: very channery moderately decomposed plant material
A - 1 to 4 inches: very channery sandy loam
BA - 4 to 8 inches: very channery sandy loam
Bw - 8 to 30 inches: extremely channery loam
C - 30 to 33 inches: extremely flaggy loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 12 to 80 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 32 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Description of Gilpin, Very Stony

Setting

Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: channery slightly decomposed plant material

A - 1 to 5 inches: channery silt loam
Bt1 - 5 to 11 inches: channery silt loam
Bt2 - 11 to 20 inches: channery silt loam
Bt3 - 20 to 28 inches: channery loam
R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 12 to 80 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Marrowbone, Very Stony

Setting

Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 5 inches: fine sandy loam
Bw1 - 5 to 10 inches: loam
Bw2 - 10 to 17 inches: fine sandy loam
Bw3 - 17 to 23 inches: loam
BC - 23 to 28 inches: channery loam
R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 12 to 80 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 24 to 32 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Minor Components

Sequoia, very stony

Percent of map unit: 10 percent
Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Concave
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Ramsey, very stony

Percent of map unit: 7 percent
Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Rayne, very stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Rock outcrop

Percent of map unit: 4 percent
Landform: Escarpments on ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F125XY001WV - Sandstone Residuum

Fedscreek, very stony

Percent of map unit: 4 percent
Landform: Ridges
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

uShfF—Shelocta-Handshoe-Fedscreek complex, 30 to 60 percent slopes, stony

Map Unit Setting

National map unit symbol: 2xnk5
Elevation: 600 to 2,460 feet
Mean annual precipitation: 28 to 55 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 152 to 245 days
Farmland classification: Not prime farmland

Map Unit Composition

Shelocta, stony, and similar soils: 50 percent
Handshoe, stony, and similar soils: 20 percent
Fedscreek, stony, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta, Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and shale over clayey residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: silt loam
BA - 3 to 7 inches: loam
Bt1 - 7 to 23 inches: channery silt loam
2Bt2 - 23 to 34 inches: channery silt loam
2Bt3 - 34 to 45 inches: very channery silt loam
2C - 45 to 59 inches: very parachannery silt loam
2Cr - 59 to 69 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 48 to 65 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Handshoe, Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy-skeletal colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 2 inches: very channery slightly decomposed plant material
A - 2 to 9 inches: very channery loam
E - 9 to 16 inches: very channery loam
Bw1 - 16 to 34 inches: very channery sandy loam
Bw2 - 34 to 50 inches: very channery loam
Bw3 - 50 to 61 inches: channery loam
BC - 61 to 80 inches: very channery sandy loam

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F124XY004OH - Acid Mixed Sedimentary Toeslope
Hydric soil rating: No

Description of Fedscreek, Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: channery slightly decomposed plant material
A - 1 to 4 inches: channery loam
BA - 4 to 8 inches: channery silt loam
Bw1 - 8 to 17 inches: channery loam
Bw2 - 17 to 30 inches: channery loam
Bw3 - 30 to 39 inches: channery loam
Bw4 - 39 to 48 inches: channery loam
C1 - 48 to 60 inches: very channery loam
C2 - 60 to 65 inches: channery silt loam
R - 65 to 75 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 62 to 70 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F124XY004OH - Acid Mixed Sedimentary Toeslope
Hydric soil rating: No

Minor Components

Marrowbone, stony

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Gilpin, stony

Percent of map unit: 4 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Matewan, stony

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear

Hydric soil rating: No

Ramsey, stony

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Magoffin and Morgan Counties, Kentucky

GnF—Gilpin-Latham-Marrowbone complex, 20 to 60 percent slopes

Map Unit Setting

National map unit symbol: lh95
Elevation: 730 to 1,450 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin and similar soils: 30 percent
Latham and similar soils: 25 percent
Marrowbone and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Typical profile

H1 - 0 to 5 inches: channery silt loam
H2 - 5 to 18 inches: channery silt loam
H3 - 18 to 30 inches: channery silt loam
R - 30 to 40 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F124XY002OH - Acid Mixed Sedimentary Upland
Hydric soil rating: No

Description of Latham

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 38 inches: silty clay loam
Cr - 38 to 48 inches: weathered bedrock

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: 20 to 60 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F124XY002OH - Acid Mixed Sedimentary Upland
Hydric soil rating: No

Description of Marrowbone

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone

Typical profile

H1 - 0 to 3 inches: loam
H2 - 3 to 27 inches: channery fine sandy loam
R - 27 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F124XY002OH - Acid Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Ramsey

Percent of map unit: 10 percent
Hydric soil rating: No

Dekalb

Percent of map unit: 5 percent
Hydric soil rating: No

Hazleton

Percent of map unit: 3 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 3 percent
Hydric soil rating: No

Fedscreek

Percent of map unit: 2 percent
Hydric soil rating: No

Helechawa

Percent of map unit: 2 percent
Hydric soil rating: No

Gr—Grigsby sandy loam, 0 to 4 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: lh96
Elevation: 700 to 1,170 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Grigsby, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grigsby, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium

Typical profile

H1 - 0 to 11 inches: sandy loam
H2 - 11 to 30 inches: sandy loam
H3 - 30 to 60 inches: stratified sandy loam to loamy sand
H4 - 60 to 80 inches: stratified sandy loam to sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F124XY007OH - Upper Floodplain
Hydric soil rating: No

Minor Components

Yeager

Percent of map unit: 5 percent
Hydric soil rating: No

Rowdy

Percent of map unit: 2 percent
Hydric soil rating: No

Cotaco

Percent of map unit: 1 percent
Hydric soil rating: No

Fedscreek

Percent of map unit: 1 percent
Hydric soil rating: No

Hazleton

Percent of map unit: 1 percent
Hydric soil rating: No

Kimper

Percent of map unit: 1 percent
Hydric soil rating: No

Morehead
Percent of map unit: 1 percent
Hydric soil rating: No

Philo
Percent of map unit: 1 percent
Hydric soil rating: No

Shelocta
Percent of map unit: 1 percent
Hydric soil rating: No

Helechawa
Percent of map unit: 1 percent
Hydric soil rating: No

KbF—Kaymine, Bethesda, and Fiveblock soils, benched, 2 to 70 percent slopes, stony

Map Unit Setting
National map unit symbol: lh98
Elevation: 710 to 1,560 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: Not prime farmland

Map Unit Composition
Kaymine, unstable fill, and similar soils: 45 percent
Bethesda, unstable fill, and similar soils: 25 percent
Fiveblock, unstable fill, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kaymine, Unstable Fill

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal coal extraction mine spoil derived from interbedded sedimentary rock

Typical profile
H1 - 0 to 8 inches: very channery loam
H2 - 8 to 65 inches: very channery loam

Properties and qualities
Slope: 2 to 70 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F124XY100OH - Mine Spoil (reserved)
Hydric soil rating: No

Description of Bethesda, Unstable Fill

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal coal extraction mine spoil derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 8 inches: very channery silt loam
H2 - 8 to 50 inches: very channery clay loam
Cr - 50 to 65 inches: weathered bedrock

Properties and qualities

Slope: 2 to 70 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F124XY100OH - Mine Spoil (reserved)
Hydric soil rating: No

Description of Fiveblock, Unstable Fill

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal coal extraction mine spoil derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 9 inches: very channery sandy loam
H2 - 9 to 65 inches: very stony sandy loam

Properties and qualities

Slope: 2 to 70 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F124XY100OH - Mine Spoil (reserved)
Hydric soil rating: No

Minor Components

Gilpin

Percent of map unit: 2 percent
Hydric soil rating: No

Fedscreek

Percent of map unit: 1 percent
Hydric soil rating: No

Helechawa

Percent of map unit: 1 percent
Hydric soil rating: No

Latham

Percent of map unit: 1 percent
Hydric soil rating: No

Dekalb

Percent of map unit: 1 percent
Hydric soil rating: No

Kimper

Percent of map unit: 1 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 1 percent
Hydric soil rating: No

Hazleton
Percent of map unit: 1 percent
Hydric soil rating: No

Marrowbone
Percent of map unit: 1 percent
Hydric soil rating: No

KfF—Kimper-Fedscreek complex, 30 to 80 percent slopes, stony

Map Unit Setting
National map unit symbol: lh99
Elevation: 800 to 1,540 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: Not prime farmland

Map Unit Composition
Kimper and similar soils: 45 percent
Fedscreek and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kimper

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock

Typical profile
H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 13 inches: channery fine sandy loam
H3 - 13 to 50 inches: channery fine sandy loam
H4 - 50 to 80 inches: channery sandy loam

Properties and qualities
Slope: 30 to 80 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Description of Fedscreek

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sandstone

Typical profile

H1 - 0 to 3 inches: channery loam
H2 - 3 to 45 inches: channery sandy loam
H3 - 45 to 80 inches: very flaggy sandy loam

Properties and qualities

Slope: 30 to 80 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Minor Components

Shelocta

Percent of map unit: 10 percent
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Hydric soil rating: No

Grigsby

Percent of map unit: 3 percent
Hydric soil rating: No

Marrowbone
Percent of map unit: 2 percent
Hydric soil rating: No

Gilpin
Percent of map unit: 1 percent
Hydric soil rating: No

Marrowbone
Percent of map unit: 1 percent
Hydric soil rating: No

Muskingum
Percent of map unit: 1 percent
Hydric soil rating: No

Dekalb
Percent of map unit: 1 percent
Hydric soil rating: No

Orrville
Percent of map unit: 1 percent
Hydric soil rating: No

RyB—Rowdy-Grigsby-Barbourville complex, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: lh9s
Elevation: 710 to 1,030 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Rowdy, occasionally flooded, and similar soils: 35 percent
Grigsby, occasionally flooded, and similar soils: 25 percent
Barbourville, rarely flooded, and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rowdy, Occasionally Flooded

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 15 inches: channery loam
H3 - 15 to 65 inches: loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 40 to 65 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F124XY010OH - Fine Terrace and Plain
Hydric soil rating: No

Description of Grigsby, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium

Typical profile

H1 - 0 to 11 inches: sandy loam
H2 - 11 to 30 inches: sandy loam
H3 - 30 to 60 inches: stratified sandy loam to loamy sand
H4 - 60 to 80 inches: stratified sandy loam to sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F124XY007OH - Upper Floodplain
Hydric soil rating: No

Description of Barbourville, Rarely Flooded

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy alluvium

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 41 inches: channery loam
H3 - 41 to 65 inches: channery sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F124XY009OH - Coarse Terrace and Plain
Hydric soil rating: No

Minor Components

Philo

Percent of map unit: 10 percent
Hydric soil rating: No

Yeager

Percent of map unit: 5 percent
Hydric soil rating: No

Helechawa

Percent of map unit: 1 percent
Hydric soil rating: No

Kimper

Percent of map unit: 1 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 1 percent
Hydric soil rating: No

Fedscreek

Percent of map unit: 1 percent

Hydric soil rating: No

Hazleton

Percent of map unit: 1 percent
Hydric soil rating: No

ShD—Shelocta silt loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: lh9v
Elevation: 700 to 1,160 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: Not prime farmland

Map Unit Composition

Shelocta and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 20 inches: silt loam
H3 - 20 to 59 inches: silt loam
Cr - 59 to 69 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F124XY004OH - Acid Mixed Sedimentary Toeslope
Hydric soil rating: No

Minor Components

Gilpin

Percent of map unit: 10 percent
Hydric soil rating: No

Allegheny

Percent of map unit: 2 percent
Hydric soil rating: No

Rayne

Percent of map unit: 2 percent
Hydric soil rating: No

Latham

Percent of map unit: 1 percent
Hydric soil rating: No

uMgmF—Matewan-Gilpin-Marrowbone complex, 12 to 80 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2yksr
Elevation: 800 to 2,300 feet
Mean annual precipitation: 28 to 55 inches
Mean annual air temperature: 39 to 67 degrees F
Frost-free period: 140 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Matewan, very stony, and similar soils: 30 percent
Gilpin, very stony, and similar soils: 25 percent
Marrowbone, very stony, and similar soils: 15 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Matewan, Very Stony

Setting

Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy-skeletal residuum weathered from sandstone

Typical profile

Oi - 0 to 1 inches: very channery moderately decomposed plant material
A - 1 to 4 inches: very channery sandy loam
BA - 4 to 8 inches: very channery sandy loam
Bw - 8 to 30 inches: extremely channery loam
C - 30 to 33 inches: extremely flaggy loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 12 to 80 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 32 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Description of Gilpin, Very Stony

Setting

Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: channery slightly decomposed plant material
A - 1 to 5 inches: channery silt loam
Bt1 - 5 to 11 inches: channery silt loam
Bt2 - 11 to 20 inches: channery silt loam
Bt3 - 20 to 28 inches: channery loam
R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 12 to 80 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Description of Marrowbone, Very Stony

Setting

Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 5 inches: fine sandy loam
Bw1 - 5 to 10 inches: loam
Bw2 - 10 to 17 inches: fine sandy loam
Bw3 - 17 to 23 inches: loam
BC - 23 to 28 inches: channery loam
R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 12 to 80 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 24 to 32 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Minor Components

Sequoia, very stony

Percent of map unit: 10 percent
Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Concave
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Ramsey, very stony

Percent of map unit: 7 percent
Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F125XY001WV - Sandstone Residuum
Hydric soil rating: No

Rayne, very stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F125XY003WV - Interbedded Sedimentary Uplands
Hydric soil rating: No

Rock outcrop

Percent of map unit: 4 percent
Landform: Escarpments on ridges
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F125XY001WV - Sandstone Residuum

Fedscreek, very stony

Percent of map unit: 4 percent
Landform: Ridges
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F125XY002WV - Interbedded Sedimentary Colluvium
Hydric soil rating: No

Ur—Udorthents, loamy, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: lh9y
Elevation: 710 to 1,050 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 67 degrees F
Frost-free period: 140 to 189 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, unstable fill, and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Unstable Fill

Setting
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Properties and qualities
Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Runoff class: Medium
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydric soil rating: No

Minor Components

Rowdy
Percent of map unit: 5 percent
Hydric soil rating: No

Grigsby
Percent of map unit: 5 percent
Hydric soil rating: No

Pope
Percent of map unit: 5 percent
Hydric soil rating: No

uShfF—Shelocta-Handshoe-Fedscreek complex, 30 to 60 percent slopes, stony

Map Unit Setting
National map unit symbol: 2xnk5
Elevation: 600 to 2,460 feet
Mean annual precipitation: 28 to 55 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 152 to 245 days
Farmland classification: Not prime farmland

Map Unit Composition
Shelocta, stony, and similar soils: 50 percent
Handshoe, stony, and similar soils: 20 percent
Fedscreek, stony, and similar soils: 15 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta, Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and shale over clayey residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: silt loam
BA - 3 to 7 inches: loam
Bt1 - 7 to 23 inches: channery silt loam
2Bt2 - 23 to 34 inches: channery silt loam
2Bt3 - 34 to 45 inches: very channery silt loam
2C - 45 to 59 inches: very parachannery silt loam
2Cr - 59 to 69 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 48 to 65 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Handshoe, Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy-skeletal colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 2 inches: very channery slightly decomposed plant material
A - 2 to 9 inches: very channery loam
E - 9 to 16 inches: very channery loam
Bw1 - 16 to 34 inches: very channery sandy loam
Bw2 - 34 to 50 inches: very channery loam

Bw3 - 50 to 61 inches: channery loam
BC - 61 to 80 inches: very channery sandy loam

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F124XY004OH - Acid Mixed Sedimentary Toeslope
Hydric soil rating: No

Description of Fedscreek, Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: channery slightly decomposed plant material
A - 1 to 4 inches: channery loam
BA - 4 to 8 inches: channery silt loam
Bw1 - 8 to 17 inches: channery loam
Bw2 - 17 to 30 inches: channery loam
Bw3 - 30 to 39 inches: channery loam
Bw4 - 39 to 48 inches: channery loam
C1 - 48 to 60 inches: very channery loam
C2 - 60 to 65 inches: channery silt loam
R - 65 to 75 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 62 to 70 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F124XY004OH - Acid Mixed Sedimentary Toeslope
Hydric soil rating: No

Minor Components

Marrowbone, stony

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Gilpin, stony

Percent of map unit: 4 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Matewan, stony

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ramsey, stony

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

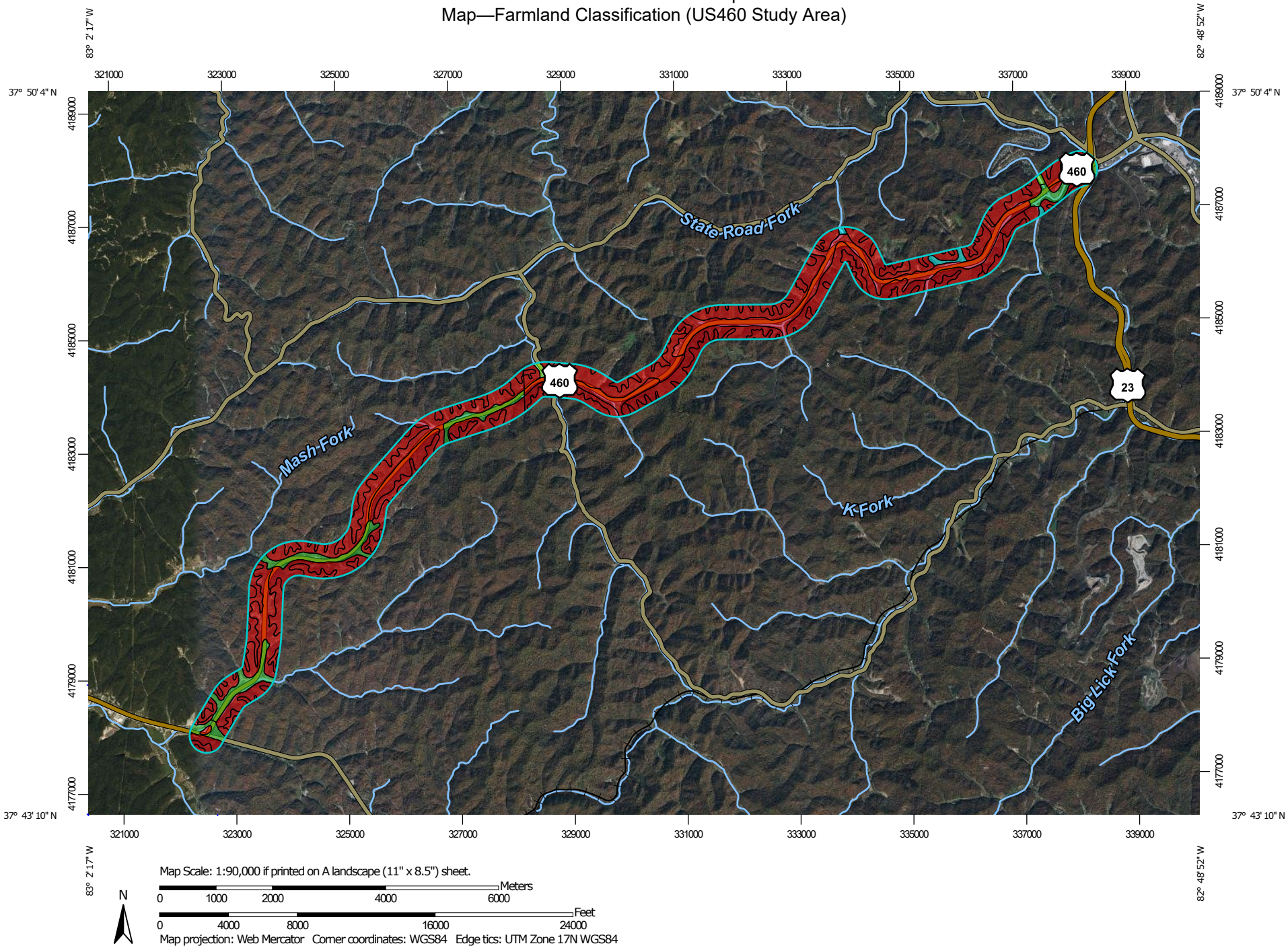
Land Classifications

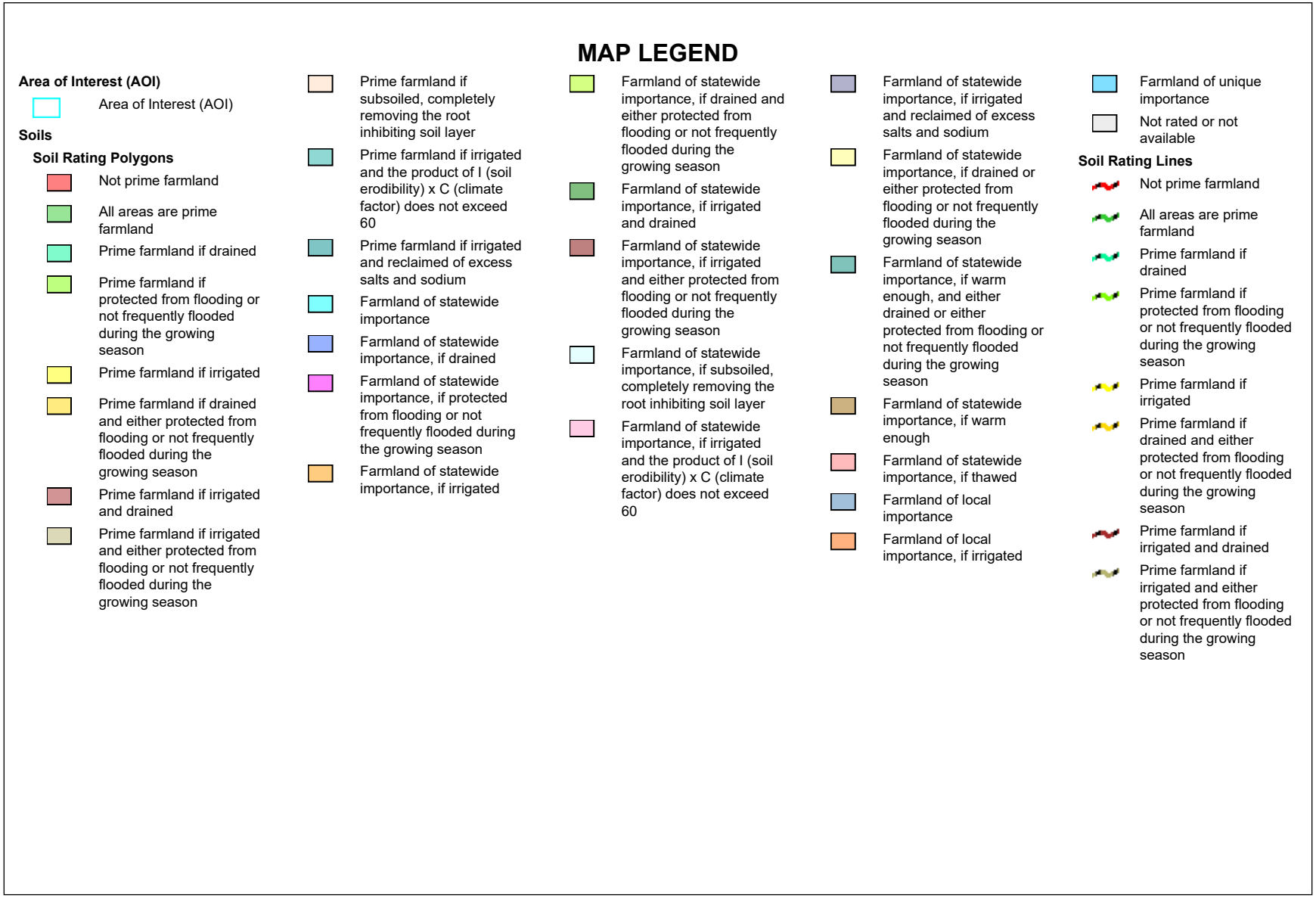
Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

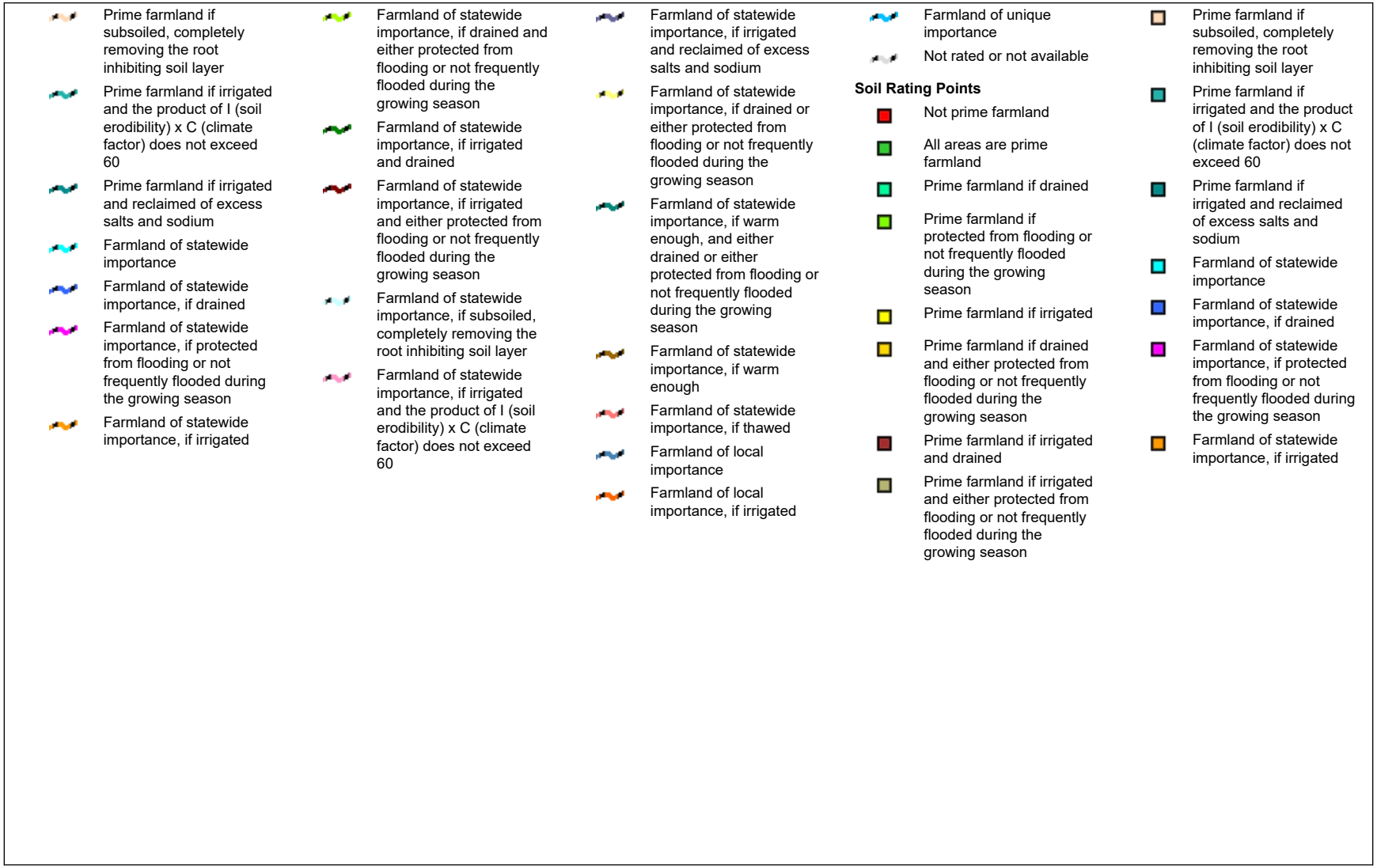
Farmland Classification (US460 Study Area)

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Map—Farmland Classification (US460 Study Area)




MAP LEGEND
Area of Interest (AOI)
Area of Interest (AOI)
Soils
Soil Rating Polygons
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated
Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated and drained
Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough
Farmland of statewide importance, if thawed
Farmland of local importance
Farmland of local importance, if irrigated
Farmland of unique importance
Not rated or not available
Soil Rating Lines
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season


Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated
Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated and drained
Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough
Farmland of statewide importance, if thawed
Farmland of local importance
Farmland of local importance, if irrigated
Farmland of unique importance
Not rated or not available
Soil Rating Points
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated

- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

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: Floyd and Johnson Counties, Kentucky
Survey Area Data: Version 19, Sep 2, 2022

Soil Survey Area: Magoffin and Morgan Counties, Kentucky
Survey Area Data: Version 18, Sep 2, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Oct 9, 2016—Dec 10, 2020

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.

Table—Farmland Classification (US460 Study Area)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AbB	Allegheny loam, 2 to 6 percent slopes, rarely flooded	All areas are prime farmland	63.1	1.9%
FbF	Fairpoint and Bethesda soils, 20 to 70 percent slopes, stony	Not prime farmland	59.8	1.8%
FsF	Fedscreek-Shelocta complex, 20 to 50 percent slopes	Not prime farmland	6.6	0.2%
GfF	Gilpin-Fedscreek-Marrowbone complex, 20 to 60 percent slopes	Not prime farmland	146.5	4.4%
Gr	Grigsby fine sandy loam, 0 to 3 percent slopes, frequently flooded	Prime farmland if protected from flooding or not frequently flooded during the growing season	14.2	0.4%
HkF	Hazleton-Fedscreek-Kimper complex, 30 to 80 percent slopes, very stony	Not prime farmland	238.3	7.2%
SeC	Shelocta loam, 6 to 15 percent slopes	Farmland of statewide importance	16.9	0.5%
ShC	Shelocta-Grigsby-Stokly complex, 2 to 15 percent slopes	Farmland of statewide importance	18.6	0.6%
uAdoC	Anthroportic Udorthents-Urban land complex, 0 to 15 percent slopes	Not prime farmland	369.9	11.1%
uHfsF	Handshoe-Fedscreek-Shelocta complex, 30 to 80 percent slopes, very stony	Not prime farmland	180.3	5.4%
uMgmF	Matewan-Gilpin-Marrowbone complex, 12 to 80 percent slopes, very rocky	Not prime farmland	174.7	5.3%
uShfF	Shelocta-Handshoe-Fedscreek complex, 30 to 60 percent slopes, stony	Not prime farmland	605.0	18.2%
Subtotals for Soil Survey Area			**1,893.9**	**57.0%**
Totals for Area of Interest			**3,324.0**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GnF	Gilpin-Latham-Marrowbone complex, 20 to 60 percent slopes	Not prime farmland	95.7	2.9%
Gr	Grigsby sandy loam, 0 to 4 percent slopes, occasionally flooded	All areas are prime farmland	192.6	5.8%
KbF	Kaymine, Bethesda, and Fiveblock soils, benched, 2 to 70 percent slopes, stony	Not prime farmland	1.4	0.0%
KfF	Kimper-Fedscreek complex, 30 to 80 percent slopes, stony	Not prime farmland	310.9	9.4%
RyB	Rowdy-Grigsby-Barbourville complex, 0 to 8 percent slopes	All areas are prime farmland	26.6	0.8%
ShD	Shelocta silt loam, 12 to 20 percent slopes	Not prime farmland	3.7	0.1%
uMgmF	Matewan-Gilpin-Marrowbone complex, 12 to 80 percent slopes, very rocky	Not prime farmland	267.5	8.0%
Ur	Udorthents, loamy, 0 to 6 percent slopes	Not prime farmland	4.9	0.1%
uShfF	Shelocta-Handshoe-Fedscreek complex, 30 to 60 percent slopes, stony	Not prime farmland	526.7	15.8%
Subtotals for Soil Survey Area			**1,430.1**	**43.0%**
Totals for Area of Interest			**3,324.0**	**100.0%**

Rating Options—Farmland Classification (US460 Study Area)

Aggregation Method: No Aggregation Necessary

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component

typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The majority of soil attributes are associated with a component of a map unit, and such an attribute has to be aggregated to the map unit level before a thematic map can be rendered. Map units, however, also have their own attributes. An attribute of a map unit does not have to be aggregated in order to render a corresponding thematic map. Therefore, the "aggregation method" for any attribute of a map unit is referred to as "No Aggregation Necessary".

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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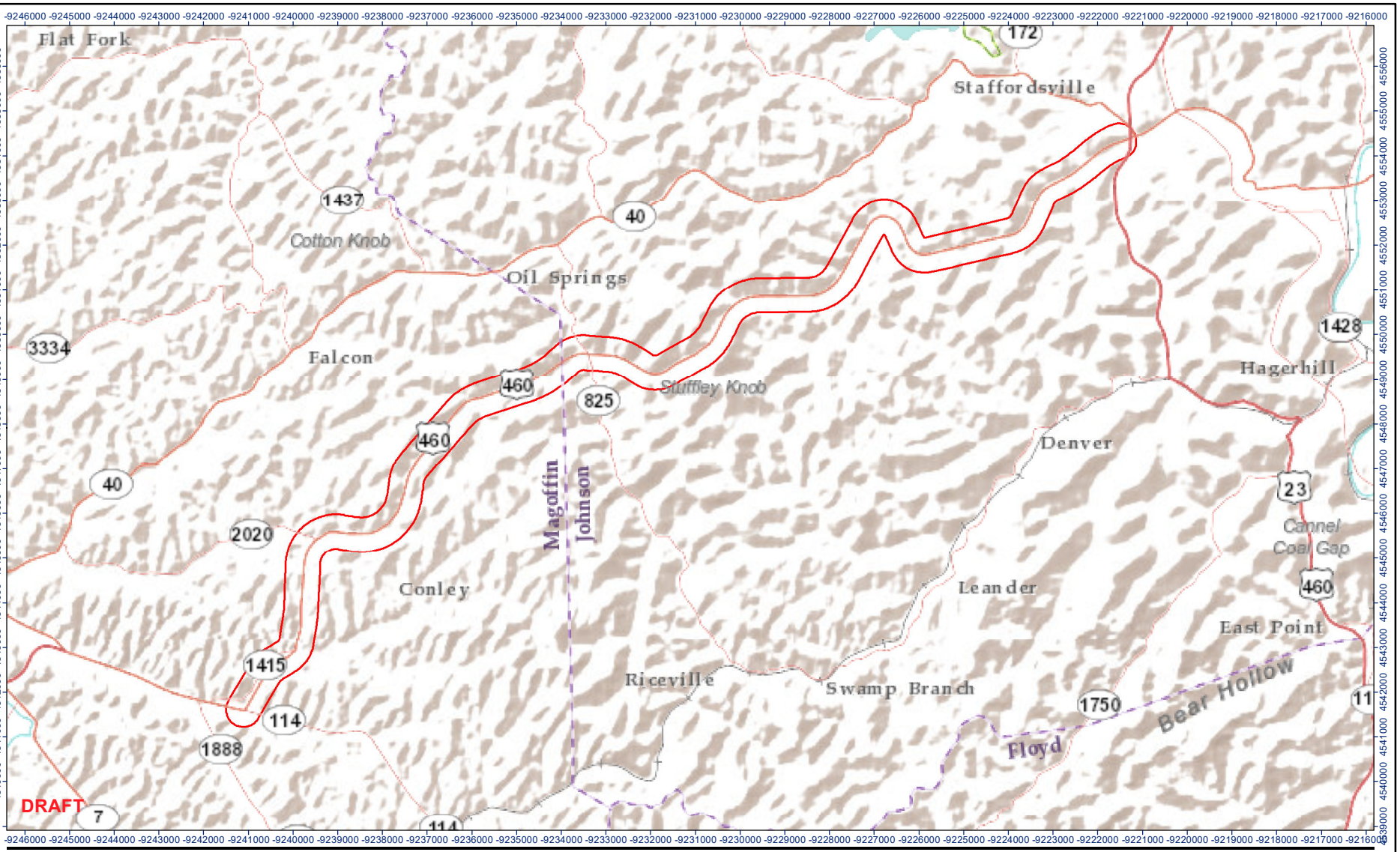
ATTACHMENT 5

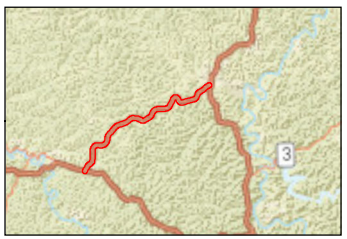
Water Resources

a. EDR DataMap Well Search Report and Map

ATTACHMENT 6

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





Legend

US 460 EO

N

0 1 2 Miles

(At original document size of 8.5x11)

1:126,720

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

2. Data Sources:

3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Stantec

CLIENT LOGO - MUST NOT EXTEND BEYOND THE LEFT & RIGHT EDGES OF

Project Location
T11N, R12E, S05
T. of Dane, Dane Co., WI

Prepared by MAJ on 2022-11-17
TR by MA by 2022-11-17
IR Review by LC on 2022-11-17

Client/Project
Client
Project
Report

XXXXXXXX-XXXX REVA

Figure No.
1

DRAFT

Title
US 460 EO Topopgraphy Map

Figure X-X.X

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