

APPENDIX J-2

Waters of the U.S. Report (2019)

Clarification Note: This document was completed before the development of Central Alternative 1B Modified (Selected); therefore, the alternative is not included in the document. Applicable information regarding Central Alternative 1B Modified (Selected) is provided in Appendix J-3 *Waters of the U.S. Report Addendum* and the FEIS.



WATERS OF THE U.S. TECHNICAL REPORT

I-69 OHIO RIVER CROSSING PROJECT
Evansville, IN and Henderson, KY





OHIO RIVER CROSSING

Waters of the U.S. Technical Report

I-69 Ohio River Crossing Project
Evansville, IN and Henderson, KY

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CHAPTER 1 – INTRODUCTION

1.1 INTRODUCTION AND DATES OF WATERS FIELD INVESTIGATION

An initial Waters of the U.S. (WOTUS) Technical Report, which was presented as Appendix J-1 to the published December 12, 2018 I-69 Ohio River Crossing (ORX) Draft Environmental Impact Statement (DEIS), was completed in the spring of 2018. The 2018 WOTUS Report involved surveying the entire I-69 project area including the three build alternatives presented in the I 69 DEIS. Broad corridors for each of the alternatives were studied along with some areas that were ultimately eliminated from consideration in the DEIS. The preferred alternatives identified in the DEIS were Central Alternatives 1A and 1B. Since the primary difference between Central Alternatives 1A and 1B involves tolling differences and since the physical footprint will be the same, Central Alternatives 1A and 1B will hereafter be referred to as the Central Alternative.

This 2019 WOTUS report should be considered a more detailed supplement to the data provided in the 2018 WOTUS for the Central Alternative. The detailed field surveys for this report were conducted on August 1-3, August 16-17, September 20-21, October 1-2, 2018, April 23-24, 2019, and May 16-17, 2019 for the Central Alternative. There was a substantial Ohio River flood event in February 2018, and its effects were apparent throughout the summer. One additional wetland was identified for the Central Alternative during this survey, and a few minor delineated boundary changes were made during the 2018 field surveys.

Since all field surveys for potential WOTUS were completed in 2017, 2018, and 2019 the United States Environmental Protection Agency (USEPA) and the United States Army Corps of Engineers (USACE) have issued a new proposed rule defining the scope of waters federally regulated under the Clean Water Act (CWA). This proposed rule was published in the Federal Register (FR) (Federal Register Vol. 84, No. 31 February 14, 2019). According to the FR summary:

“This proposal is the second step in a comprehensive, two-step process intended to review and revise the definition of “waters of the United States” consistent with the Executive Order signed on February 28, 2017, “Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the ‘Waters of the United States’ Rule.” This proposed rule is intended to increase CWA program predictability and consistency by increasing clarity as to the scope of “waters of the United States” federally regulated under the Act. This proposed definition revision is also intended to clearly implement the overall objective of the CWA to restore and maintain the quality of the nation’s waters while respecting State and tribal authority over their own land and water resources.”

Considering the proposed rule, there may be implications to jurisdictional authority over some of the WOTUS identified in this report between the USACE and the States, Indiana and Kentucky. Discussions related to jurisdiction in this WOTUS predate the proposed rule, and it is understood that jurisdictional determinations (JD) by the USACE may change.

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PROJECT LOCATION

Evansville South Quadrangle Indiana-Kentucky 7.5-Minute Series

Henderson Quadrangle Kentucky-Indiana 7.5-Minute Series

Sections 3, 4, 10, and 15 of Township 7 South, Range 10 West

Vanderburgh County, Indiana

Henderson County, Kentucky

1.2 PROJECT DESCRIPTION AND PREFERRED ALTERNATIVE

The Federal Highway Administration (FHWA), the Indiana Department of Transportation (INDOT), and the Kentucky Transportation Cabinet (KYTC) issued a revised Notice of Intent (NOI) in the Federal Register on February 13, 2017 for the preparation of an Environmental Impact Statement (EIS) for the I-69 ORX project in the Evansville, IN and Henderson, KY area, which is part of the National I-69 Corridor that extends between Mexico and Canada. An NOI was previously issued for the project on May 10, 2001. Under that NOI, a DEIS was completed in 2004, but the project was subsequently suspended in 2005.

The proposed action includes the development of an interstate highway across the Ohio River that would connect the southern terminus of I-69 in Indiana with the northern terminus of I-69 in Kentucky. Currently, I-69 does not cross the Ohio River, and the only cross-river access between Evansville and Henderson is via US 41, which is classified as a principal arterial and does not meet current interstate design standards.

The project area for the I-69 ORX DEIS extends from I-69 (formerly I-164) in Indiana on the south side of Evansville (i.e., northern terminus) across the Ohio River to I-69 (formerly Edward T. Breathitt Pennyryle Parkway) at the KY 425 interchange southeast of Henderson, KY (i.e., southern terminus). The section of Edward T. Breathitt Pennyryle Parkway between KY 351 and KY 425 that was not re-designated as I-69 was recently re-designated as US 41. The western limit of the project area is parallel to and extends a maximum of about 2,000 feet west of US 41. The eastern limit of the project area extends about 1,500 feet to 3.4 miles east of US 41.

Central Alternatives 1A and 1B have been identified as the Preferred Alternatives. Central Alternative 1A would include tolls on the US 41 and I-69 bridges. Central Alternative 1B would only include tolls on the I-69 bridge. Otherwise Central Alternatives 1A and 1B are the same. Central Alternatives 1A and 1B (Preferred) would include a new bridge approximately 7,600 feet long over the Ohio River and associated floodway, located approximately 1.5 miles east of the existing US 41 bridges. The new Ohio River bridge would include four lanes and would be wide enough to carry six lanes in the future, if needed, by restriping the lanes on the bridge. The approach roadways would be constructed four-lanes wide. The northbound US 41 bridge would be retained for vehicular traffic, and the southbound US 41 bridge would be removed. The northbound US 41 bridge, which has two lanes, would be converted from a one-way bridge to a

two-way bridge for local traffic. Other than transitions to the single two-lane US 41 Ohio River bridge, there would be no changes to US 41 through the commercial strip or north of the river past Ellis Park and the I-69/US 41/Veterans Memorial Parkway interchange.

The Central Alternative begins at existing I-69 in Indiana, approximately 1 mile east of the I-69/US 41/Veterans Memorial Parkway interchange. The Central Alternative would continue south across the Ohio River just west of a gas transmission line. It would remain just west of the gas transmission line near Green River State Forest, then turn southwest where an overpass would be provided to carry the access road for the gas transmission line over the alternative. The Central Alternative would continue south to US 60 where an interchange would be provided. As part of the US 60 interchange, US 60 would be relocated approximately 400 feet south, which would require a new bridge over the CSX Railroad east of the interchange. The Central Alternative would continue southwest and connect with US 41 via an interchange approximately 1 mile south of the US 60 interchange. From the Central Alternative's interchange with US 41 to KY 425, the existing four-lane US 41 would be modernized to meet interstate standards through improvements to ramps and merge areas. The Central Alternative would utilize rural design standards and include a depressed grass median outside of the bridge limits. The total length of the Central Alternative is 11.2 miles, which includes 2.8 miles of existing US 41.

CHAPTER 2 – METHODOLOGY

2.1 DESKTOP REVIEW

An initial *WOTUS Technical Report*, which was presented as Appendix J-1 to the published December 12, 2018 I-69 ORX DEIS, was completed. The 2018 WOTUS Report involved surveying the entire I-69 project area including the three build alternatives presented in the I 69 DEIS. This 2019 WOTUS report should be considered a more detailed supplement to the data provided in the 2018 for the preferred alternative (Central Alternative). The initial WOTUS Technical Report and WOTUS data should be considered when reviewing this report.

Prior to field investigations, a desktop analysis of available information was reviewed, and potential wetland areas were identified using published data, including: National Wetlands Inventory (NWI) maps; LiDAR maps; United States Geological Survey (USGS) 7.5-minute series topographic maps; Natural Resources Conservation Service (NRCS) soil mapping for Vanderburgh County, IN and Henderson County, KY; and previous studies for the project area, specifically the 2004 *I-69 Henderson, Kentucky to Evansville, Indiana Draft Environmental Impact Statement* (INDOT and KYTC 2004) and the 2005 *Preliminary Wetland Delineation Report - I-69 Henderson to Evansville in Vanderburgh and Warrick Counties, Indiana and Henderson County, Kentucky* (BLA 2005).

NATIONAL WETLAND INVENTORY (NWI) AND FLOODPLAIN MAPPING

The NWI mapping was used as an initial screen to determine locations of potential water resources within the project area. NWI wetlands are illustrated in the detailed mapping provided in Appendix B. Wetlands on NWI maps are classified in accordance with Cowardin et al. (1979). Non-wetlands are classified as upland on the wetland determination data forms.

LIGHT DETECTION AND RANGING (LiDAR) MAPPING

The Digital Elevation Model (DEM) hill shade map was created by merging the Indiana DEM with the Kentucky DEM. Both DEMs are 5-feet cell size, and they are derived from their state's LiDAR point cloud. Hill shade was then added to more clearly show elevation changes. This data can be used to more clearly determine stream beds and wetland features.

UNITED STATES GEOLOGICAL SURVEY (USGS) MAPPING

During review of USGS 7.5-minute series topo mapping (Appendix B), 9 intermittent (dashed blue line) streams were noted within the study area, and 3 perennial streams (Eagle Creek, Ohio River, and North Fork Canoe Creek, unnamed tributary to North Fork Canoe Creek) were noted within the study area. Seven intermittent streams were reclassified as ephemeral during the field investigation.

NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL MAPPING

According to the Soil Survey Geographic (SSGD) Database, the study area is mostly comprised of non-hydric soil, which represents 39.40% of the study area. The remainder of the study area is partially hydric (4.84%), predominantly hydric (32.18%), and predominantly non-hydric

(23.57%). One mapped soil unit comprises 29.77% of the study area: Dekoven silt loam. All mapped soil units within the study area are summarized in Table 1 (Appendix A). NRCS soil map units are illustrated in the detailed mapping provided in Appendix B.

2.2 WATERSHEDS

The I-69 ORX Project is located within the following hydrologic unit code (HUC) 12-digit watersheds: East Creek-Ohio River (051402020401) and North Fork Canoe Creek-Canoe Creek (051402020402).

2.3 FIELD RECONNAISSANCE

Field surveys were conducted in 2017 during the growing season for the entire I-69 ORX project area and the alternatives presented in the I-69 ORX DEIS, including the preferred alternative (Central Alternative). Beginning in August 2018 and concluding in early October 2018, detailed field surveys were conducted to determine the presence of streams, wetlands, and other water resources within the study area. The 2018-2019 surveys were completed to obtain additional information for the WOTUS features that were identified in 2017. Minor changes in the feature boundaries were made as needed, and additional detailed data was collected, especially for larger wetlands, adjacent uplands, and ephemeral streams.

The I-69 ORX wetlands, streams, and other waters were evaluated in the field and mapped with a handheld Global Positioning System (GPS) unit (Trimble Geo7x). Data were recorded on applicable datasheets, and features were photographed. The GPS data was converted to ArcGIS shapefiles, data was attributed, and entered into the project GIS database.

Wetlands were delineated using guidance set forth in the *1987 Corps of Engineers Wetlands Delineation Manual* (USACE 1987). Per guidance from USACE, for areas north of the Ohio River and north of Waterworks Road (Indiana), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* was used (USACE 2010). For areas north of the Ohio River but south of Waterworks Road and south of the Ohio River (Kentucky), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* was used (USACE 2012).

All locations within the study area were reviewed for wetlands. Data points were taken in locations that exhibited one (or more) wetland indicators based on visual observations and for upland locations adjacent to the wetlands. If all indicators were missing, no formal data was collected. The wetland data sheets apply to the representative data points for each wetland area surveyed. Additional general observations of wetland conditions were also made in the comments sections of the data sheets, where applicable, to fully describe the overall condition in the wetland. For example, if additional hydrology indicators, such as water marks on trees or standing water in depressions, were observed in the wetland but not at the data point, these strong hydrology indicators were included in the comment section. Another example would be the presence of an obligate species, such as common buttonbush (*Cephalanthus occidentalis*), that was identified outside of the data point.

For each wetland, a functional value assessment worksheet was used to evaluate the functions and values of each wetland. Wetland size, past disturbance, habitat diversity, and proximity to other WOTUS affects the ability of the wetland to provide these functions and are reflected in their subsequent scores. This assessment was a rapid in-the-field-check of wetland functions and values based on the best professional judgment of the wetland scientists conducting the surveys.

The upstream drainage area for each stream was calculated using StreamStats Version 4.3 (USGS 2019), if available. Streams with a drainage area greater than one square mile were evaluated in the field using the Ohio EPA Qualitative Habitat Evaluation Index (QHEI) (Ohio EPA 2006). Streams with a drainage area less than one square mile were evaluated using the Ohio EPA Headwater Habitat Evaluation Index (HHEI) (Ohio EPA 2012). Streams with standing or flowing water were evaluated using the Habitat Assessment Field Data Sheet – Low Gradient Streams in accordance with the *Rapid Bioassessment Protocol for Use in Streams and Wadeable Rivers* (Barbour, M.T. et al 1999). All streams were photographed and mapped with a GPS unit.

CHAPTER 3 – FINDINGS

3.1 WETLANDS

Field investigation resulted in the identification of thirteen (13), likely jurisdictional, wetlands within the study area, totally 27.09 acres. These features are summarized in Table 2 (Appendix A). Detailed mapping of these features is provided in Appendix B. Project area photographs are presented in Appendix C. The wetland determination data forms and accompanying upland data forms, as well as, wetland functions and values datasheets are presented in Appendix D.

3.1.1 WETLANDS 1-4

The wetlands on the north end of the project area all lie within the historical Ohio River floodplain and drain through Eagle Creek to the Ohio River. With the exception of Wetland 1, which is drained to the north of I-69 and then pumped south into a tributary to Eagle Creek, they all receive direct backwater flooding from the Ohio River, occasional overflow flooding from the Ohio River, and occasional overflow flooding from Eagle Creek, thereby creating connectivity to tributaries to traditional navigable waters (i.e., the Ohio River) via Eagle Creek. All of these wetlands are likely remnants of a much larger Ohio River floodplain bottomland hardwood wetland system. Alteration of drainage, clearing for agriculture, filling for landfills and roadways including existing I-69, and excavation from borrow pits in the floodplain are some of the long-term impacts to this wetland system. The extensive network of agricultural drainage ditches and possible field tiles south of Wetland 4 extending all the way to the Ohio River have altered the hydrology to the extent that the entire area lacks sufficient hydrology for wetlands to exist. These wetlands generally have low to moderate functional values primarily due to their small size, extensive habitat alterations, and ongoing noise and disturbance from I-69.

WETLAND 1

The area associated with Data Point 1 IN (DP-1-IN) was evaluated, because it exhibited hydrophytic vegetation. The herbaceous stratum was dominated by *Leersia oryzoides* (rice cut grass, OBL, 90%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. The soils at this data point appear to have been disturbed during construction of I-69. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One primary indicator of hydrology (Water-Stained Leaves [B9]) and three secondary indicators of hydrology (Saturation Visible on Aerial Imagery [C9], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-1-IN, this area was identified as Wetland 1.

The area associated with Data Point 1 OUT (DP-1-OUT) was infrequently mowed/maintained. However, this likely controls woody succession. DP-1-OUT was dominated by *Cynodon dactylon* (Bermuda grass, FACU, 90%). This point did not meet the hydrophytic vegetation criterion. No hydric soil or hydrology indicators were observed. Since none of three wetland criteria were met at DP-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 1, which was determined based on changes in vegetation and hydrology.

Wetland 1 is a small palustrine emergent wetland (PEM) located between I-69 and the I-69 exit ramp to northbound US 41. This wetland was not identified during the 2017 field surveys. During rain events, Wetland 1 likely receives runoff from I-69. During dry conditions, it appears that this area is mowed as part of the interchange maintenance activities. This area drains to the north through a culvert under the existing exit ramp. Approximately 0.09 acre of Wetland 1 lies within the study area. Wetland 1 has poor to low functional values primarily due to its small size, extensive habitat alteration, and ongoing noise and disturbance from I-69 traffic. Wetland 1 is adjacent to UNT-1 to Eagle Creek, a likely water of the U.S. Based on this connection, Wetland 1 is a likely water of the U.S.

WETLAND 2

The area associated with Data Point 2 IN (DP-2-IN) was evaluated, because it exhibited hydrophytic vegetation. The tree stratum was dominated by *Salix interior* (sandbar willow, FACW, 75%). The sapling/shrub stratum was dominated by *Cephalanthus occidentalis* (common buttonbush, OBL, 30%) and *Acer rubrum* (red maple, FAC, 20%). The herbaceous stratum was dominated by *Laportea canadensis* (Canadian wood-nettle, FACW, 5%) and *Acer rubrum* (5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. Five primary indicators of hydrology (High Water Table [A2], Saturation [A3], Sediment Deposits [B2], Drift Deposits [B3], and Water-Stained Leaves [B9]) and three secondary indicators of hydrology (Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-2-IN, this area was identified as Wetland 2.

The Data Point 2 OUT (DP-2-OUT) was located between Wetland 2 and Eagle Creek. This area is likely infrequently maintained. The data point was dominated by *Acer rubrum* (red maple, FAC, 10%) in the tree stratum. The sapling/shrub stratum was dominated by *Acer rubrum* (10%). The herbaceous stratum was dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 30%), *Sorghum halepense* (Johnson grass, FACU, 20%), and *Schedonorus arundinacea* (tall fescue, FACU, 20%). This point met the hydrophytic vegetation criterion, because it passed the dominance test. No hydric soil or hydrology indicators were observed. Since only one of the three wetland criteria were met at DP-2-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 2, which was determined by the changes in hydrology.

Wetland 2 is a small bottomland hardwood forest swale/ditch located south of I-69 and north of Eagle Creek. Approximately 0.44 acre of Wetland 2 lies within the study area. Wetland 2 has poor to low functional values primarily due to its small size, extensive habitat alteration, and ongoing noise and disturbance from I-69 traffic.

During rain events, Wetland 2 likely receives runoff from I-69 and its embankments, from adjacent uplands (fill material to the south and west), from a culvert on the west end of the wetland that extends under I-69, and from infrequent overflow flooding from Eagle Creek through an ephemeral channel (UNT-8 to Eagle Creek) that connects to Eagle Creek. The wetland drains through a culvert connecting to UNT-7 to Eagle Creek, a perennial stream that is likely a

water of the U.S. Wetland 2 is also adjacent to UNT-8 to Eagle Creek, a likely water of the U.S. Based on this connection, Wetland 2 is a likely water of the U.S.

WETLAND 3

The area associated with Data Point 3-1 IN (DP-3-1-IN) was dominated by *Acer rubrum* (red maple, FAC, 85%) in the tree stratum. The herbaceous stratum was dominated by *Fraxinus pennsylvanica* (green ash, FACW, 5%), *Campsis radicans* (trumpet-creeper, FACU, 2%), and *Laportea canadensis* (Canadian wood-nettle, FACW, 2%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. Four primary indicators of hydrology (High Water Table [A2], Saturation [A3], Drift Deposits [B3], and Water-Stained Leaves [B9]) and one secondary indicator of hydrology (FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-3-1-IN, this area was identified as Wetland 3.

Data Point 3-1 OUT (DP-3-1-OUT) was dominated by *Acer saccharinum* (silver maple, FACW, 30%) in the tree stratum. This data point was dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 60%) and *Convolvulus arvensis* (field bindweed, NI, 30%) in the herbaceous stratum. DP-3-1-OUT met the hydric vegetation criterion, because it passed the dominance test and the prevalence test. No hydric soil indicators were observed. One secondary indicator of hydrology (FAC-Neutral Test [D5]) was observed. Since only one of the three wetland criteria were met at DP-3-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 3, which was determined based on changes in hydrology.

Data Point 3-2 IN (DP-3-2-IN) was dominated by *Acer negundo* (boxelder, FAC, 70%) in the tree stratum. No vegetation was observed within the herbaceous stratum. This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix [F3] indicator. Two primary indicators of hydrology (Drift Deposits [B3] and Water-Stained Leaves [B9]) and two secondary indicators of hydrology (Surface Soil Cracks [B6] and Crayfish Burrows [C8]) were observed. Since all three wetland criteria were met at DP-3-2-IN, this area was identified as Wetland 3.

Data Point 3-2 OUT (DP-3-2-OUT) was dominated by *Populus deltoides* (eastern cottonwood, FAC, 70%) in the tree stratum. The sapling/shrub stratum was dominated by *Robinia pseudoacacia* (black locust, FACU, 40%) and *Maclura pomifera* (osage-orange, FACU, 30%). The herbaceous stratum was dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 5%). This point did not meet the hydrophytic vegetation criterion. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix [F3] indicator. No hydrology indicators were observed. Since only one of the three wetland criteria were met at DP-3-2-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 3, which was determined based on changes in vegetation and hydrology.

Data Point 3-3 IN (DP-3-3-IN) was dominated by *Acer rubrum* (red maple, FAC, 70%) and *Salix nigra* (black willow, OBL, 30%) in the tree stratum. The sapling/shrub stratum was dominated by

Fraxinus pennsylvanica (green ash, FACW, 5%) and *Ulmus americana* (American elm, FACW, 5%). The herbaceous stratum was dominated by *Campsis radicans* (trumpet-creeper, FACU, 10%), *Toxicodendron radicans* (eastern poison ivy, FAC, 5%), *Fraxinus pennsylvanica* (5%), and *Laportea canadensis* (Canadian wood-nettle, FACW, 5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix [F3] indicator. Two primary indicators of hydrology (Drift Deposits [B3] and Water-Stained Leaves [B9]) and two secondary indicators of hydrology (Surface Soil Cracks [B6] and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-3-3-IN, this area was identified at Wetland 3.

Data Point 3-3 OUT (DP-3-3-OUT) was dominated by *Acer rubrum* (red maple, FAC, 90%) in the tree stratum. The herbaceous stratum was dominated by *Laportea canadensis* (Canadian wood-nettle, FACW, 40%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. No hydric soil indicators were observed. One secondary indicator of hydrology (FAC-Neutral Test [D5]) was observed. Since only one of the three wetland criteria were met at DP-3-3-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 3, which was determined based on the changes in hydrology.

Data Point 3-4 IN (DP-3-4-IN) was dominated by *Fraxinus pennsylvanica* (green ash, FACW, 80%) in the tree stratum. The herbaceous stratum was dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 20%). This point met the hydrophytic vegetation criterion,, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion,, because it exhibited the Depleted Matrix [F3] indicator. Three primary indicators of hydrology (High Water Table [A2], Sediment Deposits [B2], Drift Deposits [B3]) and two secondary indicators of hydrology (Drainage Patterns [B10] and Crayfish Burrows [C8]) were observed. Since all three wetland criteria were met at DP-3-4-IN, this area was identified at Wetland 3.

Data Point 3-4 OUT (DP-3-4-OUT) was dominated by *Maclura pomifera* (Osage-orange, FACU, 70%) and *Populus deltoides* (cottonwood, FAC, 30%) in the tree stratum. The sapling/shrub stratum was dominated by *Acer negundo* (boxelder, FAC, 15%). The herbaceous stratum was dominated by *Acer negundo* (boxelder, FAC, 4%). This point met the hydrophytic vegetation criterion. The soil profile did not meet the hydric soil criterion. No hydrology indicators were observed. Since only one of the three wetland criteria were met at DP-3-2-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 3, which was determined based on changes in vegetation and hydrology.

Wetland 3 is a linear bottomland hardwood forest located parallel to and south of I-69 and north of Eagle Creek. Approximately 8.43 acres of Wetland 3 lie within the study area, and it extends offsite. Wetland 3 has low to moderate functional values primarily due to extensive habitat alteration and ongoing noise/disturbance from I-69 traffic. It does have moderate to high functional values for sediment removal and erosion control/stabilization.

Wetland 3 is located in the Eagle Creek and Ohio River floodplains. During stormwater events, the wetland likely receives runoff from I-69, overflow flooding from Eagle Creek, and infrequent

backwater flooding from the Ohio River. Wetland 3 is adjacent to Eagle Creek, a perennial stream that is likely water of the U.S. Based on this connection, Wetland 3 is a likely water of the U.S.

WETLAND 4A

Data Point 4A-1 IN (DP-4A-1-IN) was located near a borrow pit (OW-1) west of a raised levee. The vegetation was dominated by *Acer rubrum* (red maple, FAC, 80%) and *Fraxinus pennsylvanica* (green ash, FACW, 30%). The sapling/shrub stratum was dominated by *Acer rubrum* (15%). The herbaceous stratum was dominated by *Acer rubrum* (FAC, 5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix [F3] indicator. Five primary indicators of hydrology (Water Marks [B1], Sediment Deposits [B2], Drift Deposits [B3], Algal Mat or Crust [B4], and Water-Stained Leaves [B9]) and three secondary indicators of hydrology (Surface Soil Cracks [B6], Crayfish Burrows [C8], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-4A-1-IN, this area was identified as Wetland 4A.

Data Point 4A-1 OUT (DP-4A-1-OUT) was located on a ridge between a fringe wetland of a borrow pit (OW-1) and a bottomland hardwood forest. The elevated ridge was likely the result of spoil material being placed from the adjacent borrow pit. The dominant vegetation in the tree stratum was *Acer saccharinum* (silver maple, FACW, 60%) and *Ulmus americana* (American elm, FACW, 30%). The herbaceous stratum was dominated by *Laportea canadensis* (Canadian wood-nettle, FACW, 5%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. No hydric soil indicators were observed. One secondary indicator of hydrology (FAC-Neutral Test [D5]) was observed. Since only one of the three wetland criteria were met at DP-4A-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 4A, which was determined based on the changes in hydrology.

Wetland 4A is a bottomland hardwood wetland. Borrow pits and spoil from stream/ditch maintenance likely affect this wetland's hydrology. Approximately 2.07 acres of Wetland 4A are within the study area. Wetland 4A extends offsite. This wetland has low to moderate functional values primarily due to its small size and extensive habitat alteration.

Wetland 4A is parallel to Eagle Creek. The area primarily receives overflow flooding from Eagle Creek and backwater flooding the Ohio River. Because of its connectivity to these two waters of the U.S., Wetland 4A is a likely water of the U.S.

WETLAND 4B

The area associated with Data Point 4B-2 IN (DP-4B-2-IN) was evaluated, because it exhibited hydrophytic vegetation. The herbaceous stratum was dominated by *Scirpus atrovirens* (dark-green bulrush, OBL, 60%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Five primary indicators of hydrology (Water Marks [B1], Sediment Deposits [B2], Drift Deposits [B3], Algal Mat or Crust [B4], and Water-Stained Leaves [B9]) and three secondary indicators of hydrology (Surface Soil Cracks [B6], Crayfish Burrows [C8], and FAC-Neutral Test [D5]) were observed. Since all three wetland

criteria were met at DP-4-2-IN, this area was identified as Wetland 4B. Some purple loosestrife (*Lythrum salicaria*) (OBL) was noted just south of this data point

Data Point 4B-2 OUT (DP-4B-2-OUT) was located at the top of the bank of a borrow pit (OW-1) near the edge of a corn field. This data point was dominated by *Quercus palustris* (pin oak, FACW, 30%) and *Ulmus americana* (American elm, FACW, 15%) in the tree stratum. The sapling/shrub stratum was dominated by *Ulmus americana* (45%). The herbaceous stratum was dominated by *Ambrosia trifida* (giant ragweed, FAC, 40%) and *Secale cereale* (rye, NI, 30%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence index. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One secondary indicator of hydrology (FAC-Neutral Test [D5]) was observed. Since only two of the three wetland criteria were met at DP-4B-2-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 4B, which was determined based on changes in hydrology.

Data Point 4B-3 OUT (DP-4B-3-OUT) was located at the top of the bank of a borrow pit (OW-1) between OW-1 and Eagle Creek. This data point was dominated by *Acer saccharinum* (silver maple, FACW, 60%) and *Acer negundo* (boxelder, FAC, 20%) in the tree stratum. The herbaceous stratum was dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 40%) and *Campsis radicans* (trumpet creeper, FACU, 30%). This point met the hydrophytic vegetation criterion,, because it passed the dominance test and the prevalence index. The soil profile did not meet the hydric soil criterion. One primary indicator of hydrology (Sediment Deposits [B2]) was observed. The sediment deposits were from recent Ohio River flooding. Since only two of the three wetland criteria were met at DP-4B-3-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 4B, which was determined based on changes in hydrology and soils.

Wetland 4B is an emergent fringe wetland located on the southern border of a borrow pit (OW-1). Approximately 0.32 acre of Wetland 4B lies within the study area. This wetland extends offsite around the borrow pit. Wetland 4B has low functional values primarily due to its small size and extensive habitat alteration from the borrow pit excavation. Wetland 4B is adjacent to Eagle Creek, a perennial stream that is likely water of the U.S. Based on this connection, Wetland 4B is a likely water of the U.S.

3.1.2 WETLANDS 5-6

The wetlands south of the Ohio River within the Ohio River floodplain have not been cleared, leveled, and altered hydrologically as drastically as the wetlands north of the river. A large remnant wetland complex remains that is predominantly bottomland forest but also includes emergent wetlands that can be farmed during dry years. The wetland boundaries are variable, and I-69 would cross three portions of this wetland system. The entire area receives direct backwater and overflow flooding from the Ohio River, thereby creating connectivity to traditional navigable waters (i.e., the Ohio River). These wetlands also receive stormwater flow from the upland watershed to the south. All of these wetlands are likely remnants of a much larger Ohio River floodplain bottomland hardwood and scrub shrub wetland system. Although not impacted by the I-69 project, portions of this wetland to the east include bald cypress

(*Taxodium distichum*) and common buttonbush (*Cephalanthus occidentalis*) swamps. Unlike the wetlands north of the Ohio River, the primary impact to historical wetlands in this area was for agricultural clearing with only minor improvements to the drainage, i.e., the extensive network of agricultural drainage ditches is absent. Rather, the agricultural drainage is primarily through natural sloughs and swales in the undulating floodplain. Wetland 5 is an example of the drainage through a farmed area. The higher terraces are farmed, and the low-lying areas that are too wet to farm drain the area. During dry years, some of the low-lying emergent wetlands are farmed, however these areas were not farmed in 2017 and 2018. These areas are maintained, either mowed or disked, to prevent woody succession. This wetland has moderate to high functional values primarily due to the size, the lack of disturbance, and the quality of the habitats present.

WETLAND 5

Wetland 5 is part of a much larger predominantly bottomland hardwood forest located in the Ohio River floodplain that is bisected by and parallel to a pipeline right-of-way, south of Green River #2 Road. Due to this connectivity to a water of the U.S, Wetland 5 is likely a water of the U.S. The PFO components are part of a linear forest swale that generally runs perpendicular (east-west) through the study area, and it extends east and west of the study area. The land directly north of the wetland is farmed. This wetland system has PFO and PEM components and is hydrologically connected to Wetland 6 outside of the study area. The various components of this wetland system are discussed below. Overall, Wetland 5 has moderate functional values primarily due to extensive habitat alteration from adjacent agricultural activities. The wetland does have high functional values for wildlife, especially waterfowl and shorebirds, when seasonally flooded.

WETLAND 5A

Data Point 5A-1 IN (DP-5A-1-IN) was dominated by *Fraxinus pennsylvanica* (green ash, FACW, 40%) in the herbaceous stratum. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Five secondary indicators of hydrology (Surface Soil Cracks [B6], Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-5A-1-IN, this area was identified as Wetland 5A.

Data Point 5A-2 IN (DP-5A-2-IN) was dominated by *Carex scoparia* (broom sedge, FACW, 40%) and *Polygonum hydropiperoides* (swamp smartweed, OBL, 30%) in the herbaceous stratum. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Three primary hydrology indicators (Saturation [A3], Water Marks [B1], and Sediment Deposits [B2]) and two secondary indicators of hydrology (Drainage Patterns [B10] and Crayfish Burrows [C8]) were observed. Since all three wetland criteria were met at DP-5A-2-IN, this area was identified as an herbaceous component of Wetland 5A.

Data Point 5A-1 OUT (DP-5A-1-OUT) was adjacent to an agricultural field and a utility right-of-way. The area was recently tilled so natural vegetation was virtually absent with only a few individual plants remaining. This data point was dominated by *Sorghum halepense* (Johnson grass, FACU, 2%), *Amaranthus retroflexus* (red-root, FACU, 2%), and *Chamaecrista fasciculata* (partridge

pea, FACU, 2%) in the herbaceous stratum. This point did not meet hydrophytic vegetation criterion. No hydric soil indicators were observed. Two secondary indicators of hydrology (Surface Soil Cracks [B6] and Geomorphic Position [D2]) were observed. Since only one of the three wetland criteria were met at DP-5A-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 5A, which was determined based on changes in vegetation.

Wetland 5A represents a small portion of PEM habitat within Wetland 5 primarily within the pipeline ROW. The wetland extends both east and west outside of the study area. This area appears to remain saturated for long durations during the growing season. It receives infrequent overflow flooding from the Ohio River. Approximately 0.93 acre of Wetland 5A lies within the study area. Wetland 5A has moderate functional values primarily due to its small size, extensive habitat alteration from adjacent agricultural activities. The wetland does have high functional values for wildlife, especially waterfowl, when seasonally flooded.

Wetland 5A is in the Ohio River floodplain and adjacent to the Ohio River, a water of the U.S. Based on this connection, Wetland 5A is a likely water of the U.S.

WETLAND 5B

The area associated with Data Point 5B-1-IN (DP-5B-1-IN) was evaluated, because of terrain position and it exhibited hydrophytic vegetation. The tree stratum was dominated by *Acer rubrum* (red maple, FAC, 75%). The sapling/shrub stratum was dominated by *Cephalanthus occidentalis* (common buttonbush, OBL, 40%). The herbaceous stratum was dominated by *Impatiens capensis* (spotted touch-me-not, FACW, 15%) and *Fraxinus pennsylvanica* (green ash, FACW, 10%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. One primary indicator of hydrology (Water-Stained Leaves [B9]) and four secondary indicators of hydrology (Surface Soil Cracks [B6], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-5B-1-IN, this area was identified as bottomland forest Wetland 5B.

Data Point 5B-1 OUT (DP-5B-1-OUT) was on a high, moderately well-drained, terrace. This location was dominated by *Acer rubrum* (red maple, FAC, 80%) in the tree stratum. The sapling/shrub stratum was dominated by *Ulmus americana* (American elm, FACW, 30%). The herbaceous stratum was dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 80%). The vine stratum was dominated by *Smilax glauca* (cat greenbrier, FACU, 5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. No hydric soil indicators were observed. One secondary indicator of hydrology (Geomorphic Position [D2]) was observed. Since only one of the three wetland criteria was met at DP-5B-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 5B, which was determined based on changes in hydrology.

Wetland 5B represents a PFO portion of Wetland 5. It lies within a low forested swale which likely contains water during stormwater events and during Ohio River floods. The PFO

components are part of a linear forest swale that generally runs perpendicular (east-west) through the study area, and it extends east and west outside of the study area. Approximately 0.62 acre of Wetland 5B lies within the study area. Wetland 5B has moderate functional values primarily due to its small size, extensive habitat alteration from adjacent agricultural activities. The wetland does have high functional values for wildlife, especially waterfowl and shorebirds, when seasonally flooded.

Wetland 5B is in the Ohio River floodplain and is adjacent to the Ohio River, a water of the U.S. Based on this connection, Wetland 5B is a likely water of the U.S.

WETLAND 5C

Wetland 5C represents the edge of another PFO portion of Wetland 5 that was east of the pipeline ROW. Data Point 5C-1 IN (DP-5C-1-IN) was very similar to data point (DP-5A-1-IN). The overstory vegetation in this area was dominated by *Acer rubrum* (red maple, FAC, 60%), *Quercus palustris* (pin oak, FACW, 40%) and *Celtis laevigata* (sugarberry, FACW, 25%) in the tree stratum. *Fraxinus pennsylvanica* (green ash, FACW, 60%) dominated the shrub stratum. The herbaceous stratum was dominated by *Fraxinus pennsylvanica* (green ash, FACW, 20%) and *Parthenocissus quinquefolia* (Virginia creeper, FACU, 5%). The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Three primary hydrology indicators (High Water Table [A2], Saturation [A3], and Water Marks [B1]) and two secondary indicators of hydrology (Drainage Patterns [B10] and Crayfish Burrows [C8]) were observed. Since all three wetland criteria were met at DP-5C-1-IN, this area was identified as a forested component of Wetland 5C. Approximately 0.07 acre of Wetland 5C lies within the study area. Wetland 5C has moderate functional values primarily due to its small size, extensive habitat alteration from adjacent agricultural activities. The wetland does have high functional values for wildlife, especially waterfowl, when seasonally flooded.

Wetland 5C is in the Ohio River floodplain, drains directly to the Ohio River, and is adjacent to the Ohio River, a water of the U.S. Based on this connection, Wetland 5C is a likely water of the U.S.

WETLAND 5D

The area associated with Data Point 5D-1 IN (DP-5D-1-IN) was evaluated, because it exhibited hydrophytic vegetation. The herbaceous stratum was dominated by *Eleocharis obtusa* (blunt spike rush, OBL, 80%) and *Echinochloa muricata* (rough barnyard grass, FACW, 30%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One primary indicator of hydrology (Algal Mat or Crust [B4]) and three secondary indicators of hydrology (Crayfish Burrows [C8], Geomorphic Position [D2], FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-5D-1-IN, this area was identified at Wetland 5D.

Data Point 5D-1 OUT (DP-5D-1-OUT) was located on a higher stream terrace that appeared to be moderately well drained. The area is likely infrequently flooded by the Ohio River. This location was dominated by *Zea mays* (corn, NI, 80%) in the herbaceous stratum. This point did not meet

the hydrophytic vegetation criterion. No hydric soil indicators were observed. One secondary indicator of hydrology (Geomorphic Position [D2]) was observed. Since none of three wetland criteria were met at DP-5D-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 5D, which was determined based on changes in vegetation and hydrology.

Data Point 5D-2 IN (DP-5D-2-IN) was evaluated, because it exhibited hydrophytic vegetation. The herbaceous stratum was dominated by *Echinochloa muricata* (rough barnyard grass, FACW, 80%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One primary indicator of hydrology (Algal Mat or Crust [B4]) and five secondary indicators of hydrology (Surface Soil Cracks [B6], Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-5D-2-IN, this area was identified as Wetland 5D.

Data Point 5D-2 OUT (DP-5D-2-OUT) was positioned on a moderately well-drained ridge between two swales that are part of Wetland 5. This location had virtually no vegetation with only *Brassica rapa* (field mustard, NI, 1%) present in the herbaceous stratum. This point did not meet the hydrophytic vegetation criterion. No hydric soil indicators were observed. One secondary indicators of hydrology (Surface Soil Cracks [B6]) was observed. Since none of the three wetland criteria were met at DP-5D-2-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 5D, which was determined based on changes in elevation and hydrology.

Data Point 5D-3 OUT (DP-5D-3-OUT) was positioned on a moderately well-drained terrace. This location was dominated by *Zea mays* (corn, NI, 100%) in the herbaceous stratum. This point did not meet the hydrophytic vegetation criterion. No hydric soil indicators were observed. Two secondary indicators of hydrology (Surface Soil Cracks [B6] and Geomorphic Position [D2]) were observed. Since just one of the three wetland criteria were met at DP-5D-3-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 5D, which was determined based on changes in hydrology.

Wetland 5D represents a PEM portion of Wetland 5 where two emergent swales of the same wetland cross. These swales generally run perpendicular (northeast-southwest) through the study area, and extend east and west outside of the study area. This swale remained wet following the 2018 Ohio River flood. Near the wetland boundaries, portions of this wetland are farmed suggesting that portions of the wetland may be farmed during dry years. Approximately 1.40 acres of Wetland 5D lies within the study area. Wetland 5D has moderate functional values primarily due to extensive habitat alteration from adjacent agricultural activities. The wetland does have high functional values for wildlife, especially waterfowl and shorebirds, when seasonally flooded.

Wetland 5D is adjacent to the Ohio River, a water of the U.S. Based on this connection, Wetland 5D is a likely water of the U.S.

WETLAND 6

The area associated with Data Point 6-1 IN (DP-6-1-IN) was evaluated, because it exhibited hydrophytic vegetation. The tree stratum was dominated by *Ulmus americana* (American elm, FACW, 35%) and *Acer rubrum* (red maple, FAC, 30%). The herbaceous stratum was dominated by *Laportea canadensis* (Canadian wood-nettle, FAC, 5%), *Carex grayi* (Gray's sedge, FACW, 2%), and *Toxicodendron radicans* (eastern poison ivy, FAC, 2%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Two primary indicators of hydrology (Water Marks [B1] and Sediment Deposits [B2]) and five secondary indicators of hydrology (Surface Soil Cracks [B6], Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-6-1-IN, this area was identified as Wetland 6.

Data Point 6-1 OUT (DP-6-1-OUT) was adjacent to an agricultural field and a utility right-of-way. The area was on a higher stream terrace that appears to be moderately well drained. The tree stratum was dominated by *Acer rubrum* (red maple, FAC, 40%) and *Ulmus americana* (American elm, FACW, 30%). The herbaceous stratum was dominated by *Chasmanthium latifolium* (Indian wood-oats, FACU, 50%) and *Campsis radicans* (trumpet-creeper, FAC, 20%). This point met the hydrophytic vegetation criterion, because it passed the dominance test. No hydric soil indicators were observed. One secondary indicator of hydrology (Surface Soil Cracks [B6]) was observed. Since only one of the three wetland criteria was met at DP-6-1-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 6, which was determined based on changes in hydrology.

Data Point 6-2 IN (DP-6-2-IN) was evaluated, because it exhibited hydrophytic vegetation. The tree stratum was dominated by *Ulmus americana* (American elm, FACW, 55%) and *Quercus texana* (nuttall oak, OBL, 40%). The herbaceous stratum was dominated by *Saururus cernuus* (lizard's-tail, OBL, 60%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. The soil profile met the hydric soil criterion, because it exhibited Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. Five secondary indicators of hydrology (Surface Soil Cracks [B6], Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three of the wetland criteria were met at DP-6-2-IN, this area was identified as Wetland 6. This was an interior data point and does not have a corresponding upland data point.

Data Point 6-3 IN (DP-6-3-IN) was evaluated, because it exhibited hydrophytic vegetation. The tree stratum was dominated by *Ulmus americana* (American elm, FACW, 50%) and *Acer rubrum* (red maple, FAC, 40%). The herbaceous stratum was dominated by *Lindera benzoin* (spicebush, FAC, 15%) and *Laportea canadensis* (Canadian wood-nettle, FAC, 5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. The soil profile met the hydric soil criterion, because it exhibited Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. Four secondary indicators of hydrology (Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-6-3-IN, this area was identified at

Wetland 6. This was an interior wetland data point and does not have a corresponding upland data point.

Data Point 6-4 IN (DP-6-4-IN) was evaluated, because it exhibited hydrophytic vegetation. The tree stratum was dominated by *Acer rubrum* (red maple, FAC, 70%). The herbaceous stratum was dominated by *Onoclea sensibilis* (sensitive fern, FACW, 10%), *Ulmus americana* (American elm, FACW, 5%), *Toxicodendron radicans* (eastern poison ivy, FAC, 5%), and *Impatiens capensis* (spotted touch-me-not, FACW, 5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and the prevalence test. Aerial photography from 1992 show this area was cleared and in agriculture. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One primary indicator of hydrology (Oxidized Rhizospheres on Living Roots [C3]) and four secondary indicators of hydrology (Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-4-1-IN, this area was identified at Wetland 6.

Data Point 6-4 OUT (DP-6-4-OUT) was upslope from Wetland 6 and appears to be moderately well drained. At this location, the soils likely do not remain saturated for long durations. This data point was dominated by *Acer saccharum* (silver maple, FACU, 80%) and *Salix nigra* (black willow, OBL, 30%) in the tree stratum. The herbaceous stratum was dominated by *Urtica dioica* (stinging nettle, FACU, 20%). The woody vine stratum was dominated by *Smilax glauca* (cat greenbrier, FACU, 5%). No hydrophytic vegetation indicators were met. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One secondary hydrology indicator (Geomorphic Position [D2]) was observed. Since only one of the three wetland criteria were met at DP-6-4-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 6, which was determined based on changes in vegetation and hydrology.

Wetland 6 is a large bottomland hardwood forest that is parallel to a pipeline right-of-way. The land directly north of the wetland is farmed. This large PFO wetland extends both east and west outside of the study area. Approximately 12.14 acres of Wetland 6 lies within the study area. This wetland has the highest functional values in the project area primarily due to its size, the lack of disturbance, and the quality of the habitat present.

Wetland 6 is located in the Ohio River floodplain. Because of this connectivity, Wetland 6 is likely a water of the U.S.

WETLAND 7

Data Point 7 IN (DP-7-IN) was evaluated, because it exhibited hydrophytic vegetation. The herbaceous stratum was dominated by *Leersia oryzoides* (rice cut grass, OBL, 90%). The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Five secondary indicators of hydrology (Surface Soil Cracks [B6], Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-7-IN, this area was identified as Wetland 7.

Data Point 7 OUT (DP-7-OUT) was taken on a hillslope above an old farm pond. The soils at this data point appear to be well drained. This location was dominated by *Acer rubrum* (red maple, FAC, 98%) in the tree stratum. The herbaceous stratum was primarily bare, but dominated by *Toxicodendron radicans* (eastern poison ivy, FAC, 5%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and prevalence test. No hydric soil indicators were observed. One secondary hydrology indicator (Geomorphic Position [D2]) was observed. Since only one of the three wetland criteria were met at DP-7-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 7, which was determined based on changes in hydrology.

Wetland 7 is a small emergent wetland that appears to be an old farm pond that had the levee washed out in two locations. The old levee was eroded to the extent that the area does not pond water over 6 to 12 inches at any time. Ephemeral streams UNT-9 and UNT-12 to the Ohio River enter the upstream end of the wetland and braid through the wetland. Ephemeral stream UNT-1 to the Ohio River begins below the old pond dam. UNT-1 to the Ohio River is a tributary to a traditional navigable water (i.e., the Ohio River). Because of this connectivity, Wetland 7 is a likely water of the U.S.

The bottom of the old pond is primarily an herbaceous wetland (PEM) surrounded by trees rooted in the uplands. Approximately 0.33 acre of Wetland 7 lies within the study area. Wetland 7 generally has low to moderate functional values primarily due to its small size and the quality of the habitats present.

Wetland 7 is located in the Ohio River floodplain. Because of this connectivity, this Wetland 7 is likely a water of the U.S.

WETLAND 8

The area associated with Data Point 8 IN (DP-8-IN) was evaluated, because it exhibited hydrophytic vegetation. The herbaceous stratum was dominated by *Ammannia coccinea* (valley redstem, OBL, 60%) and *Leersia oryzoides* (rice cut grass, OBL, 25%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. One primary indicator of hydrology (Oxidized Rhizospheres on Living Roots [C3]) and five secondary indicators of hydrology (Surface Soil Cracks [B6], Drainage Patterns [B10], Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-8-IN, this area was identified as Wetland 8.

Data Point 8 OUT (DP-8-OUT) lies within an agricultural field and appeared to be well drained. This location was dominated by *Glycine max* (soybeans, NI, 90%) in the herbaceous stratum. This point did not meet hydrophytic vegetation criterion. No hydric soil or hydrology indicators were observed. Since none of the three wetland criteria were met at DP-8-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 8, which was determined based on changes in vegetation and hydrology.

Wetland 8 is a narrow emergent wetland located in a valley within a large agricultural field. The PEM wetland likely receives runoff from the adjacent field. Approximately 0.18 acre of Wetland 8 lies within the study area. The wetland is bordered by sawtooth blackberry (*Rubus argutus*, FACU). Wetland 8 generally has poor to low functional values primarily due to its small size and the ongoing disturbance from agricultural practices.

Wetland 8 flows into UNT-1 to North Fork Canoe Creek, a likely water of the U.S. Because of this connectivity, Wetland 8 is likely a water of the U.S.

3.1.3 WETLANDS 9-13

Several small roadside ditch wetlands were identified in the existing US 41 right-of-way in Kentucky. They all have connectivity to North Fork Canoe Creek by ephemeral stream channels, thereby creating connectivity to tributaries to traditional navigable waters (i.e., the Ohio River) via North Fork Canoe Creek. All of these wetlands are generally low-quality and are part of the overall drainage system for the roadway. Historically, the drainage throughout the US 41 area has been noticeably altered, however there is no remaining evidence that these roadside ditch wetlands were part of a larger wetland system. The small size of these roadside wetlands and the continual disturbance from US 41 limits many wetland functions including erosion control and stabilization, wildlife habitat, floodwater alteration/retention, and sediment, nutrient, and toxicant removal. The functional values were all considered poor or absent.

WETLAND 9

The area associated with Data Point 9 IN (DP-9-IN) was evaluated, because it exhibited hydrophytic vegetation. This location was dominated by *Catalpa speciosa* (northern catalpa, FAC, 10%) and *Fraxinus pennsylvanica* (green ash, FACW, 10%). The sapling/shrub stratum was dominated by *Rhus glabra* (smooth sumac, NI, 10%). The herbaceous stratum was dominated by *Echinochloa crus-galli* (large barnyard grass, FAC, 45%) and *Persicaria pensylvanica* (pinkweed, FACW, 15%). This point met the hydrophytic vegetation criterion, because it passed the dominance test and prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Redox Dark Surface (F6) indicator. Three primary indicators of hydrology (Sediment Deposits [B2], Drift Deposits [B3], and Water-Stained Leaves [B9]) and three secondary indicators of hydrology (Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-9-IN, this area was identified as Wetland 9.

Data Point 9 OUT (DP-9-OUT) lies west of US 41 within maintained ROW. This location was dominated by *Cynodon dactylon* (Bermuda grass, FACU, 85%) in the herbaceous stratum. This point did not meet the hydrophytic vegetation criterion. No hydric soil or hydrology indicators were observed. Since none of the three wetland criteria were met at DP-9-OUT, this point was determined to be upland. This data point helped establish the boundary for Wetland 9, which was determined based on changes in vegetation and hydrology.

Wetland 9 is a small roadside ditch emergent wetland located near a culvert east of US 41 and south of Zion Road. Approximately 0.01 acre of Wetland 9 lies within the study area. Wetland 9

is adjacent to UNT-32 to North Fork Canoe Creek, a likely water of the U.S. Because of this connectivity, Wetland 9 is likely a water of the U.S.

WETLAND 10

The area associated with Data Point 10 IN (DP-10-IN) was evaluated, because it exhibited hydrophytic vegetation. This location was dominated by *Echinochloa crus-galli* (large barnyard grass, FAC, 80%) in the herbaceous stratum. This point met the hydrophytic vegetation criterion, because it passed the dominance test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. Two primary indicators of hydrology (Sediment Deposits [B2] and Oxidized Rhizospheres on Living Roots [C3]) and three secondary indicators of hydrology (Drainage Patterns [B10], Crayfish Burrows [C8], and Geomorphic Position [D2]) were observed. Since all three wetland criteria were met at DP-10-IN, this area was identified as Wetland 10.

Data Point 10 OUT (DP-10-OUT) lies east of US 41 within maintained ROW. This location was dominated by *Cynodon dactylon* (Bermuda grass, FACU, 90%) in the herbaceous stratum. This point did not meet the hydrophytic vegetation criterion. No hydric soil or hydrology indicators were observed. Since none of the three wetland criteria were met at DP-10-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 10, which was determined based on changes in vegetation and hydrology.

Wetland 10 is a small roadside ditch emergent wetland east of US 41 and south of Zion Road. Approximately 0.02 acre of Wetland 10 lies within the study area. Wetland 10 is adjacent to UNT-32 to North Fork Canoe Creek, a likely water of the U.S. Because of this connectivity, Wetland 10 is likely a water of the U.S.

WETLAND 11

The area associated with Data Point 11 IN (DP-11-IN) was evaluated, because it exhibited hydrophytic vegetation. This location was dominated by *Typha angustifolia* (narrow-leaf cattail, OBL, 60%) in the herbaceous stratum. This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Depleted Matrix (F3) indicator. Three secondary indicators of hydrology (Drainage Patterns [B10], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-11-IN, this area was identified as Wetland 11.

Data Point 11 OUT (DP-11-OUT) lies east of US 41 in maintained ROW. This location was dominated by *Cynodon dactylon* (Bermuda grass, FACU, 95%) in the herbaceous stratum. This point did not meet the hydrophytic vegetation criteria. No hydric soil or hydrology indicators were observed. Since none of the three wetland criteria were met at DP-11-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 11, which was determined based on changes in vegetation and hydrology.

Wetland 11 is a small roadside ditch emergent wetland east of US 41 and south of Zion Road. Approximately 0.01 acre of Wetland 11 lies within the study area. Wetland 11 is adjacent to UNT-

32 to North Fork Canoe Creek, a likely water of the U.S. Because of this connectivity, Wetland 11 is likely a water of the U.S.

WETLAND 12

Data Point 12 IN (DP-12-IN) was dominated by *Phalaris arundinacea* (reed canary grass, FACW, 80%) in the herbaceous stratum. This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. The soil profile met the hydric soil criterion, because it exhibited the Thick Dark Surface (A12) indicator. Two primary indicators of hydrology (Sediment Deposits [B2] and Water-Stained Leaves [B9]) and two secondary indicators of hydrology (Crayfish Burrows [C8] and Geomorphic Position [D2]) were observed. Since all three wetland criteria were met at DP-12-IN, this area was identified as Wetland 12.

Data Point 12 OUT (DP-12-OUT) lies east of US 41 within maintained ROW. This location was dominated by *Cynodon dactylon* (Bermuda grass, FACU, 85%) in the herbaceous stratum. This point did not meet the hydrophytic vegetation criterion. No hydric soil or hydrology indicators were observed. Since none of the three wetland criteria were met at DP-12-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 12, which was determined based on changes in vegetation and hydrology.

Wetland 12 is a small roadside ditch emergent wetland east of US 41 and south of Zion Road, and north of the northbound US 41 entrance ramp overpass. Approximately 0.01 acre of Wetland 12 lies within the study area. Wetland 12 is adjacent to UNT-34 to North Fork Canoe Creek, a likely water of the U.S. Because of this connectivity, Wetland 12 is likely a water of the U.S.

WETLAND 13

The area associated with Data Point 13 IN (DP-13-IN) was evaluated, because it exhibited hydrophytic vegetation. This location was dominated by *Fraxinus pennsylvanica* (green ash, FACW, 5%), *Salix interior* (sandbar willow, FACW, 5%), and *Acer saccharinum* (silver maple, FACW, 5%) in the sapling/shrub stratum. The herbaceous stratum was dominated by *Typha angustifolia* (narrow-leaf cattail, OBL, 80%). This point met the hydrophytic vegetation criterion, because it passed the rapid test, dominance test, and prevalence test. The soil profile met the hydric soil criterion, because it exhibited Depleted Below Dark Surface (A11) and Depleted Matrix (F3) indicators. Four primary indicators of hydrology (High Water Table [A2], Saturation [A3], Sediment Deposits [B2], and Water-Stained Leaves [B9]) and three secondary indicators of hydrology (Crayfish Burrows [C8], Geomorphic Position [D2], and FAC-Neutral Test [D5]) were observed. Since all three wetland criteria were met at DP-13-IN, this area was identified as Wetland 13.

Data Point 13 OUT (DP-13-OUT) lies west of US 41. This location was dominated by *Cynodon dactylon* (Bermuda grass, FACU, 80%) in the herbaceous stratum. This point did not meet the hydrophytic vegetation criterion. No hydric soil or hydrology indicators were observed. Since none of the three wetland criteria were met at DP-13-OUT, this point was determined to be upland. This data point helped establish the boundary of Wetland 13, which was determined based on changes in vegetation and hydrology.

Wetland 13 is an emergent roadside ditch wetland in the US 41 ROW just east of the intersection of Washington Street and KY 2084. Approximately 0.02 acre of Wetland 13 lies within the study area. Wetland 13 is adjacent to UNT-34 to North Fork Canoe Creek, a likely water of the U.S. Because of this connectivity, Wetland 13 is likely a water of the U.S.

3.1.4 ADDITIONAL DATA POINTS

Areas that were suspected to be wetlands, such as mapped NWI wetlands, aerial photograph signatures that suggest the potential for wetlands, or field observations were also surveyed. The areas below lacked one or more of the requisite parameters (hydrophytic vegetation, hydric soils, and hydrology) to be considered a wetland, and they were documented to explain why the areas would not be considered wetlands or would not be regulated.

UPL-01

The area associated with this Data Point Upland 1 (UPL-01) was located in an agricultural field. This Ohio River floodplain swale was sampled, because aerial photography and the 2019 Ohio River flooding showed visual evidence of a possible wetland. This area had no living vegetation, however corn stubble from 2018 was present in the herbaceous stratum. This did not meet the hydrophytic vegetation criterion. The extensive 2019 Ohio River flooding kept this area wet for a long duration in 2019; however, evidence present indicates that this area likely does not retain water for long durations during the growing season; the area is usually farmed (e.g. the area was farmed in 2018), and the area is infrequently flooded by the Ohio River. No hydric soil indicators were observed. Two secondary indicators of hydrology (Surface Soil Cracks [B6] and Crayfish Burrows [C8]) were observed. Since only one of the three wetland criteria were met at UPL-01, this area was determined to be upland.

UPL-02

The area associated with this Data Point Upland 2 (UPL-02) was located in an agricultural field. This area was sampled, because the 2018 Ohio River flooding showed visual evidence of a possible wetland. This area was dominated by *Echinochloa crus-galli* (large barnyard grass, FACW, 30%) and *Amaranthus spinosus* (red-root, FACU, 10%) in the herbaceous stratum. This point met the hydrophytic vegetation criterion, because it passed the prevalence test. At the time of the survey, the adjacent fields were farmed with soybeans (*Glycine max*, NI) and corn (*Zea mays*, NI). It appears that the Ohio River flood kept this area wet for a long duration in 2018; however, this area likely does not retain water for long durations during the growing season and is usually farmed (e.g. the area was farmed in 2017). There was soybean stubble from the 2017 growing season throughout the swale. No hydric soil indicators were observed. One secondary indicator of hydrology (Surface Soil Cracks [B6]) was observed. Since only one of the three wetland criteria were met at UPL-02, this area was determined to be upland.

UPL-03

The area associated with this Data Point Upland 3 (UPL-03) was located in an agricultural field. This Ohio River floodplain swale was sampled, because aerial photography and the 2019 Ohio River flooding showed visual evidence of a possible wetland. This area had no living vegetation, however corn and soybean stubble from 2018 was present in the herbaceous stratum. This did

not meet the hydrophytic vegetation criterion. The extensive 2019 Ohio River flooding kept this area wet for a long duration in 2019; however, evidence present indicates that this area likely does not retain water for long durations during the growing season; the area is usually farmed (e.g. the area was farmed in 2018); and the area is infrequently flooded by the Ohio River. No hydric soil indicators were observed. Two secondary indicators of hydrology (Surface Soil Cracks [B6] and Crayfish Burrows [C8]) were observed. Since only one of the three wetland criteria were met at UPL-03, this area was determined to be upland.

UPL-04

The area associated with Data Point Upland 4 (UPL-04) was in a swale in the middle on an agricultural field. This area was dominated by *Glycine max* (soybean, NI, 95%) in the herbaceous stratum. The area does not appear to remain saturated for long durations during the growing season. The 2018 Ohio River flooding covered this entire area, but in most years this swale is likely moderately well drained. In 2017, this swale near Shawnee Drive was farmed with corn. No hydric soil indicators were observed. One secondary indicator of hydrology (Geomorphic Position [D2]) was observed. Since none of the three wetland criteria were met at UPL-04, this area was determined to be upland.

UPL-05

The area associated with Data Point Upland 5 (UPL-05) was in the US 41 road ditch/swale. This area was dominated by *Ludwigia alternifolia* (seedbox, FACW, 30%) and *Schedonorus arundinacea* (tall fescue, FACU, 20%) in the herbaceous stratum. The downstream end of this swale appears to have been filled with sediment from upstream agricultural areas, and there is an eroded channel that makes a connection to UNT-36 to North Fork Canoe Creek. No hydric soil indicators were observed. Two primary hydrology indicators of hydrology Surface Water (A1) and Saturation (A3) were observed. One secondary indicator of hydrology (Crayfish Burrows [C8]) was observed. Since only two of the three wetland criteria were met at UPL-05, this area was determined to be upland.

3.2 STREAMS

Field investigation resulted in the identification of 68, likely jurisdictional, streams within the study area, totally 34,286 linear feet. These features are summarized in the Stream Summary Table (Appendix A). Detailed mapping of these features is provided in Appendix B.

None of the documented streams were listed as a Federal Wild and Scenic River, a State Natural, Scenic and Recreational River (IWSRCC 2018), or on the Indiana Register's listing on Outstanding Rivers and Streams. No Kentucky state-designated Wild Rivers are located in the project area. The Ohio River from River Mile (RM) 784.7 to 786.6 is an Outstanding State Resource Water (OSRW) due to the presence of the federally threatened rabbitsfoot mussel (*Quadrula cylindrica cylindrica*). This stretch of OSRW river would include approximately 438 acres of Ohio River habitat at normal pool evaluation.

3.2.1 EAGLE CREEK AND TRIBUTARIES TO EAGLE CREEK

UNT-1 TO EAGLE CREEK

UNT-1 to Eagle Creek is a concrete-lined channel in the infrequently maintained I-69/US 41 interchange. It exhibited a 6-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-1 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). This channel substrate is artificial (concrete). No riffles or pools were observed. Based on field observations, UNT-1 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 27. Approximately 208 linear feet of UNT-1 to Eagle Creek lies within the study area. UNT-1 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-2 TO EAGLE CREEK

UNT-2 to Eagle Creek is a deeply incised, eroded channel located in the infrequently maintained I-69/US 41 interchange. The upstream end of this channel is near a culvert that has riprap protection. UNT-2 to Eagle Creek exhibited a 9-foot wide by 6-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-2 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-2 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 27. Approximately 167 linear feet of UNT-2 to Eagle Creek lies within the study area. UNT-2 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-3 TO EAGLE CREEK

UNT-3 to Eagle Creek is an erosional feature that has stabilized over time. The area is infrequently maintained through mowing or use of herbicides. UNT-3 to Eagle Creek exhibited a 2-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-3 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-3 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 11. Approximately 560 linear feet of UNT-3 to Eagle Creek lies within the study area. UNT-3 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-4 TO EAGLE CREEK

UNT-4 to Eagle Creek through the study area is entirely encapsulated in a culvert. Water is pumped through this culvert to an unnamed tributary to Eagle Creek, south of the study area. Since UNT-4 to Eagle Creek was not visible within the study area, a data sheet was not prepared. UNT-4 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.06 square mile (USGS 2019). The substrate is artificial. Based on field observations, this stream is likely ephemeral. Approximately 226 linear feet of UNT-4 to Eagle Creek lies within the study area, entirely encapsulated in a culvert. UNT-4 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-5 TO EAGLE CREEK

UNT-5 to Eagle Creek is an ephemeral channel north of I-69. This channel drains to a pump station. UNT-5 to Eagle Creek exhibited a 5-foot wide by 3-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-5 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-5 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 26. Approximately 10 linear feet of UNT-5 to Eagle Creek lies within the study area. UNT-5 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-6 TO EAGLE CREEK

UNT-6 to Eagle Creek is a dry ephemeral channel north of I-69. It exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-6 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-6 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 21. Approximately 318 linear feet of UNT-6 to Eagle Creek lies within the study area. UNT-6 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-7 TO EAGLE CREEK

UNT-7 to Eagle Creek is a dry ephemeral channel north of and parallel to I-69. It exhibited a 3-foot wide by 1-foot deep OHWM. Although this was mapped as an intermittent stream on the USGS topographic map, based on field observations, this stream is likely ephemeral. UNT-7 to Eagle Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles

or pools were observed. Based on field observations, UNT-7 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 21. Approximately 514 linear feet of UNT-7 to Eagle Creek lies within the study area. UNT-7 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-8 TO EAGLE CREEK

UNT-8 to Eagle Creek is a deeply incised channel that receives fairly frequent backwater flooding from Eagle Creek. It exhibited a 12-foot wide by 3-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-8 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-8 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 22. Approximately 56 linear feet of UNT-8 to Eagle Creek lies within the study area. UNT-8 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-9 TO EAGLE CREEK

UNT-9 to Eagle Creek drains into Eagle Creek. The channel likely receives runoff from I-69. The tributary braids into Wetland 3 with no defined channels. UNT-9 to Eagle Creek exhibited a 3-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-9 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.25 square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-9 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 22. Approximately 146 linear feet of UNT-9 to Eagle Creek lies within the study area. UNT-9 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-10 TO EAGLE CREEK

UNT-10 to Eagle Creek drains into Eagle Creek. The channel likely receives runoff from I-69. The tributary braids into Wetland 3 with no defined channels. UNT-10 to Eagle Creek exhibited a 3-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-10 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-10 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 22. Approximately 144 linear feet of UNT-10 to Eagle Creek lies within the study area. UNT-10 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

EAGLE CREEK

Eagle Creek is a channelized, but stable, legal drain ([EVCAPC 2018](#)). When the Ohio River rises, backwater reverses the flow to Eagle Creek. The left descending bank was sprayed with herbicides to kill woody vegetation, and it appears that channel maintenance only occurs from the south side of Eagle Creek in the project area. A levee located north of I-69 may impact hydrology during high water events. Eagle Creek exhibited a 30-foot wide by 10-foot deep OHWM. Eagle Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 6.12 square miles ([USGS 2019](#)). The substrate was dominated by silt. No riffles were observed. Pools were observed. Based on field observations, Eagle Creek was classified as a poor-quality stream. This was supported by its QHEI score of 37. Approximately 1,042 linear feet of Eagle Creek lies within the study area. Eagle Creek is a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-11 TO EAGLE CREEK

UNT-11 to Eagle Creek is a channel that drains from an agricultural field into a borrow pit (OW-1). It exhibited a 2-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-11 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile ([USGS 2019](#)). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-11 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 12. Approximately 80 linear feet of UNT-11 to Eagle Creek lies within the study area. UNT-11 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-12 TO EAGLE CREEK

UNT-12 to Eagle Creek is an agricultural stream/ditch that flows into Eagle Creek to the northwest. The area is routinely mowed and sprayed with herbicides. The stream/ditch is maintained. UNT-12 to Eagle Creek exhibited a 12-foot wide by 4-foot deep OHWM. Although this was mapped as an intermittent stream on the USGS topographic map, based on field observations, this stream is likely ephemeral. UNT-12 to Eagle Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.04 square mile ([USGS 2019](#)). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-12 to Eagle Creek was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 1,147 linear feet of UNT-12 to Eagle Creek lies within the study area. Although this is a well-maintained agricultural stream/ditch, UNT-12 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-13 TO EAGLE CREEK

UNT13 to Eagle Creek is an agricultural stream/ditch that flows into a larger agricultural stream/ditch, which flows into Eagle Creek. The area is routinely mowed and sprayed with herbicides. The stream/ditch is maintained. UNT-13 to Eagle Creek exhibited a 12-foot wide by 4-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-13 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-13 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 25. Approximately 537 linear feet of UNT-13 to Eagle Creek lies within the study area. UNT-13 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-14 TO EAGLE CREEK

UNT-14 to Eagle Creek is an agricultural stream/ditch that flows into a larger agricultural stream/ditch, which flows into Eagle Creek. The area is routinely mowed and sprayed with herbicides. The stream/ditch is maintained. UNT-14 to Eagle Creek exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-14 to Eagle Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-14 to Eagle Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 20. Approximately 834 linear feet of UNT-14 to Eagle Creek lies within the study area. UNT-14 to Eagle Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to Eagle Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

3.2.2 OHIO RIVER AND TRIBUTARIES TO THE OHIO RIVER**OHIO RIVER**

The Ohio River is 981 miles long and flows through six states: Pennsylvania, Ohio, West Virginia, Kentucky, Indiana, and Illinois. These states collaborate with the Ohio River Valley Water Sanitation Commission (ORSANCO), an interstate water pollution control agency, to monitor and assess the river (ORSANCO 2016). The river basin stretches across a 205,000-square-mile area within which over 25 million people reside (ORANSCO 2019). The river has an average depth of 24 feet and an average width of 0.5 mile (ORSANCO 2016).

The Ohio River is designated as an Outstanding State Resource Water (OSRW) by the Kentucky Division of Water (KDOW) between RM 784.7 to 786.6. Within the study area, the Ohio River exhibited a 2,029-foot wide by >30-foot deep OHWM. The Ohio River is shown as perennial on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with the Ohio River was not available in StreamStats; however, the drainage of the Ohio River is 205,000 square miles (ORANSCO 2019). The substrate was dominated by silt and sand. No riffles or pools

were observed. Based on field observations, the Ohio River was classified as a fair-quality stream. This was supported by its QHEI score of 58. Approximately 200 linear feet of Ohio River lies within the study area. Ohio River is a WOTUS, because it is a traditionally navigable waterway.

UNT-1 TO OHIO RIVER

UNT-1 to Ohio River is a dry channel that has been channelized and armored with riprap. It exhibited a 11-foot wide by 3-foot deep OHWM. Although this stream was mapped as intermittent on the USGS topographic map, based on field observations, this stream is likely ephemeral. UNT-1 to Ohio River is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate within this channel is artificial and gravel. No riffles or pools were observed. Based on field observations, UNT-1 to Ohio River was classified as a poor-quality stream. This was supported by its HHEI score of 40. Approximately 1,716 linear feet of UNT-1 to Ohio River lies within the study area. UNT1 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-2 TO OHIO RIVER

UNT-2 to Ohio River is a dry shallow channel that is proximal to a utility right-of-way. The channel extends west to a recently logged area. UNT-2 to Ohio River exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-2 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by clay and gravel. No riffles or pools were observed. Based on field observations, UNT-2 to Ohio River was classified as a very poor-quality stream. This was supported by its HHEI score of 19. Approximately 451 linear feet of UNT-2 to Ohio River lies within the study area. UNT-2 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-3 TO OHIO RIVER

UNT-3 to Ohio River is a typically dry channel in an upland forest. Recent logging activity has likely contributed to the presence of silt and muck in the channel. UNT-3 to Ohio River exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-3 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-3 to Ohio River was classified as a very poor-quality stream. This was supported by its HHEI score of 27. Approximately 474 linear feet of UNT-3 to Ohio River lies within the study area. UNT-3 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-4 TO OHIO RIVER

UNT-4 to Ohio River is a dry channel that cuts across a utility right-of-way. It exhibited a 3-foot wide by 3-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-4 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and cobble. No riffles were observed. Pools were observed. Based on field observations, UNT-4 to Ohio River was classified as a poor-quality stream. This was supported by its HHEI score of 38. Approximately 14 linear feet of UNT-4 to Ohio River lies within the study area. UNT-4 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-5 TO OHIO RIVER

UNT-5 to Ohio River is deeply incised, typically dry, channel within an upland forest. It exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-5 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by gravel and clay. No riffles were observed. Pools were observed. Based on field observations, UNT-5 to Ohio River was classified as a poor-quality stream. This was supported by its HHEI score of 33. Approximately 432 linear feet of UNT-5 to Ohio River lies within the study area. UNT-5 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-6 TO OHIO RIVER

UNT-6 to Ohio River is a deeply incised channel located west of a utility right-of-way. It exhibited a 3-foot wide by 3-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-6 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and cobble. No riffles were observed. Pools were observed. Based on field observations, UNT-6 to Ohio River was classified as a fair-quality stream. This was supported by its HHEI score of 50. Approximately 42 linear feet of UNT-6 to Ohio River lies within the study area. UNT-6 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-7 TO OHIO RIVER

UNT-7 to Ohio River is a deeply incised channel in a wooded draw. It exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-7 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by cobble and gravel. No riffles were observed. Pools were observed. Based on field observations, UNT-7 to Ohio River was

classified as a fair-quality stream. This was supported by its HHEI score of 46. Approximately 419 linear feet of UNT-7 to Ohio River lies within the study area. UNT-7 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-8 TO OHIO RIVER

UNT-8 to Ohio River is a dry eroded channel through a pipeline right-of-way. It exhibited a 3-foot wide by 3-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-8 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by bedrock and cobble. No riffles were observed. Pools were observed. Based on field observations, UNT-8 to Ohio River was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 60 linear feet of UNT-8 to Ohio River lies within the study area. UNT-8 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-9 TO OHIO RIVER

UNT-9 to Ohio River is a narrow, incised channel in a wooded draw. It exhibited a 2-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-9 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by clay and silt. No riffles or pools were observed. Based on field observations, UNT-9 to Ohio River was classified as a very poor-quality stream. This was supported by its HHEI score of 11. Approximately 434 linear feet of UNT-9 to Ohio River lies within the study area. UNT-9 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-10 TO OHIO RIVER

UNT-10 to Ohio River is a narrow, incised channel in a wooded draw. It exhibited a 2-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-10 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by clay and leaf packs/woody debris. No riffles or pools were observed. Based on field observations, UNT-10 to Ohio River was classified as a very poor-quality stream. This was supported by its HHEI score of 12. Approximately 155 linear feet of UNT-10 to Ohio River lies within the study area. UNT-10 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-11 TO OHIO RIVER

UNT-11 to Ohio River is a dry eroded channel within a forest. It exhibited a 5-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-11 to Ohio River

is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-11 to Ohio River was classified as a very poor-quality stream. This was supported by its HHEI score of 26. Approximately 878 linear feet of UNT-11 to Ohio River lies within the study area. UNT-11 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-12 TO OHIO RIVER

UNT-12 to Ohio River is a dry eroded channel in a wooded draw that is surrounded by agricultural fields. It exhibited a 3-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-12 to Ohio River is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by clay and silt. No riffles or pools were observed. Based on field observations, UNT-12 to Ohio River was classified as a poor-quality stream. This was supported by its HHEI score of 16. Approximately 113 linear feet of UNT-12 to Ohio River lies within the study area. UNT-12 to Ohio River is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

3.2.3 NORTH FORK CANOE CREEK AND TRIBUTARIES TO NORTH FORK CANOE CREEK

UNT-1 TO NORTH FORK CANOE CREEK

UNT-1 to North Fork Canoe Creek is a dry, eroded, incised channel just south of Wetland 8. The area surrounding the channel is used for agriculture. UNT-1 to North Fork Canoe Creek exhibited a 3-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-1 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-1 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 25. Approximately 494 linear feet of UNT-1 to North Fork Canoe Creek lies within the study area. UNT-1 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to North Fork Canoe Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-2 TO NORTH FORK CANOE CREEK

UNT-2 to North Fork Canoe Creek is a dry, deeply incised, eroded channel in a valley. The area surrounding the channel is used for agriculture. UNT-2 to North Fork Canoe Creek exhibited an 8-foot wide by 6-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-2 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.03 square mile (USGS 2019). The substrate was dominated by clay and silt. No riffles or pools were observed. Based on field

observations, UNT-2 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 25. Approximately 306 linear feet of UNT-2 to North Fork Canoe Creek lies within the study area. UNT-2 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to North Fork Canoe Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-3 TO NORTH FORK CANOE CREEK

UNT-3 to North Fork Canoe Creek is a dry channel in a broad wooded draw, and the channel braids in some areas. The channel is more defined along the reach northwest and southeast of the data point. There are mowed fields/wildlife food plots on both sides of this channel. UNT-3 to North Fork Canoe Creek exhibited a <1-foot wide by <1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-3 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.04 square mile (USGS 2019). The substrate was dominated by silt and leaf packs/woody debris. No riffles or pools were observed. Based on field observations, UNT-3 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 14. Approximately 328 linear feet of UNT-3 to North Fork Canoe Creek lies within the study area. UNT-3 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to North Fork Canoe Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-4 TO NORTH FORK CANOE CREEK

UNT-4 to North Fork Canoe Creek is a dry channel within a utility right-of-way. It exhibited a 4-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-4 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.03 square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-4 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 41. Approximately 321 linear feet of UNT-4 to North Fork Canoe Creek lies within the study area. UNT-4 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to North Fork Canoe Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-5 TO NORTH FORK CANOE CREEK

UNT-5 to North Fork Canoe Creek is a dry channel within a utility right-of-way. It exhibited a 6-foot wide by 3-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-5 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.06 square mile (USGS 2019). The substrate was dominated by silt and cobble. No riffles or pools were observed. Based on field observations, UNT-5 to North Fork Canoe Creek was classified as a fair-quality stream. This was supported by its HHEI score of 43. Approximately 302 linear feet of UNT-5 to North Fork Canoe Creek lies within the study area. UNT-5 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to North Fork Canoe Creek, which is a tributary to the Ohio River (a traditionally navigable waterway).

UNT-6 TO NORTH FORK CANOE CREEK

UNT-6 to North Fork Canoe Creek is a dry channel with incised banks surrounded by agriculture. It exhibited a 14-foot wide by 8-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-6 to North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.67 square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-6 to North Fork Canoe Creek was classified as a fair-quality stream. This was supported by its HHEI score of 45. Approximately 880 linear feet of UNT-6 to North Fork Canoe Creek lies within the study area. UNT-6 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway). UNT-6 to North Fork Canoe Creek is also crossed upstream near the western end of the relocated US 60, but it is not within the construction limits and would not be impacted.

UNT-7 TO NORTH FORK CANOE CREEK

UNT-7 to North Fork Canoe Creek dry channel directly south of US 60. The channel is surrounded by agriculture. UNT-7 to North Fork Canoe Creek exhibited a 12-foot wide by 8-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-7 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.04 square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-7 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 35. Approximately 183 linear feet of UNT-7 to North Fork Canoe Creek lies within the study area. UNT-7 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-8 TO NORTH FORK CANOE CREEK

UNT-8 to North Fork Canoe Creek is a dry channel directly south of US 60. The channel is surrounded by agriculture. UNT-8 to North Fork Canoe Creek exhibited a 5-foot wide by 1.5-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-8 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is <0.01 square miles (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-8 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 160 linear feet of UNT-8 to North Fork Canoe Creek lies within the study area. Note that the eroded channel transitions into a broad drainage swale or grassed waterway that does not exhibit a bed and bank or OHWM and eventually extends 1,176 feet to UNT-9 to North Fork Canoe Creek. Although UNT-8 to North Fork Canoe Creek may be considered a WOTUS because of the presence of an OHWM at the data point and its connectivity to the Ohio River (a traditionally navigable waterway), this eroded channel may be considered isolated.

UNT-9 TO NORTH FORK CANOE CREEK

UNT-9 to North Fork Canoe Creek is a moist channel surrounded by agriculture. It exhibited a 20-foot wide by 10-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-9 to North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.87 square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-9 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 41. Approximately 1,802 linear feet of UNT-9 to North Fork Canoe Creek lies within the study area. UNT-9 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-10 TO NORTH FORK CANOE CREEK

UNT-10 to North Fork Canoe Creek is an erosional feature in an agricultural field. It exhibited a 3-foot wide by 1-foot deep OHWM. Although this stream is mapped as intermittent on the USGS topographic mapping, based on field observations, this stream is likely ephemeral. UNT-10 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.11 square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-10 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its QHEI score of 34.5. Approximately 82 linear feet of UNT-10 to North Fork Canoe Creek lies within the study area. UNT-10 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-11 TO NORTH FORK CANOE CREEK

UNT-11 to North Fork Canoe Creek is a well-maintained dry railroad stream/ditch. It exhibited a 11-foot wide by 4-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-11 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-11 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 31. Approximately 737 linear feet of UNT-11 to North Fork Canoe Creek lies within the study area. UNT-11 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-12 TO NORTH FORK CANOE CREEK

UNT-12 to North Fork Canoe Creek is a dry channel near US 60. It exhibited a 11-foot wide by 10-foot deep OHWM. Although this stream is mapped as intermittent on the USGS topographic mapping, based on field observations, this stream is likely ephemeral. UNT-12 to North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage

area associated with this stream is 0.64 square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-12 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 37. Approximately 289 linear feet of UNT-12 to North Fork Canoe Creek lies within the study area. UNT-12 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-13 TO NORTH FORK CANOE CREEK

UNT-13 to North Fork Canoe Creek is a moist channel with isolated pools near US 60. The channel is surrounded by agriculture. It exhibited a 9-foot wide by 10-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-13 to North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 1.77 square miles (USGS 2019), and the QHEI assessment sheet was used at this data point. The substrate was dominated by silt and sand. No riffles were observed. Pools were observed. Based on field observations, UNT-13 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its QHEI score of 34.5. Approximately 360 linear feet of UNT-13 to North Fork Canoe Creek lies within the study area. UNT-13 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-14 TO NORTH FORK CANOE CREEK

UNT-14 to North Fork Canoe Creek is a roadside stream/ditch with a dry channel directly south of US 60. It exhibited a 4-foot wide by 1.5-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-14 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-14 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 27. Approximately 36 linear feet of UNT-14 to North Fork Canoe Creek lies within the study area. UNT-14 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-15 TO NORTH FORK CANOE CREEK

UNT-15 to North Fork Canoe Creek is an erosional feature in an agricultural field. It exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-15 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-15 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 26. Approximately 59 linear feet of UNT-15 to North Fork Canoe Creek lies within the study area. UNT-15 to North Fork Canoe Creek is likely a WOTUS because

of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-16 TO NORTH FORK CANOE CREEK

UNT-16 to North Fork Canoe Creek is an erosional feature in an agricultural field. It exhibited a 4-foot wide by 1.5-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-16 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-16 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 26. Approximately 267 linear feet of UNT-16 to North Fork Canoe Creek lies within the study area. UNT-16 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-17 TO NORTH FORK CANOE CREEK

UNT-17 to North Fork Canoe Creek is a channel with steep banks surrounded by agriculture. It exhibited a 13-foot wide by 7-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-17 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.50 square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-17 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 36. Approximately 780 linear feet of UNT-17 to North Fork Canoe Creek lies within the study area. UNT-17 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-18 TO NORTH FORK CANOE CREEK

UNT-18 to North Fork Canoe Creek this is a dry channel surrounded by agriculture. It exhibited a 4-foot wide by 4-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-18 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-18 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 21. Approximately 241 linear feet of UNT-18 to North Fork Canoe Creek lies within the study area. UNT-18 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-19 TO NORTH FORK CANOE CREEK

UNT-19 to North Fork Canoe Creek is a dry channel with steep banks surrounded by agriculture. It exhibited a 9-foot wide by 6-foot deep OHWM. Based on field observations, this stream is likely

ephemeral. UNT-19 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by clay and silt. No riffles or pools were observed. Based on field observations, UNT-19 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 26. Approximately 234 linear feet of UNT-19 to North Fork Canoe Creek lies within the study area. UNT-19 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-20 TO NORTH FORK CANOE CREEK

UNT-20 to North Fork Canoe Creek is a dry channel surrounded by agriculture. It exhibited a 14-foot wide by 8-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-20 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by gravel and silt. No riffles or pools were observed. Based on field observations, UNT-20 to North Fork Canoe Creek was classified as a fair-quality stream. This was supported by its HHEI score of 45. Approximately 490 linear feet of UNT-20 to North Fork Canoe Creek lies within the study area. UNT-20 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-21 TO NORTH FORK CANOE CREEK

UNT-21 to North Fork Canoe Creek is a dry vegetated channel near Kimsey Lane. It exhibited a 9-foot wide by 6-foot deep OHWM. Based on field observations, this stream is likely intermittent in nature. UNT-21 to North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 0.73 square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-21 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 35. Approximately 1,840 linear feet of UNT-21 to North Fork Canoe Creek lies within the study area. UNT-21 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-22 TO NORTH FORK CANOE CREEK

UNT-22 is an erosional feature in an agricultural field north of Kimsey Lane. It exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-22 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-22 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 26. Approximately 234 linear feet of UNT-22 to North Fork Canoe Creek lies within the

study area. UNT-22 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-23 TO NORTH FORK CANOE CREEK

UNT-23 to North Fork Canoe Creek is a dry vegetated channel parallel to Kimsey Lane. It exhibited a 9-foot wide by 6-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-23 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 1.54 square mile (USGS 2019), and the QHEI assessment form was used for this data point. The substrate was dominated by silt and hardpan. No riffles were observed. Pools were observed. Based on field observations, UNT-23 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its QHEI score of 32. Approximately 16 linear feet of UNT-23 to North Fork Canoe Creek lies within the study area. UNT-23 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-24 TO NORTH FORK CANOE CREEK

UNT-24 to North Fork Canoe Creek is an agricultural stream/ditch south of Kimsey Lane. It exhibited a 3-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-24 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-24 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 11. Approximately 81 linear feet of UNT-24 to North Fork Canoe Creek lies within the study area. UNT-24 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-25 TO NORTH FORK CANOE CREEK

UNT-25 to North Fork Canoe Creek is a well-maintained roadside channel west of US 41. It exhibited a 1.5-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-25 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and clay. No riffles or pools were observed. Based on field observations, UNT-25 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 11. Approximately 1,673 linear feet of UNT-25 to North Fork Canoe Creek lies within the study area. UNT-25 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-26 TO NORTH FORK CANOE CREEK

UNT-26 to North Fork Canoe Creek is a well-maintained roadside channel east of US 41. It exhibited a 1.5-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-26 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-26 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 32. Approximately 1,753 linear feet of UNT-26 to North Fork Canoe Creek lies within the study area. UNT-26 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

NORTH FORK CANOE CREEK

North Fork Canoe Creek is perennial tributary of the Ohio River. Within the study area, North Fork Canoe Creek exhibited a 35-foot wide by 12-foot deep OHWM. North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 13.3 square miles (USGS 2019). The substrate was dominated by silt and cobble. No riffles were observed. Pools were observed. Based on field observations North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its QHEI score of 38. Approximately 1,596 linear feet of North Fork Canoe Creek lies within the study area. North Fork Canoe Creek is a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-27 TO NORTH FORK CANOE CREEK

UNT-27 to North Fork Canoe Creek is an agricultural stream/ditch. It exhibited a 15-foot wide by 6-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-27 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-27 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 41. Approximately 601 linear feet of UNT-27 to North Fork Canoe Creek lies within the study area. UNT-27 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-28 TO NORTH FORK CANOE CREEK

UNT-28 to North Fork Canoe Creek is dry agricultural stream/ditch that runs parallel to US 41. It exhibited a 3-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-28 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field

observations, UNT-28 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 1,697 linear feet of UNT-28 to North Fork Canoe Creek lies within the study area. UNT-28 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-29 TO NORTH FORK CANOE CREEK

UNT-29 to North Fork Canoe Creek is dry agricultural stream/ditch that runs parallel to US 41. It exhibited a 4-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-29 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-29 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 1,619 linear feet of UNT-29 to North Fork Canoe Creek lies within the study area. UNT-29 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-30 TO NORTH FORK CANOE CREEK

UNT-30 to North Fork Canoe Creek is a dry, well-maintained roadside channel north of Van Wyk Road. It exhibited a 4-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-30 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-30 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 458 linear feet of UNT-30 to North Fork Canoe Creek lies within the study area. UNT-30 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-31 TO NORTH FORK CANOE CREEK

UNT-31 to North Fork Canoe Creek is a dry, well-maintained roadside channel south of Van Wyk Road. It exhibited a 4-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-31 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and gravel. No riffles or pools were observed. Based on field observations, UNT-31 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 30. Approximately 405 linear feet of UNT-31 to North Fork Canoe Creek lies within the study area. UNT-31 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-32 TO NORTH FORK CANOE CREEK

UNT-32 to North Fork Canoe Creek is located within a dry, well-maintained roadside channel that parallels US 41. It exhibited a 1.5-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-32 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by silt and sand. No riffles or pools were observed. Based on field observations, UNT-32 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 16. Approximately 378 linear feet of UNT-32 to North Fork Canoe Creek lies within the study area. UNT-32 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-33 TO NORTH FORK CANOE CREEK

UNT-33 to North Fork Canoe Creek is dry, well-maintained roadside channel that parallels US 41. It exhibited a 1.5-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-33 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by sand and silt. No riffles or pools were observed. Based on field observations, UNT-33 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 16. Approximately 208 linear feet of UNT-33 to North Fork Canoe Creek lies within the study area. UNT-33 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-34 TO NORTH FORK CANOE CREEK

UNT-34 to North Fork Canoe Creek is dry, well-maintained roadside channel between the ramps to US 41. It exhibited a 2-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-34 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by sand and silt. No riffles or pools were observed. Based on field observations, UNT-34 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 16. Approximately 286 linear feet of UNT-34 to North Fork Canoe Creek lies within the study area. UNT-34 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-35 TO NORTH FORK CANOE CREEK

UNT-35 to North Fork Canoe Creek is dry, well-maintained roadside channel near US 41. It exhibited a 1.5-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-35 to North Fork Canoe Creek is not shown on USGS 7.5-minute series

topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by sand and silt. No riffles or pools were observed. Based on field observations, UNT-35 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 16. Approximately 181 linear feet of UNT-35 to North Fork Canoe Creek lies within the study area. UNT-35 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-36 TO NORTH FORK CANOE CREEK

UNT-36 to North Fork Canoe Creek is a tributary that flows under the Edward T. Breathitt Pennyrile Parkway via a culvert. Based on field observations, this stream is likely perennial. Within the study area, North Fork Canoe Creek exhibited a 15-foot wide by 6-foot deep OHWM. UNT-36 to North Fork Canoe Creek is shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream is 2.43 square mile (USGS 2019). Approximately 259 linear feet of UNT-36 to North Fork Canoe Creek lies within the study area. UNT-36 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-37 TO NORTH FORK CANOE CREEK

UNT-37 to North Fork Canoe Creek is a well-maintained roadside channel near US 41 that has an eroded channel and a mowed road ditch swale. It exhibited a 2-foot wide by 0.5-foot deep OHWM. Based on field observations, this stream is likely ephemeral. This area was also investigated as a wetland, but it lacked hydric soils. UNT-37 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by sand and silt. No riffles were observed. Based on field observations, UNT-37 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 21. Approximately 0 linear feet of UNT-37 to North Fork Canoe Creek lies within the study area. UNT-37 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-38 TO NORTH FORK CANOE CREEK

UNT-38 to North Fork Canoe Creek is generally dry, well-maintained roadside channel parallel to US 41. It exhibited a 1.5-foot wide by 2-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-38 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by sand and silt. No riffles were observed. Based on field observations, UNT-38 to North Fork Canoe Creek was classified as a poor-quality stream. This was supported by its HHEI score of 21. Approximately 333 linear feet of UNT-38 to North Fork Canoe Creek lies within the study area. UNT-38 to North Fork Canoe Creek is likely a WOTUS

because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

UNT-39 TO NORTH FORK CANOE CREEK

UNT-39 to North Fork Canoe Creek is dry, well-maintained roadside channel near US 41 that parallels US 41 then turns west out of the project area. It exhibited a 1.5-foot wide by 1-foot deep OHWM. Based on field observations, this stream is likely ephemeral. UNT-39 to North Fork Canoe Creek is not shown on USGS 7.5-minute series topographic mapping. The upstream drainage area associated with this stream was not available in StreamStats and is therefore assumed to be less than one square mile (USGS 2019). The substrate was dominated by sand and silt. No riffles were observed. Based on field observations, UNT-39 to North Fork Canoe Creek was classified as a very poor-quality stream. This was supported by its HHEI score of 21. Approximately 940 linear feet of UNT-39 to North Fork Canoe Creek lies within the study area. UNT-39 to North Fork Canoe Creek is likely a WOTUS because of the presence of an OHWM and its connectivity to the Ohio River (a traditionally navigable waterway).

3.2.4 OTHER WATERS

Other waters present in the I-69 ORX study area include one man-made borrow pit, which is illustrated on the maps provided in Appendix B. Approximately 13.4 acres of open water habitat (OW-1) lies within the study area. This area receives backwater flooding from the Ohio River and headwater flooding from Eagle Creek.

CHAPTER 4 – CONCLUSION

Based on the field review, the study area has features that are likely WOTUS. Sixty-eight (68) streams, totaling 34,286 linear feet, were identified within the study area. Thirteen (13) wetlands, totaling 27.09 acres were also identified within the study area. One open water feature, totaling 13.4 acres, was identified within the study area.

Efforts to avoid, minimize, and mitigate impacts to WOTUS will continue through the design phase of the project. If impacts are unavoidable, mitigation may be required. The INDOT Environmental Services Division and KYTC should be contacted immediately if impacts will occur. The final determination of jurisdictional waters is ultimately made by the USACE. This report reflects the analysis and best judgment of the wetland scientists based on the guidelines set forth by the USACE.

CHAPTER 5 – ACKNOWLEDGEMENT

This waters determination has been prepared based on the best available information, interpreted in the light of the investigator's training, experience, and professional judgement in conformance with the 1987 Corps of Engineers Wetlands Delineation Manual, the appropriate regional supplements, the USACE Jurisdictional Determination Form Instructional Guidebook, and other appropriate agency guidelines. The preliminary JD form is attached.

Printed Name	Luke F. Eggering, PWS
Signature	
Title	Project Scientist/Professional Wetland Scientist
Consultant Firm	Parsons
INDOT District	INDOT Vincennes District
KYTC District	KYTC District 2

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CHAPTER 7 – ACRONYMS

The list of acronyms is shown in the table below.

Acronym	Full Acronym Reference
DEIS	Draft Environmental Impact Statement
DEM	Digital Elevation Model
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EVCAPC	Evansville-Vanderburgh County Area Plan Commission
FHWA	Federal Highway Administration
FR	Federal Register
GIS	geographic information system
GPS	global positioning system
HHEI	Headwater Habitat Evaluation Index
HUC	hydrologic unit code
INDOT	Indiana Department of Transportation
IWSRCC	Interagency Wild and Scenic Rivers Coordinating Council
KDOW	Kentucky Division of Water
KYTC	Kentucky Transportation Cabinet
LDB	left descending bank
NOI	notice of intent
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
ORANSCO	Ohio River Valley Water Sanitation Commission
OSRW	Outstanding State Resource Water
ORX	Ohio River Crossing
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine scrub-shrub
RDB	right descending bank
RM	River Mile
ROW	right-of-way
QHEI	Qualitative Habitat Evaluation Index
SSGD	Soil Survey Geographic Database
UNT	unnamed tributary
US	United States
USACE	Department of the Army, United States Army Corps of Engineers
USGS	United States Geological Survey
WOTUS	Waters of the United States

APPENDIX A

Tables

Table 1. Mapped Soil Units within the I-69 Ohio River Crossing Project Study Area

SOIL UNIT ABBREVIATION	SOIL UNIT	HYDRIC SOIL RATING	ACREAGE WITHIN STUDY AREA	%
As	Ashton silt loam	Not Hydric (0%)	3.66	0.64
Bd	Birds silt loam	Predominantly Hydric (66-99%)	1.95	0.34
Bk	Breaks and alluvial land (wheeling)	Predominantly Non-Hydric (1-32%)	0.92	0.16
Br	Borrow pits	Not Hydric (0%)	32.42	5.65
De	Dekoven silt loam	Predominantly Hydric (66-99%)	170.84	29.77
Dw	Dekoven and Wakeland silt loams	Partially Hydric (33-65%)	27.81	4.84
Gn	Ginat silt loam	Predominantly Hydric (66-99%)	1.28	0.22
He	Henshaw silt loam, 0 to 2 percent slopes, rarely flooded	Predominantly Non-Hydric (1-32%)	38.11	6.64
Hana	Huntington fine sandy loam, 0 to 4 percent slopes (grigsby)	Predominantly Non-Hydric (1-32%)	2.82	0.49
Hsia	Huntington silt loam, 0 to 4 percent slopes, occasionally flooded	Predominantly Non-Hydric (1-32%)	8.20	1.43
Ht	Huntington silty clay loam	Not Hydric (0%)	50.72	8.84
LmF	Litz-Muskingum silt loams, 30 to 50 percent slopes	Not Hydric (0%)	8.35	1.45
Ln	Lindside silty clay loam	Predominantly Non-Hydric (1-32%)	3.25	0.57
Ma	Made land	Predominantly Non-Hydric (1-32%)	2.93	0.51
Mn	Melvin silty clay loam	Predominantly Hydric (66-99%)	9.61	1.67
Nw	Newark silty clay loam	Predominantly Non-Hydric (1-32%)	11.69	2.04
Pa	Patton silt loam, 0 to 2 percent slopes, rarely flooded	Predominantly Hydric (66-99%)	1.02	0.18
Rh	Rahm silty clay loam	Not Hydric (0%)	0.23	0.04
ScA	Sciotoville fine sandy loam, 0 to 2 percent slopes	Not Hydric (0%)	0.46	0.08
uAlfB	Alford silt loam, 2 to 6 percent slopes	Not Hydric (0%)	0.22	0.04
uAlfB2	Alford silt loam, 2 to 6 percent slopes, eroded	Not Hydric (0%)	1.71	0.30
uAlfC2	Alford silt loam, 6 to 12 percent slopes, eroded	Not Hydric (0%)	9.87	1.72
uAlfC3	Alford silt loam, 6 to 12 percent slopes, severely eroded	Not Hydric (0%)	2.28	0.40
uAlfD2	Alford silt loam, 12 to 20 percent slopes, eroded	Not Hydric (0%)	0.13	0.02
uAlfD3	Alford silt loam, 12 to 20 percent slopes, severely eroded	Not Hydric (0%)	10.13	1.77

SOIL UNIT ABBREVIATION	SOIL UNIT	HYDRIC SOIL RATING	ACREAGE WITHIN STUDY AREA	%
uAlfE	Alford silt loam, 20 to 30 percent slopes	Not Hydric (0%)	12.48	2.17
uAlfF	Alford silt loam, 30 to 60 percent slopes	Not Hydric (0%)	1.60	0.28
uBelA	Belknap silt loam, 0 to 2 percent slopes, occasionally flooded	Predominantly Non-Hydric (1-32%)	9.74	1.70
hay	Haymond silt loam, 0 to 2 percent slopes, occasionally flooded	Predominantly Non-Hydric (1-32%)	11.01	1.92
hobs	Hosmer silt loam, 2 to 6 percent slopes	Not Hydric (0%)	2.89	0.50
uHosB2	Hosmer silt loam, 2 to 6 percent slopes, eroded	Not Hydric (0%)	14.99	2.61
uHosC2	Hosmer silt loam, 6 to 12 percent slopes, eroded	Not Hydric (0%)	6.01	1.05
uHosC3	Hosmer silt loam, 6 to 12 percent slopes, severely eroded	Not Hydric (0%)	14.12	2.46
uHosD3	Hosmer silt loam, 12 to 20 percent slopes, severely eroded	Not Hydric (0%)	1.06	0.18
uUnA	Uniontown silt loam, 0 to 2 percent slopes, rarely flooded	Not Hydric (0%)	0.43	0.07
uUnB	Uniontown silt loam, 2 to 6 percent slopes, rarely flooded	Not Hydric (0%)	10.08	1.76
uWakA	Wakeland silt loam, 0 to 2 percent slopes, occasionally flooded	Predominantly Non-Hydric (1-32%)	43.37	7.56
W	Water	Not Hydric (0%)	23.92	4.17
Wb	Weinbach silt loam	Predominantly Non-Hydric (1-32%)	3.25	0.57
WhA	Wheeling loam, 0 to 2 percent slopes	Not Hydric (0%)	2.19	0.38
WhB2	Wheeling loam, 2 to 6 percent slopes, eroded	Not Hydric (0%)	3.51	0.61
Wo	Woodmere silty clay loam	Not Hydric (0%)	12.63	2.20
TOTAL			573.91	100.00

Source: NRCS 2019

Table 2: I-69 Ohio River Crossing Project Wetland Summary Table

FEATURE NAME	PHOTOGRAPH NUMBER(S)	LATITUDE	LONGITUDE	COWARDIN CLASSIFICATION ¹	WETLAND AREA (ACRES) WITHIN STUDY AREA	QUALITY	LIKELY WATER OF U.S. (Y/N)
Wetland 1	1, 5, 6, 7, 8	37.93872	-87.53858	Palustrine Emergent	0.09	Poor	Y
Wetland 2	24, 25, 26, 27, 28, 29	37.93596	-87.52557	Palustrine Forested	0.44	Poor	Y
Wetland 3	32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 51, 52, 53, 54, 55, 56	37.93583	-87.52266	Palustrine Forested	8.43	Moderate	Y
Wetland 4A	61, 62, 63, 64	37.93405	-87.52532	Palustrine Forested	2.07	Moderate	Y
Wetland 4B	67, 68, 69, 70, 71	37.93359	-87.52471	Palustrine Emergent	0.32		Y
INDIANA TOTALS					11.35		
Wetland 5A	97, 98, 99, 100, 101, 102, 106, 109	37.89997	-87.52027	Palustrine Emergent	0.93	Moderate	Y
Wetland 5B	104, 105, 107, 108, 110	37.89918	-87.52014	Palustrine Forested	0.62		Y
Wetland 5C	103	37.89983	-87.51983	Palustrine Forested	0.07		Y
Wetland 5D	111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125	37.89798	-87.51971	Palustrine Emergent	1.40		Y
Wetland 6	126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141	37.89519	-87.51862	Palustrine Forested	12.14	High	Y
Wetland 7	158, 159, 160, 161, 162, 163	37.88546	-87.51521	Palustrine Emergent	0.33	Moderate	Y
Wetland 8	172, 173, 174, 175, 176, 177	37.88162	-87.51594	Palustrine Emergent	0.18	Poor	Y
Wetland 9	262, 263, 264, 265,	37.82992	-87.56735	Palustrine Emergent	0.01	Poor	Y
Wetland 10	266, 267, 268, 269	37.82807	-87.56665	Palustrine Emergent	0.02	Poor	Y
Wetland 11	271, 272, 273	37.82723	-87.56650	Palustrine Emergent	0.01	Poor	Y
Wetland 12	276, 277, 279, 280	37.82597	-87.56587	Palustrine Emergent	0.01	Poor	Y
Wetland 13	284, 285, 286, 287	37.82465	-87.56789	Palustrine Emergent	0.02	Poor	Y
KENTUCKY TOTALS					15.74		
TOTALS					27.09		

1. Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979)

Table 3: I-69 Ohio River Crossing Project Stream Summary Table

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	OHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-1 to Eagle Creek	2, 3, 4	37.93854, -87.53897	6	<1	208	Artificial	N	N/N	27	Very poor	Y	NA	Ephemeral
UNT-2 to Eagle Creek	9, 10, 11	37.93811, -87.53802	9	6	167	Silt/Clay	N	N/N	27	Very poor	Y	NA	Ephemeral
UNT-3 to Eagle Creek	12,13, 14	37.93771, -87.53727	2	<1	560	Silt/Clay	N	N/N	11	Very poor	Y	NA	Ephemeral
UNT-4 to Eagle Creek	-	37.93881, -87.53714	N/A ⁴	N/A ⁴	226	Artificial	N	N/A ⁴	N/A ⁵	N/A ⁴	Y	0.06	Ephemeral
UNT-5 to Eagle Creek	15, 16, 17	37.93642, -87.53343	5	3	10	Silt/Clay	N	N/N	26	Very poor	Y	NA	Ephemeral
UNT-6 to Eagle Creek	18, 19	37.93664, -87.52701	3	1	318	Silt/Clay	N	N/N	21	Very poor	Y	NA	Ephemeral
UNT-7 to Eagle Creek	20, 21	37.93657, -87.52691	3	1	514	Silt/Clay	Y	N/N	21	Very poor	Y	NA	Ephemeral
UNT-8 to Eagle Creek	22, 23	37.93525, -87.52670	12	3	56	Silt/Clay	N	N/N	22	Very poor	Y	NA	Ephemeral
UNT-9 to Eagle Creek	30	37.93609, -87.52514	3	<1	146	Silt/Clay	N	N/N	22	Very poor	Y	0.25	Ephemeral
UNT-10 to Eagle Creek	31, 33	37.93675, -87.52317	3	<1	144	Silt/Clay	N	N/N	22	Very poor	Y	NA	Ephemeral
Eagle Creek	45, 46, 46, 48, 49, 50	37.93533, -87.52389	30	10	1,042	Silt	Y	N/Y	37*	Poor	Y	6.12	Perennial
UNT-11 to Eagle Creek	72, 73,	37.93345, -87.52263	2	<1	80	Silt/Clay	N	N/N	12	Very poor	Y	NA	Ephemeral

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	OHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-12 to Eagle Creek	77	37.93215, -87.52483	12	4	1,147	Silt/Clay	Y	N/N	30	Poor	Y	0.04	Ephemeral
UNT-13 to Eagle Creek	75, 76	37.93187, -87.52530	12	4	537	Silt/Clay	N	N/N	25	Very poor	Y	NA	Ephemeral
UNT-14 to Eagle Creek	81, 82	37.93053, -87.52486	3	1	834	Silt/Clay	N	N/N	20	Very poor	Y	NA	Ephemeral
INDIANA TOTALS					5,989								
Ohio River	95, 96	37.90136, -87.51918	2,029	>30	200	Silt/Sand	Y	N/N	58*	Fair	Y	205,000 ⁶	Perennial
UNT-1 to Ohio River	142, 154, 155	37.88948, -87.51613	11	3	1,716	Artificial/Gravel	Y	N/N	40	Poor	Y	NA	Ephemeral
UNT-2 to Ohio River	143, 144	37.88931, -87.51670	3	1	451	Clay/Gravel	N	N/N	19	Very poor	Y	NA	Ephemeral
UNT-3 to Ohio River	145, 146	37.88891, -87.51687	3	1	474	Silt/Gravel	N	N/N	27	Very poor	Y	NA	Ephemeral
UNT-4 to Ohio River	147, 148	37.88900, -87.51586	3	3	14	Silt/Cobble	N	N/Y	38	Poor	Y	NA	Ephemeral
UNT-5 to Ohio River	149, 150	37.88769, -87.5158	3	1	432	Gravel/Clay	N	N/Y	33	Poor	Y	NA	Ephemeral
UNT-6 to Ohio River	-	37.88709, -87.51534	3	3	42	Silt/Cobble	N	N/Y	50	Fair	Y	NA	Ephemeral
UNT-7 to Ohio River	151, 152	37.88631, -87.51586	3	1	419	Cobble/Gravel	N	N/Y	46	Fair	Y	NA	Ephemeral
UNT-8 to Ohio River	153, 156, 157	37.88630, -87.51508	3	3	60	Bedrock/Cobble	N	N/Y	30	Poor	Y	NA	Ephemeral

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	OHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-9 to Ohio River	166, 167	37.88462, -87.51585	2	<1	434	Clay/Silt	N	N/N	11	Very poor	Y	NA	Ephemeral
UNT-10 to Ohio River	164, 165	37.88478, -87.51592	2	<1	155	Clay/Leaf Pack/Woody Debris	N	N/N	12	Very poor	Y	NA	Ephemeral
UNT-11 to Ohio River	170, 171	37.88347, -87.51491	5	2	878	Clay/Silt	N	N/N	26	Very poor	Y	NA	Ephemeral
UNT-12 to Ohio River	168, 169	37.88447, -87.51457	3	2	113	Clay/Silt	N	N/N	16	Very poor	Y	NA	Ephemeral
UNT-1 to North Fork Canoe Creek	178, 179	37.88112, -87.51607	3	2	494	Clay/Silt	N	N/N	25	Very poor	Y	NA	Ephemeral
UNT-2 to North Fork Canoe Creek	180, 181, 182	37.87914, -87.51703	8	6	306	Clay/Silt	N	N/N	25	Very poor	Y	0.03	Ephemeral
UNT-3 to North Fork Canoe Creek	183, 184	37.87794, -87.51793	<1	<1	328	Silt/Leaf Pack/Woody Debris	N	N/N	14	Very poor	Y	0.04	Ephemeral
UNT-4 to North Fork Canoe Creek	190, 191	37.87351, -87.52187	4	2	321	Silt/Sand	N	N/N	41	Poor	Y	0.03	Ephemeral
UNT-5 to North Fork Canoe Creek	192, 193	37.87109, -87.52359	6	3	302	Silt/Cobble	N	N/N	43	Fair	Y	0.06	Ephemeral
UNT-6 to North Fork Canoe Creek	194	37.85822, -87.53216	14	8	880	Silt/Gravel	Y	N/N	45	Fair	Y	0.67	Ephemeral
UNT-7 to North Fork Canoe Creek	195, 196	37.86429, -87.53661	12	8	183	Silt/Gravel	N	N/N	35	Poor	Y	0.04	Ephemeral

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	OHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-8 to North Fork Canoe Creek	197, 198	37.86399, -87.53151	5	1.5	160	Silt/Gravel	N	N/N	30	Poor	Y	<1	Ephemeral
UNT-9 to North Fork Canoe Creek	199, 200	37.86229, -87.52767	20	10	1,802	Silt/Sand	Y	N/N	41	Poor	Y	0.87	Ephemeral
UNT-10 to North Fork Canoe Creek	-	37.86149, -87.52348	3	1	82	Silt/Sand	N	N/N	34.5	Poor	Y	0.11	Ephemeral
UNT-11 to North Fork Canoe Creek	201, 202	37.86199, -87.52138	11	4	737	Silt/Clay	N	N/N	31	Poor	Y	NA	Ephemeral
UNT-12 to North Fork Canoe Creek	203, 204, 212	37.86127, -87.51739	11	10	289	Silt/Sand	Y	N/N	37	Poor	Y	0.64	Ephemeral
UNT-13 to North Fork Canoe Creek	205, 206	37.86156, -87.51632	9	10	360	Silt/Sand	Y	N/Y	34.5*	Poor	Y	1.77	Ephemeral
UNT-14 to North Fork Canoe Creek	207, 208	37.86135, -87.51653	4	1.5	36	Silt/Sand	N	N/N	27	Very poor	Y	NA	Ephemeral
UNT-15 to North Fork Canoe Creek	-	37.85914, -87.52828	3	1	59	Silt/Sand	N	N/N	26	Very poor	Y	NA	Ephemeral
UNT-16 to North Fork Canoe Creek	209, 210, 212	37.85811, -87.53069	4	1.5	267	Silt/Sand	N	N/N	26	Very poor	Y	NA	Ephemeral
UNT-17 to North Fork Canoe Creek	220, 221	37.85428, -87.54710	13	7	780	Silt/Clay	N	N/N	36	Poor	Y	0.50	Ephemeral

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	OHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-18 to North Fork Canoe Creek	222, 223	37.8546, -87.54706	4	4	241	Silt/Clay	N	N/N	21	Very poor	Y	NA	Ephemeral
UNT-19 to North Fork Canoe Creek	224, 225	37.85418, -87.54681	9	6	234	Silt/Clay	N	N/N	26	Very poor	Y	NA	Ephemeral
UNT-20 to North Fork Canoe Creek	227	37.85358, -87.55093	14	8	490	Silt/Gravel	N	N/N	45	Fair	Y	NA	Ephemeral
UNT-21 to North Fork Canoe Creek	235, 236, 237	37.84837, -87.56449	9	6	1,840	Silt/Gravel	Y	N/N	35	Poor	Y	0.73	Intermittent
UNT-22 to North Fork Canoe Creek	238, 239	37.84708, -87.56247	3	1	234	Silt/Sand	N	N/N	26	Very poor	Y	NA	Ephemeral
UNT-23 to North Fork Canoe Creek	-	37.84653, -87.56203	9	6	16	Silt/Hardpan	N	N/Y	32*	Poor	Y	1.54	Ephemeral
UNT-24 to North Fork Canoe Creek	242, 243	37.84950, -87.567811	3	1	81	Silt/Clay	N	N/N	11	Very poor	Y	NA	Ephemeral
UNT-25 to North Fork Canoe Creek	244, 245	37.84594, -87.56666	1.5	1	1,673	Silt/Clay	N	N/N	11	Very poor	Y	NA	Ephemeral
UNT-26 to North Fork Canoe Creek	246, 247	37.84578, -87.56601	1.5	1	1,753	Silt/Sand	N	N/N	32	Poor	Y	NA	Ephemeral
North Fork Canoe Creek	250, 251, 252, 253	37.84439, -87.56658	35	12	1,596	Silt/Cobble	Y	N/Y	38*	Poor	Y	13.30	Perennial

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	OHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-27 to North Fork Canoe Creek	248, 249	37.84535, -87.567003	15	6	601	Silt/Sand	N	N/N	41	Poor	Y	NA	Ephemeral
UNT-28 to North Fork Canoe Creek	260, 261	37.84233, -87.56585	3	2	1,697	Silt/Gravel	N	N/N	30	Poor	Y	NA	Ephemeral
UNT-29 to North Fork Canoe Creek	254, 255, 256	37.84309, -87.56512	4	2	1,619	Silt/Gravel	N	N/N	30	Poor	Y	NA	Ephemeral
UNT-30 to North Fork Canoe Creek	257, 258	37.84270, -87.56488	4	2	458	Silt/Gravel	N	N/N	30	Poor	Y	NA	Ephemeral
UNT-31 to North Fork Canoe Creek	259	37.84267, -87.56476	4	1	405	Silt/Gravel	N	N/N	30	Poor	Y	NA	Ephemeral
UNT-32 to North Fork Canoe Creek	275	37.82629, -87.56612	1.5	1	378	Sand/Silt	N	N/N	16	Very poor	Y	NA	Ephemeral
UNT-33 to North Fork Canoe Creek	276, 278	37.82579, -87.56576	1.5	1	208	Sand/Silt	N	N/N	16	Very poor	Y	NA	Ephemeral
UNT-34 to North Fork Canoe Creek	283, 285, 286, 288	37.82556, -87.56645	2	2	286	Sand/Silt	N	N/N	16	Very poor	Y	NA	Ephemeral
UNT-35 to North Fork Canoe Creek	-	37.82194, -87.56839	1.5	1	181	Sand/Silt	N	N/N	16	Very poor	Y	NA	Ephemeral
UNT-36 to North Fork Canoe Creek	296, 297, 299	37.81462, -87.56305	15	6	259	Sand/Gravel	Y	N/Y	34.5*	Poor	Y	2.43	Perennial

FEATURE NAME	PHOTO NUMBER (S)	LATITUDE, LONGITUDE	OHWM WIDTH (FEET)	OHWM DEPTH (FEET)	LENGTH WITHIN STUDY AREA (FEET)	PREDOMINANT SUBSTRATE (S) ¹	USGS BLUE-LINE (Y/N)	RIFFLES /POOLS (Y/N)	QHEI/ HHEI SCORE ²	QUALITATIVE QUALITY RATING ³	LIKELY WATER OF U.S. (Y/N)	UPSTREAM DRAINAGE AREA ⁴ (SQUARE MILES)	STREAM TYPE
UNT-37 to North Fork Canoe Creek	293, 295, 297	37.81475, -87.56277	2	0.5	0	Sand/Silt	N	N/N	21	Very poor	Y	NA	Ephemeral
UNT-38 to North Fork Canoe Creek	298, 300	37.81400, -87.56299	1.5	2.0	333	Sand/Silt	N		21	Very poor	Y	NA	Ephemeral
UNT-39 to North Fork Canoe Creek	301, 302, 304	37.80921, -87.56422	1.5	1.0	940	Sand/Silt	N	N/Y	21	Very poor	Y	NA	Ephemeral
KENTUCKY TOTALS					28,297								
TOTALS					34,286								

Notes:

1. Only the predominant substrate(s), as indicated on the HHEI/QHEI, is/are listed.
2. Values listed are HHEI, except where noted by (*), which are QHEI values.
3. The qualitative quality rating is based on ranges presented in the Ohio EPA Qualitative Habitat Evaluation Index (QHEI) ([Ohio EPA 2006](#)).
4. The upstream drainage area for each stream was calculated using StreamStats Version 4.3 ([USGS 2019](#)).
5. UNT-4 to Eagle Creek through the study area is entirely encapsulated in a culvert. Since UNT-4 to Eagle Creek was not visible within the study area, this data is not available.
6. StreamStats data is not available for the Ohio River within the Study Area. Drainage data was obtained from the Ohio River Valley Water Sanitation Commission ([ORANSCO 2019](#)).

APPENDIX B

Mapping

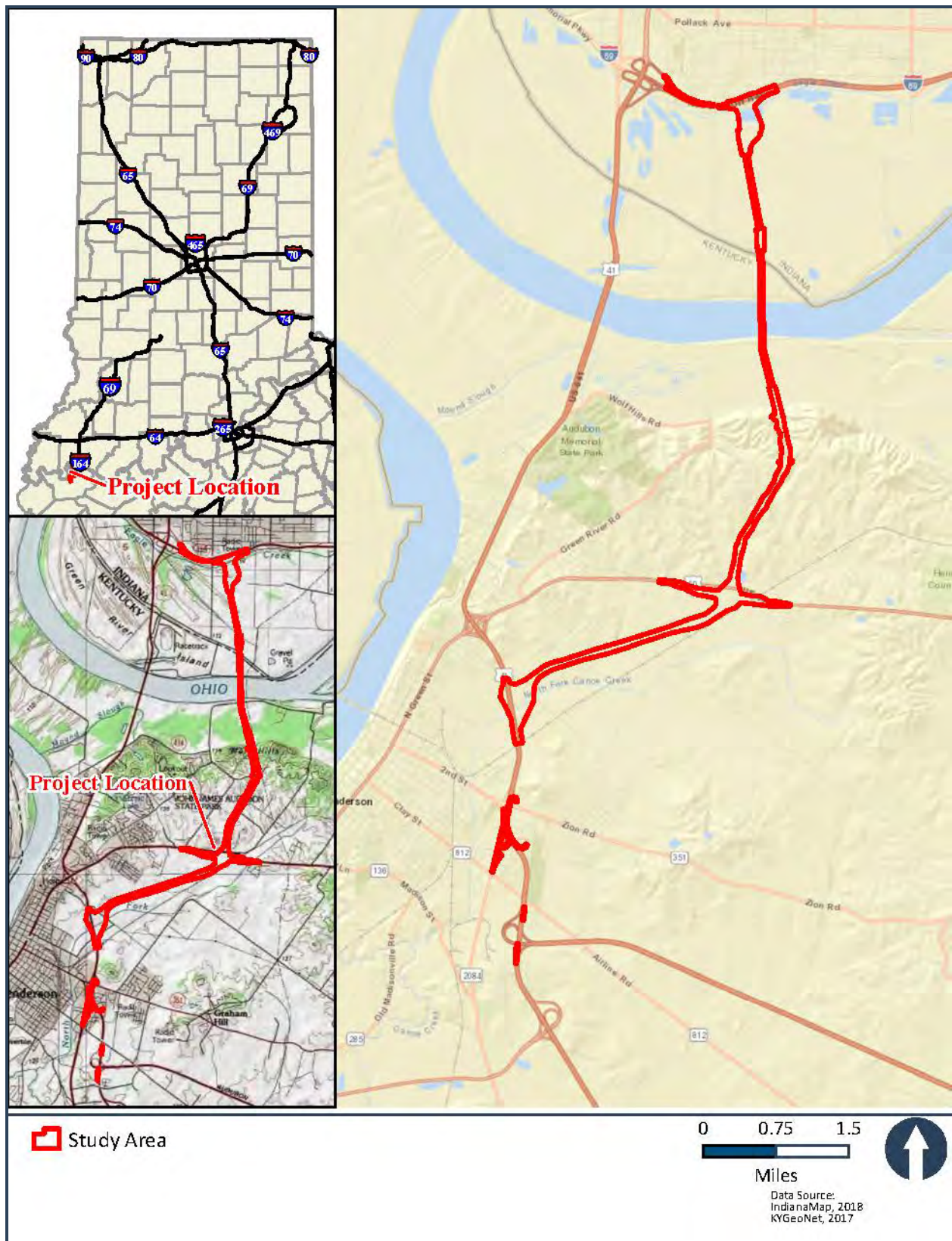


Figure 1. I-69 ORX Project Location Map

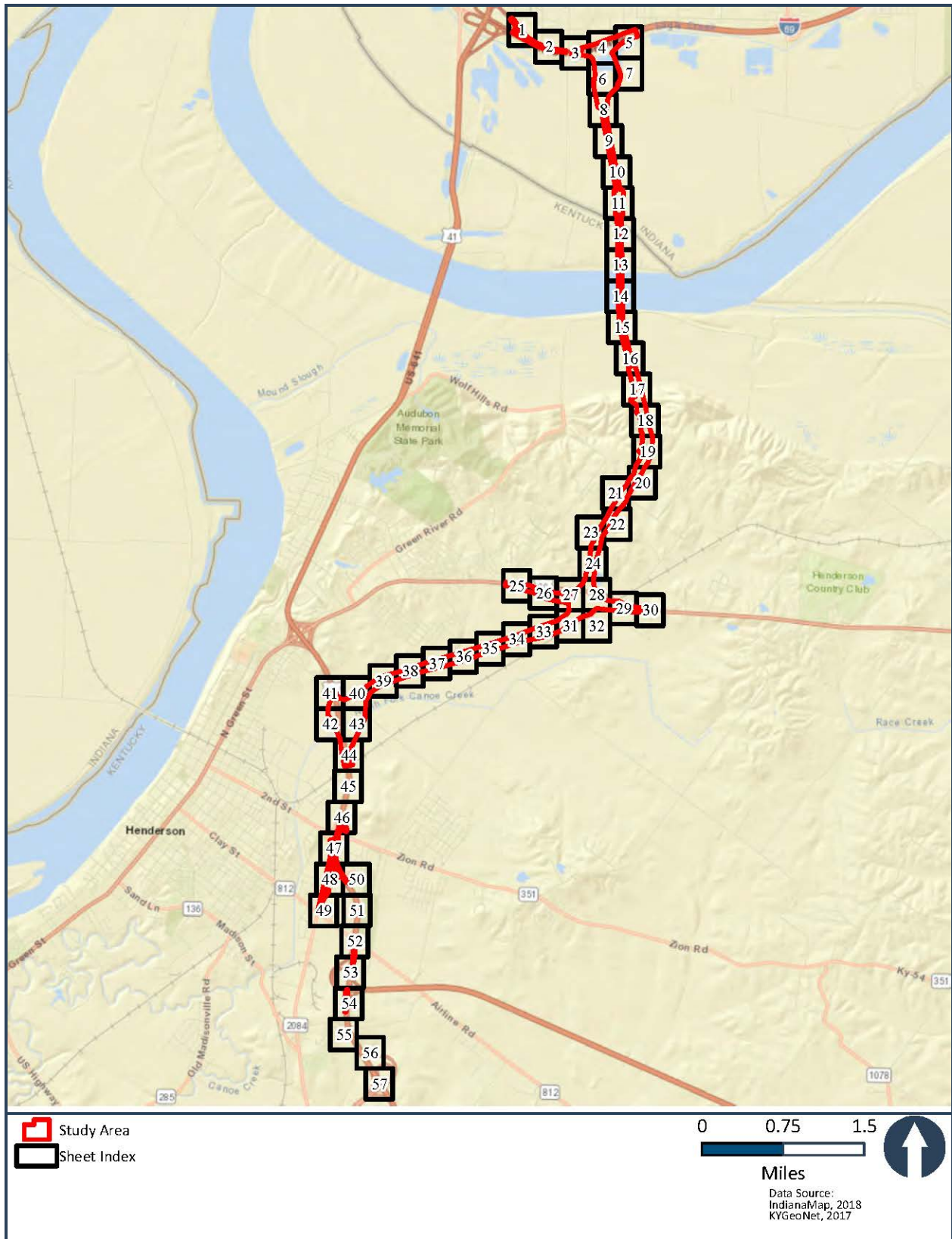


Figure 2. I-69 ORX Project Index Map

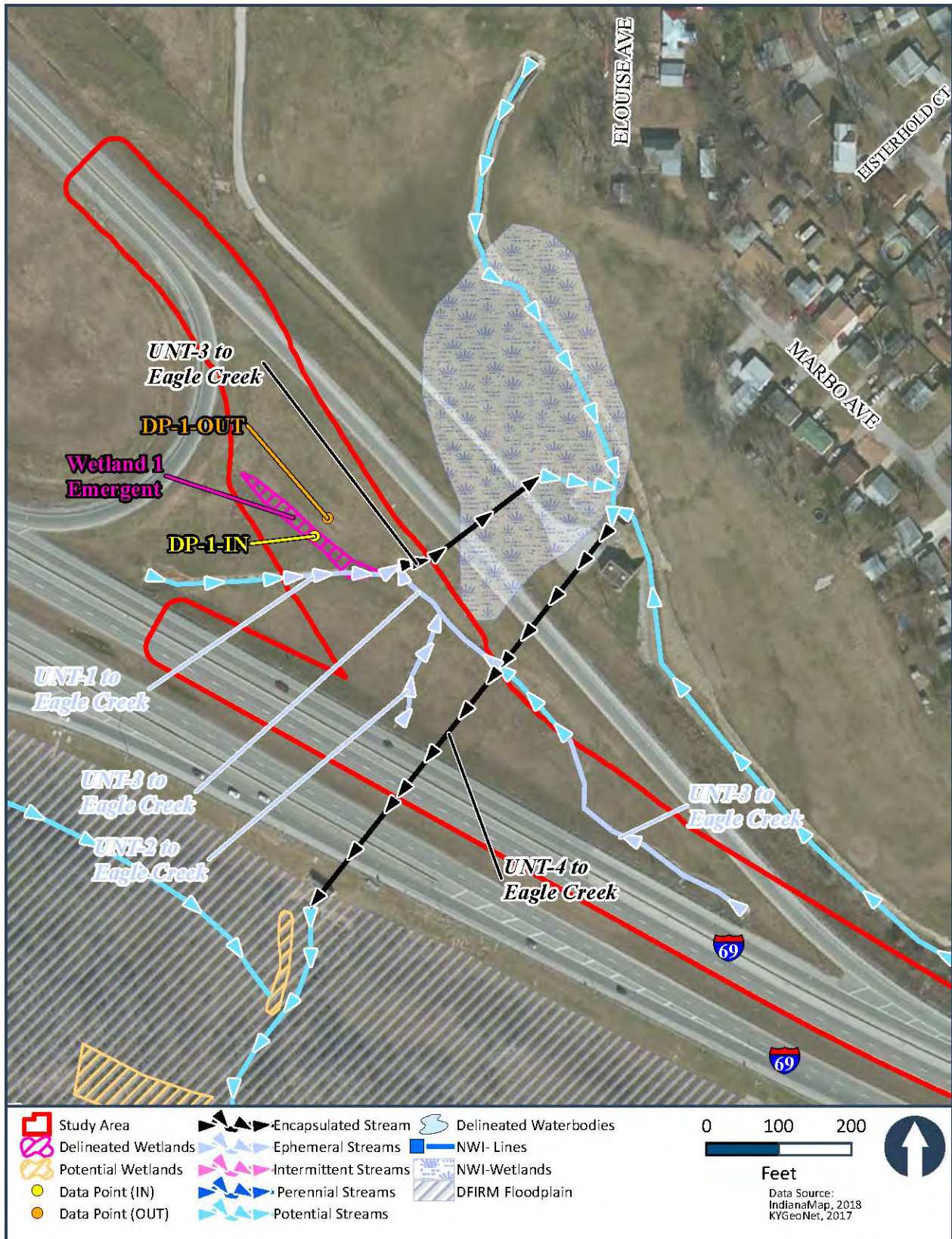


Figure 3. I-69 ORX NWI Maps (1 of 57)



Figure 3. I-69 ORX NWI Maps (2 of 57)

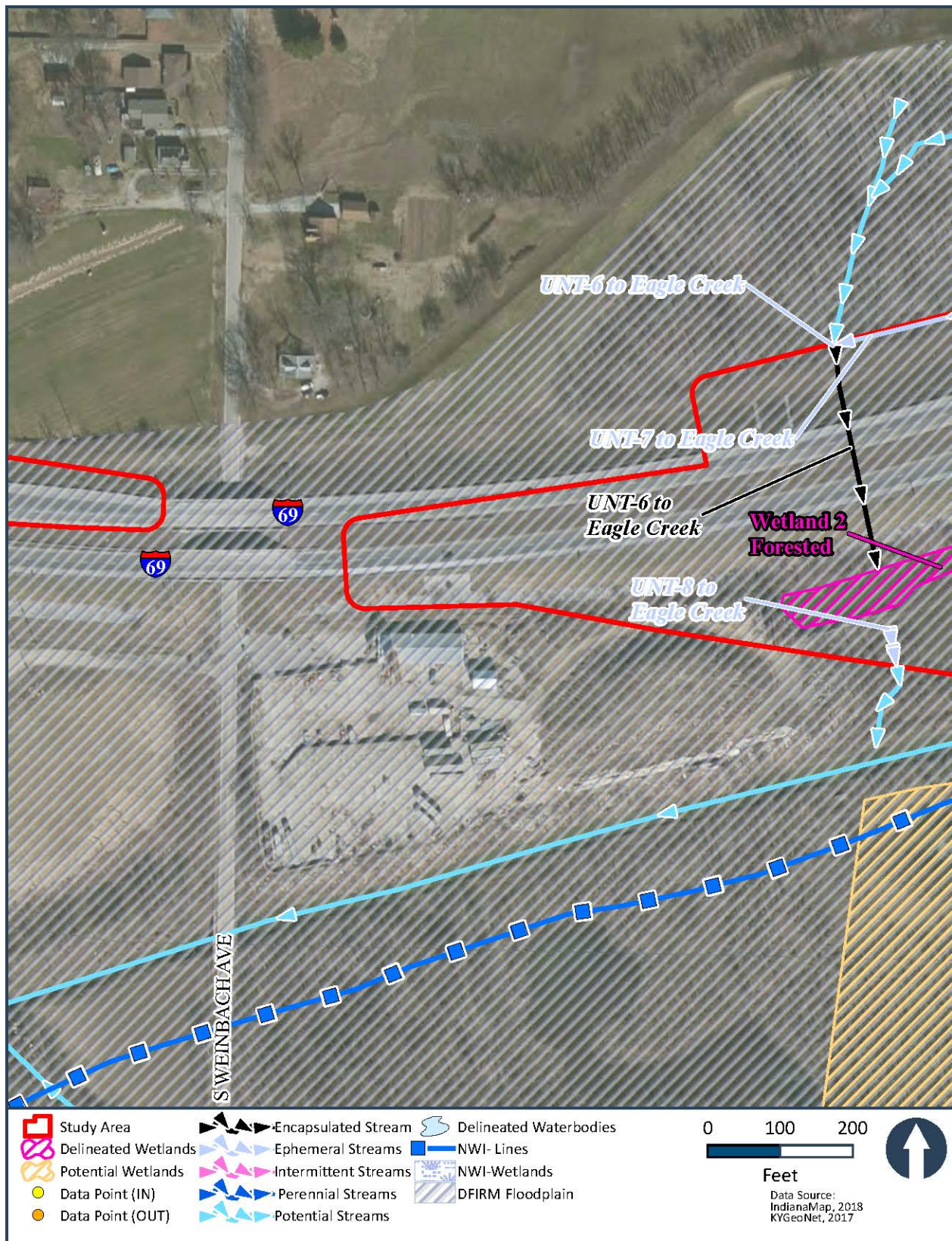


Figure 3. I-69 ORX NWI Maps (3 of 57)

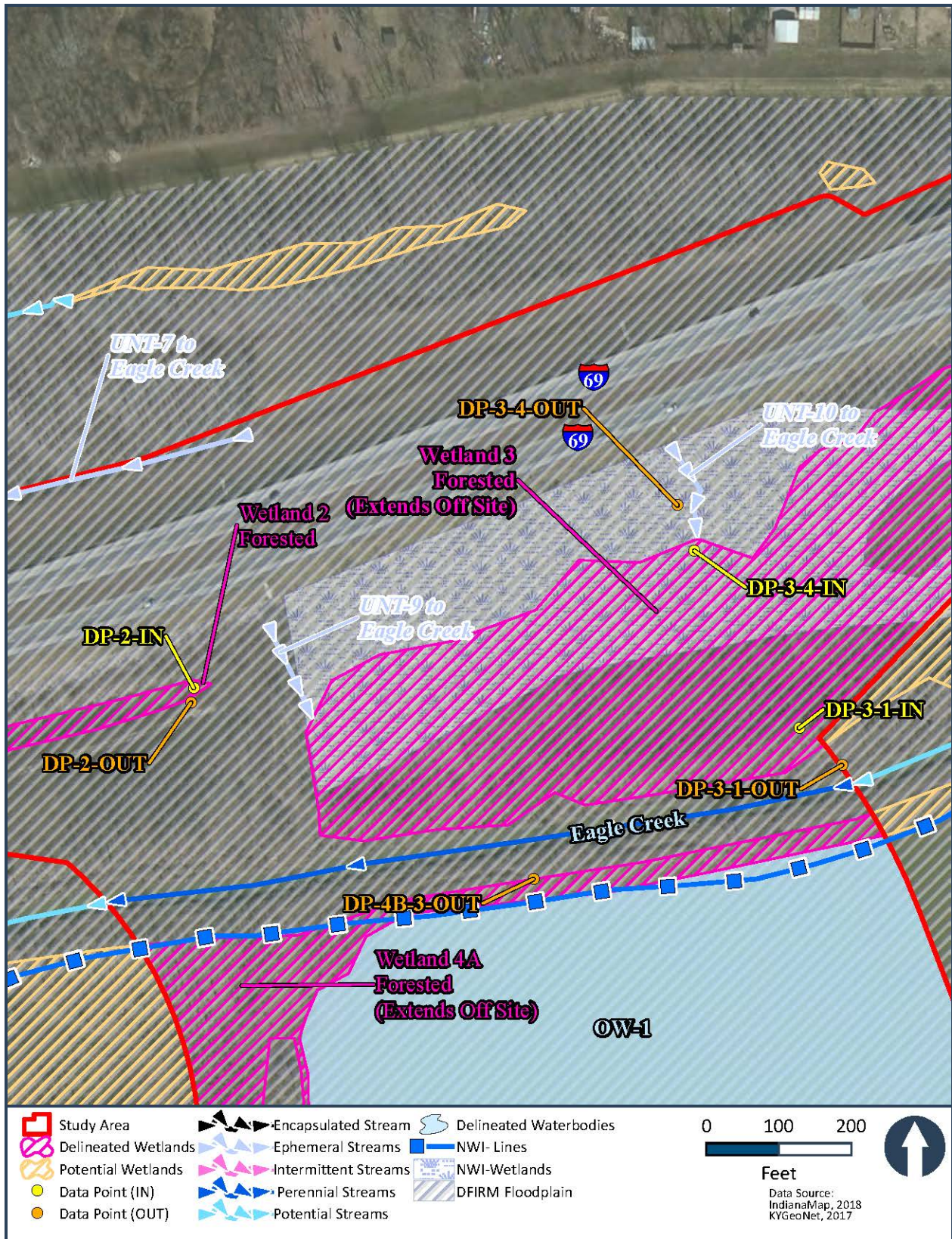


Figure 3. I-69 ORX NWI Maps (4 of 57)

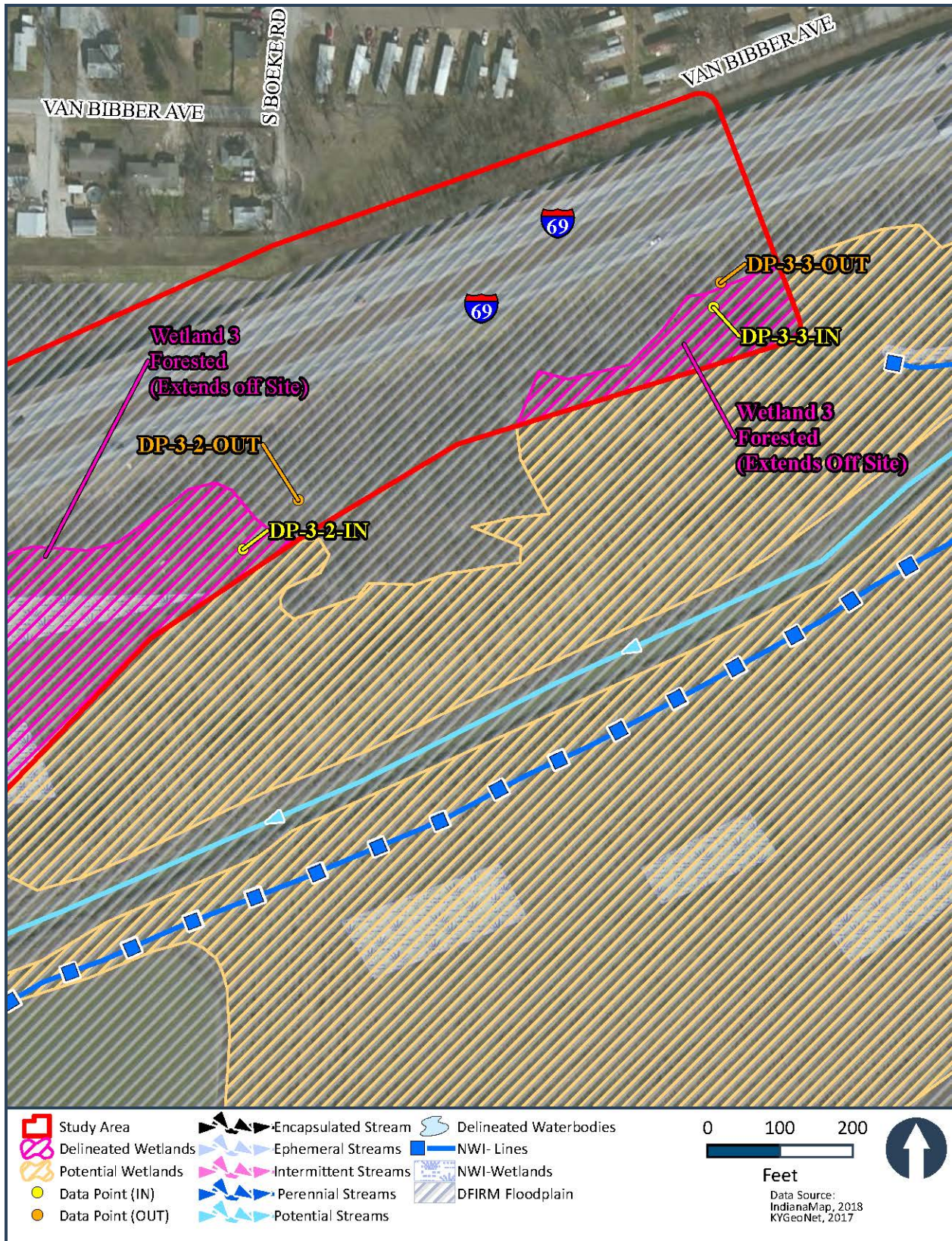


Figure 3. I-69 ORX NWI Maps (5 of 57)

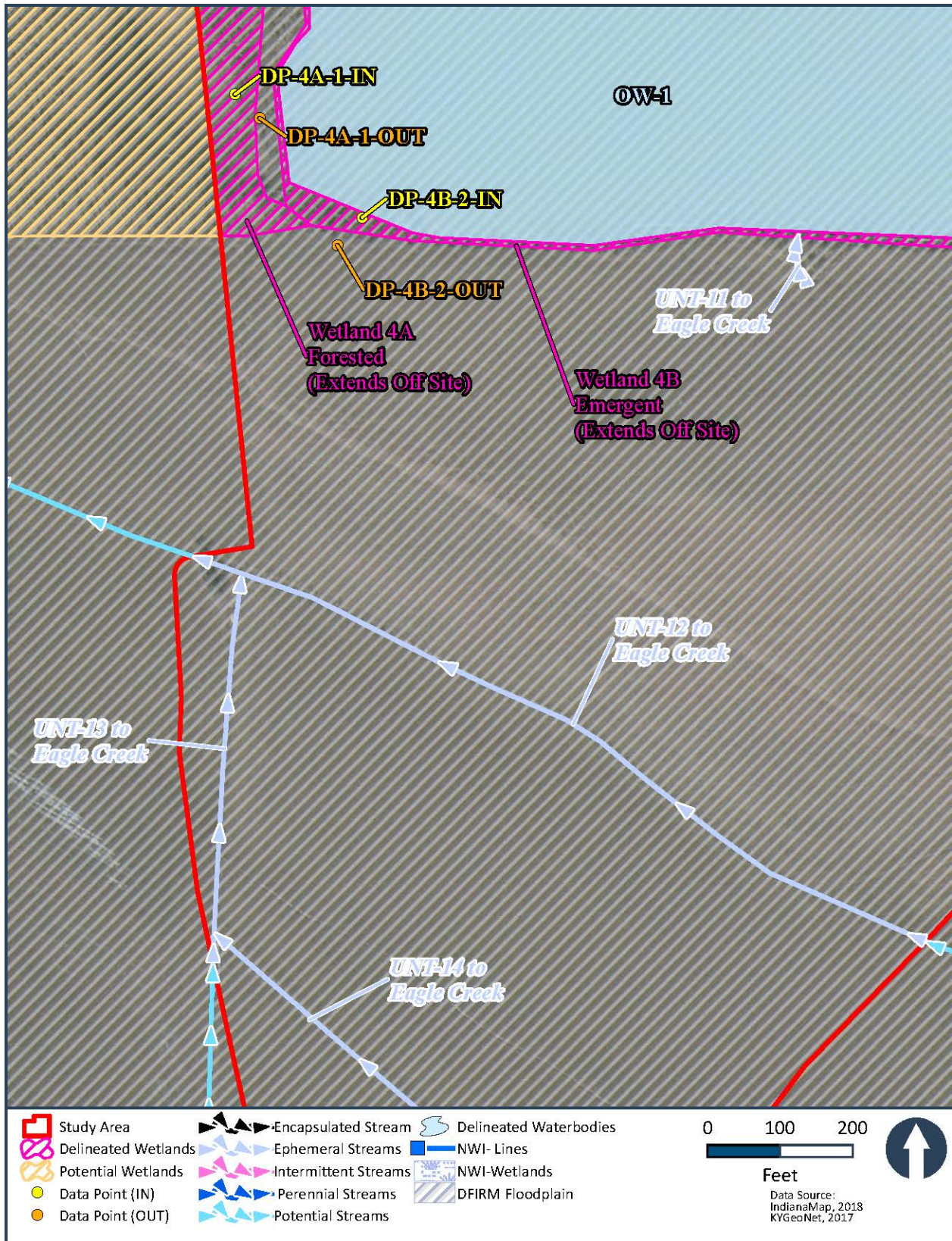


Figure 3. I-69 ORX NWI Maps (6 of 57)

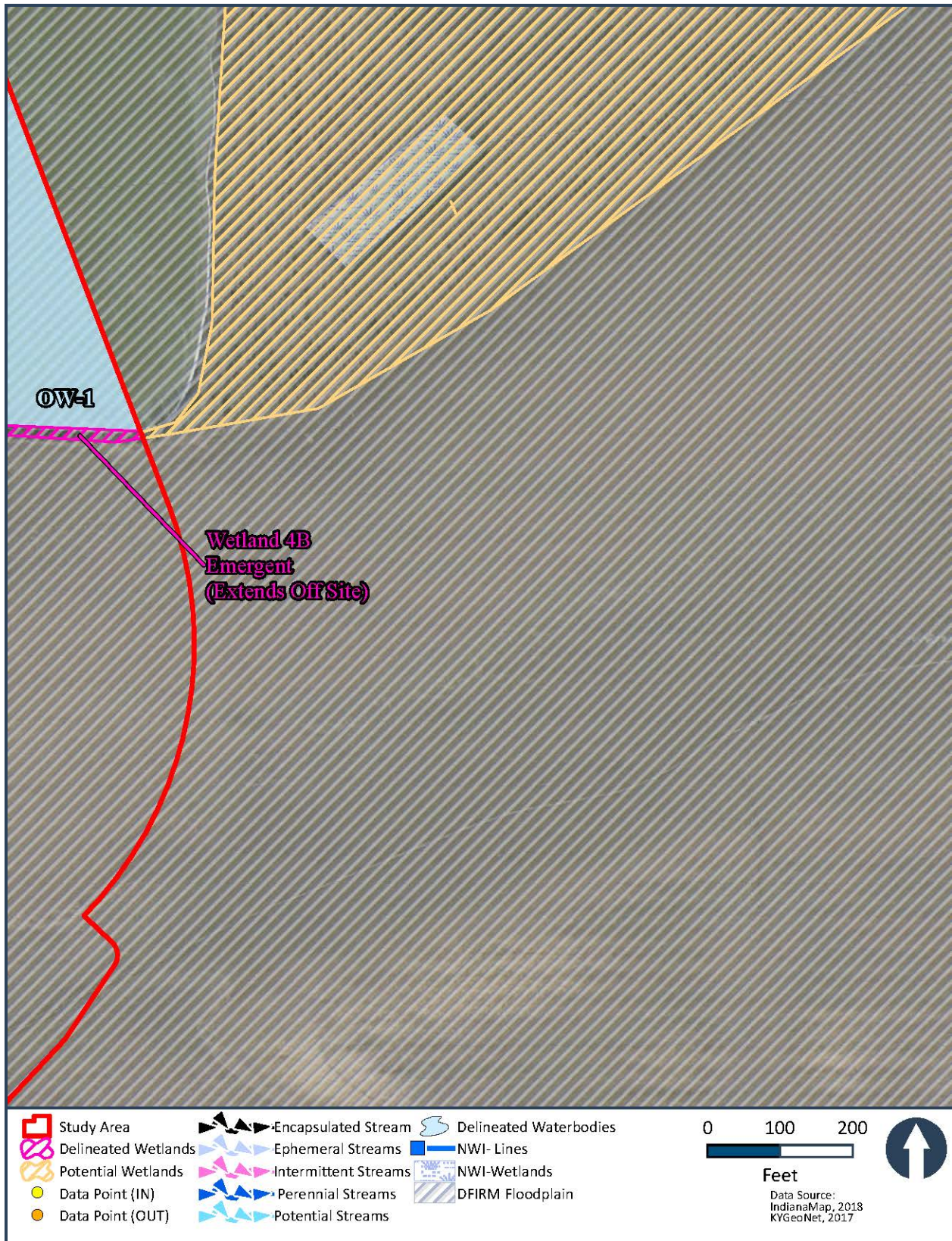


Figure 3. I-69 ORX NWI Maps (7 of 57)

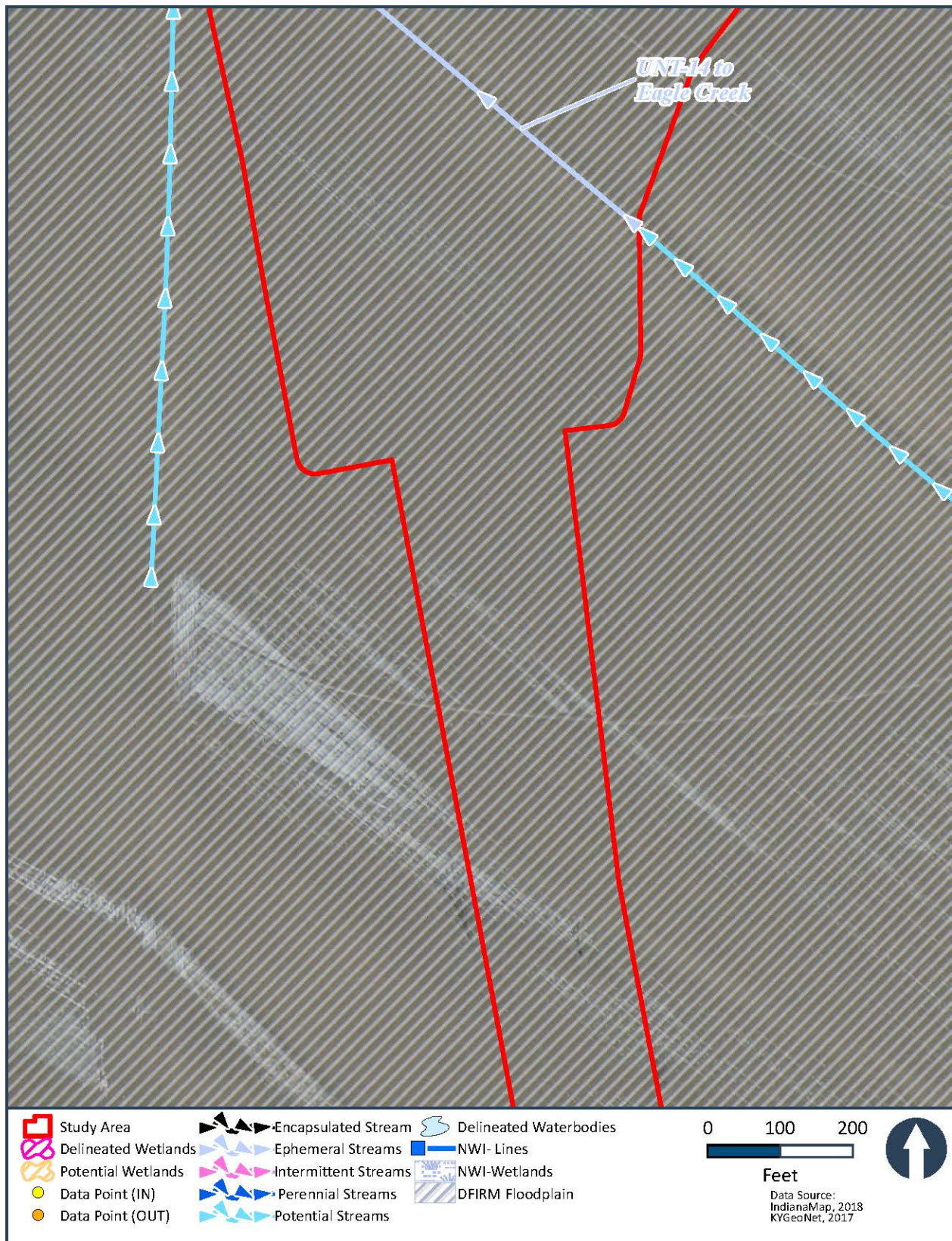


Figure 3. I-69 ORX NWI Maps (8 of 57)



Figure 3. I-69 ORX NWI Maps (9 of 57)



Figure 3. I-69 ORX NWI Maps (10 of 57)

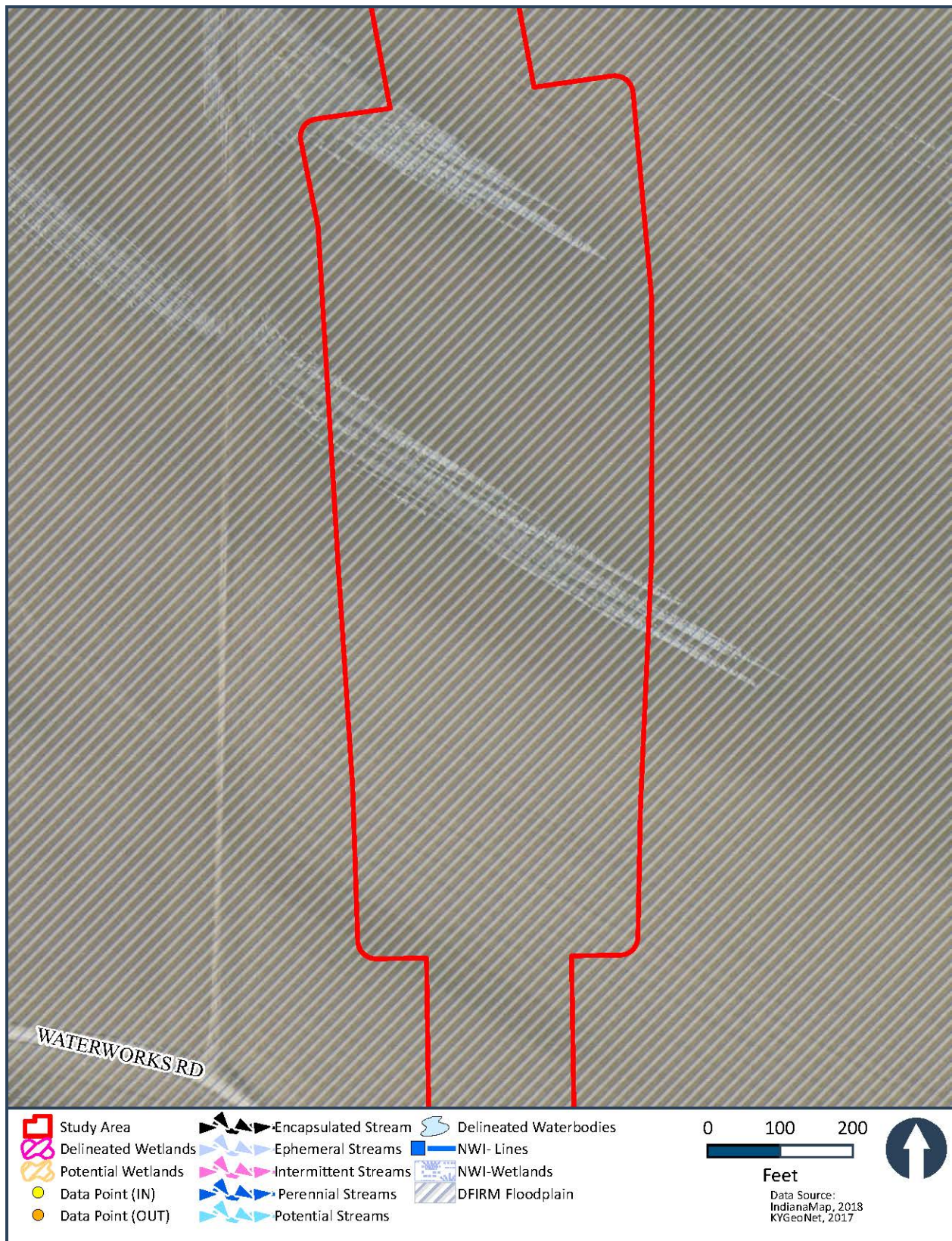


Figure 3. I-69 ORX NWI Maps (11 of 57)



Figure 3. I-69 ORX NWI Maps (12 of 57)



Figure 3. I-69 ORX NWI Maps (13 of 57)

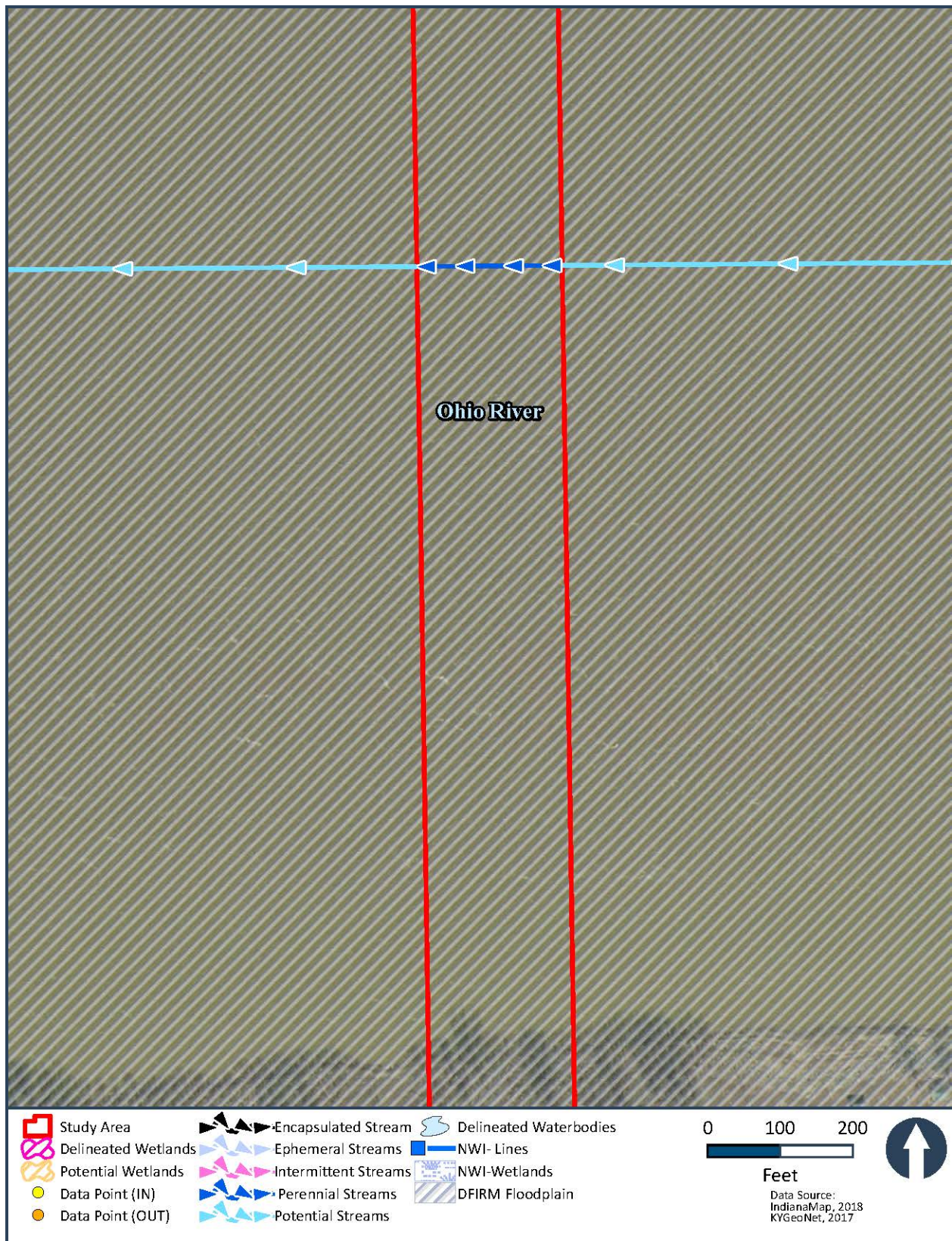


Figure 3. I-69 ORX NWI Maps (14 of 57)

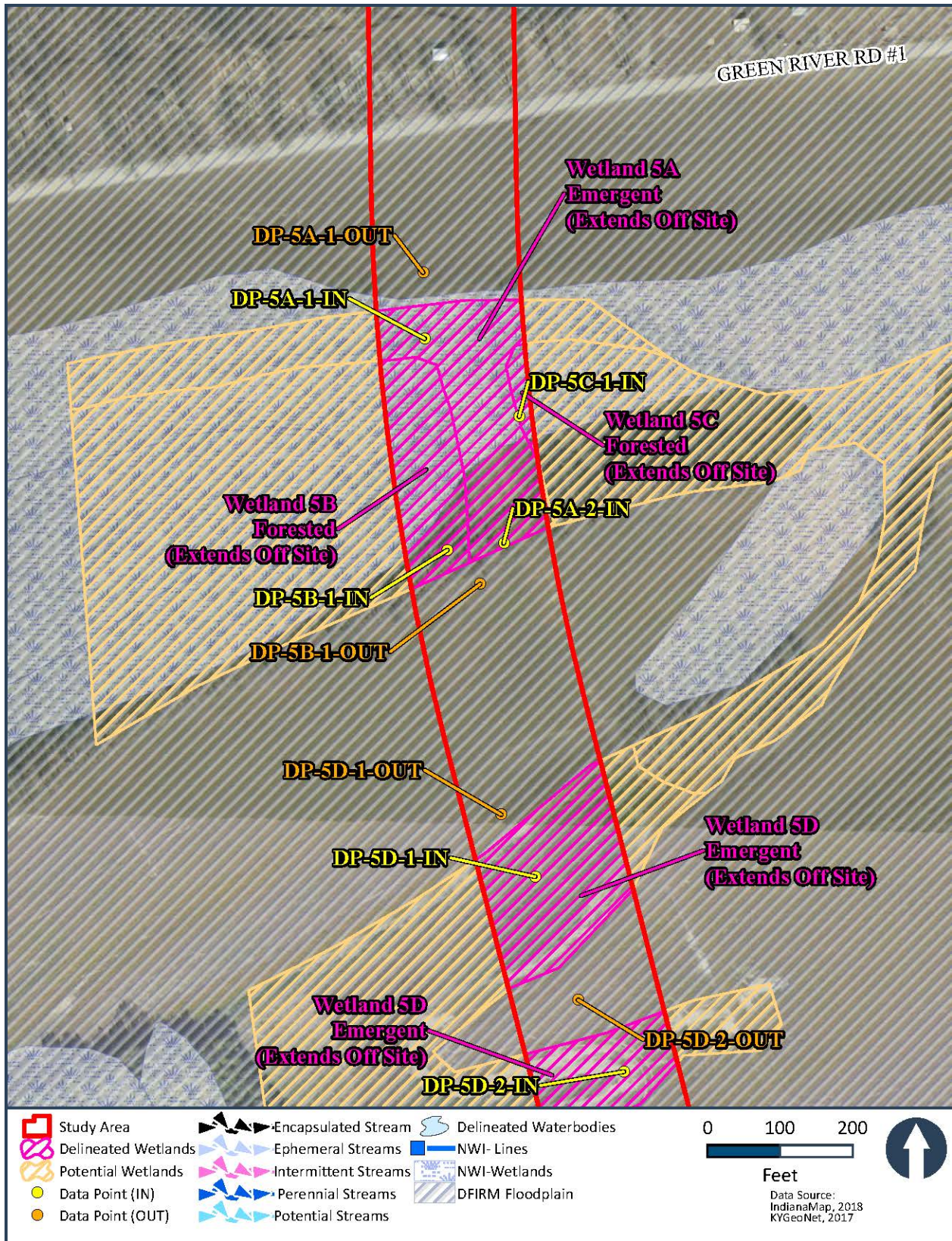


Figure 3. I-69 ORX NWI Maps (15 of 57)

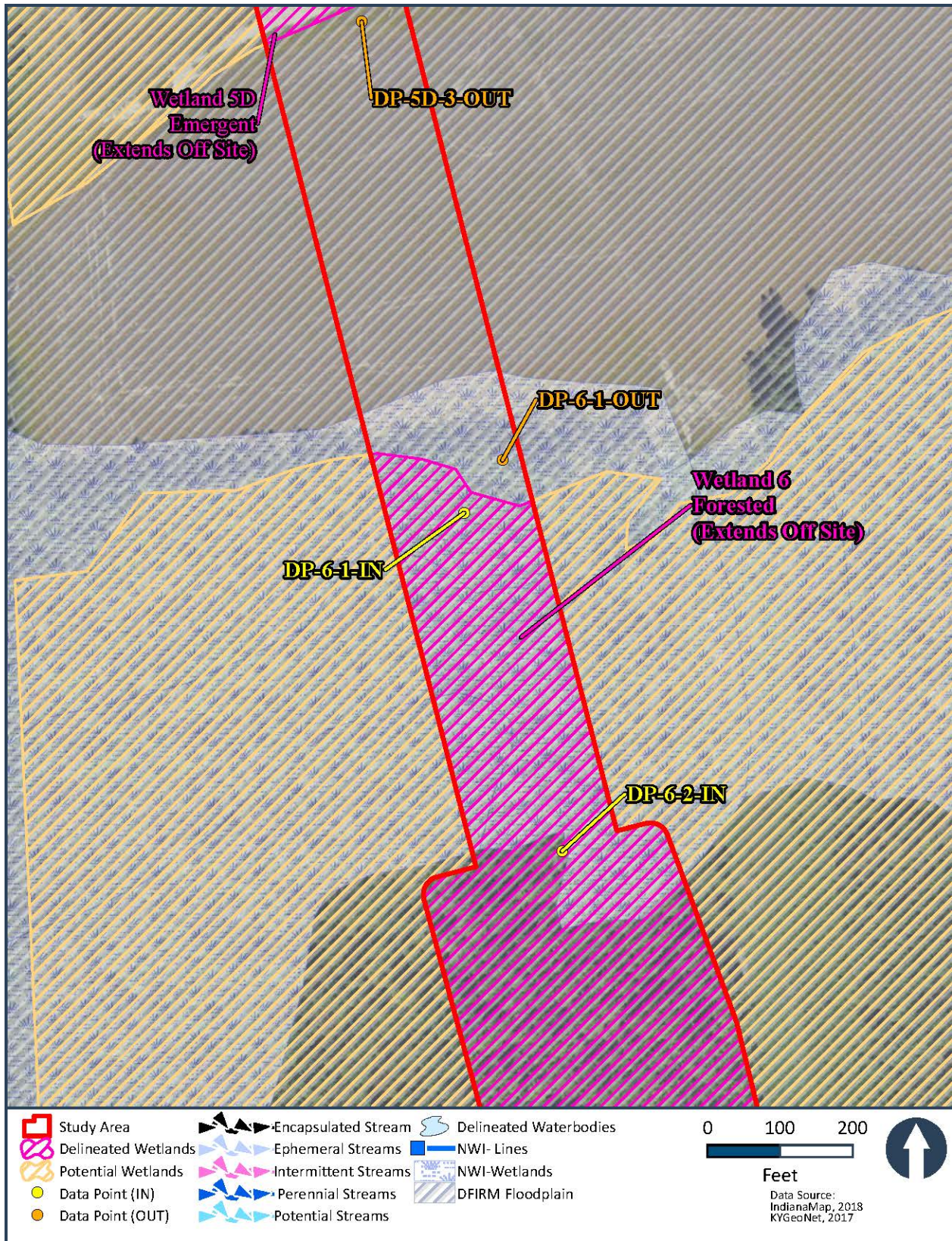


Figure 3. I-69 ORX NWI Maps (16 of 57)

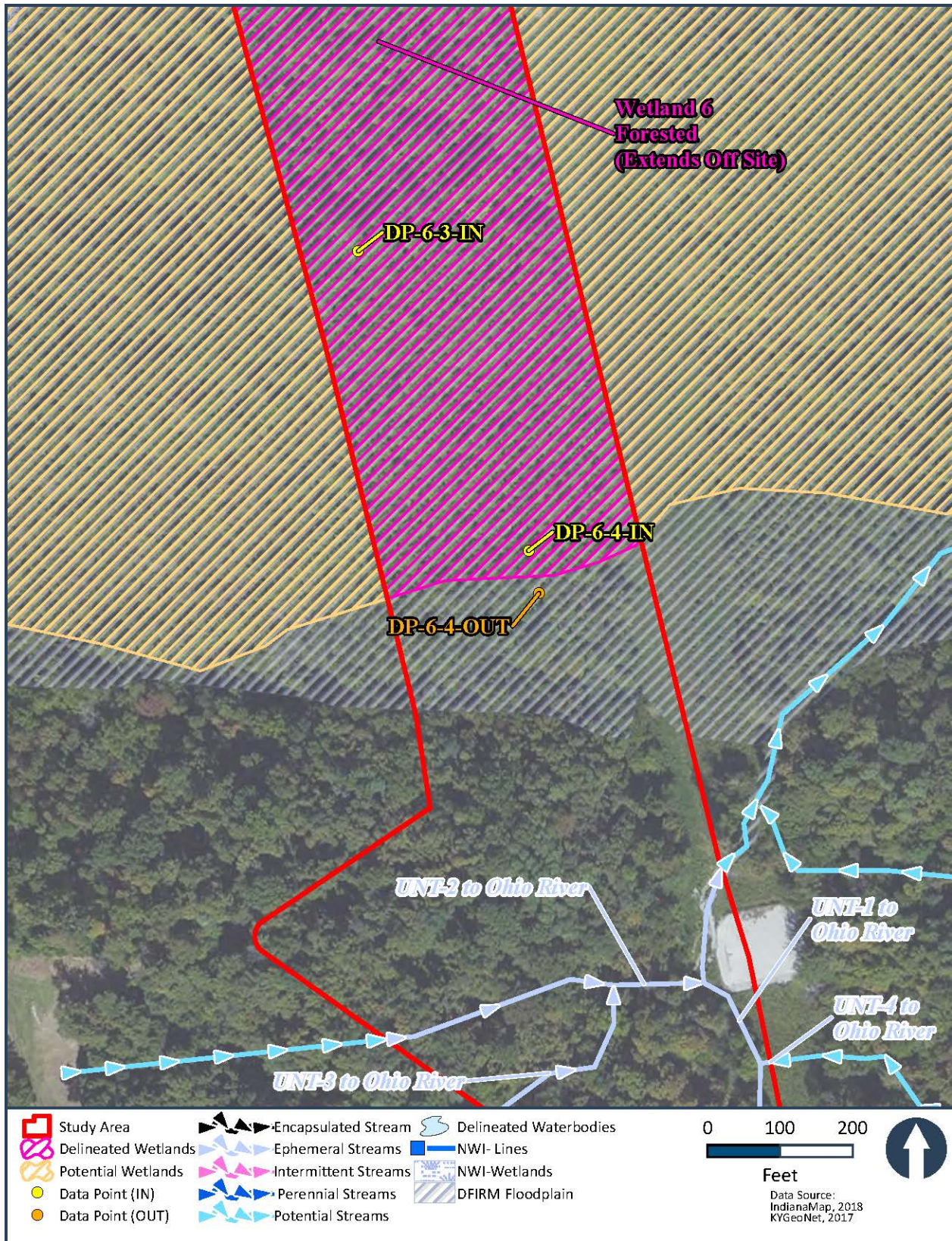


Figure 3. I-69 ORX NWI Maps (17 of 57)

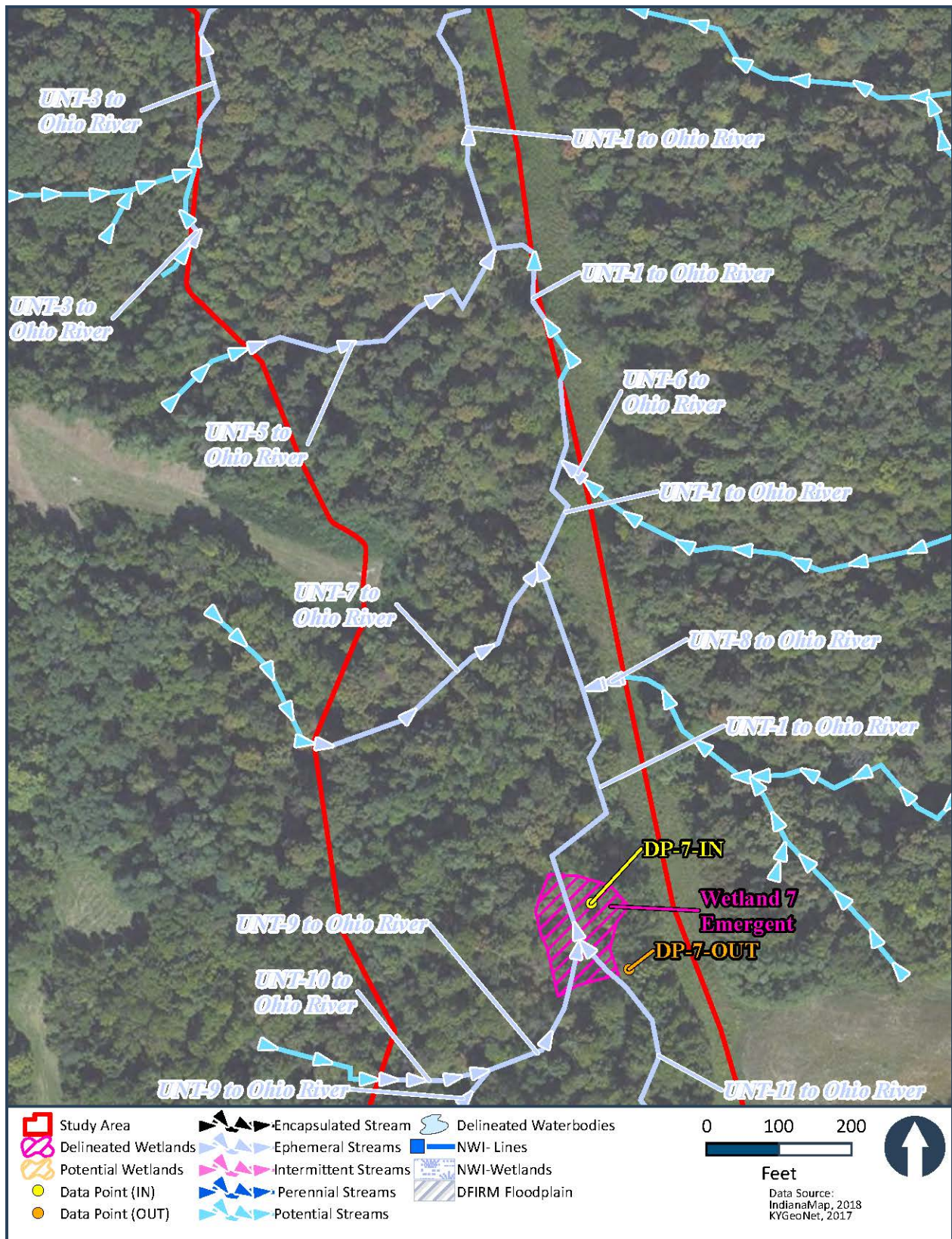


Figure 3. I-69 ORX NWI Maps (18 of 57)

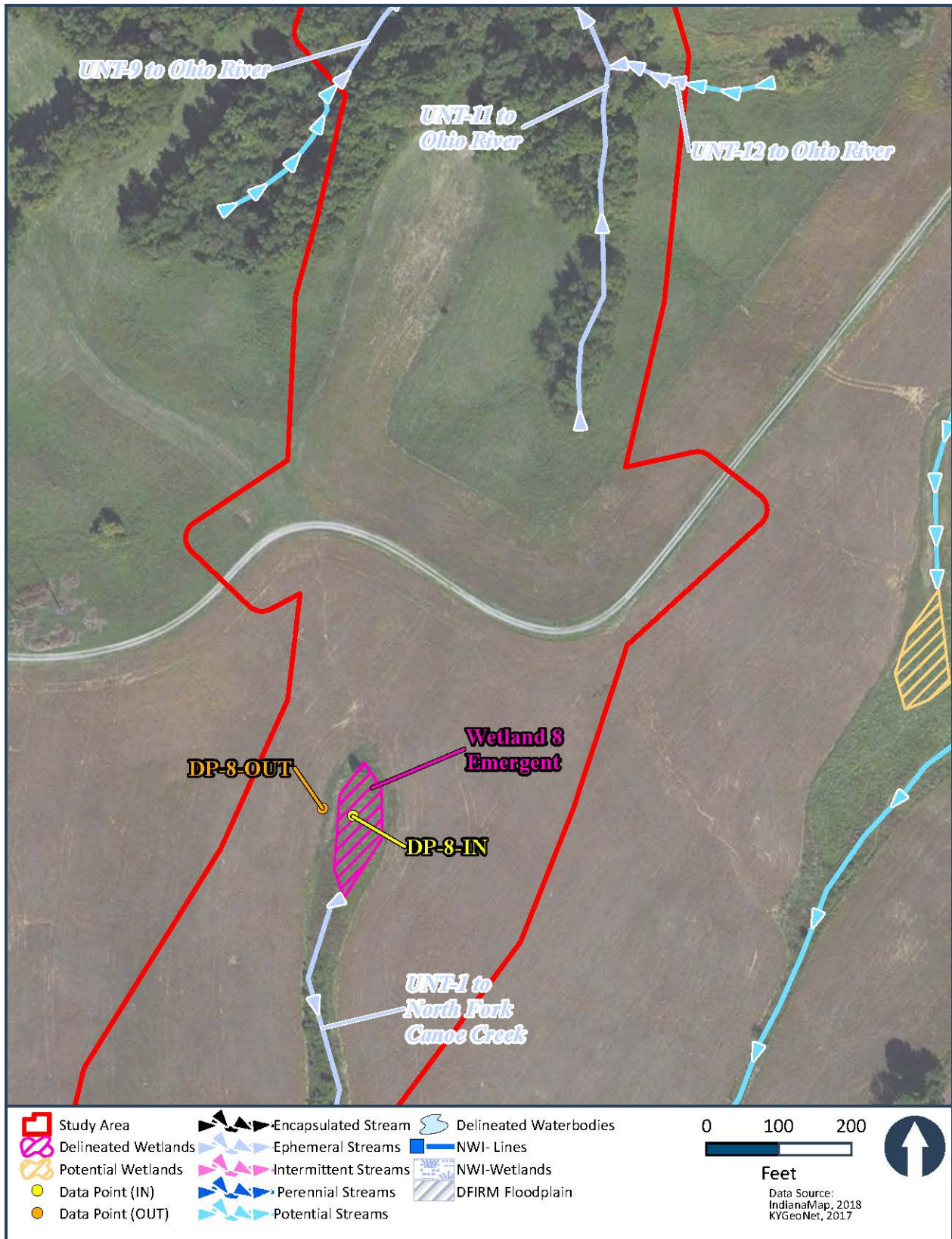


Figure 3. I-69 ORX NWI Maps (19 of 57)

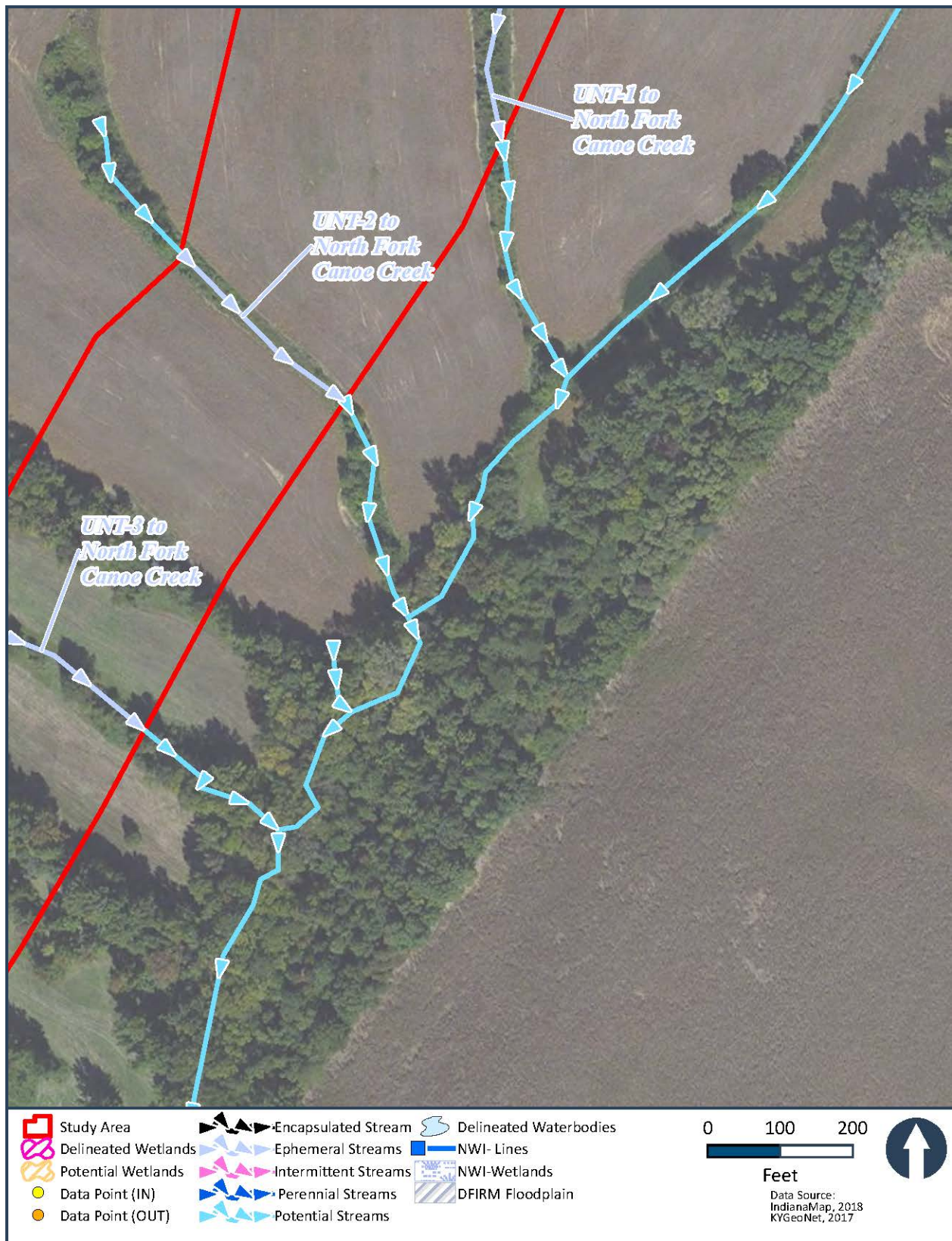


Figure 3. I-69 ORX NWI Maps (20 of 57)



Figure 3. I-69 ORX NWI Maps (21 of 57)

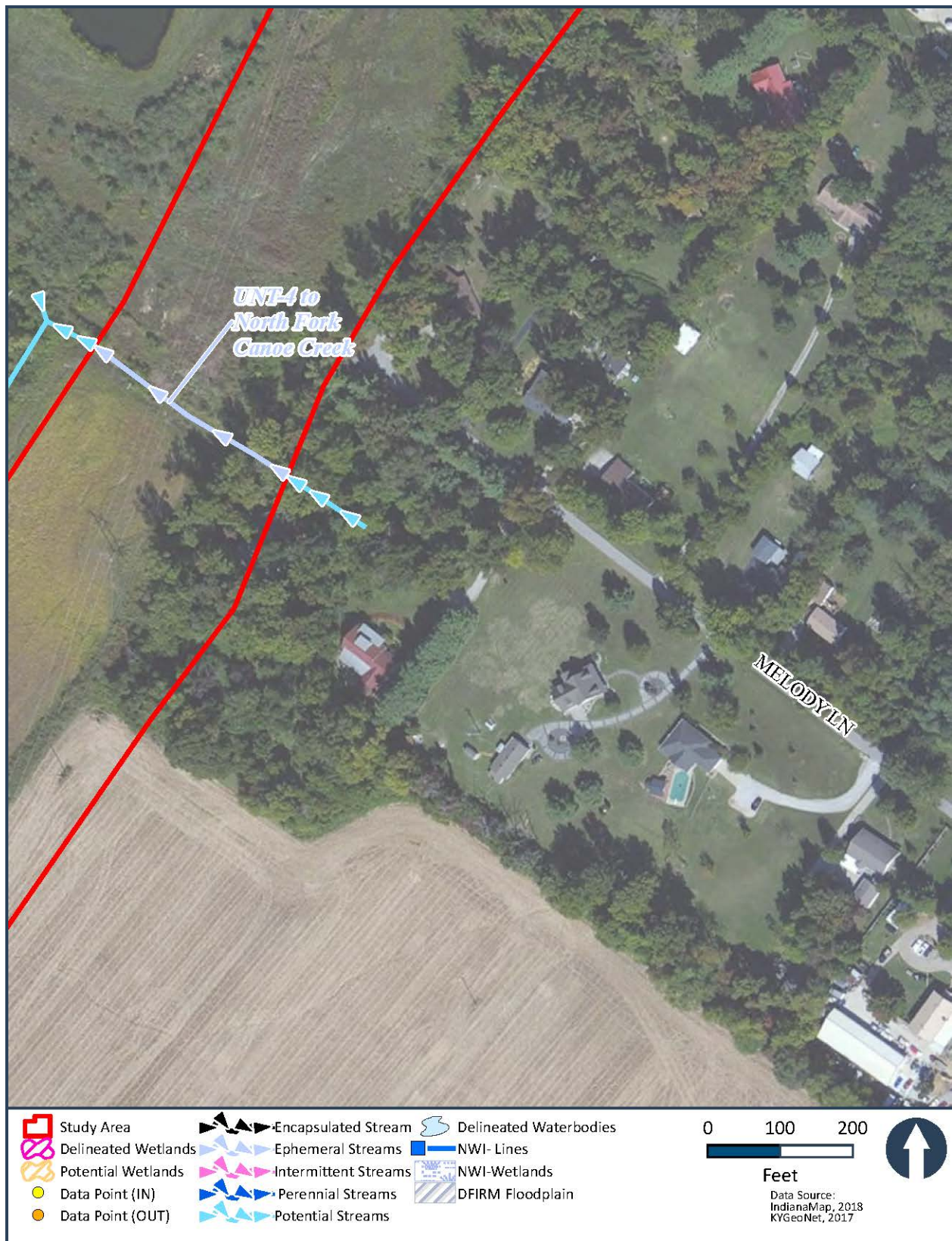


Figure 3. I-69 ORX NWI Maps (22 of 57)

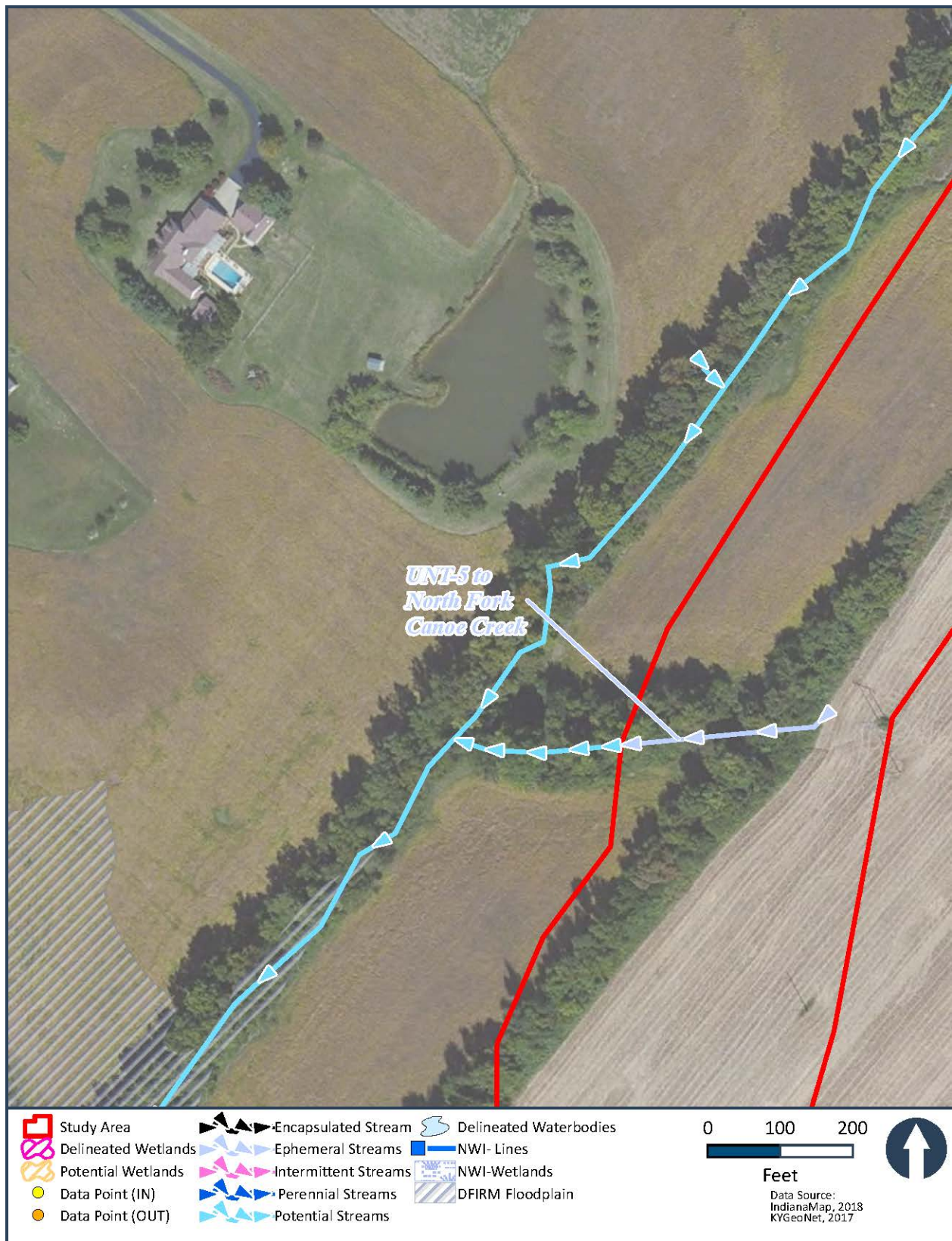


Figure 3. I-69 ORX NWI Maps (23 of 57)



Figure 3. I-69 ORX NWI Maps (24 of 57)

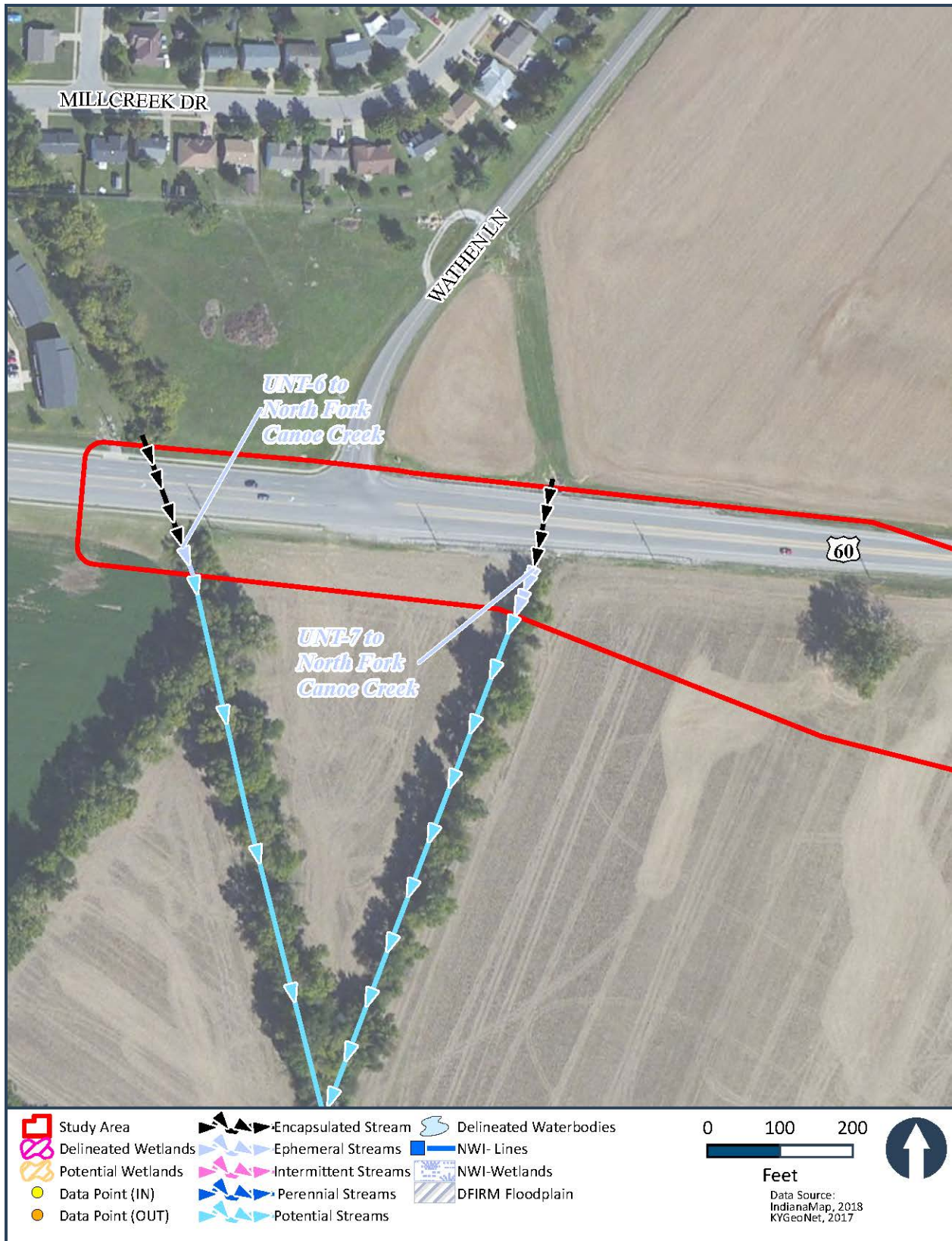


Figure 3. I-69 ORX NWI Maps (25 of 57)

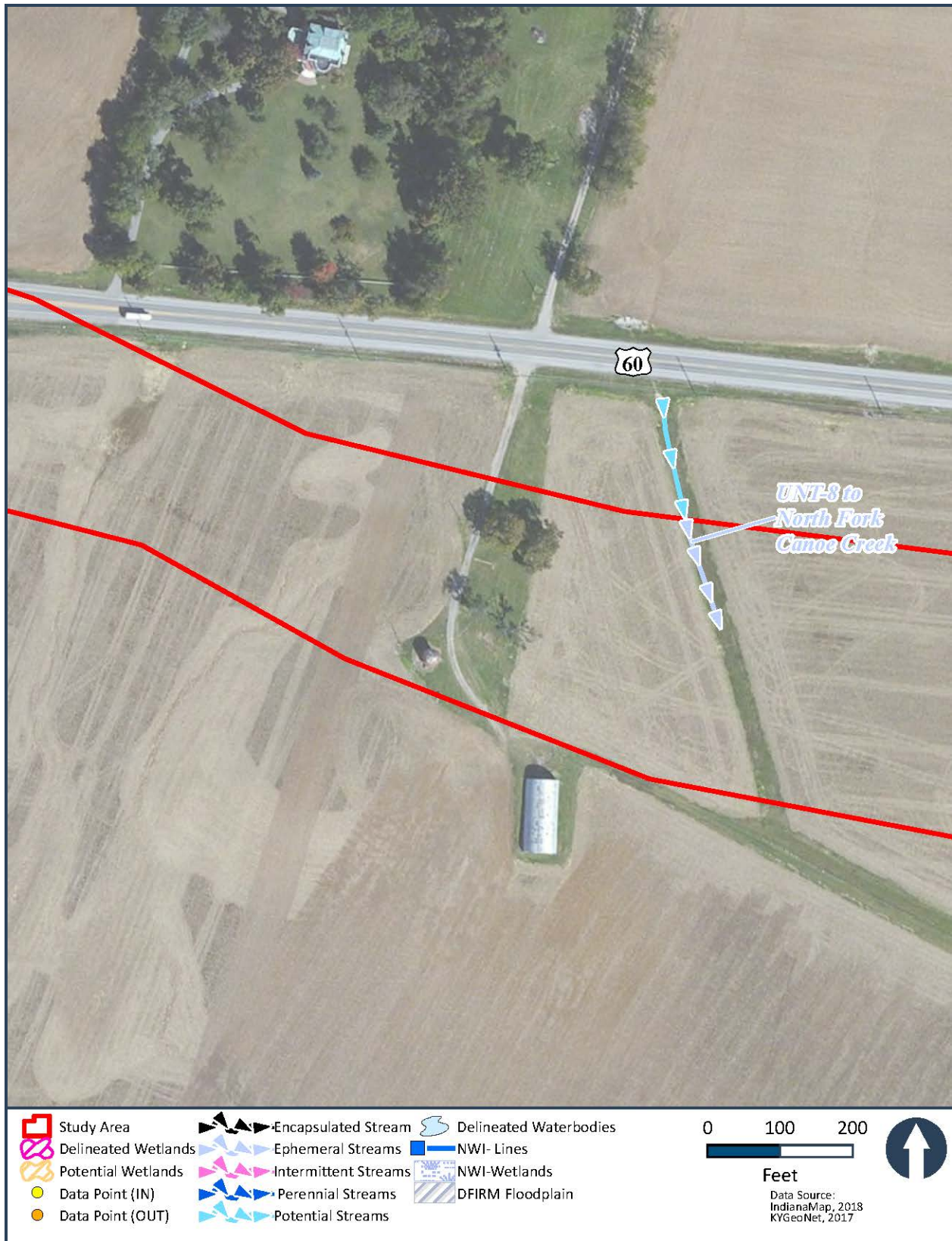


Figure 3. I-69 ORX NWI Maps (26 of 57)



Figure 3. I-69 ORX NWI Maps (27 of 57)

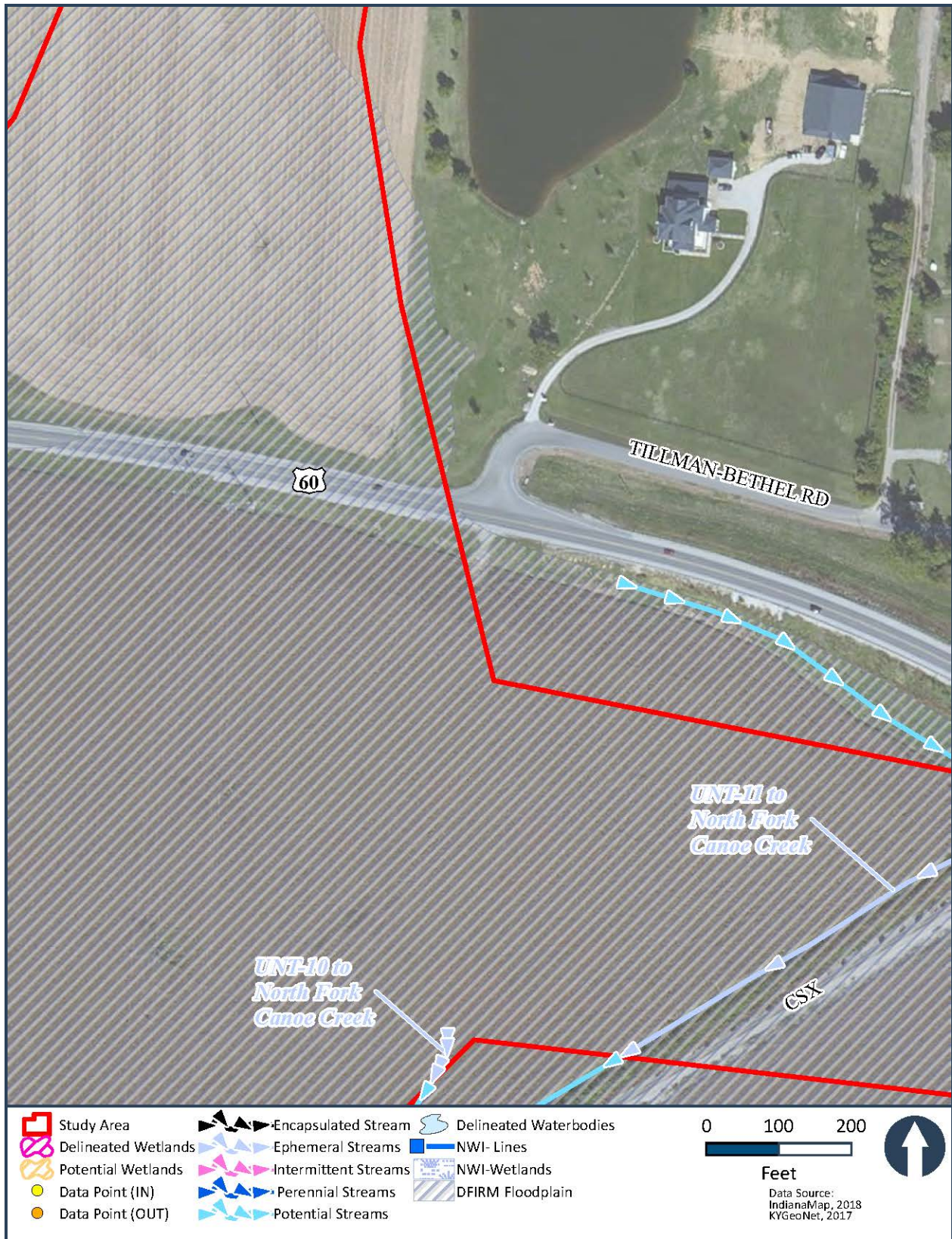


Figure 3. I-69 ORX NWI Maps (28 of 57)

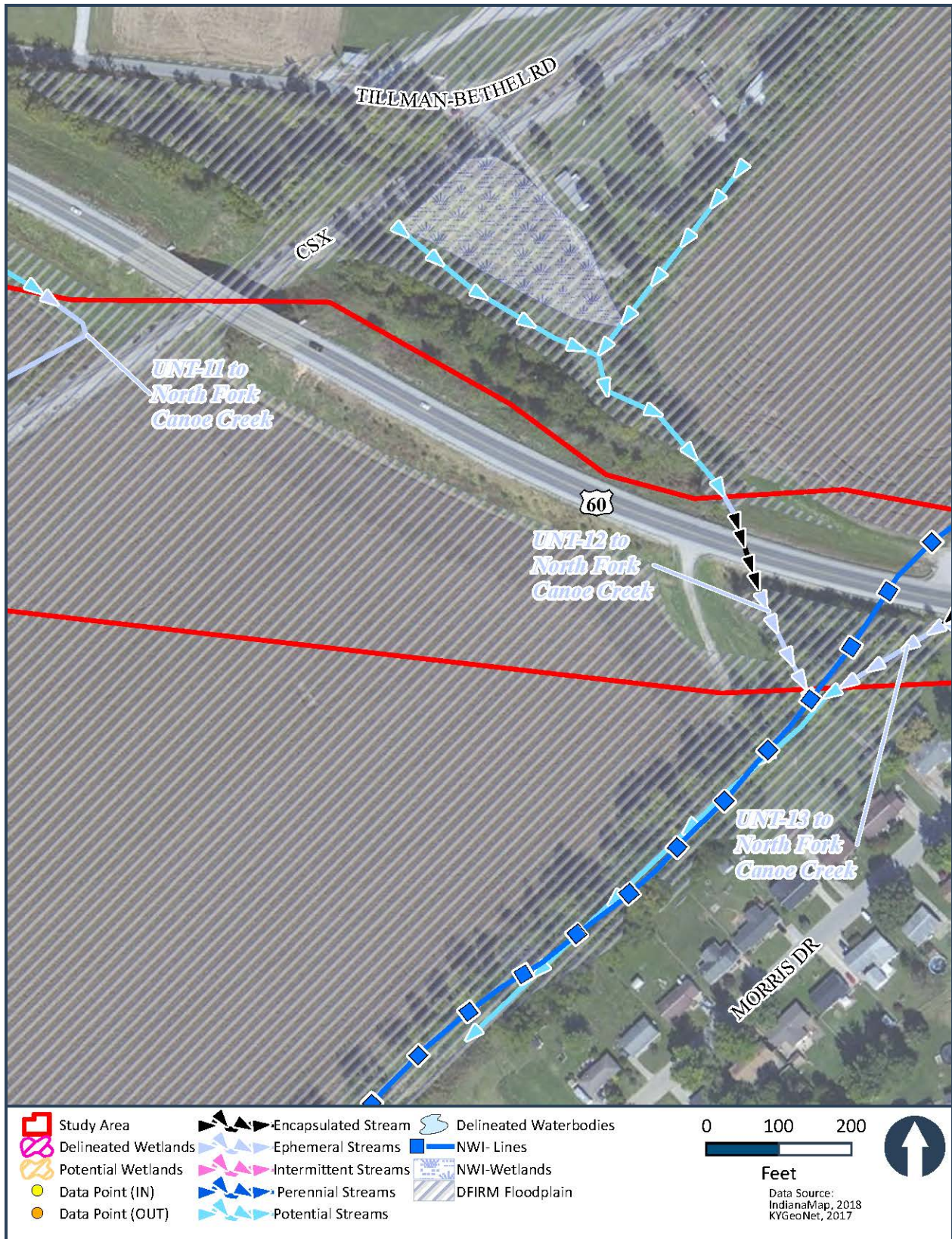


Figure 3. I-69 ORX NWI Maps (29 of 57)



Figure 3. I-69 ORX NWI Maps (30 of 57)

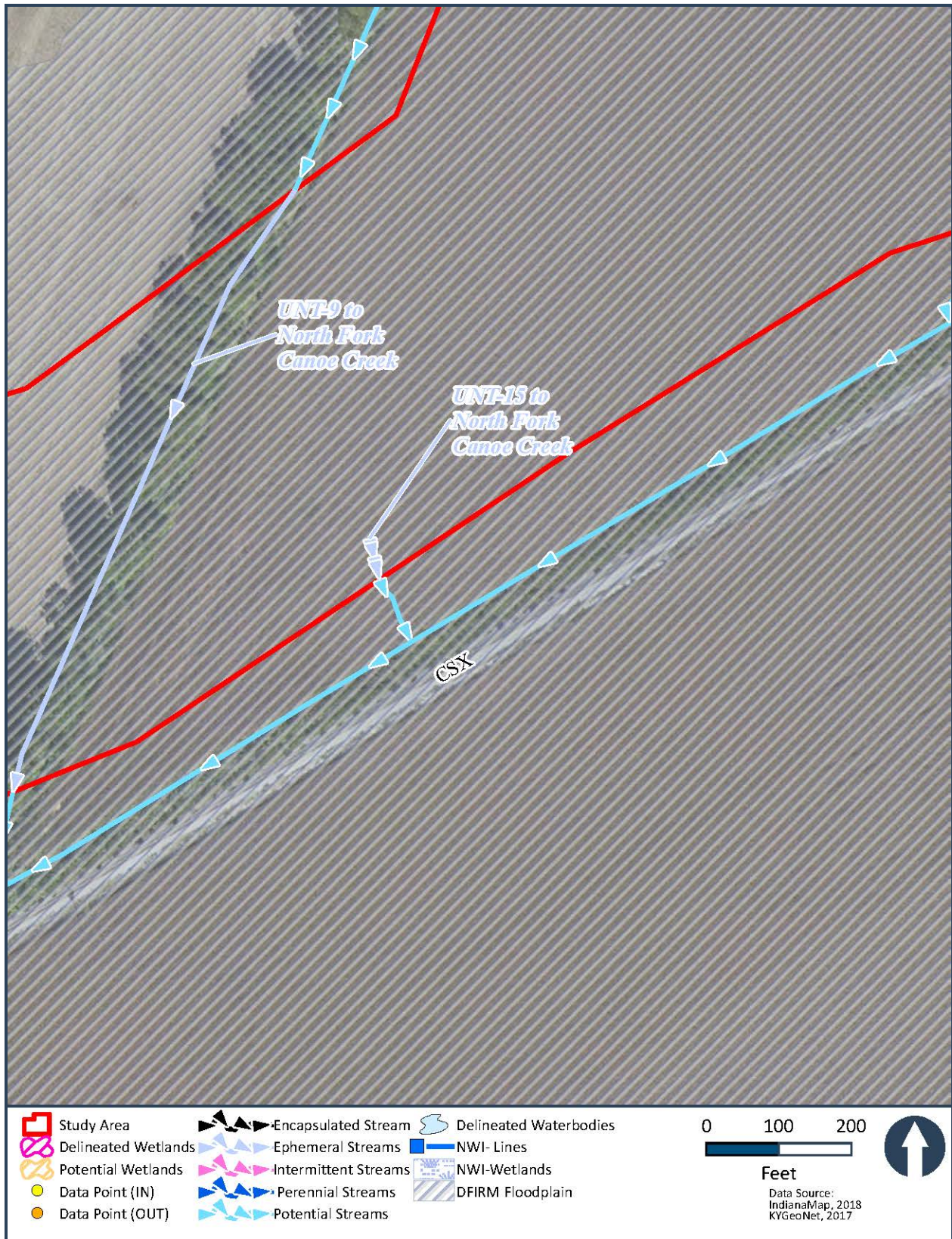


Figure 3. I-69 ORX NWI Maps (31 of 57)



Figure 3. I-69 ORX NWI Maps (32 of 57)



Figure 3. I-69 ORX NWI Maps (33 of 57)



Figure 3. I-69 ORX NWI Maps (34 of 57)



Figure 3. I-69 ORX NWI Maps (35 of 57)

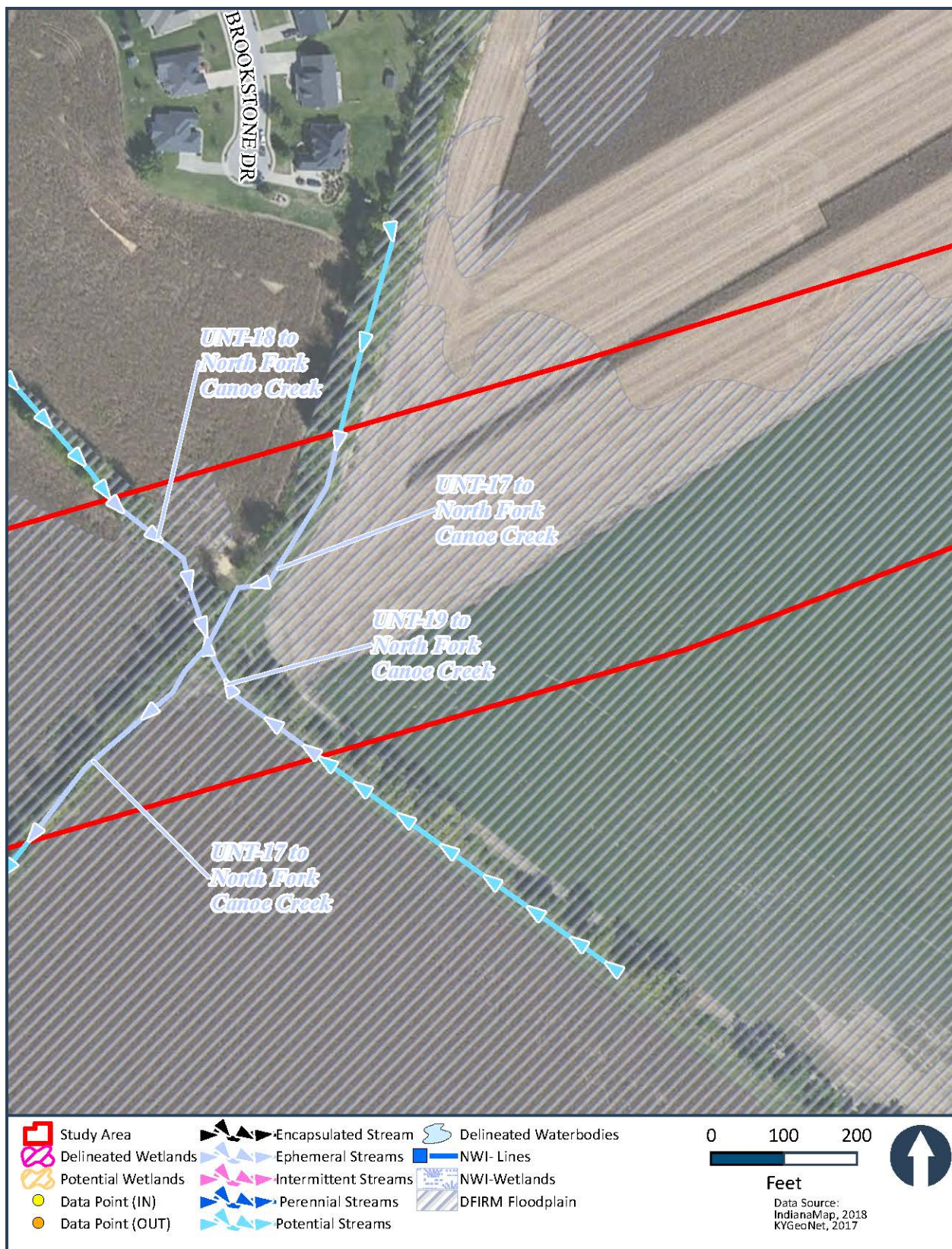


Figure 3. I-69 ORX NWI Maps (36 of 57)



Figure 3. I-69 ORX NWI Maps (37 of 57)

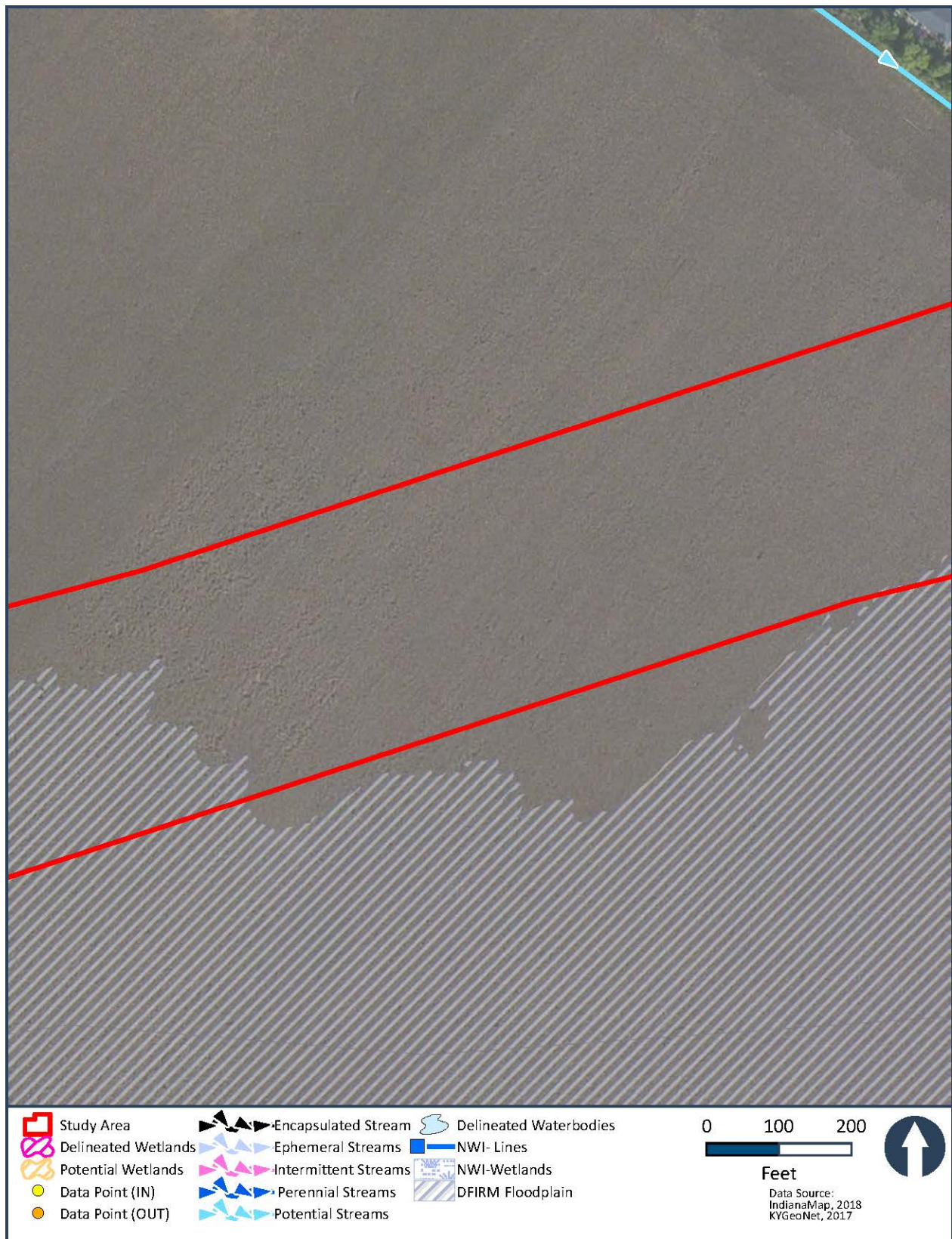


Figure 3. I-69 ORX NWI Maps (38 of 57)



Figure 3. I-69 ORX NWI Maps (39 of 57)

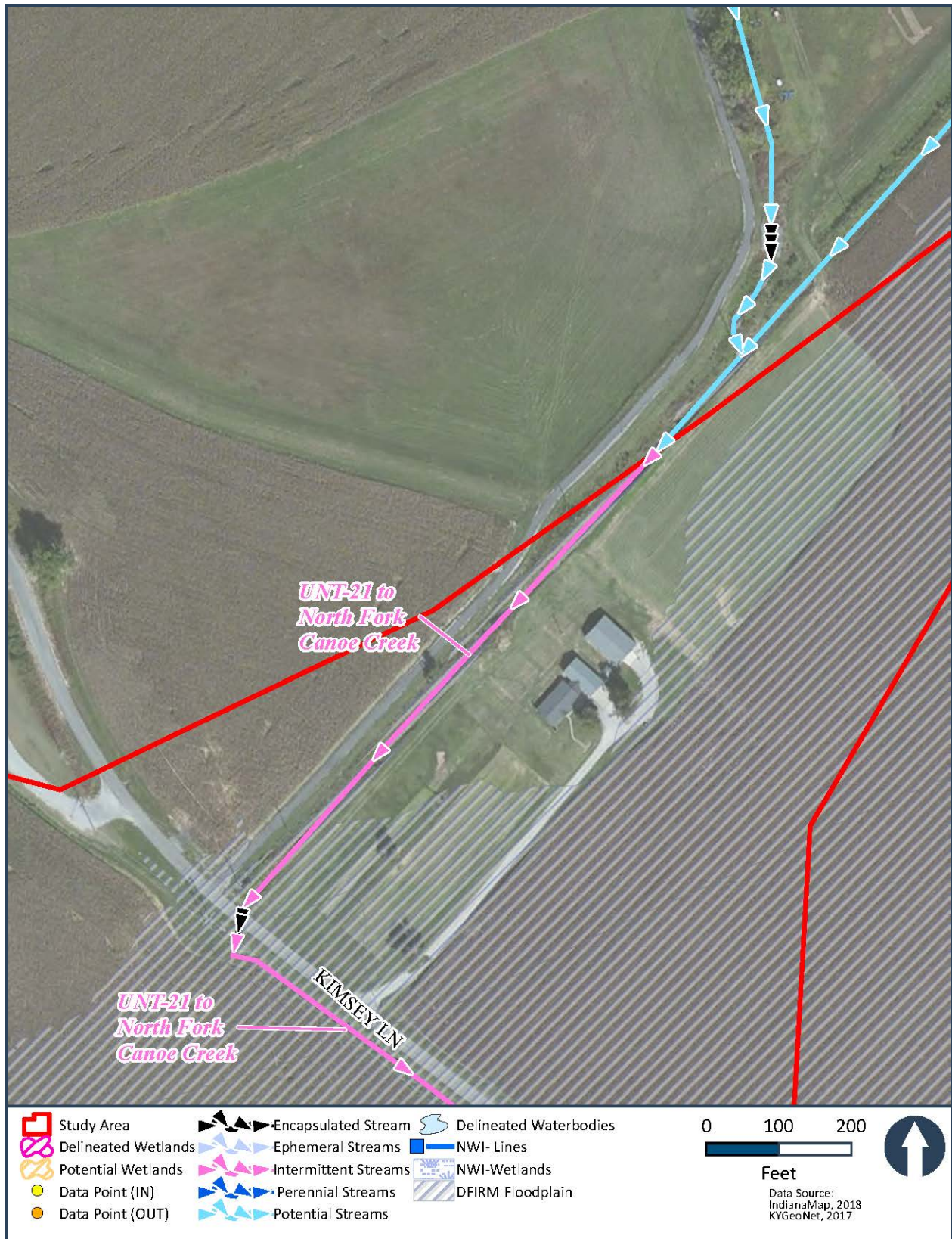


Figure 3. I-69 ORX NWI Maps (40 of 57)

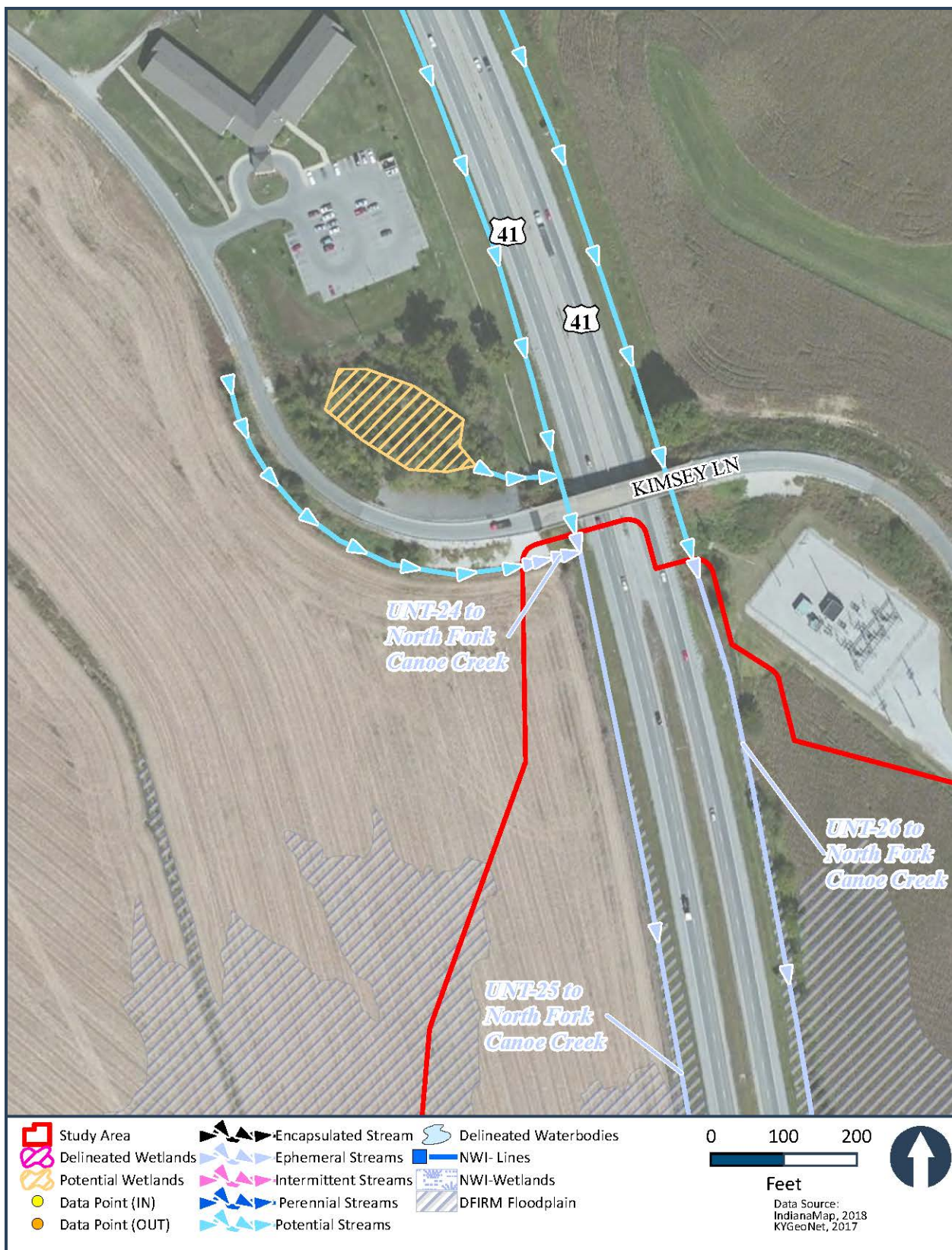


Figure 3. I-69 ORX NWI Maps (41 of 57)

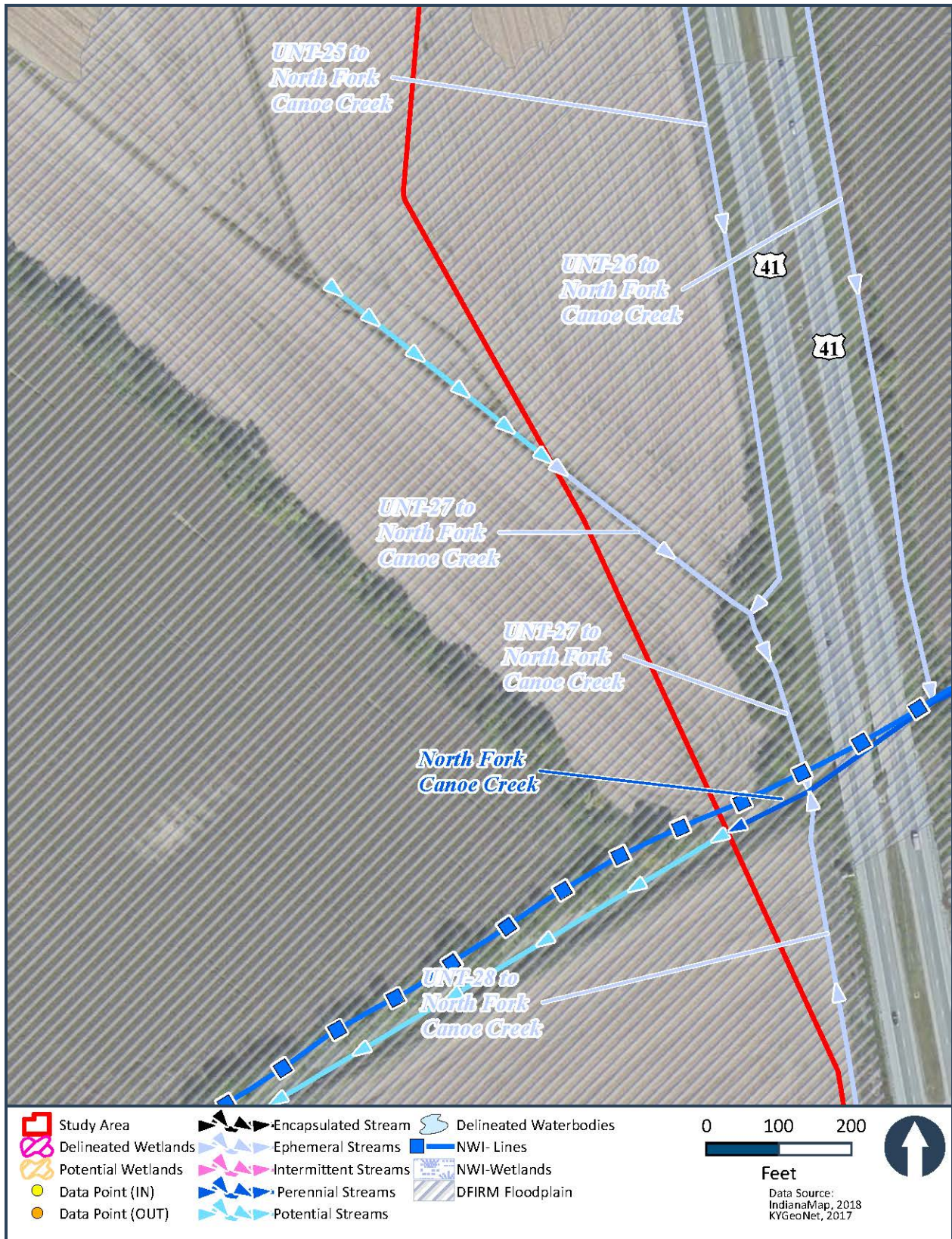


Figure 3. I-69 ORX NWI Maps (42 of 57)

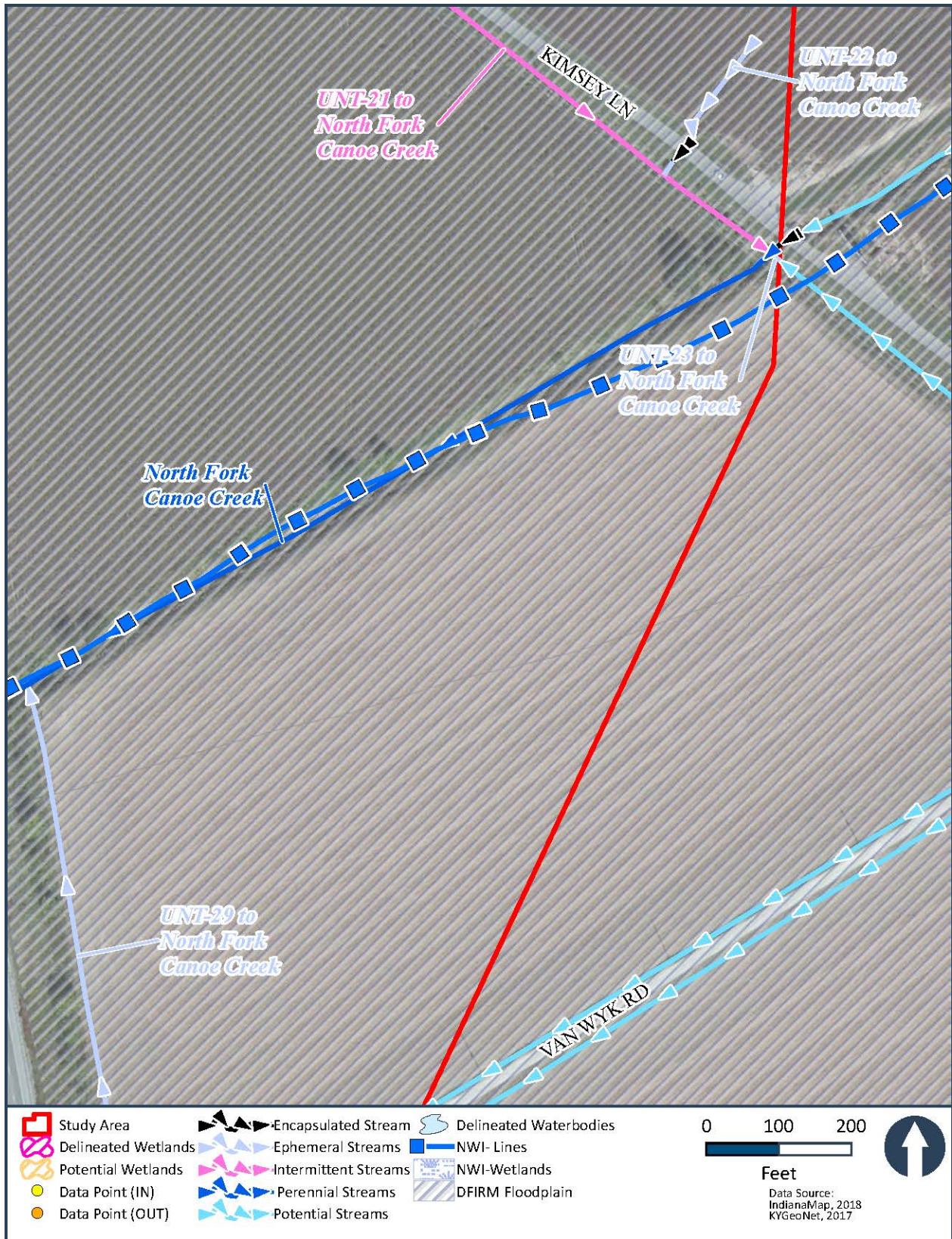


Figure 3. I-69 ORX NWI Maps (43 of 57)

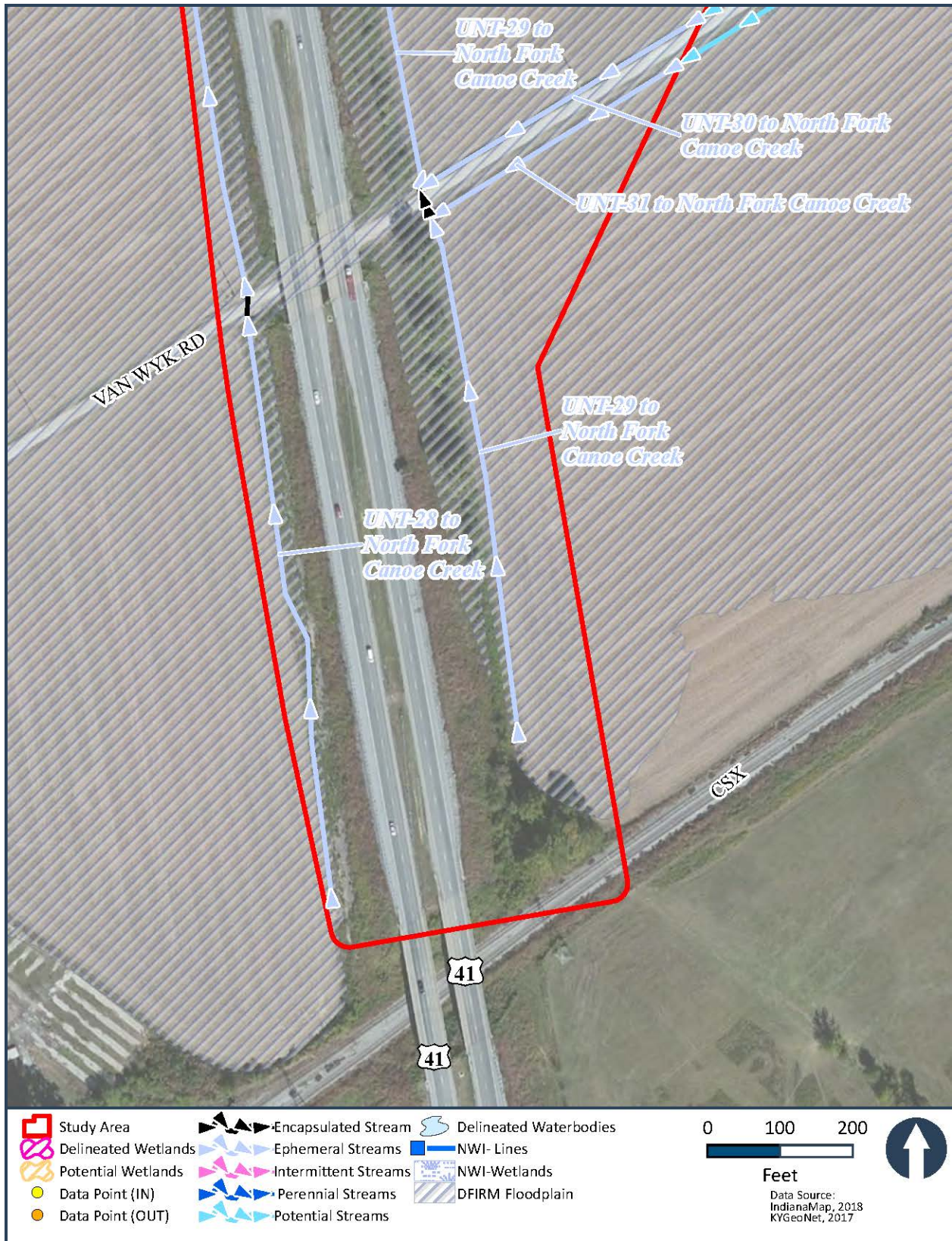


Figure 3. I-69 ORX NWI Maps (44 of 57)



Figure 3. I-69 ORX NWI Maps (45 of 57)

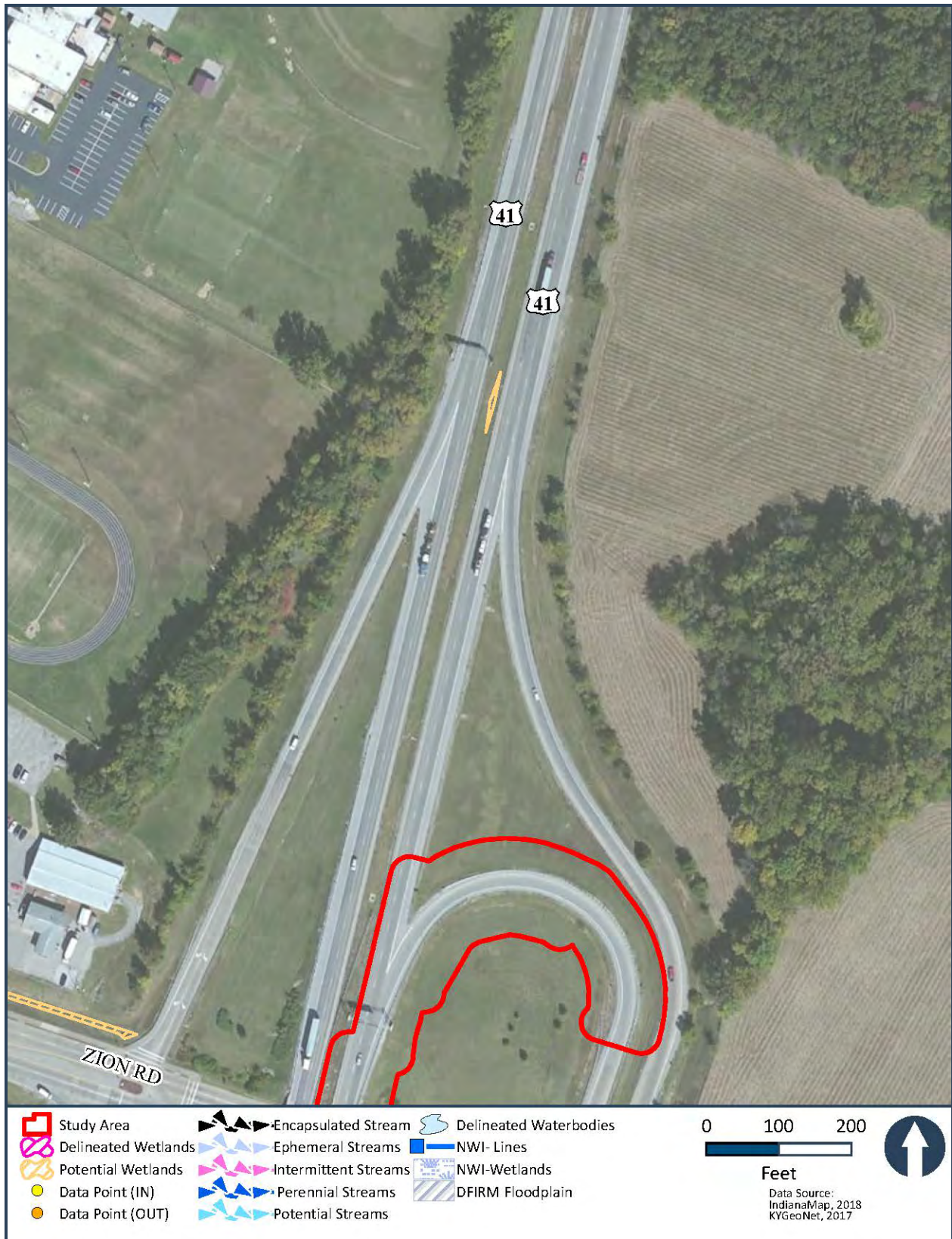


Figure 3. I-69 ORX NWI Maps (46 of 57)

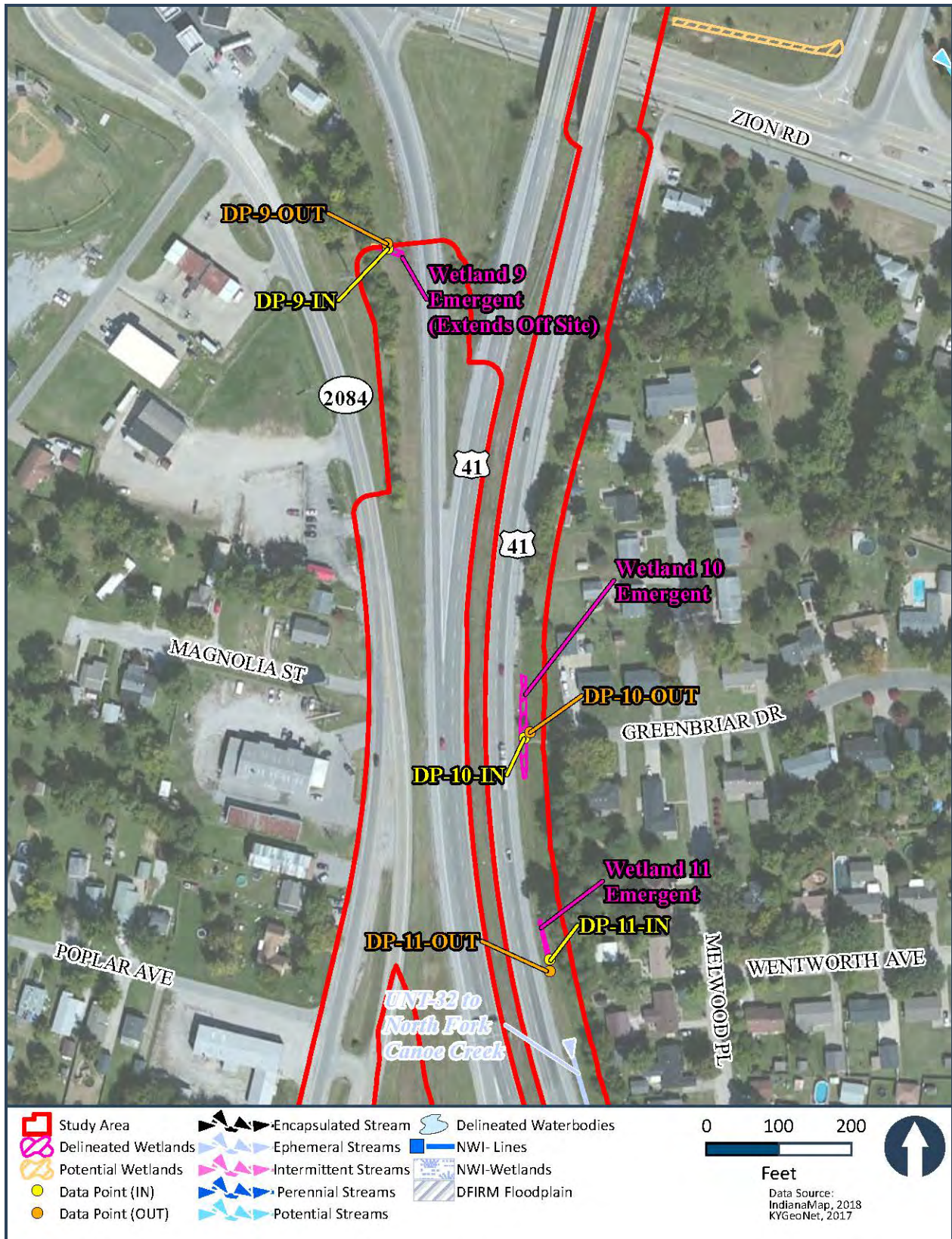


Figure 3. I-69 ORX NWI Maps (47 of 57)

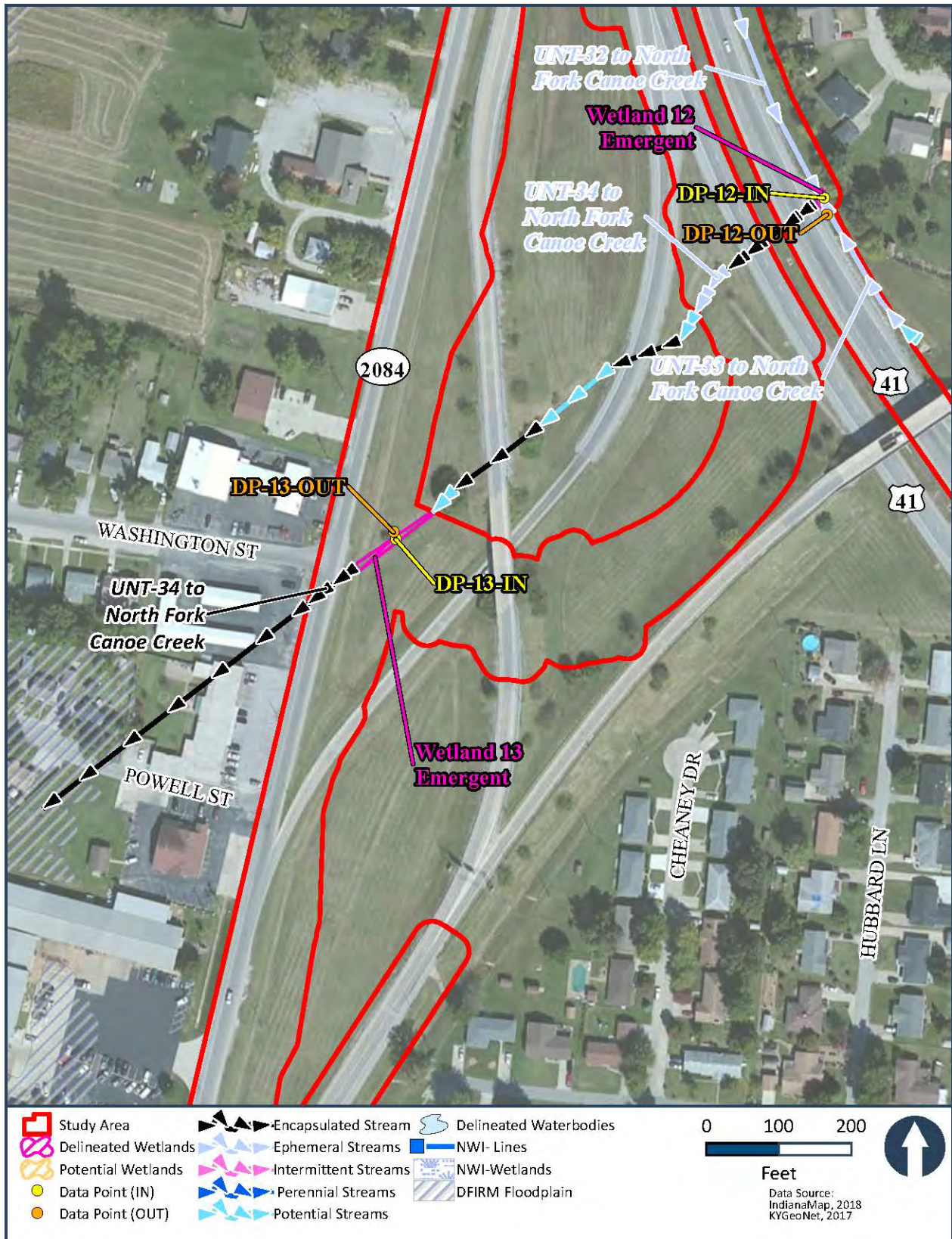


Figure 3. I-69 ORX NWI Maps (48 of 57)

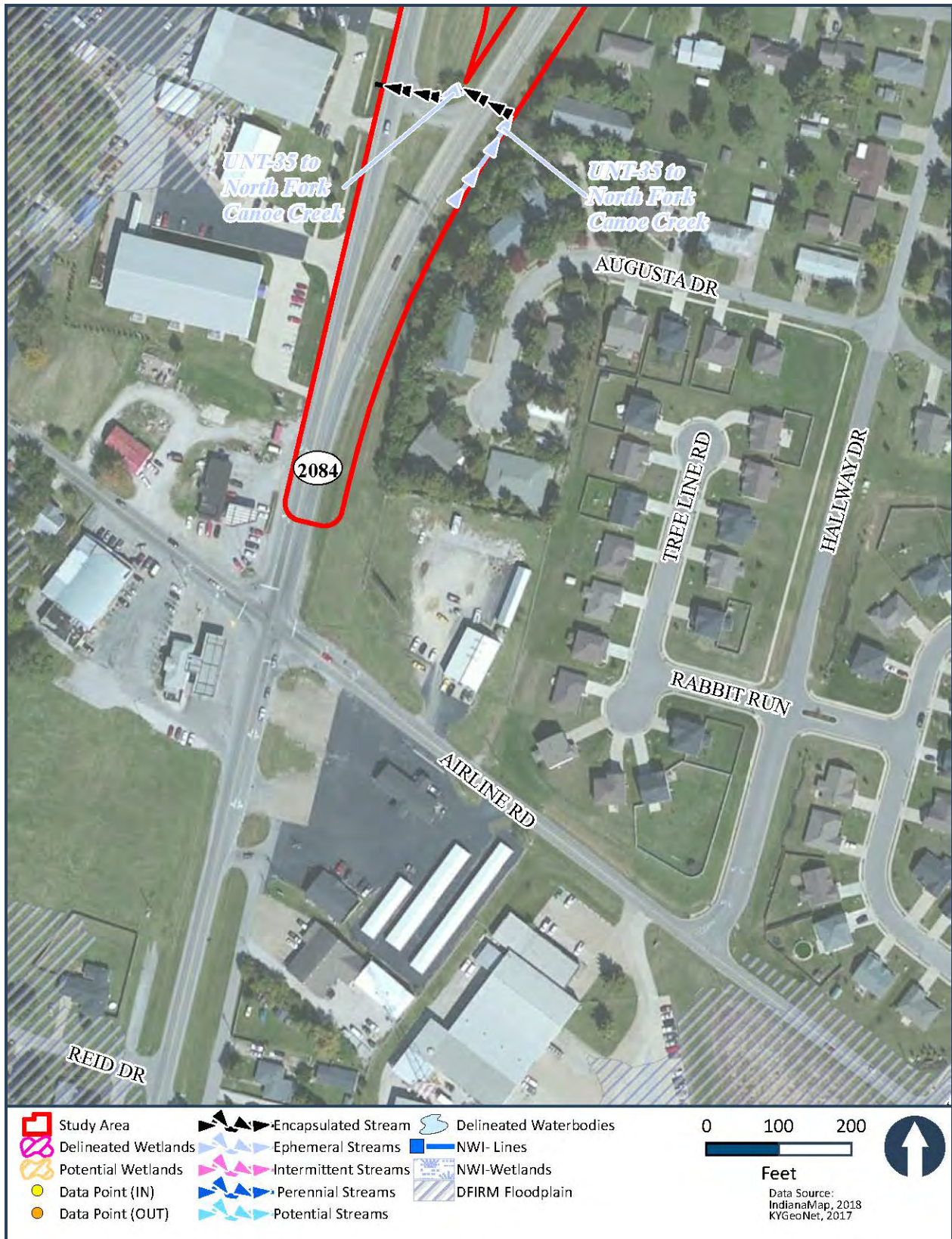


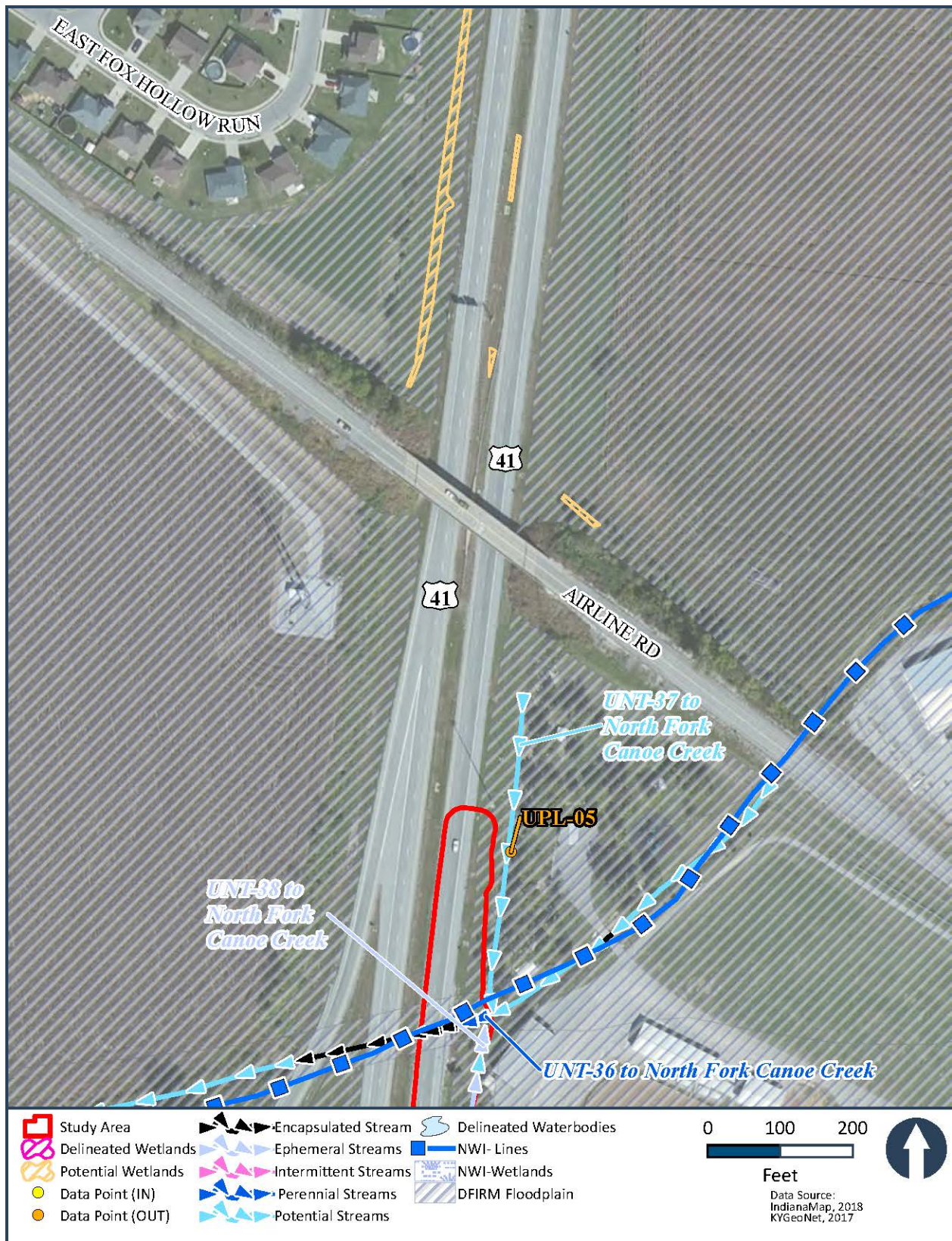
Figure 3. I-69 ORX NWI Maps (49 of 57)



Figure 3. I-69 ORX NWI Maps (50 of 57)



Figure 3. I-69 ORX NWI Maps (51 of 57)



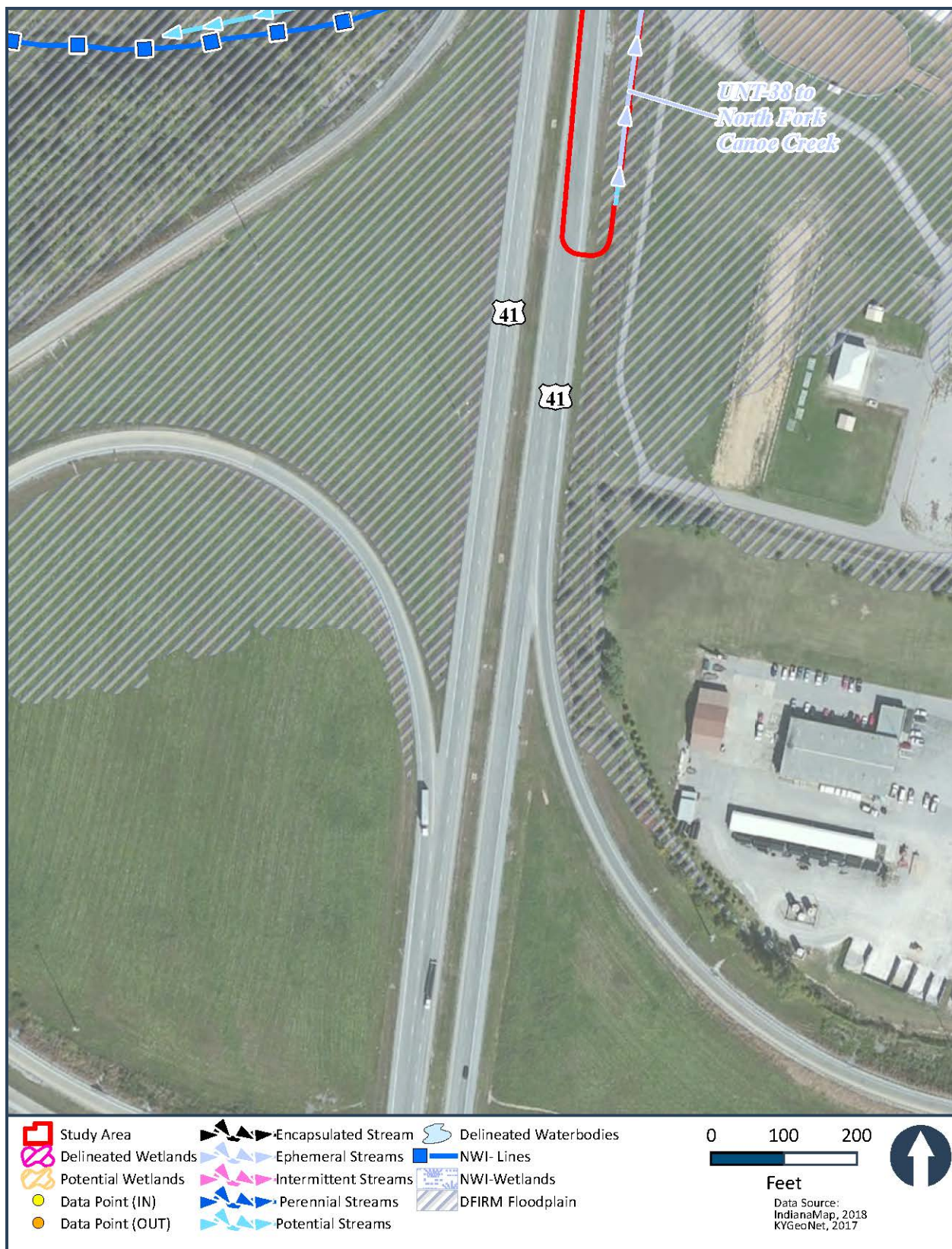


Figure 3. I-69 ORX NWI Maps (53 of 57)



Figure 3. I-69 ORX NWI Maps (54 of 57)



Figure 3. I-69 ORX NWI Maps (55 of 57)

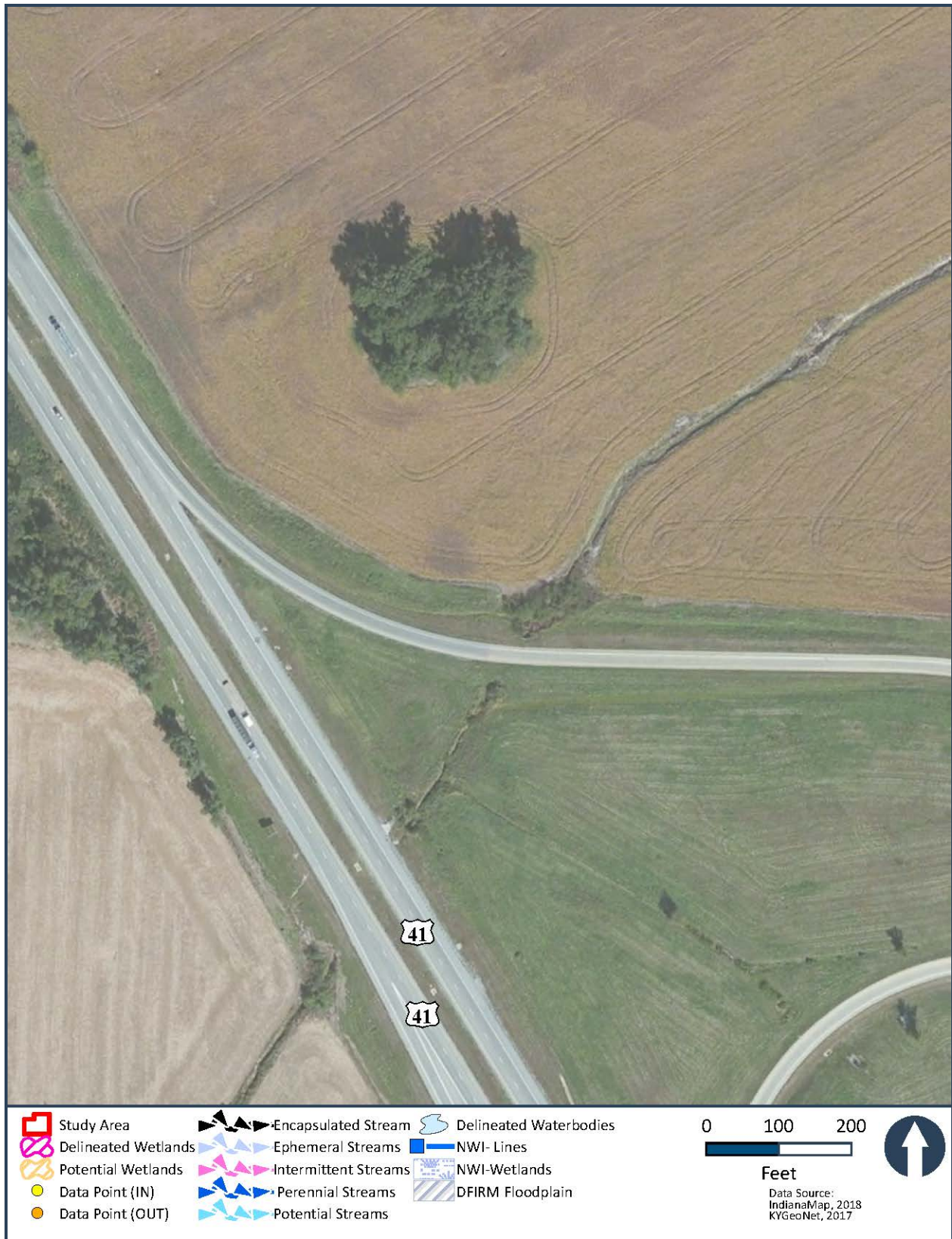


Figure 3. I-69 ORX NWI Maps (56 of 57)

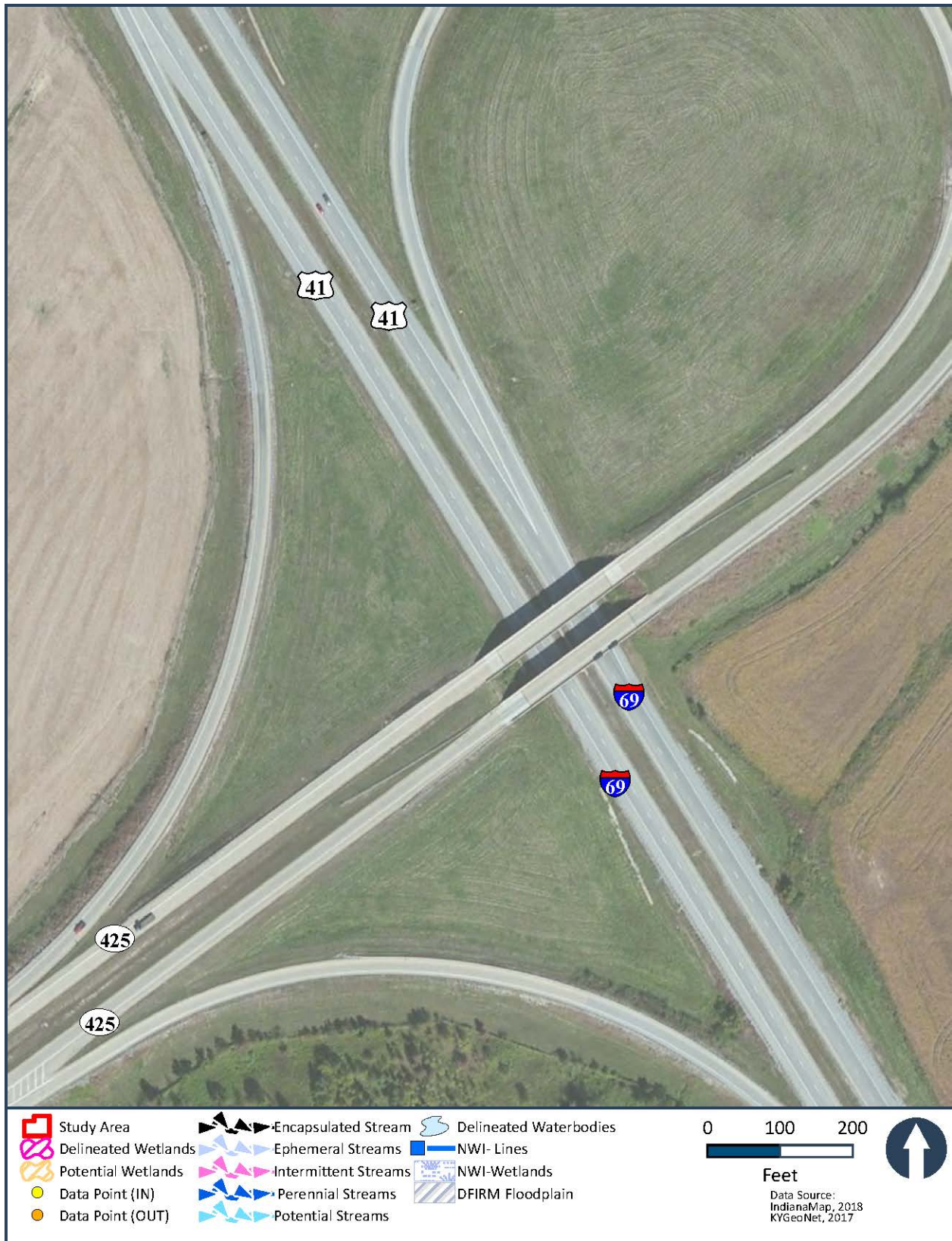


Figure 3. I-69 ORX NWI Maps (57 of 57)

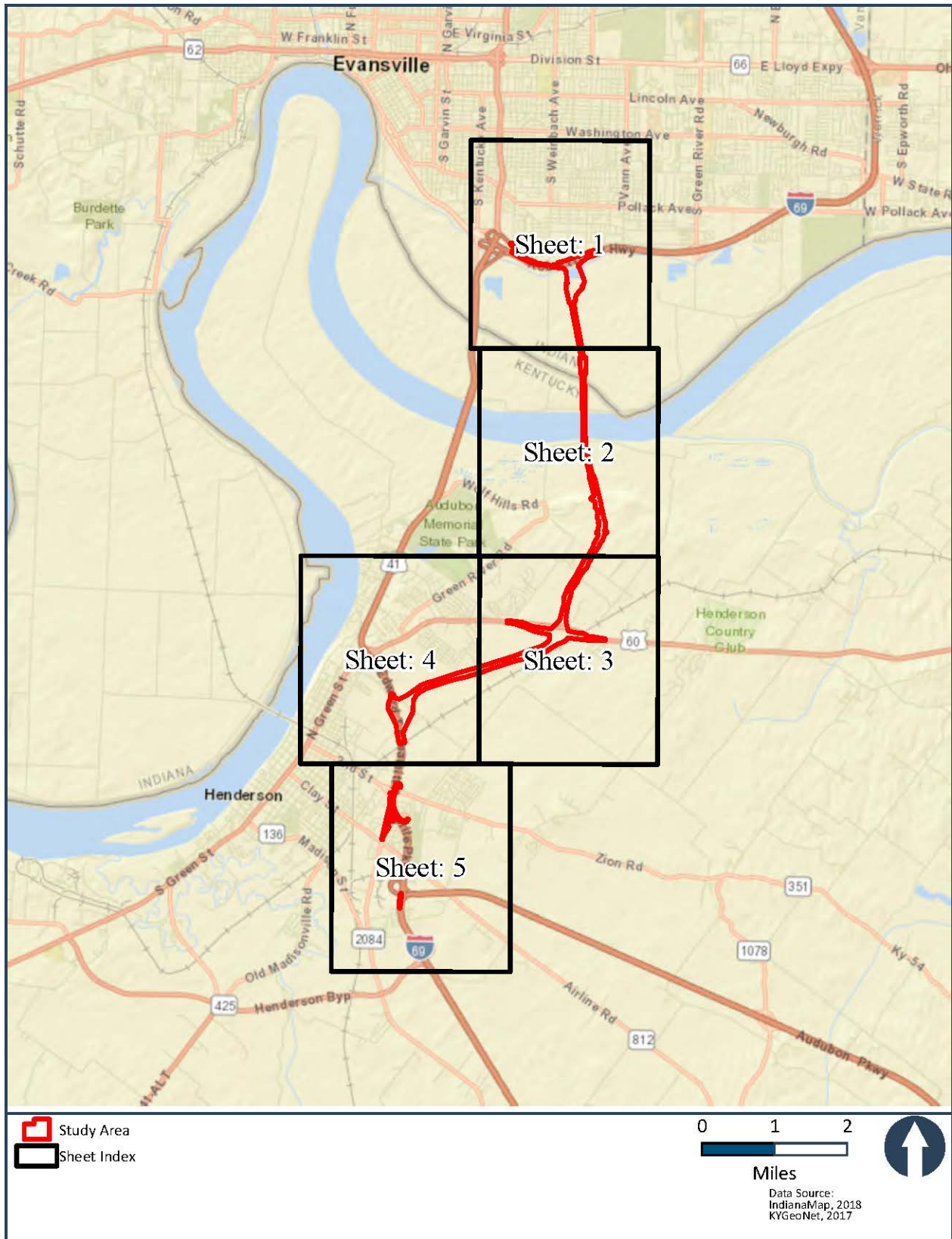
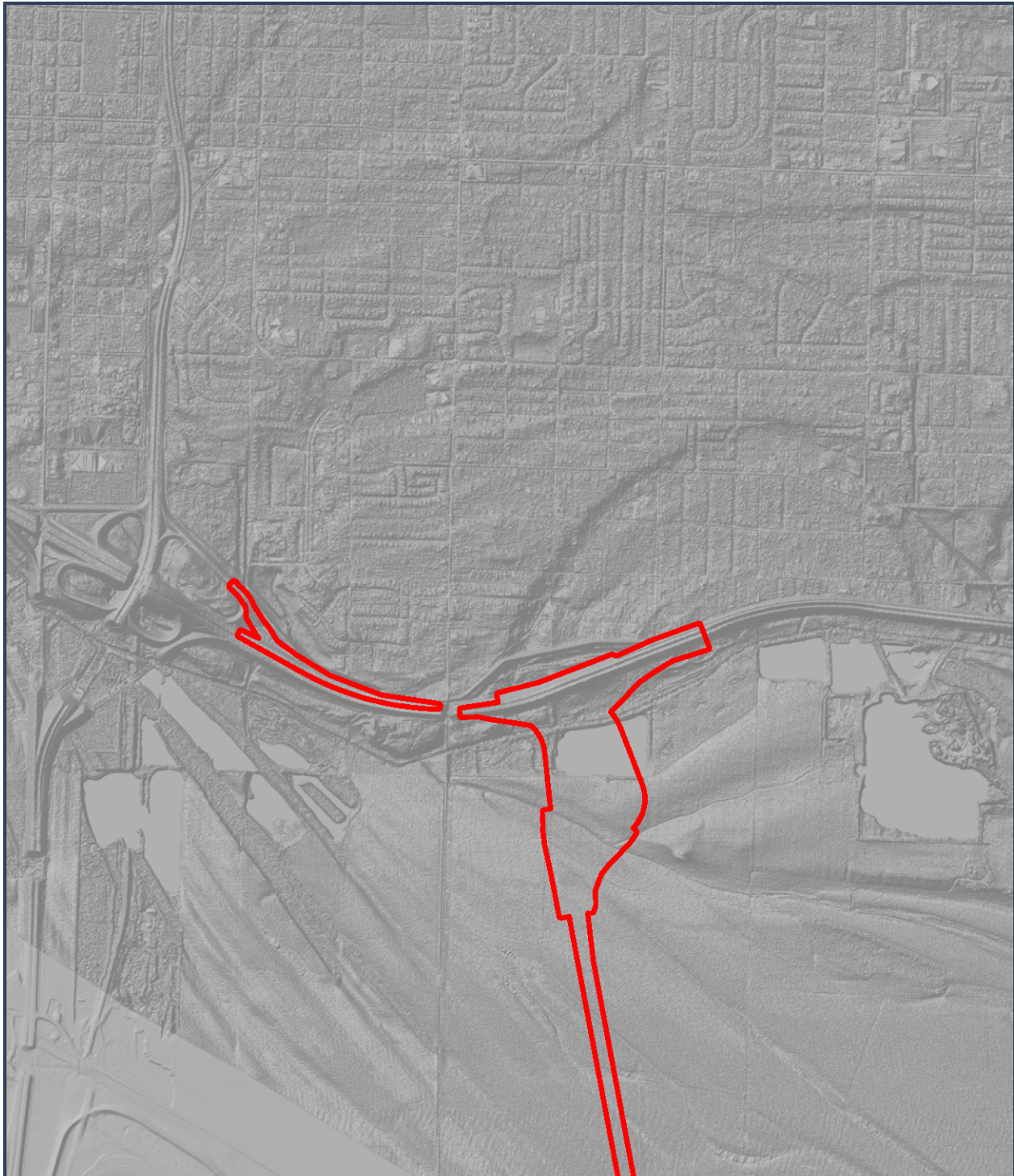




Figure 4. I-69 ORX LiDAR and USGS Topographic Index Map



 Study Area
 Sheet Index

0 1,000 2,000

Feet

Data Source:
IndianaMap, 2018
KYGeoNet, 2017



Figure 5. I-69 ORX LiDAR Map (1 of 5)

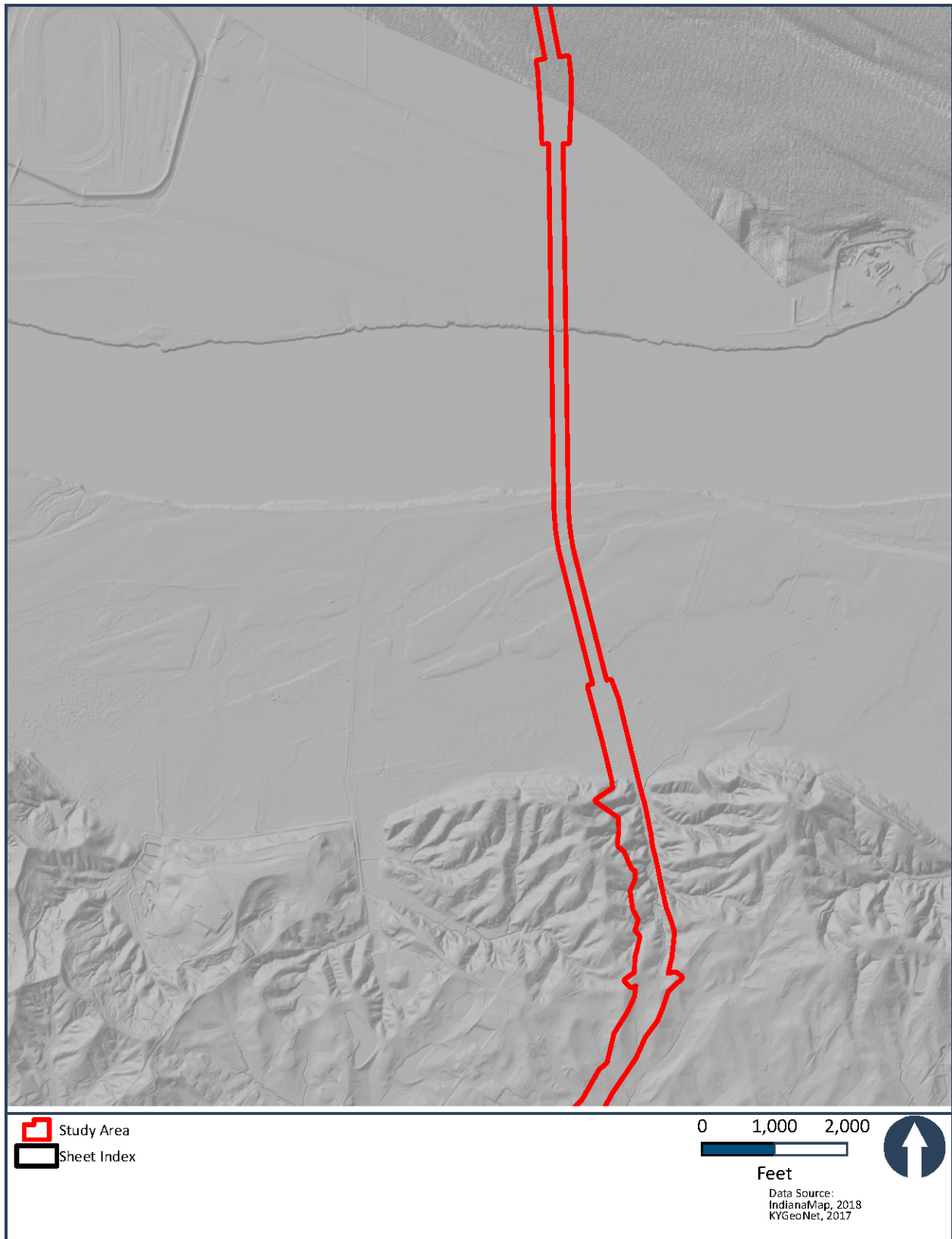


Figure 5. I-69 ORX LiDAR Map (2 of 5)

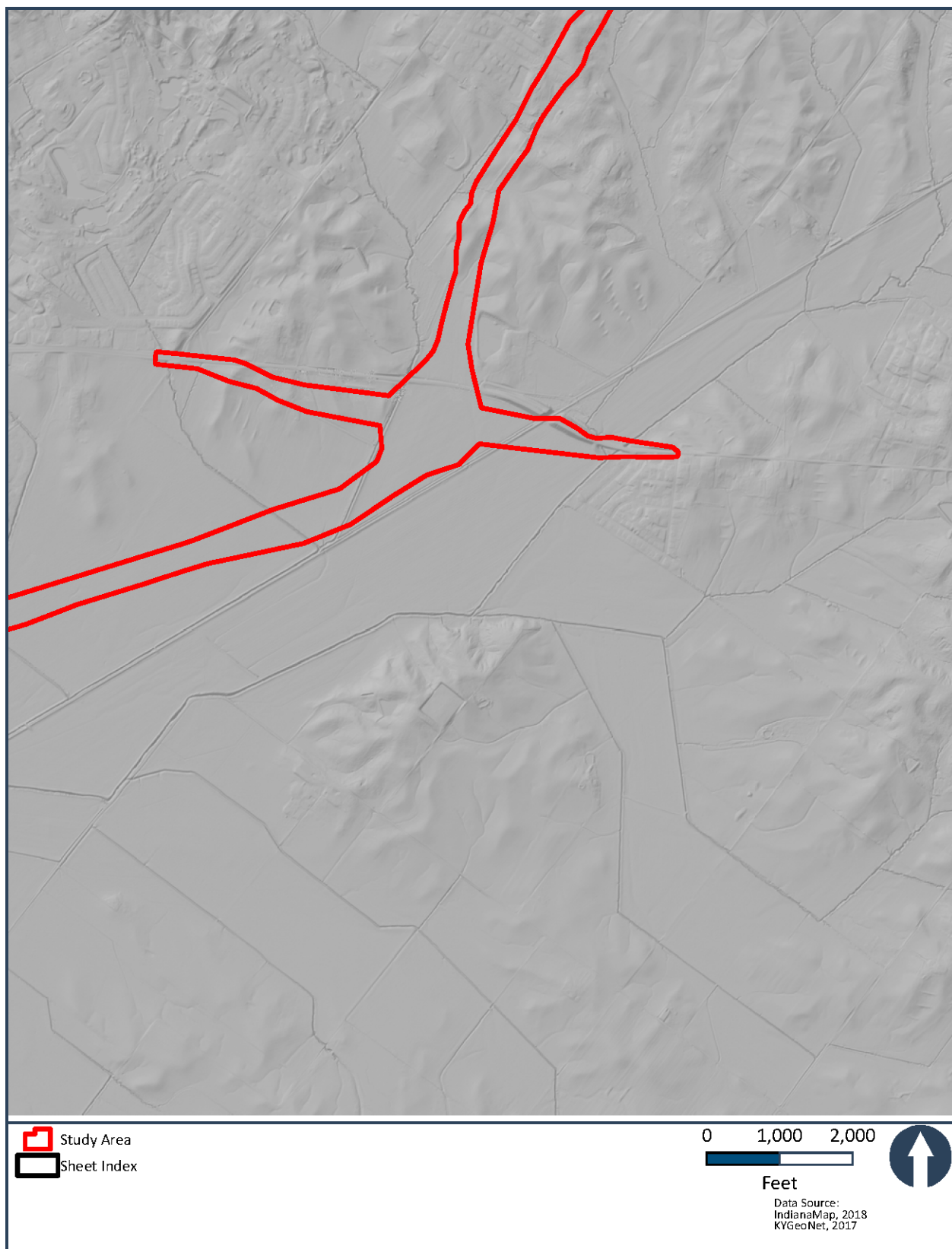


Figure 5. I-69 ORX LiDAR Map (3 of 5)

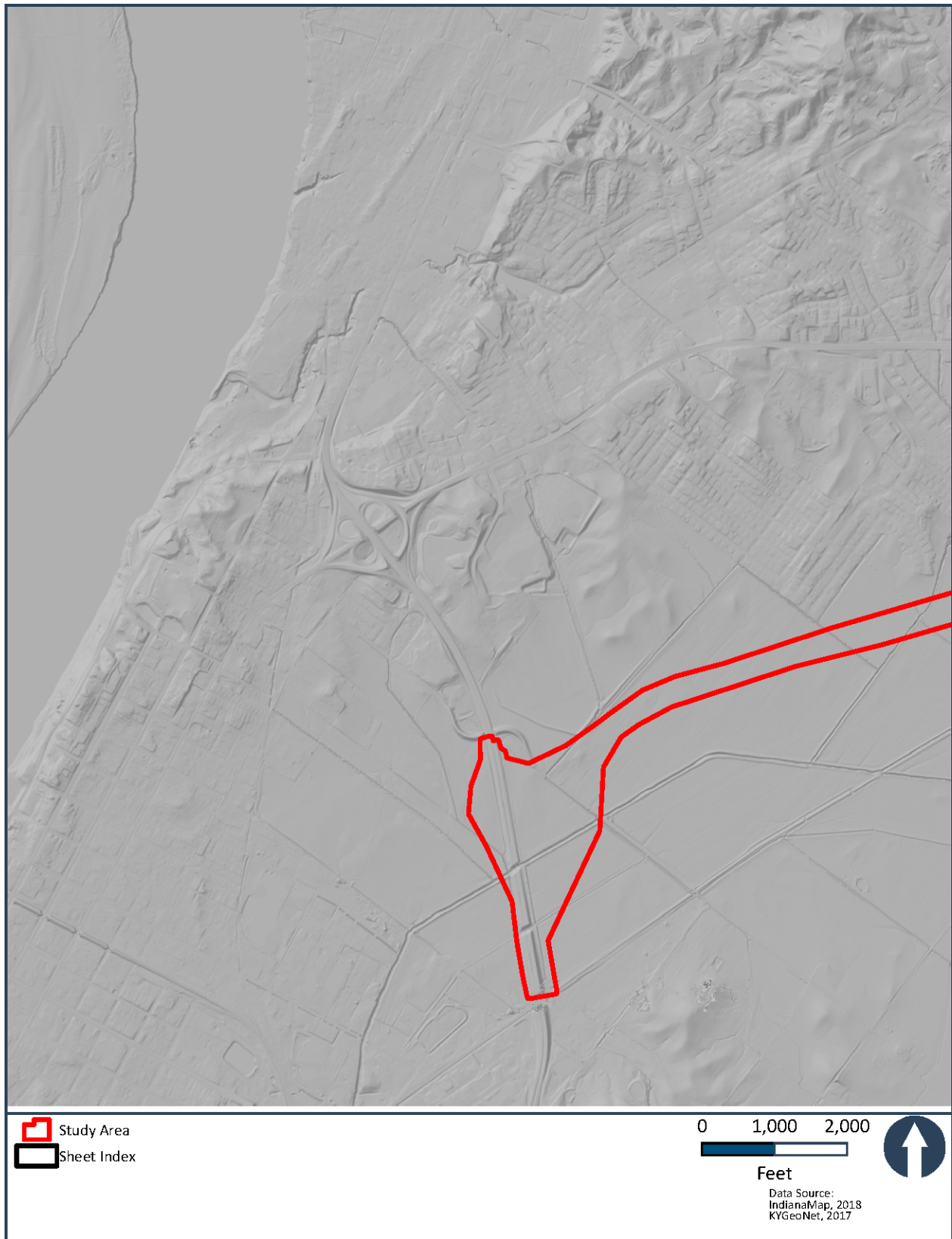


Figure 5. I-69 ORX LiDAR Map (4 of 5)

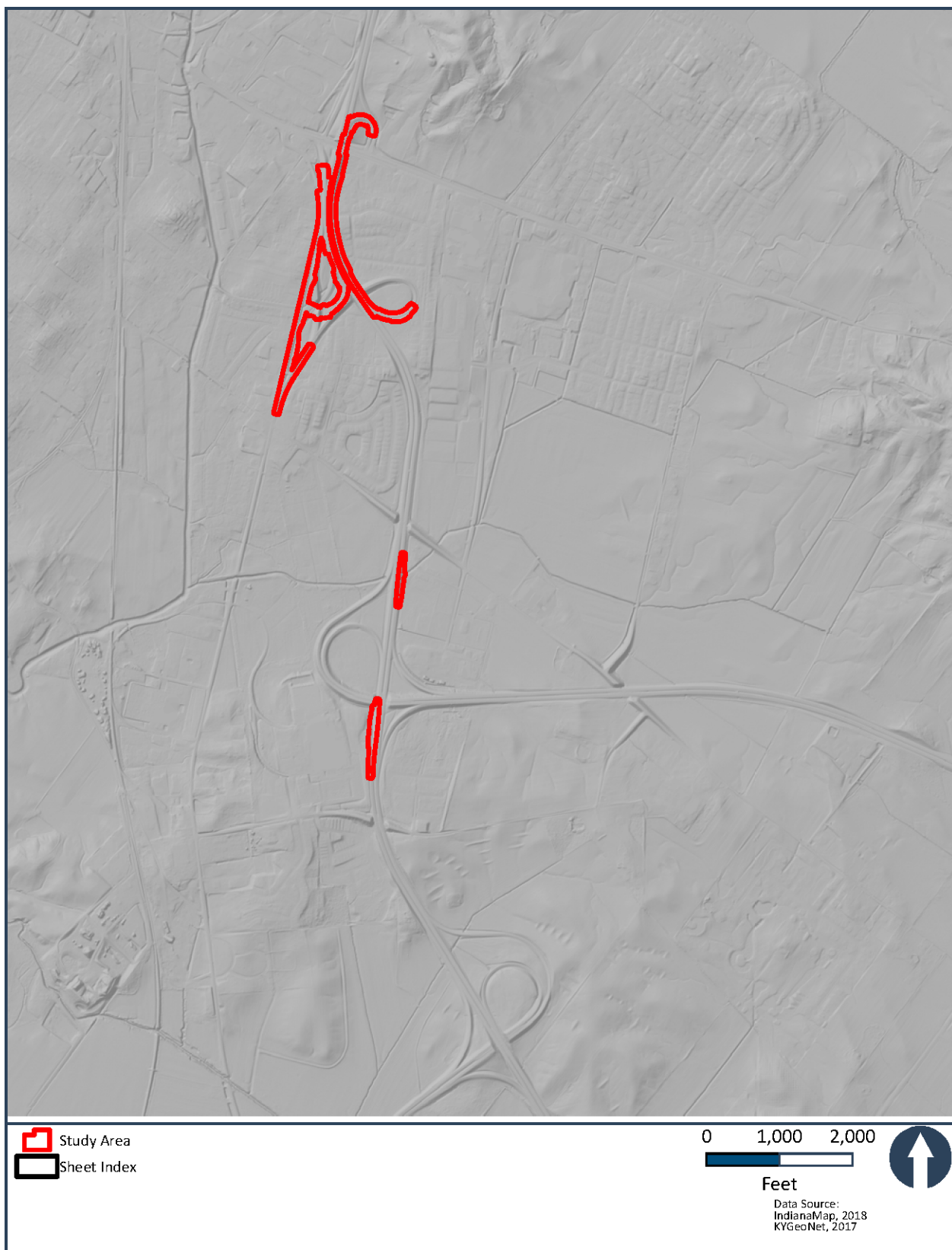


Figure 5. I-69 ORX LiDAR Map (5 of 5)

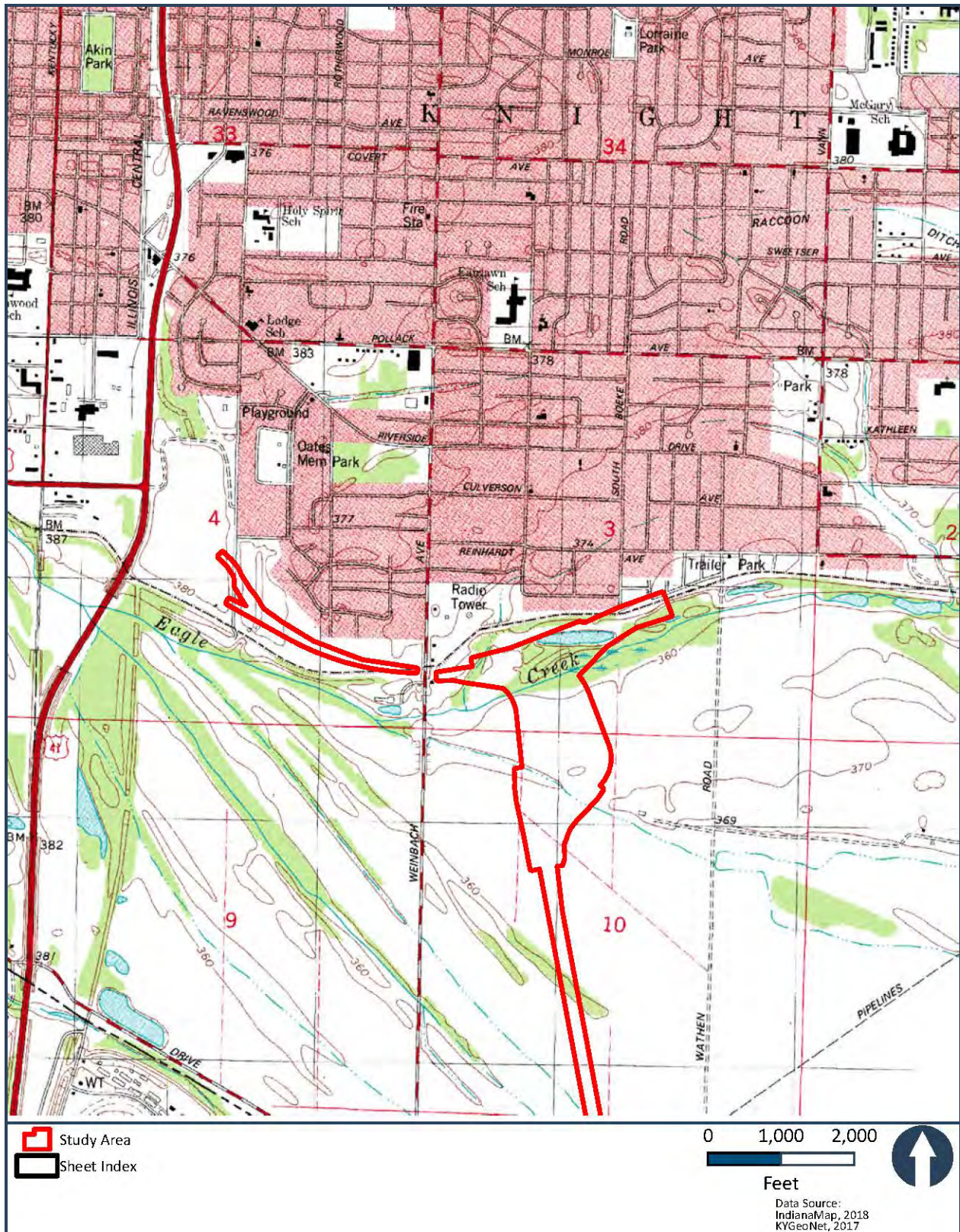


Figure 6. I-69 ORX USGS Topographic Maps (1 of 5)

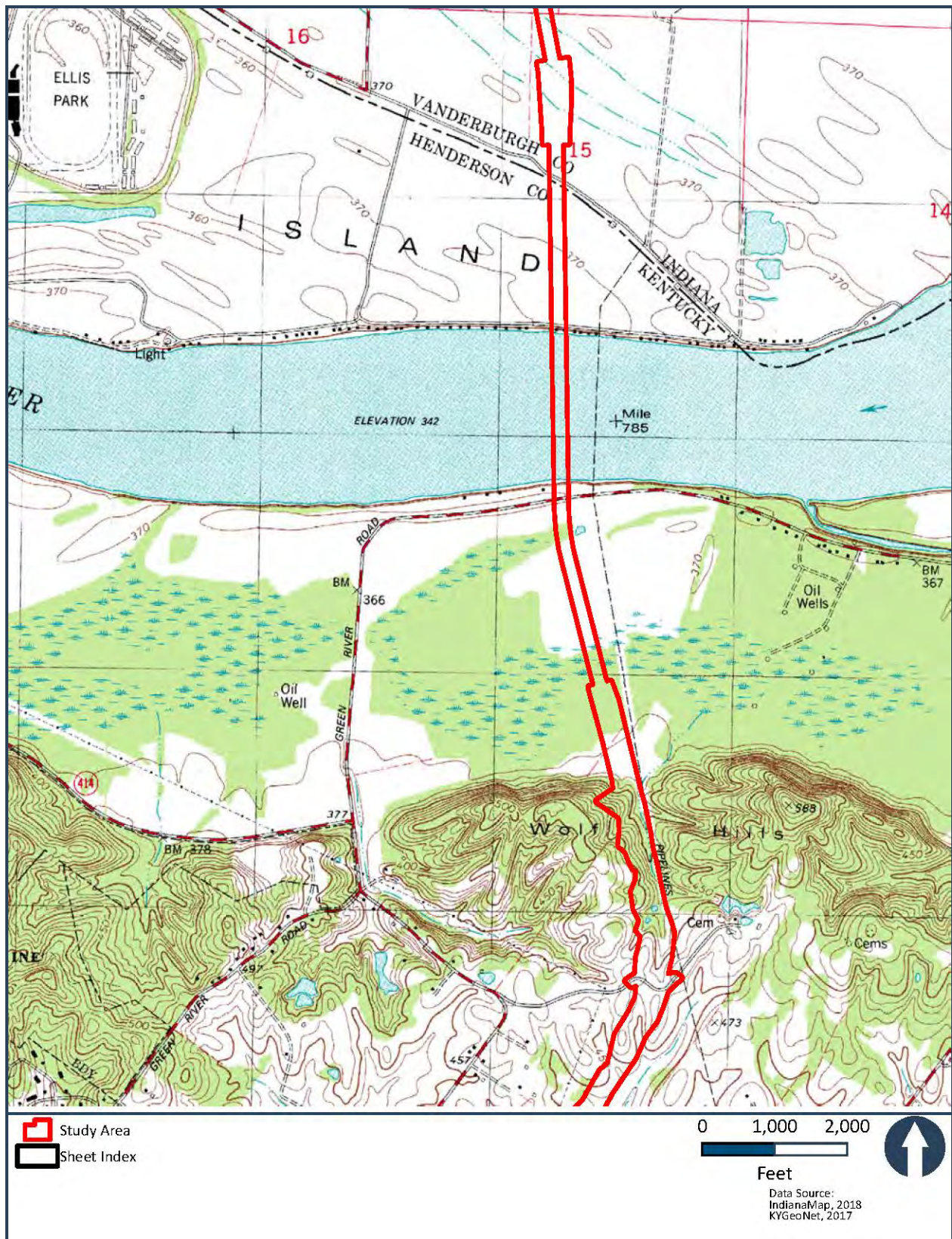


Figure 6. I-69 ORX USGS Topographic Maps (2 of 5)

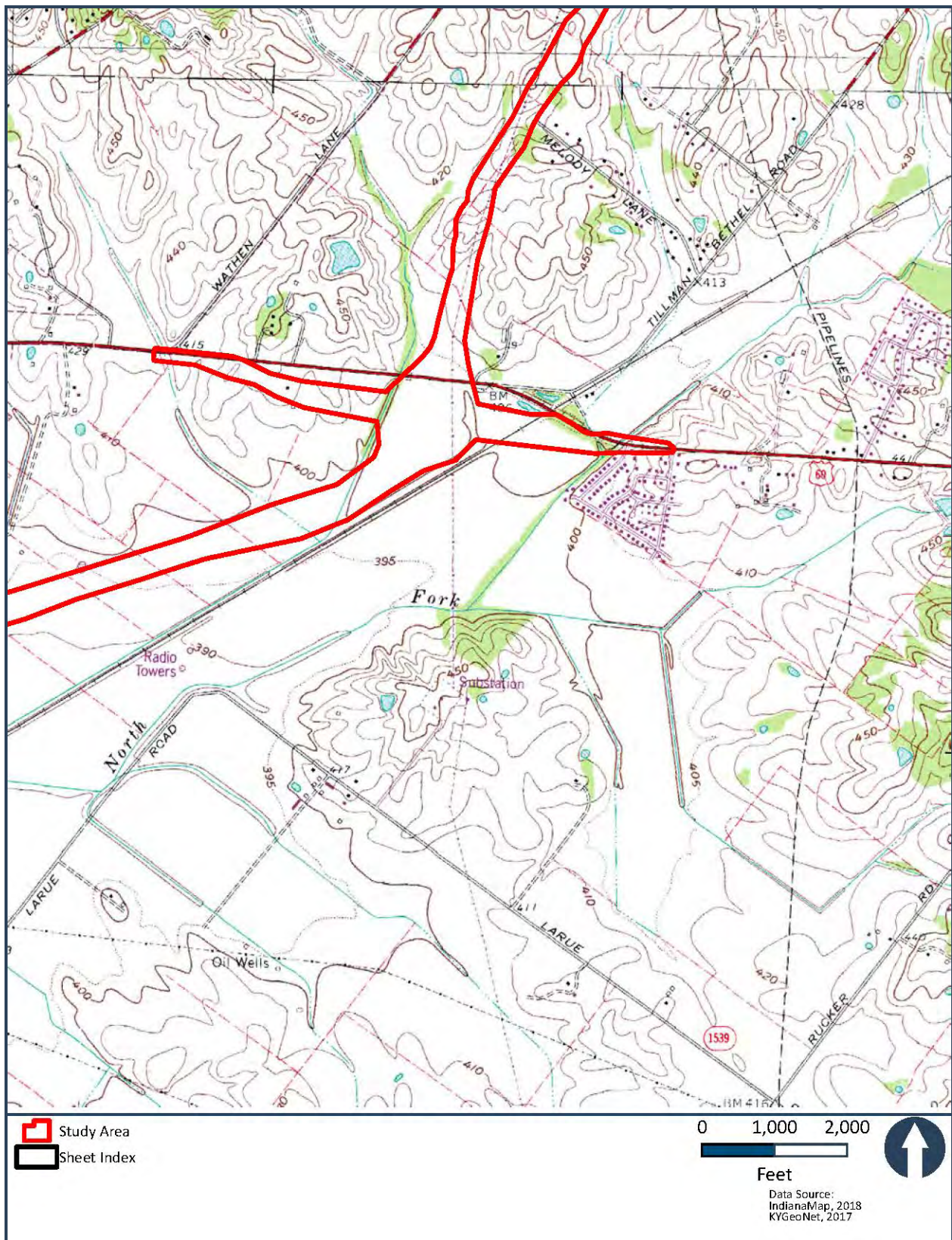


Figure 6. I-69 ORX USGS Topographic Maps (3 of 5)

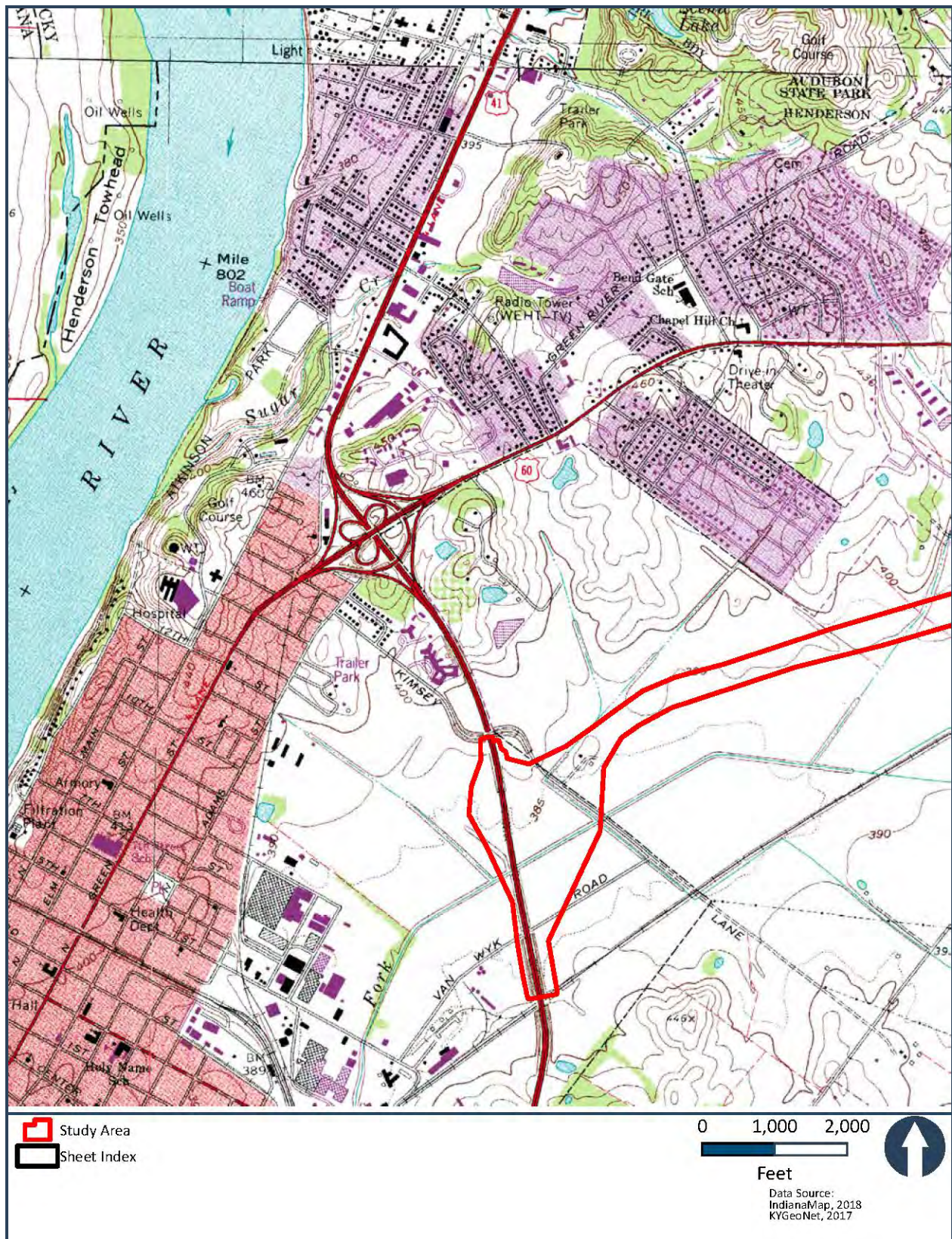


Figure 6. I-69 ORX USGS Topographic Maps (4 of 5)

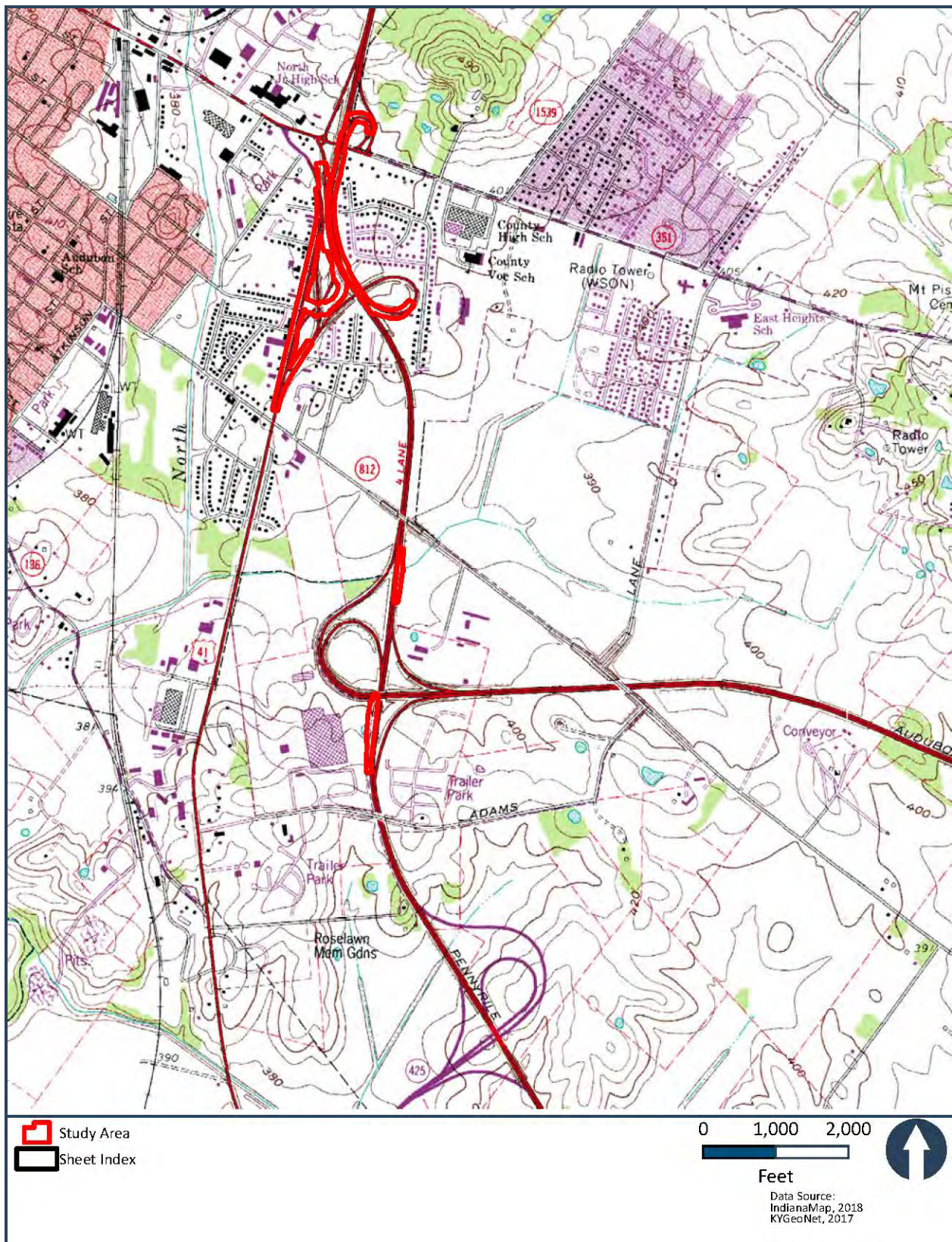


Figure 6. I-69 ORX USGS Topographic Maps (5 of 5)

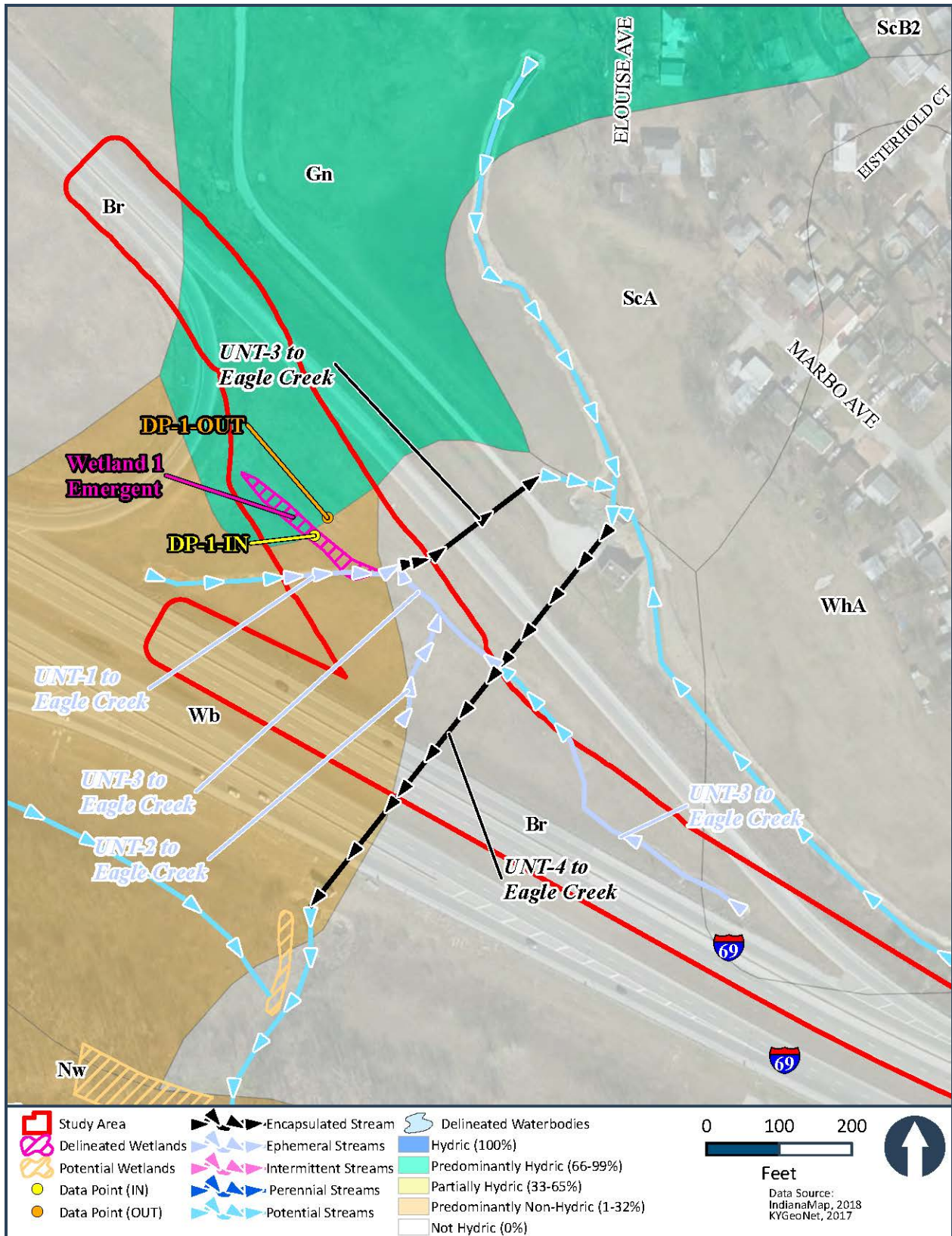


Figure 7. I-69 ORX NRCS Soil Maps (1 of 57)

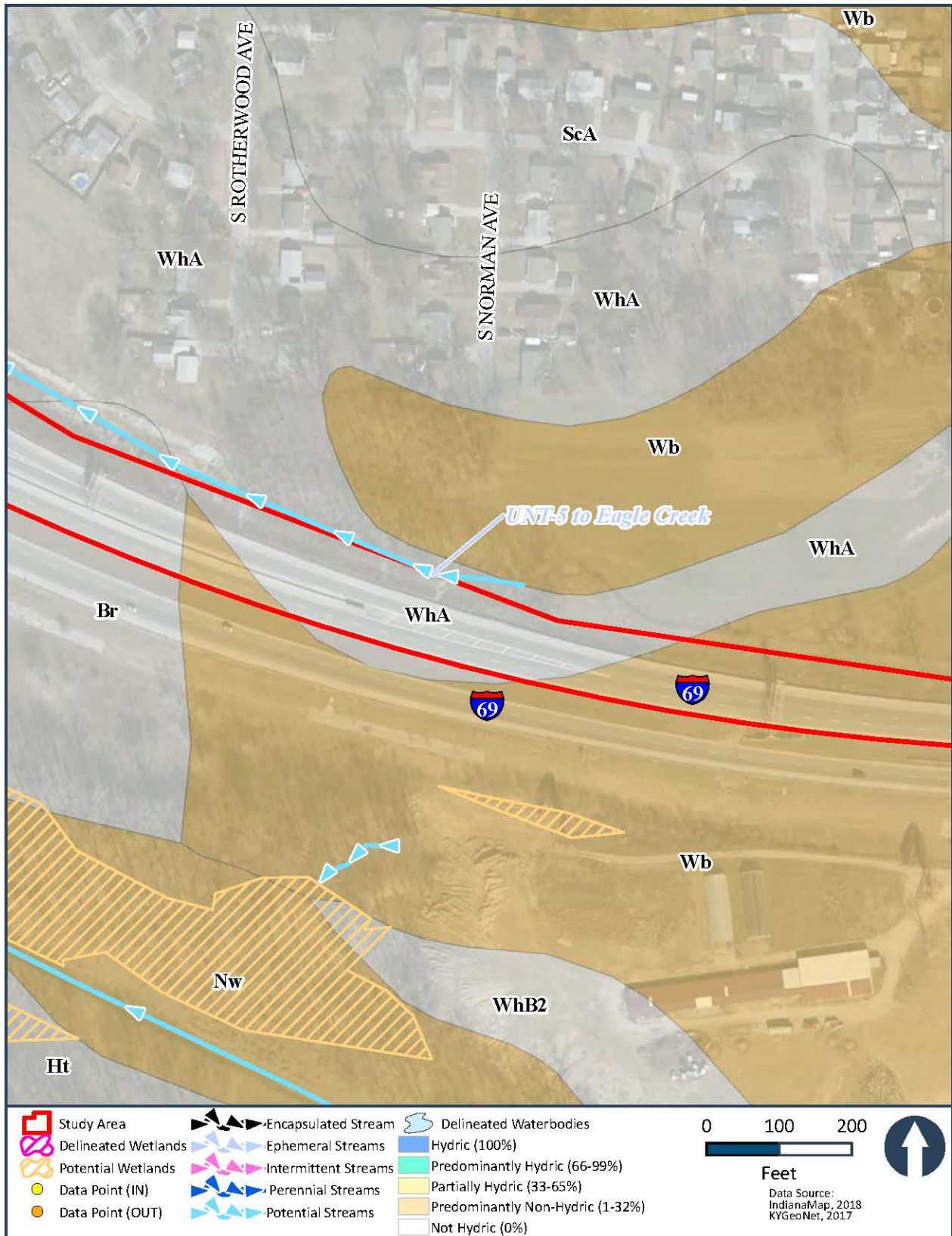


Figure 7. I-69 ORX NRCS Soil Maps (2 of 57)

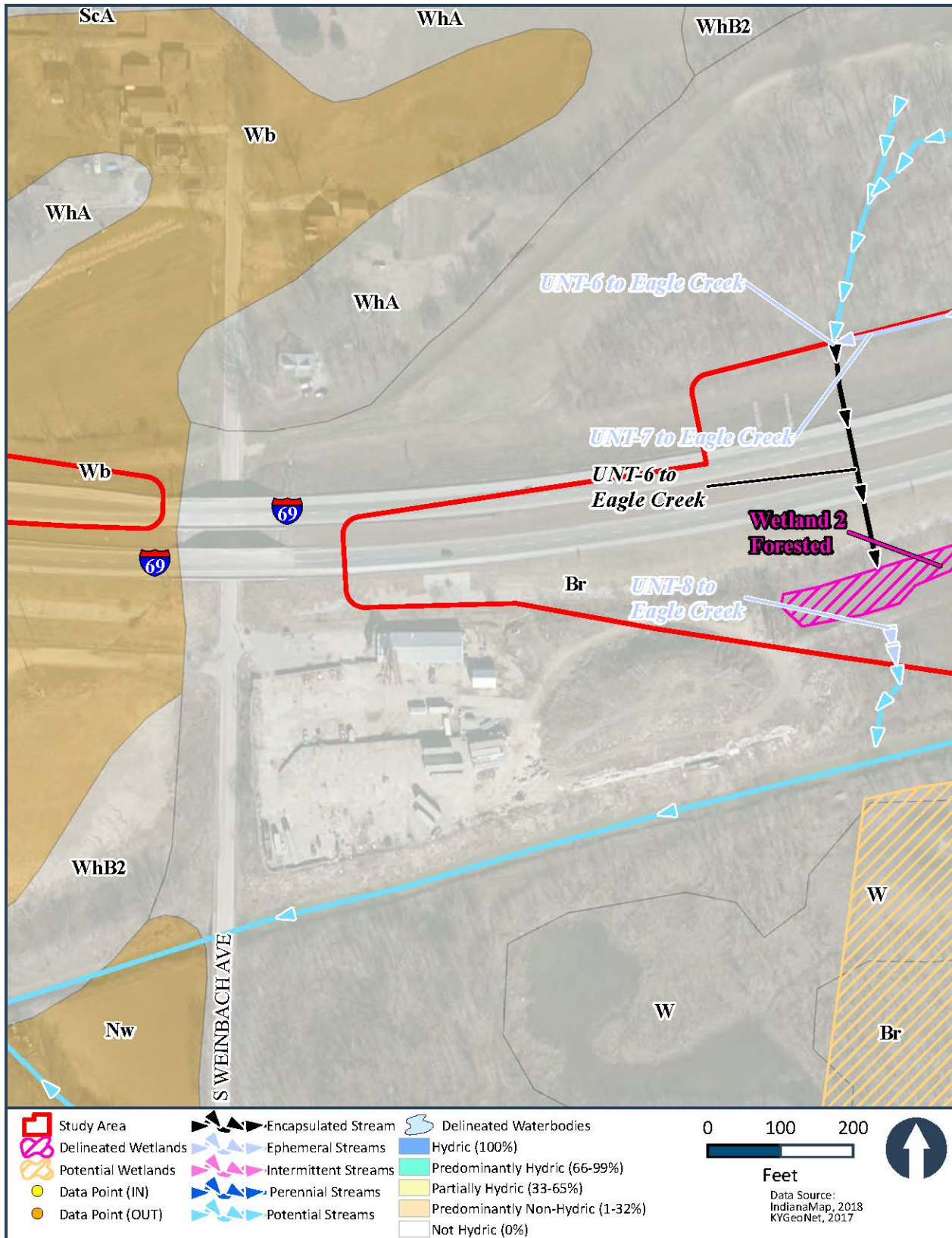


Figure 7. I-69 ORX NRCS Soil Maps (3 of 57)

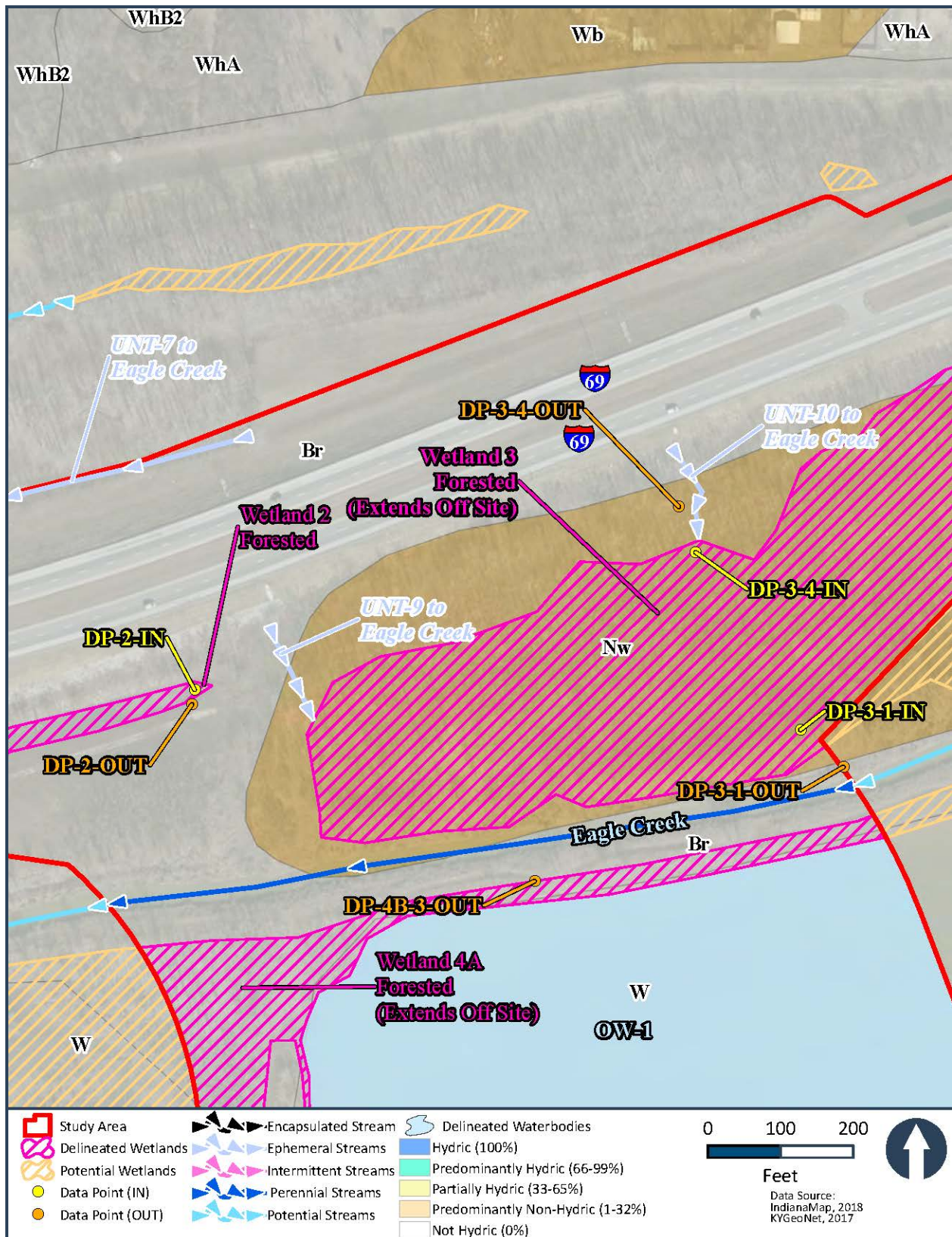


Figure 7. I-69 ORX NRCS Soil Maps (4 of 57)

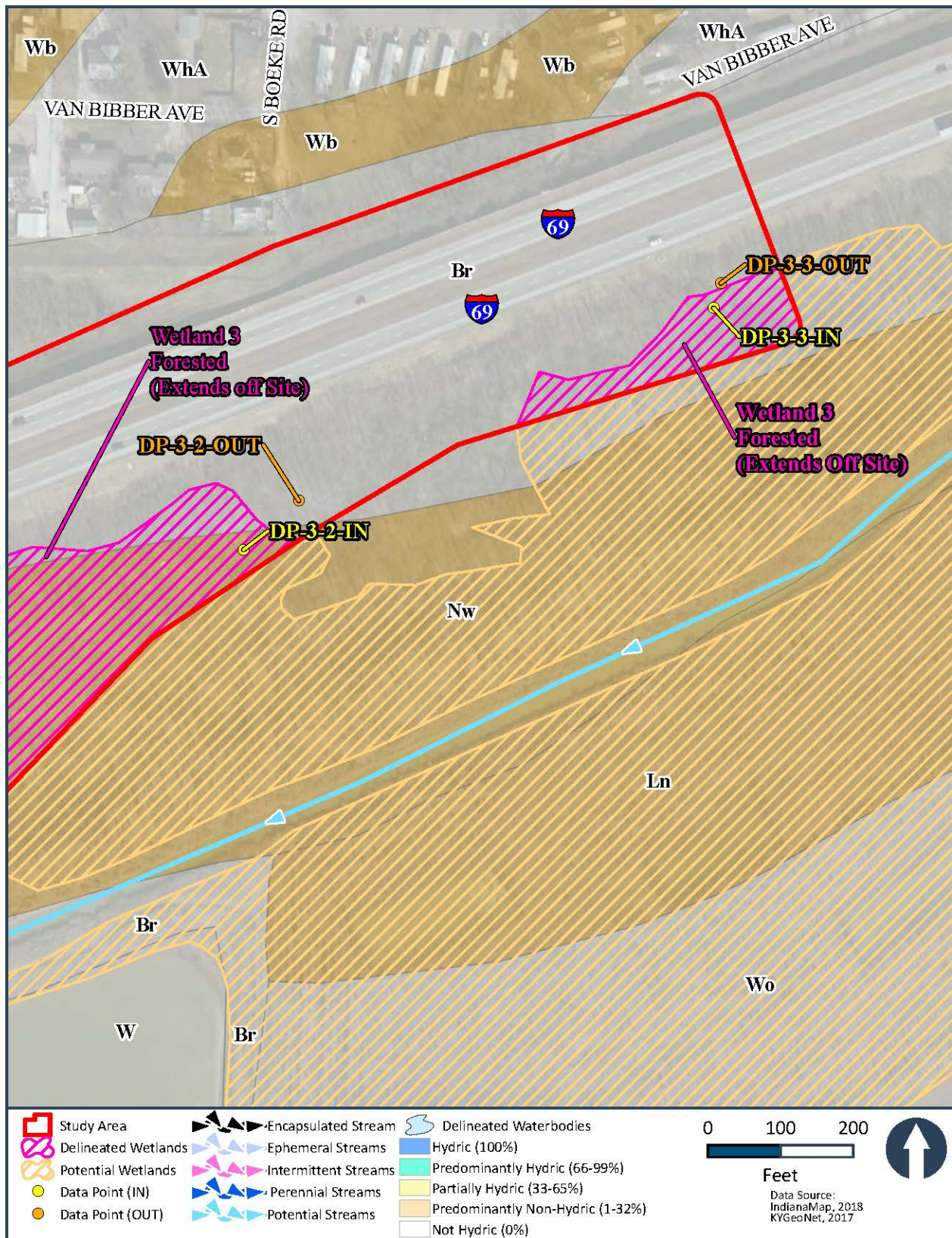


Figure 7. I-69 ORX NRCS Soil Maps (5 of 57)

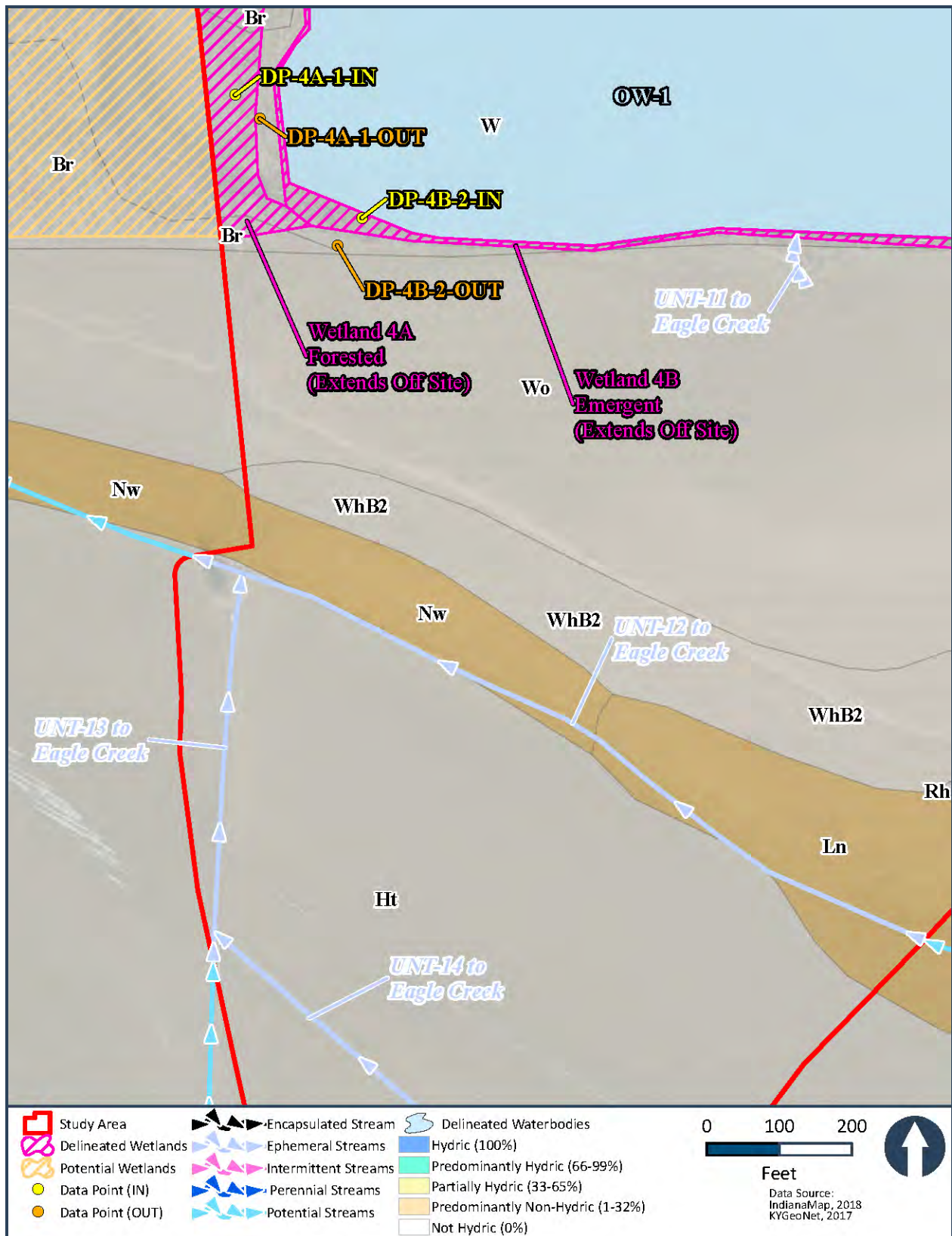


Figure 7. I-69 ORX NRCS Soil Maps (6 of 57)

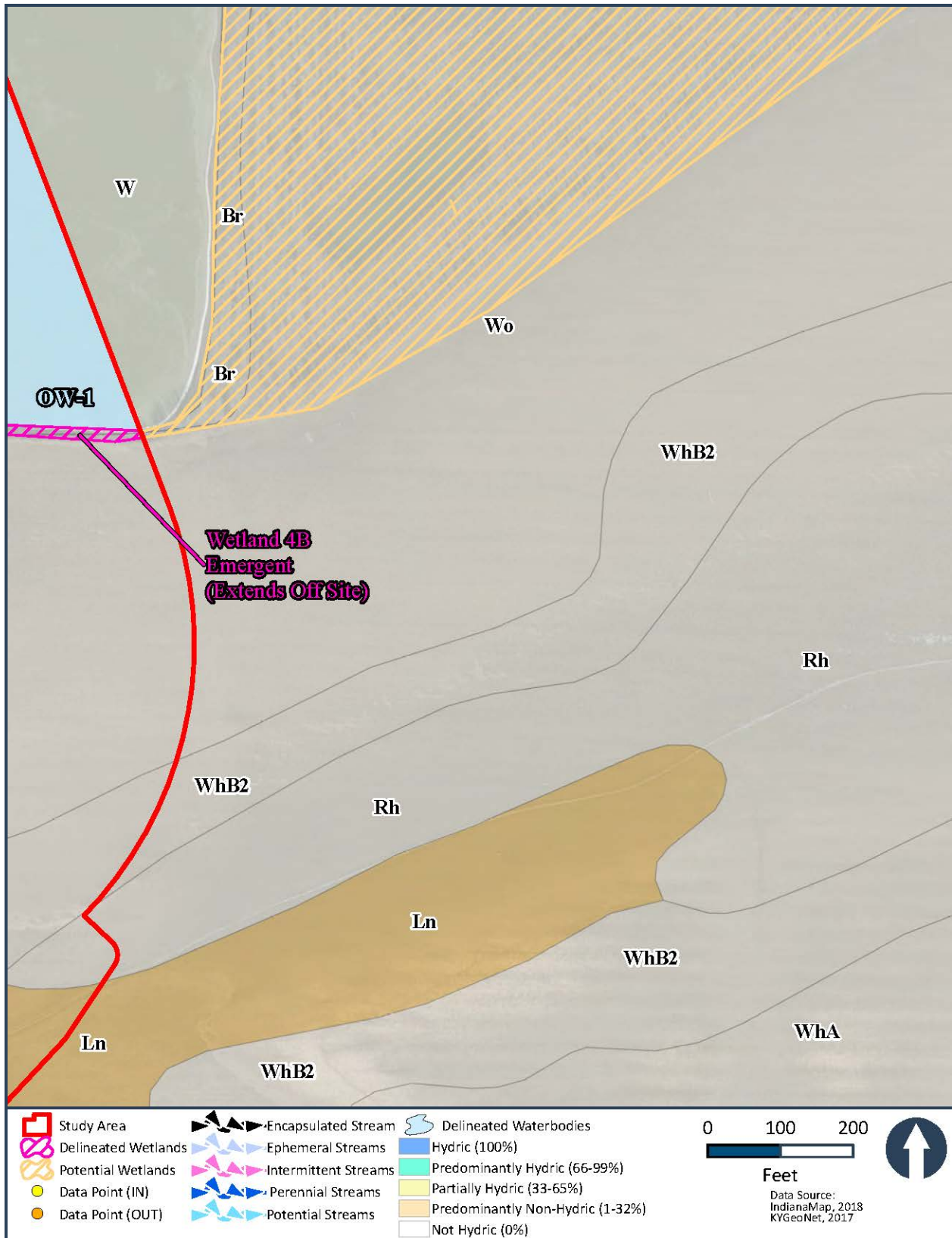


Figure 7. I-69 ORX NRCS Soil Maps (7 of 57)

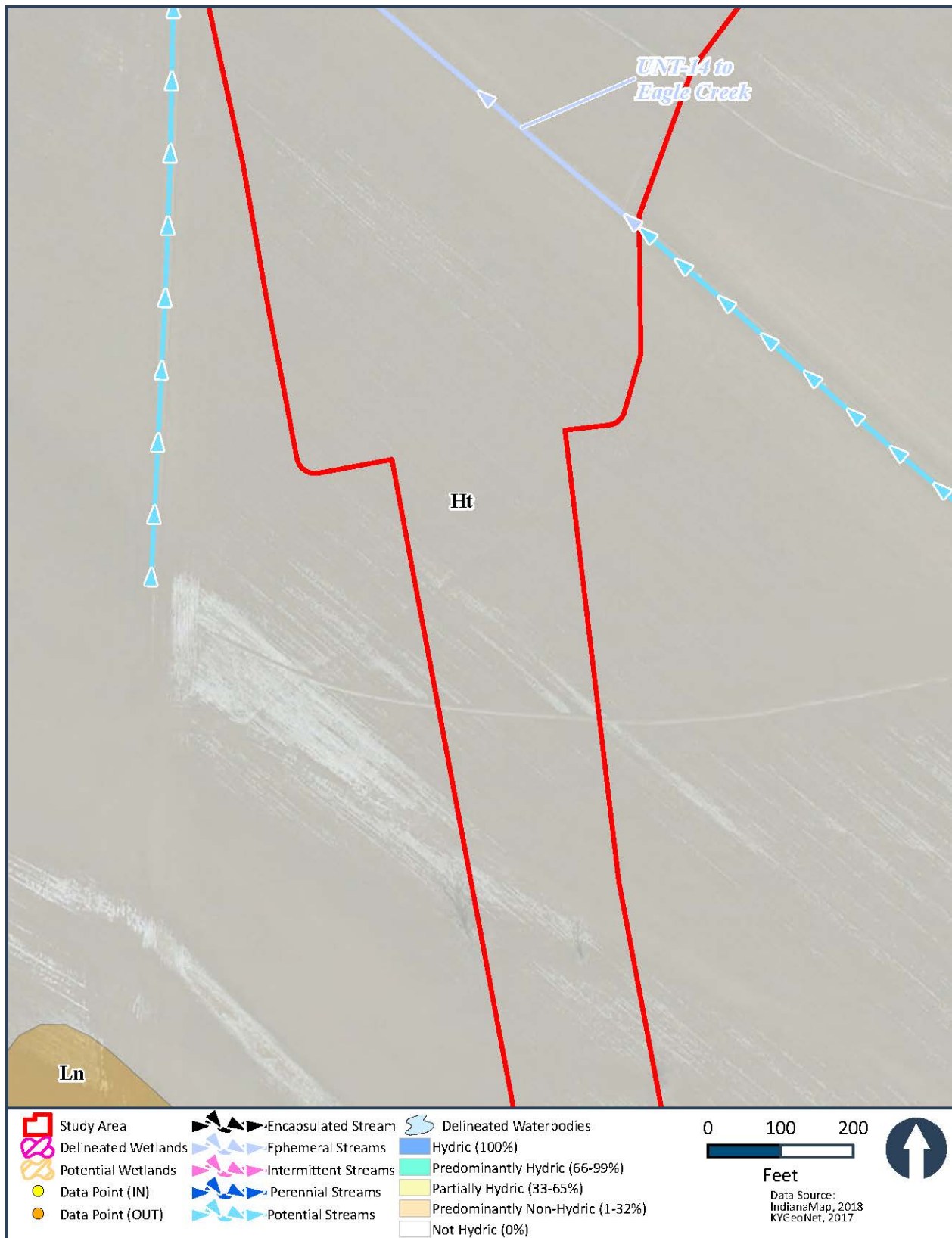


Figure 7. I-69 ORX NRCS Soil Maps (8 of 57)



Figure 7. I-69 ORX NRCS Soil Maps (9 of 57)



Figure 7. I-69 ORX NRCS Soil Maps (10 of 57)



Figure 7. I-69 ORX NRCS Soil Maps (11 of 57)

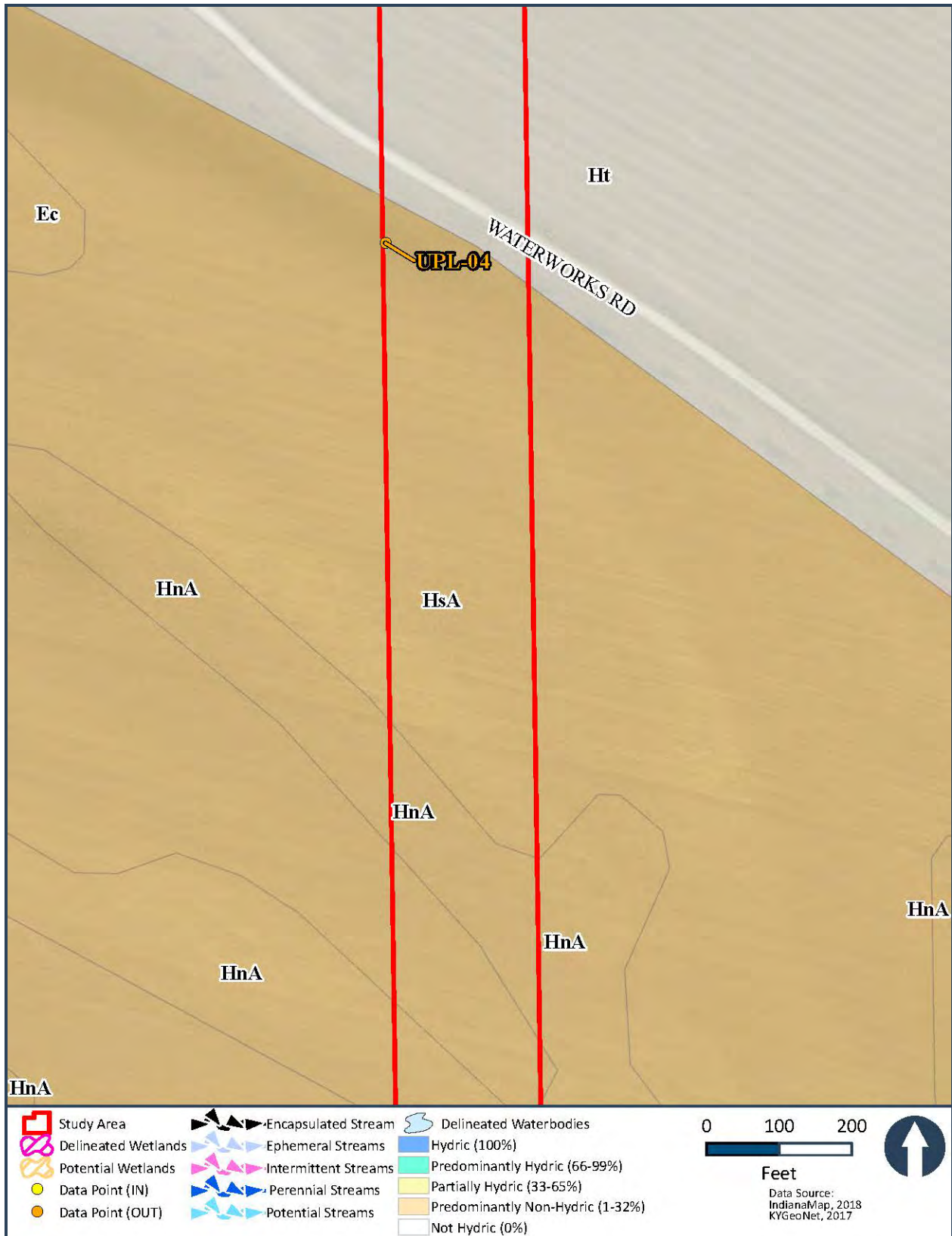


Figure 7. I-69 ORX NRCS Soil Maps (12 of 57)

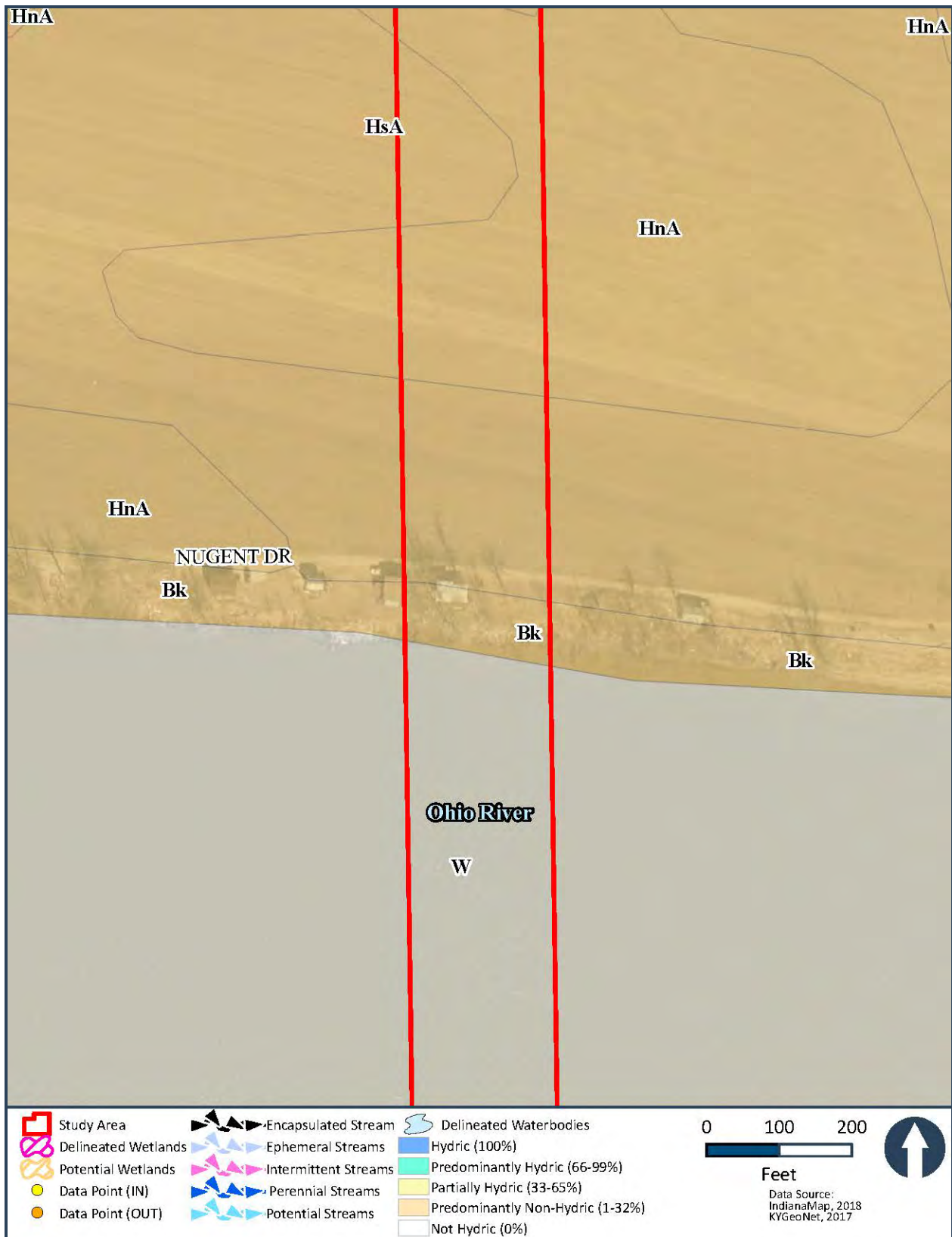


Figure 7. I-69 ORX NRCS Soil Maps (13 of 57)

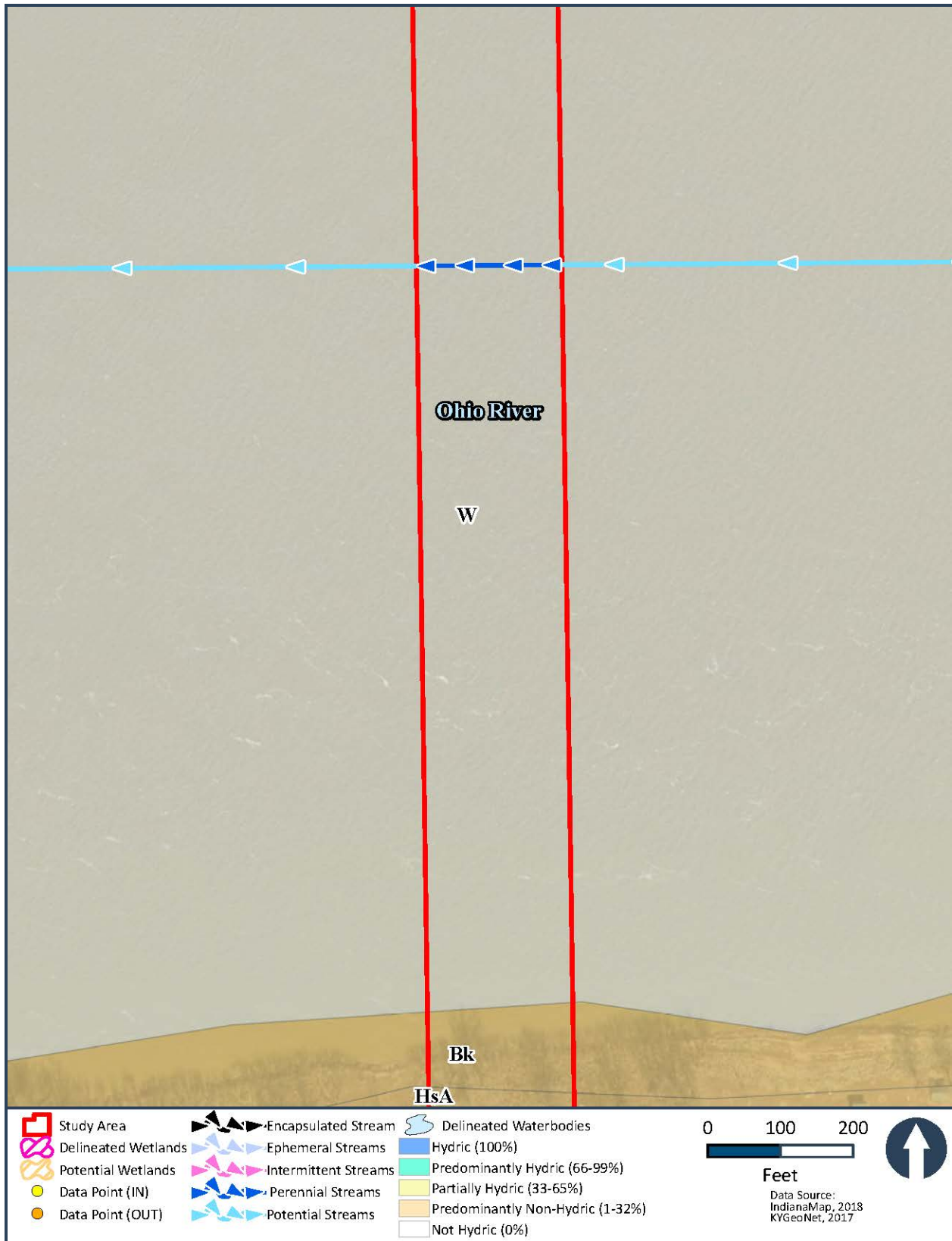


Figure 7. I-69 ORX NRCS Soil Maps (14 of 57)

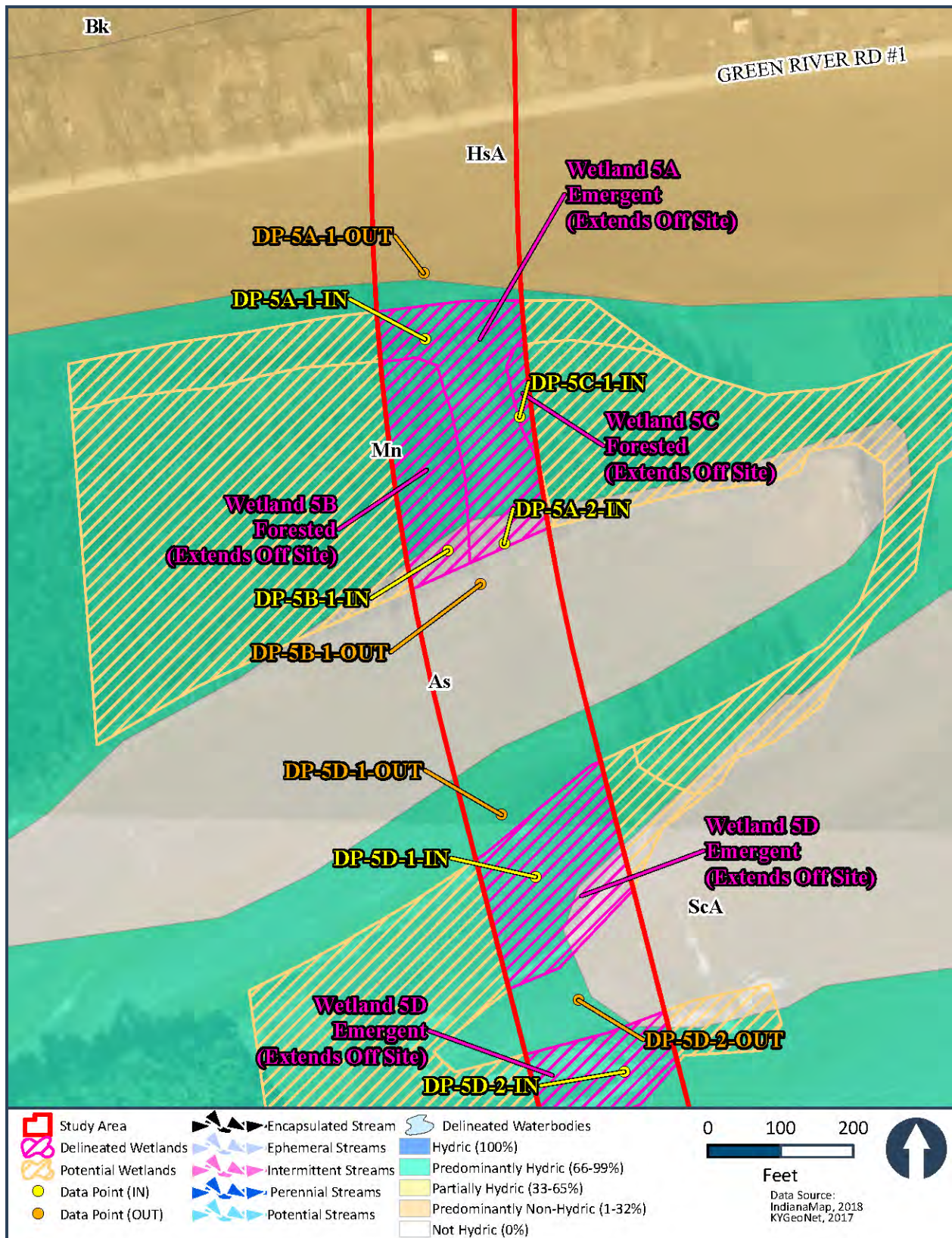


Figure 7. I-69 ORX NRCS Soil Maps (15 of 57)

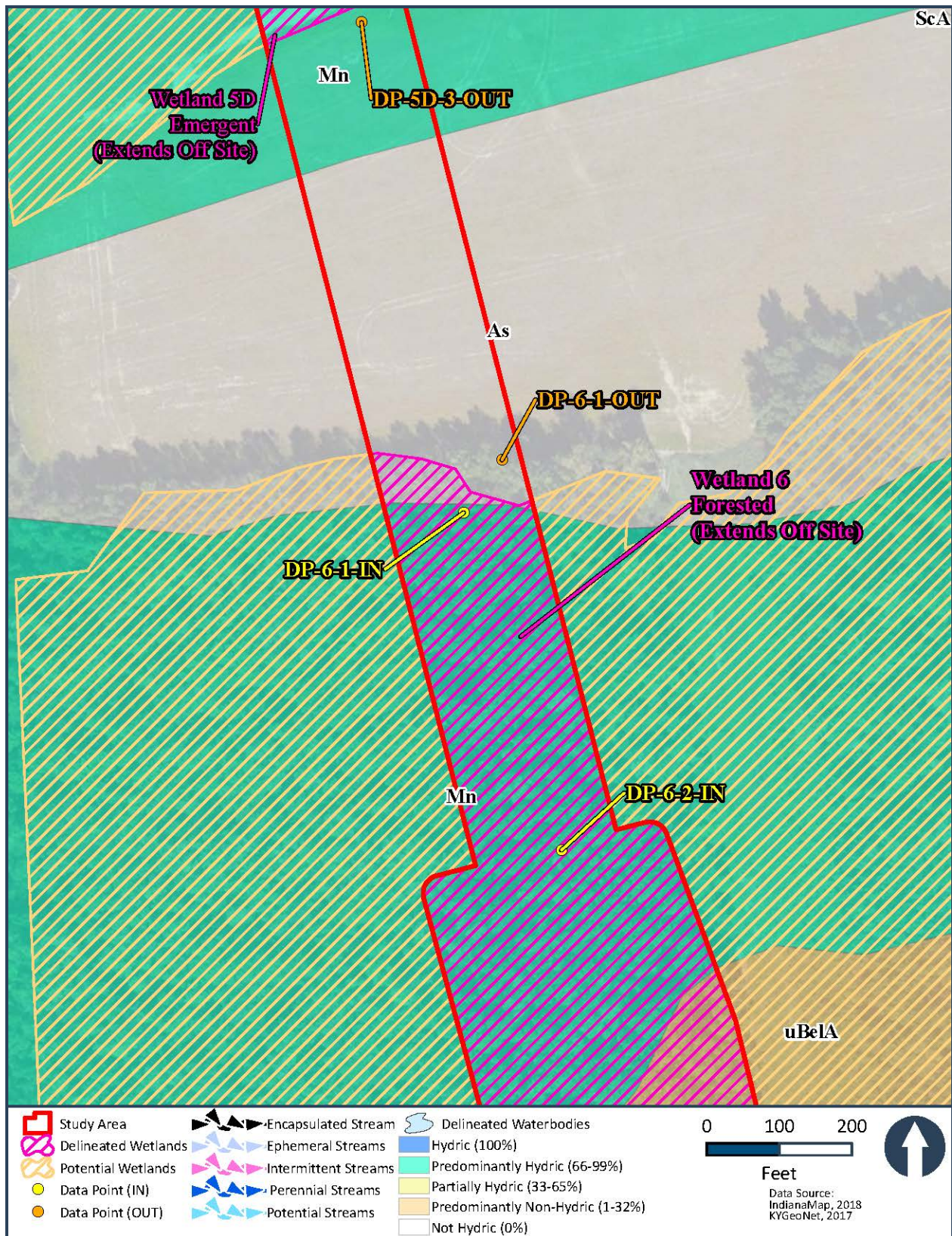


Figure 7. I-69 ORX NRCS Soil Maps (16 of 57)

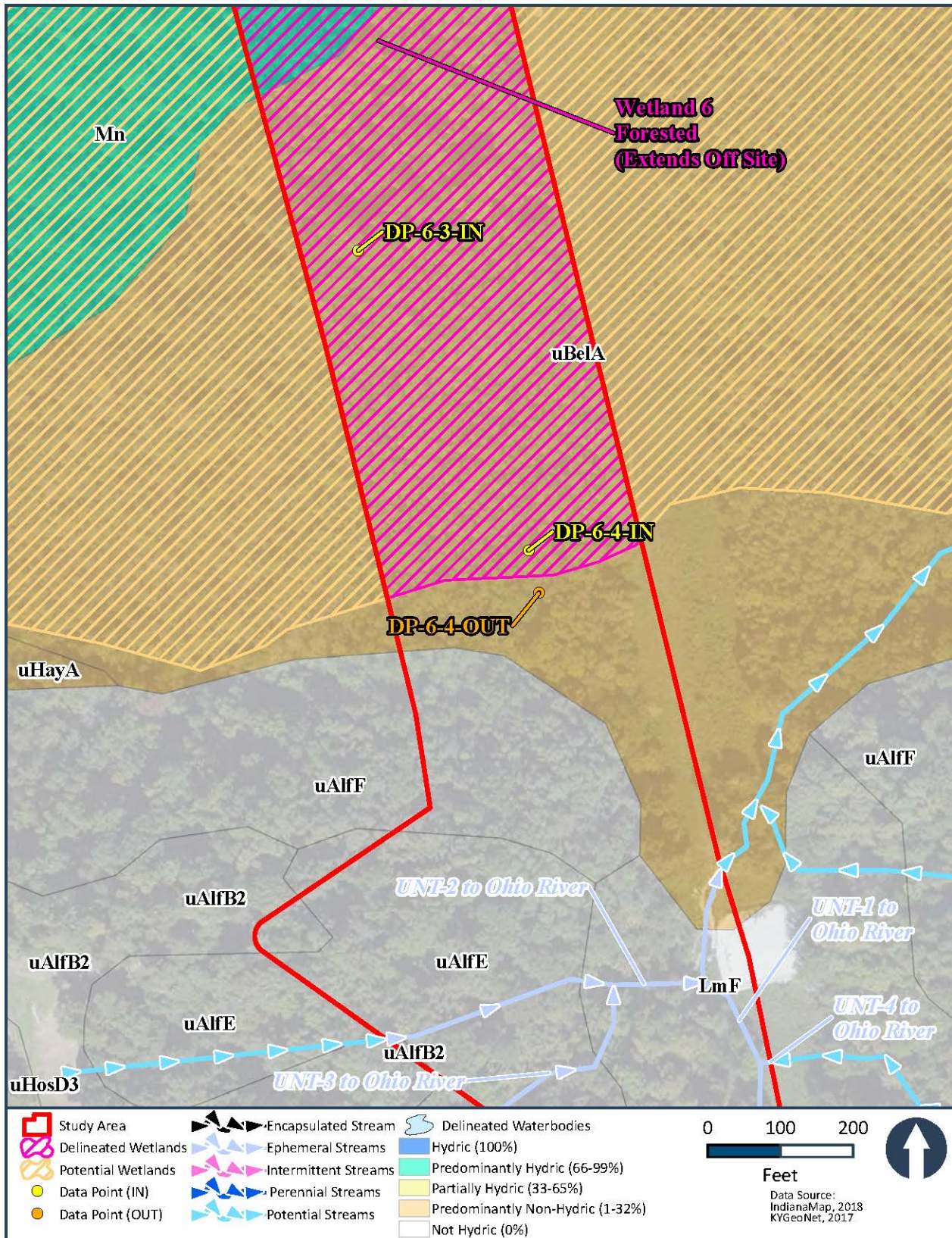


Figure 7. I-69 ORX NRCS Soil Maps (17 of 57)

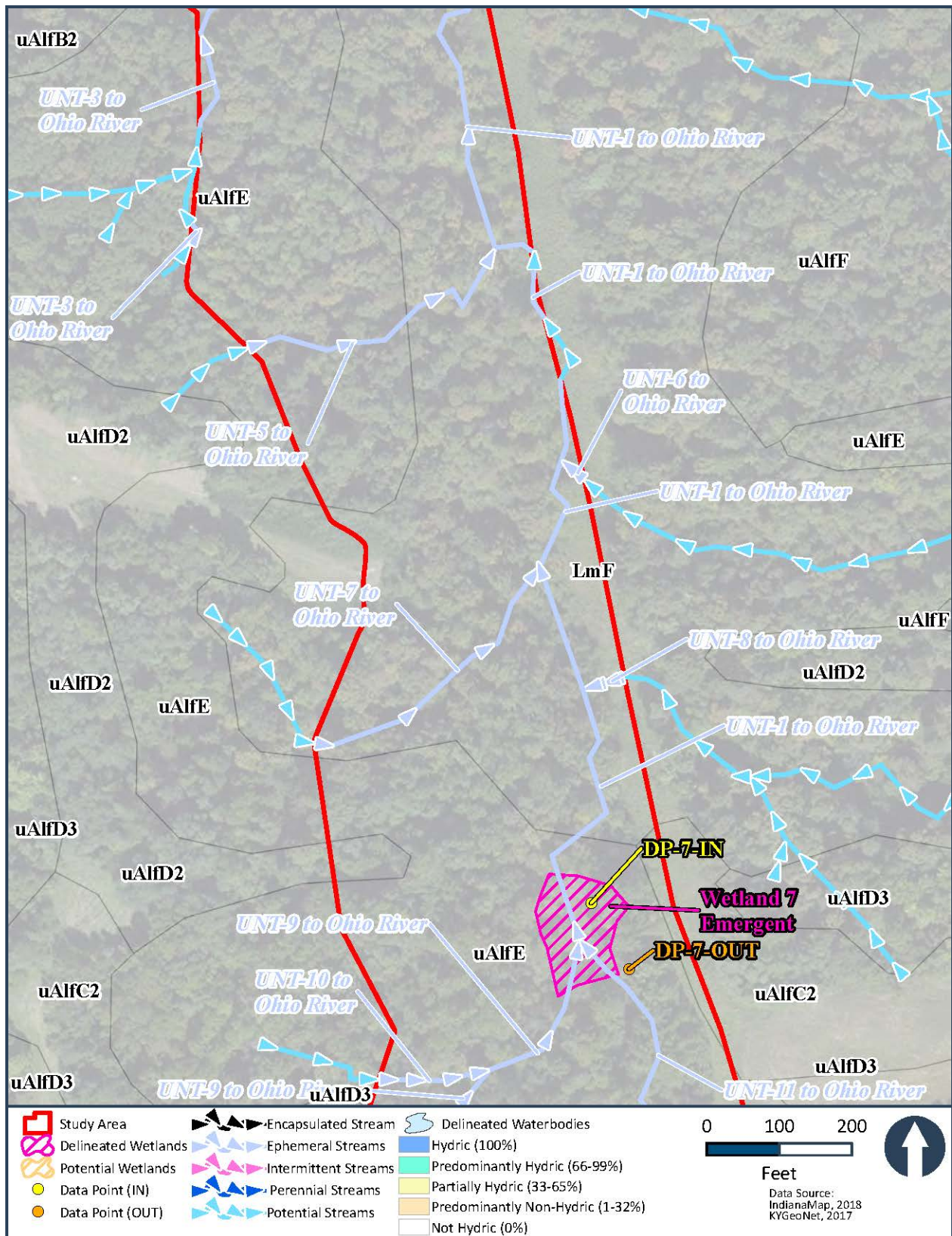


Figure 7. I-69 ORX NRCS Soil Maps (18 of 57)

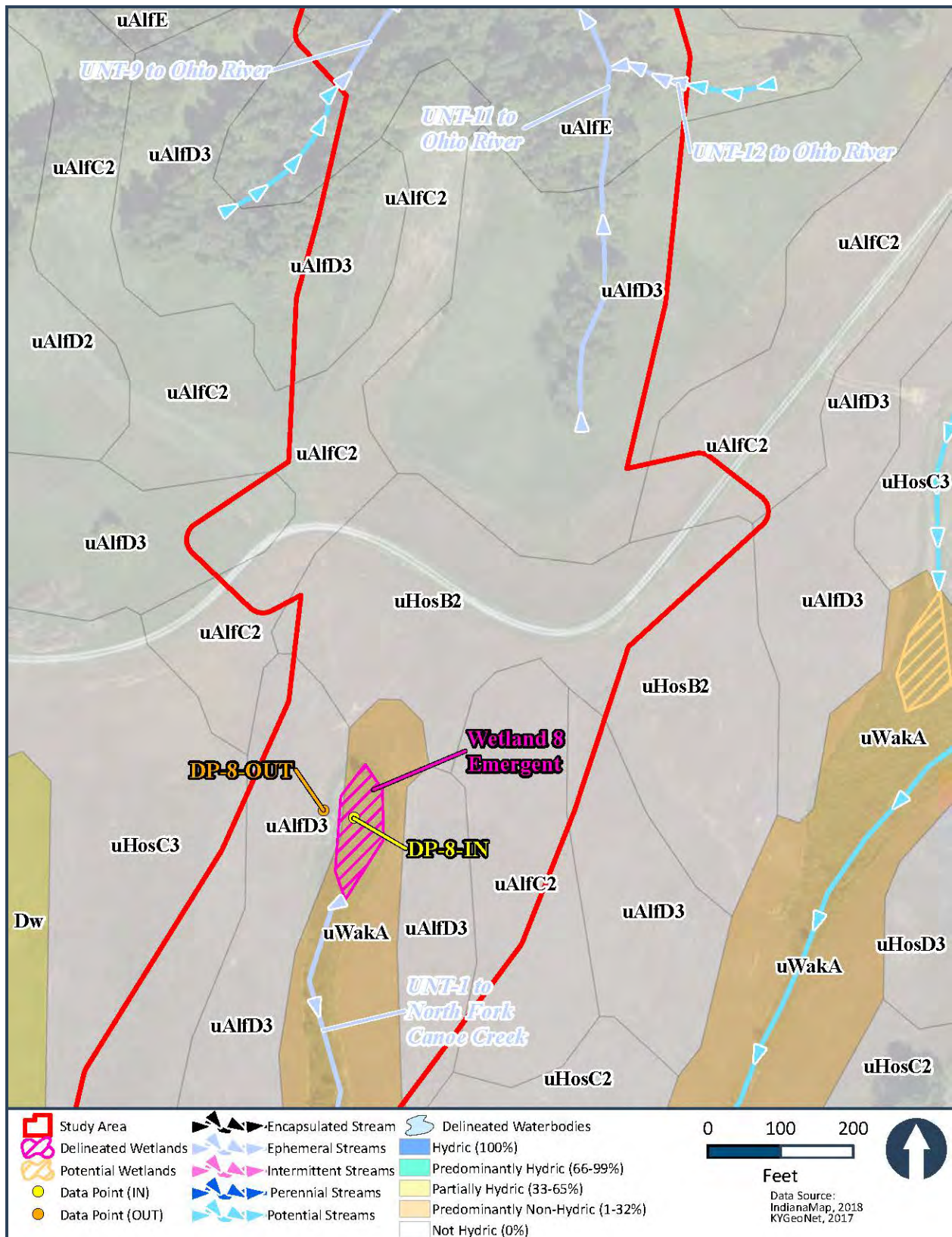


Figure 7. I-69 ORX NRCS Soil Maps (19 of 57)

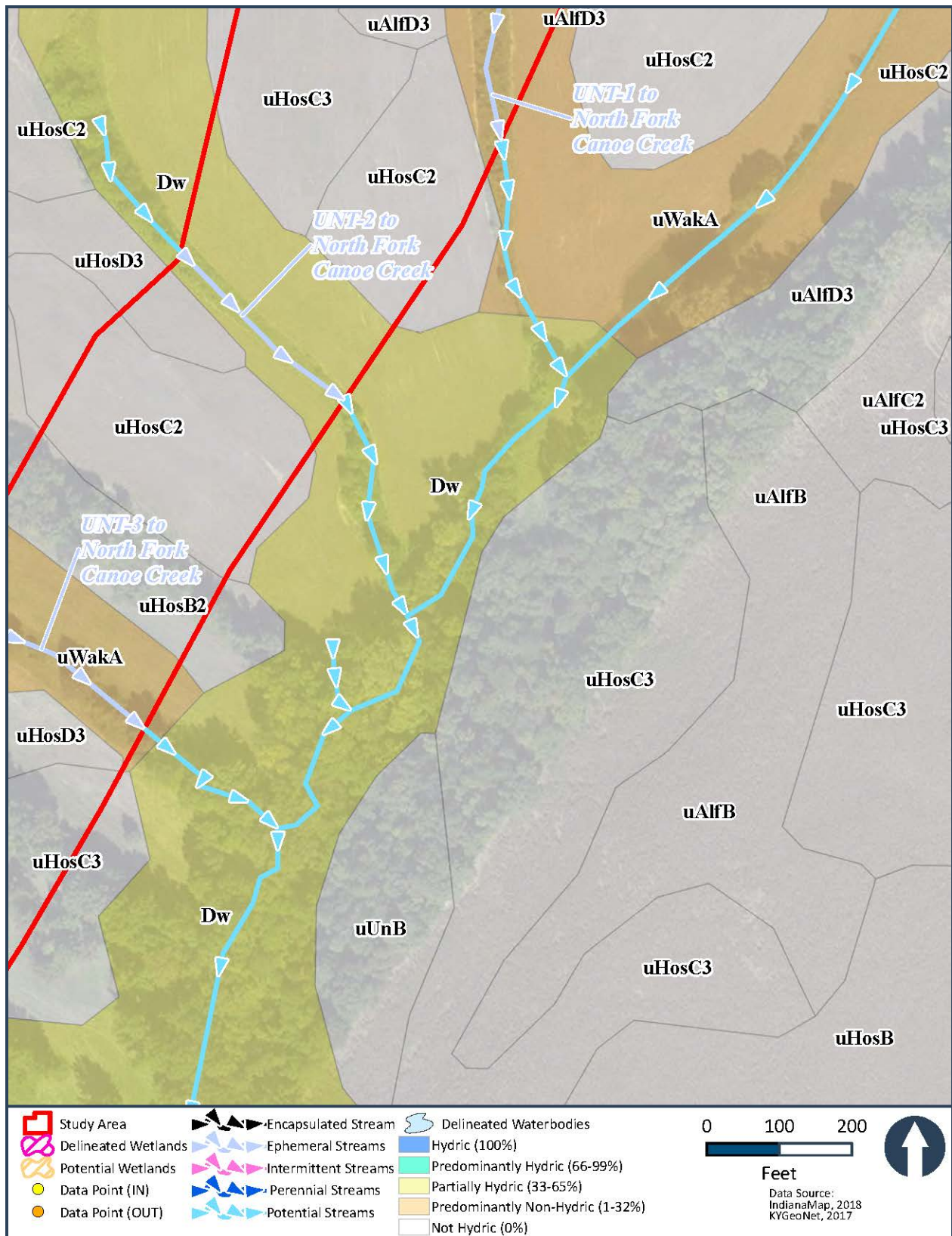


Figure 7. I-69 ORX NRCS Soil Maps (20 of 57)

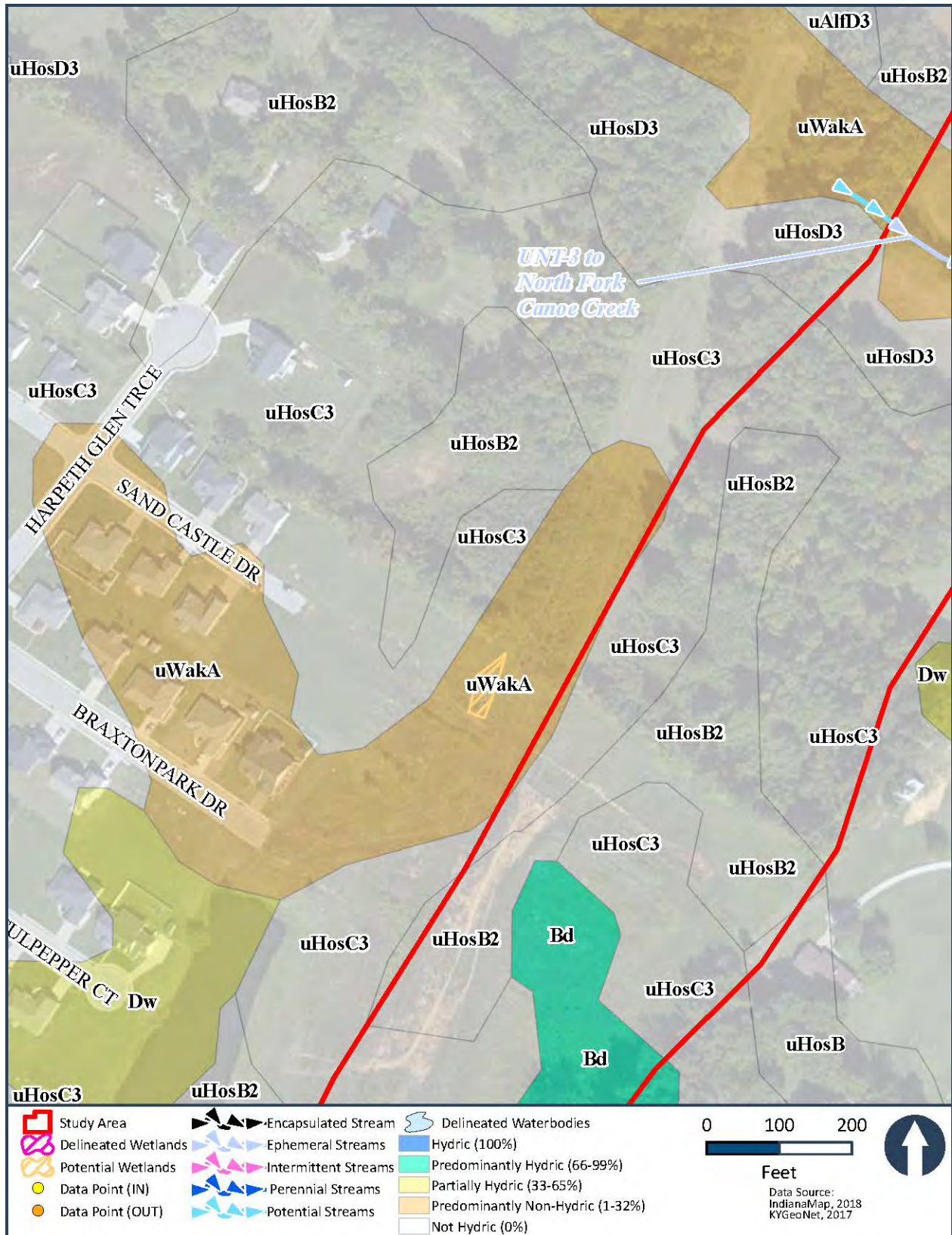


Figure 7. I-69 ORX NRCS Soil Maps (21 of 57)

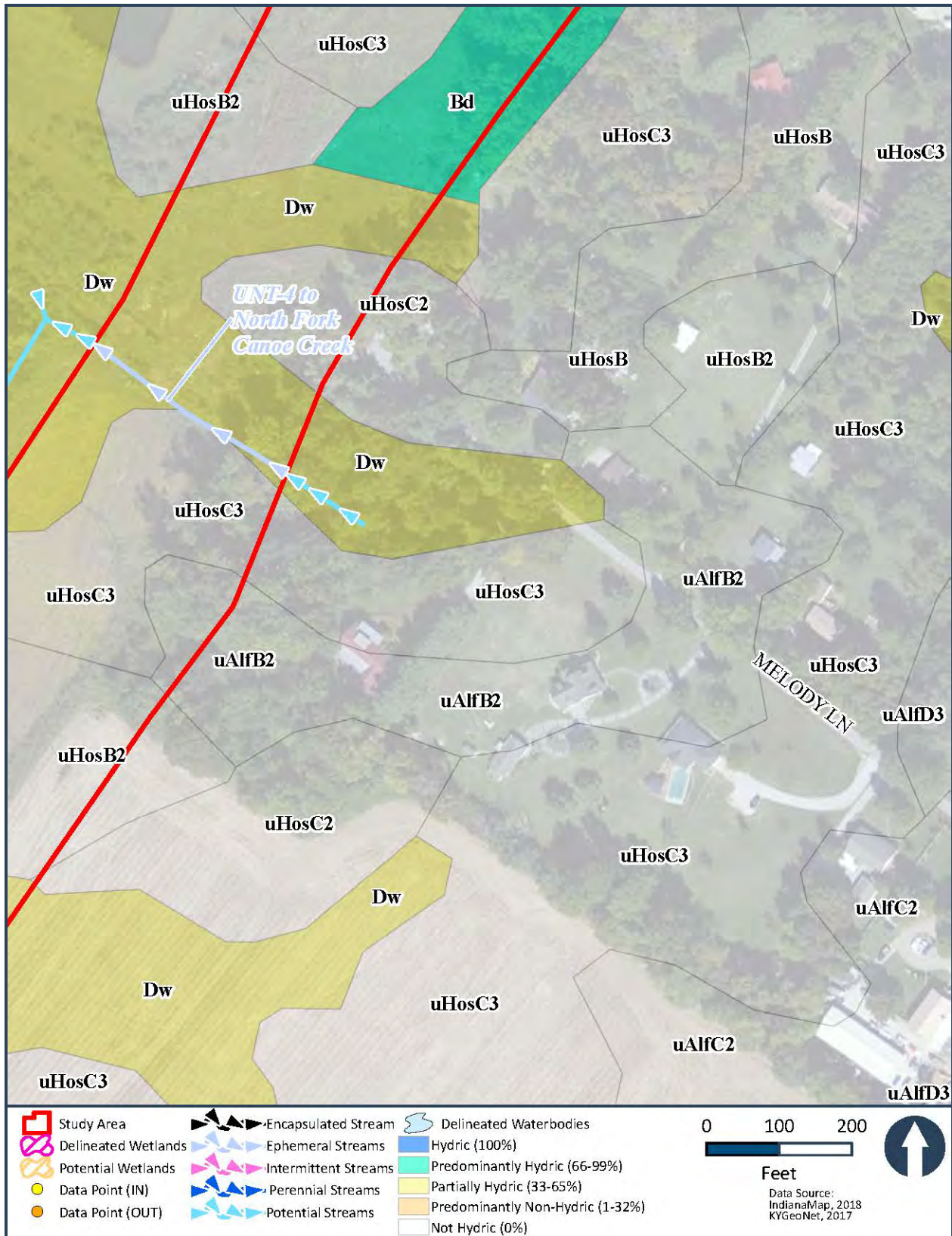


Figure 7. I-69 ORX NRCS Soil Maps (22 of 57)

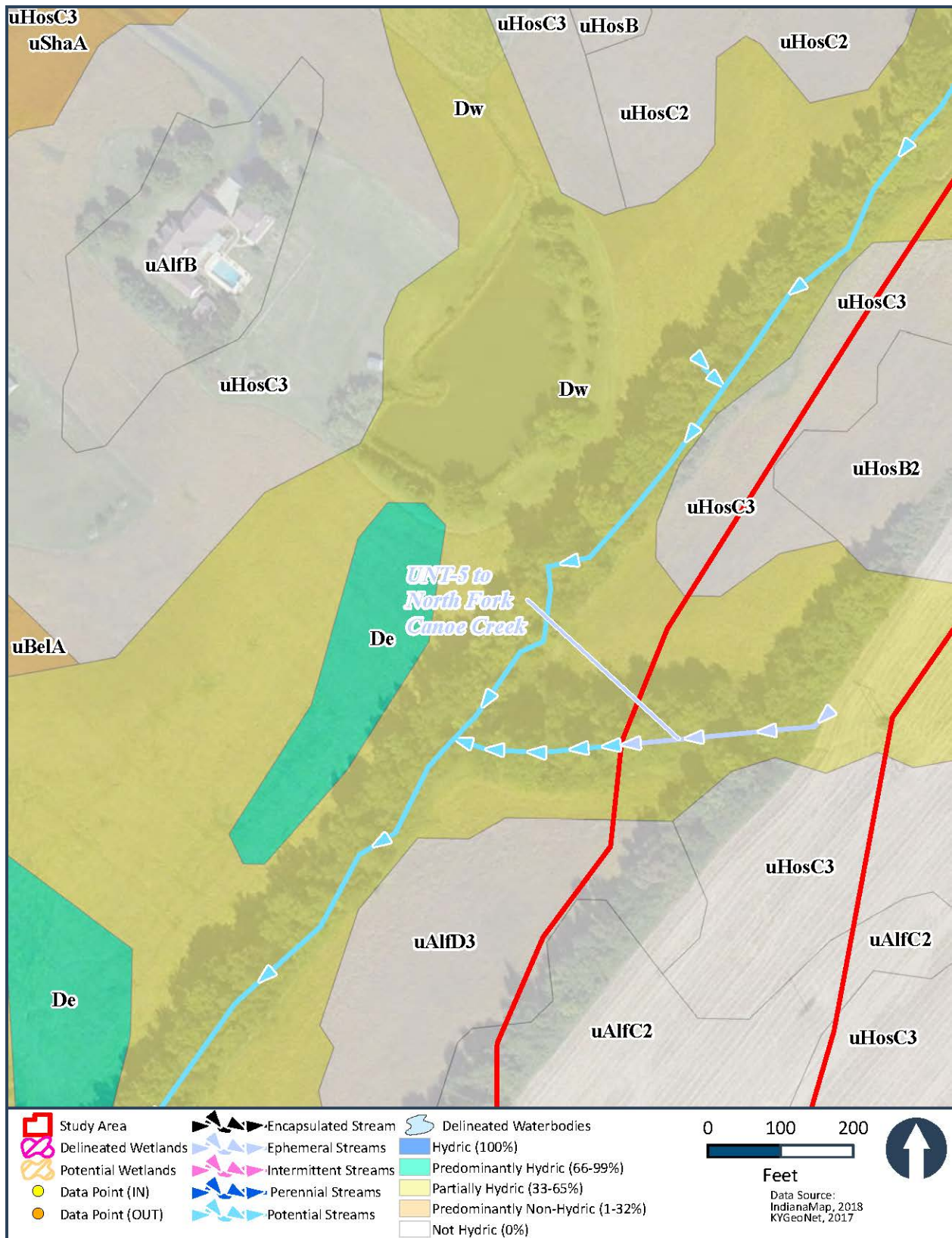


Figure 7. I-69 ORX NRCS Soil Maps (23 of 57)

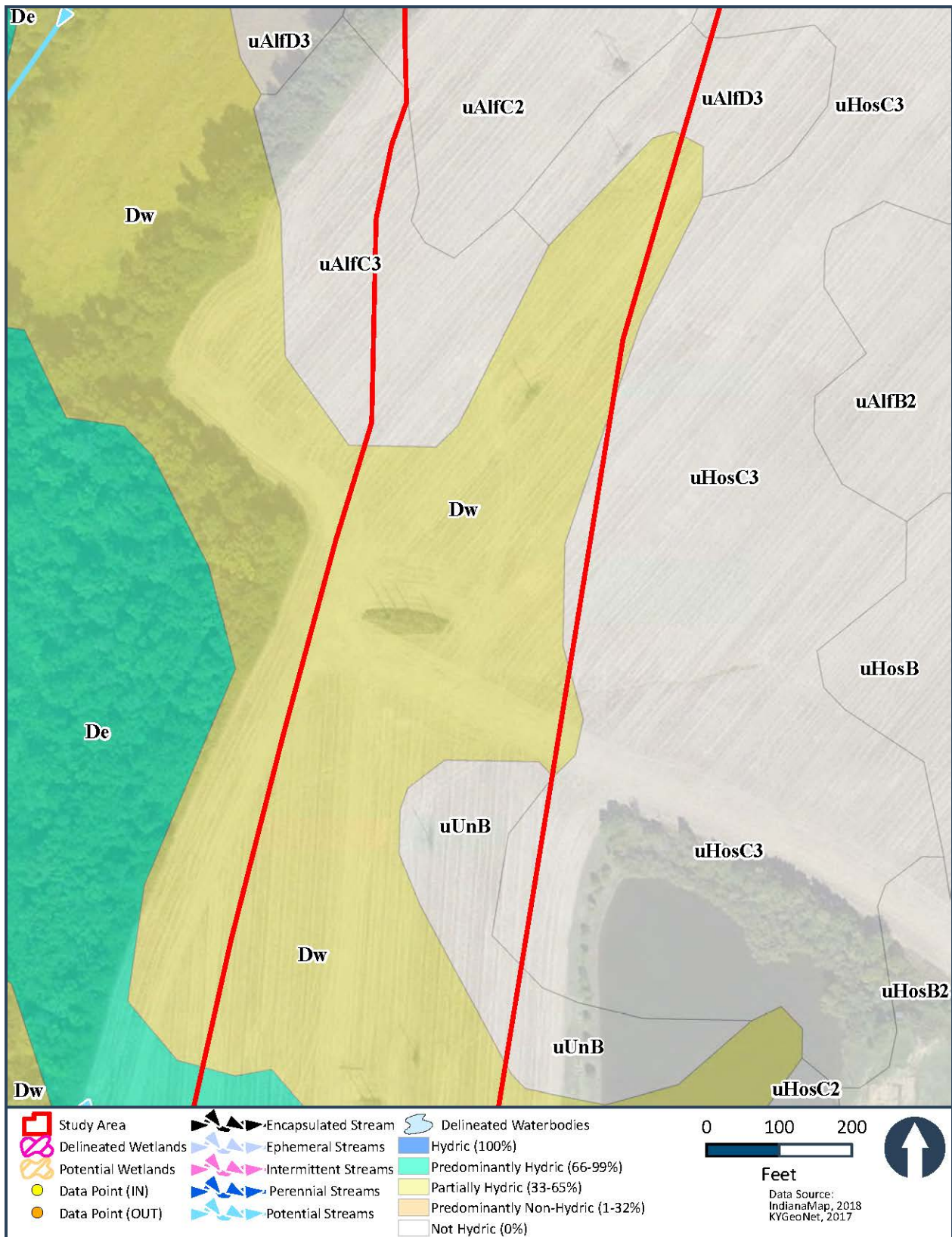


Figure 7. I-69 ORX NRCS Soil Maps (24 of 57)

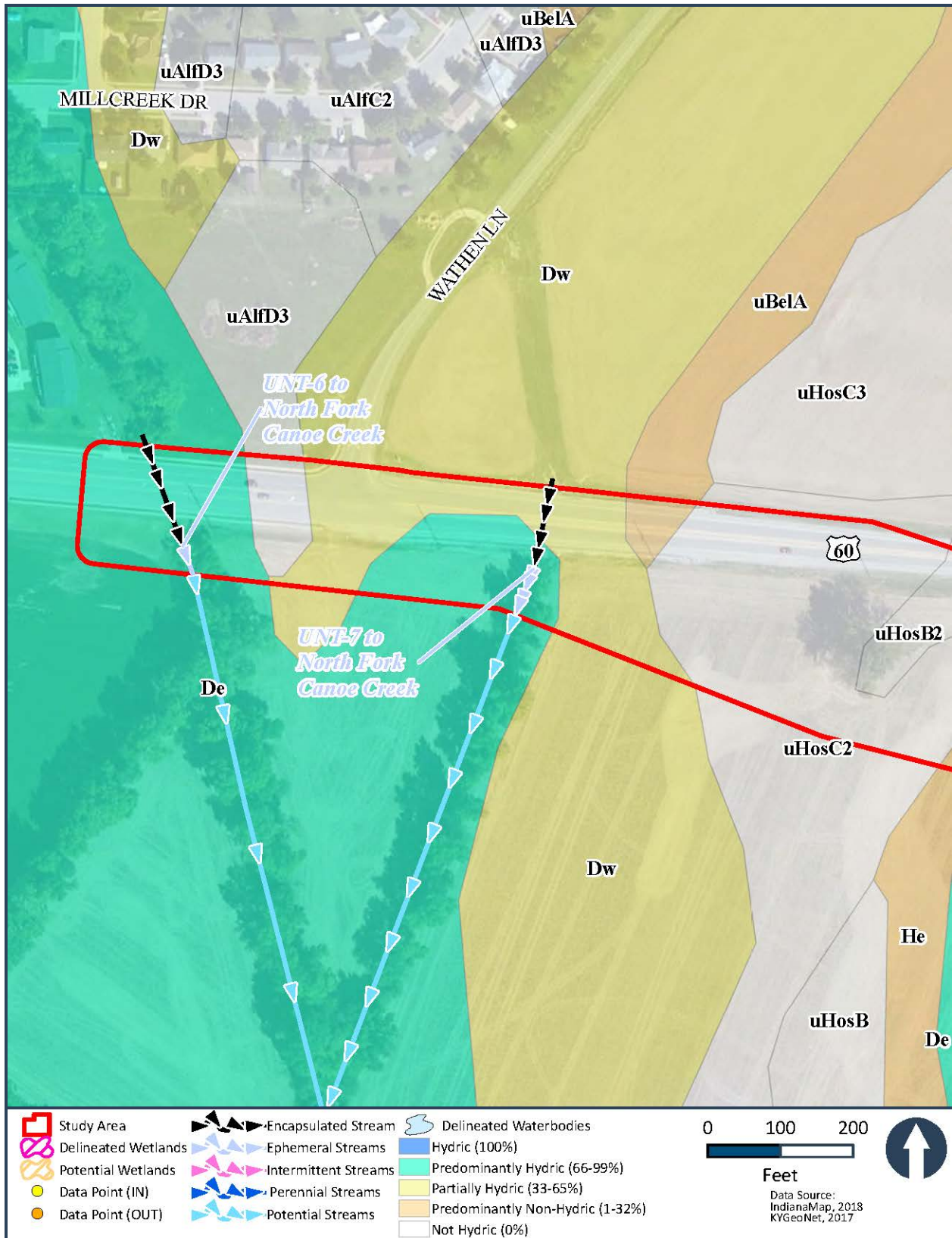


Figure 7. I-69 ORX NRCS Soil Maps (25 of 57)

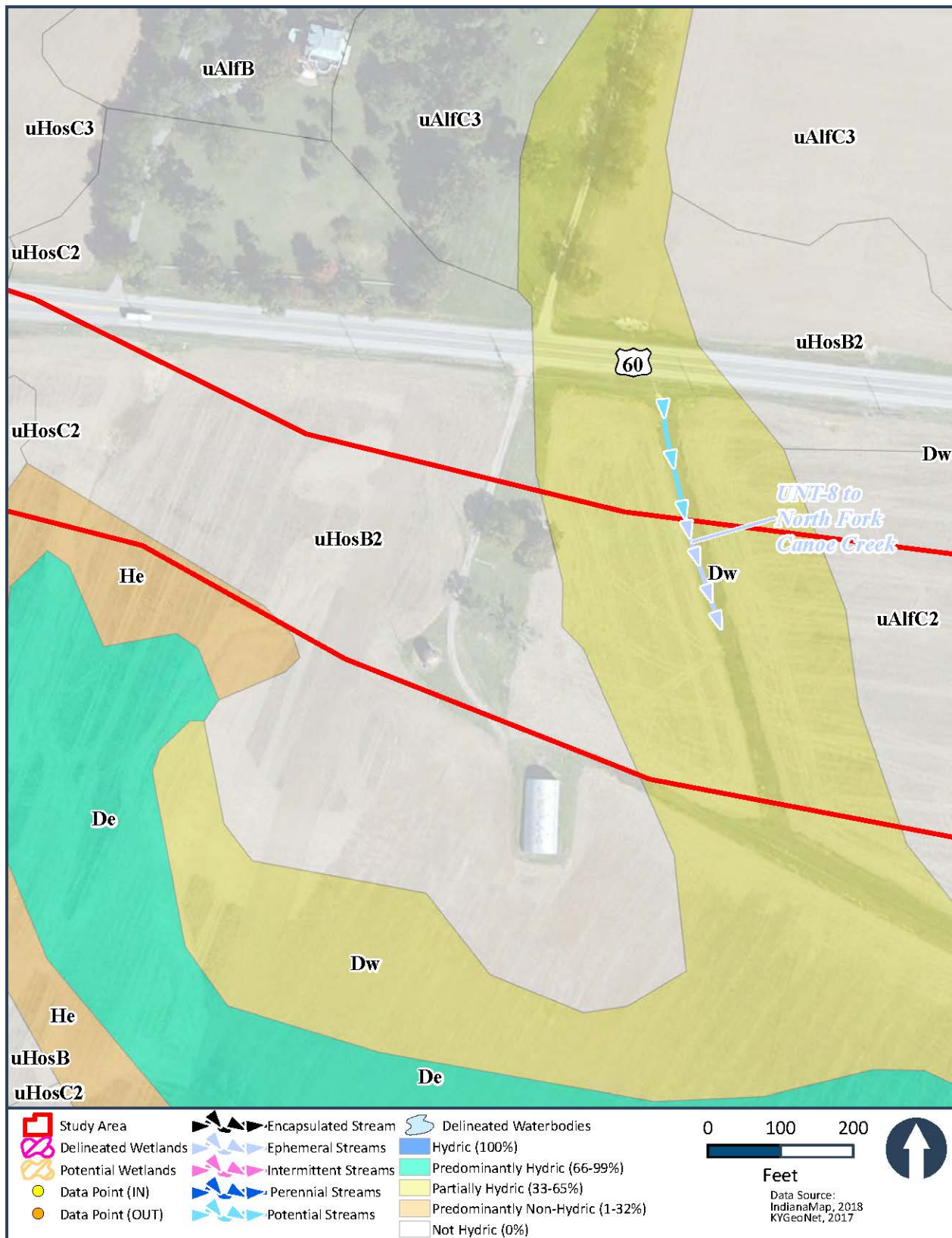


Figure 7. I-69 ORX NRCS Soil Maps (26 of 57)

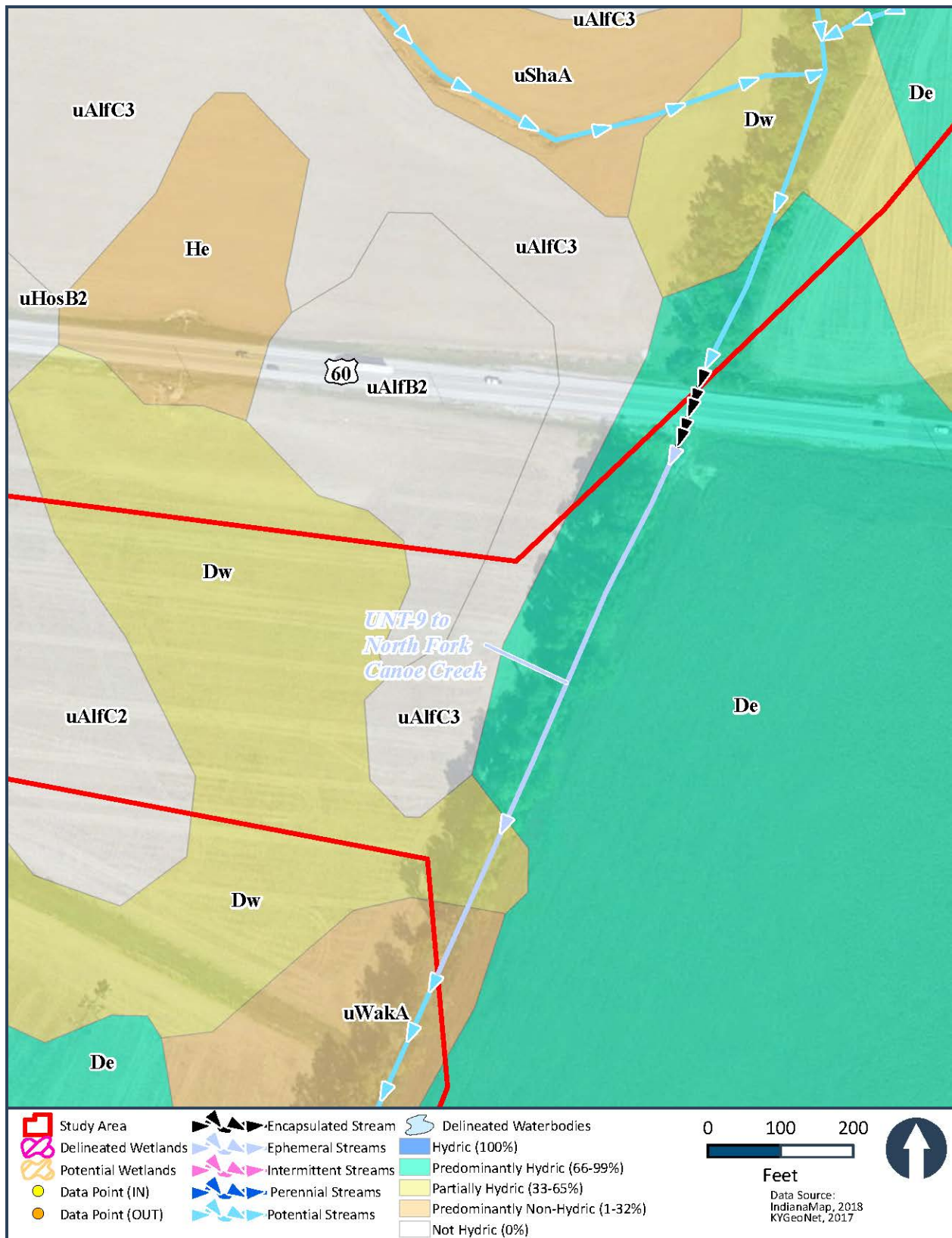


Figure 7. I-69 ORX NRCS Soil Maps (27 of 57)

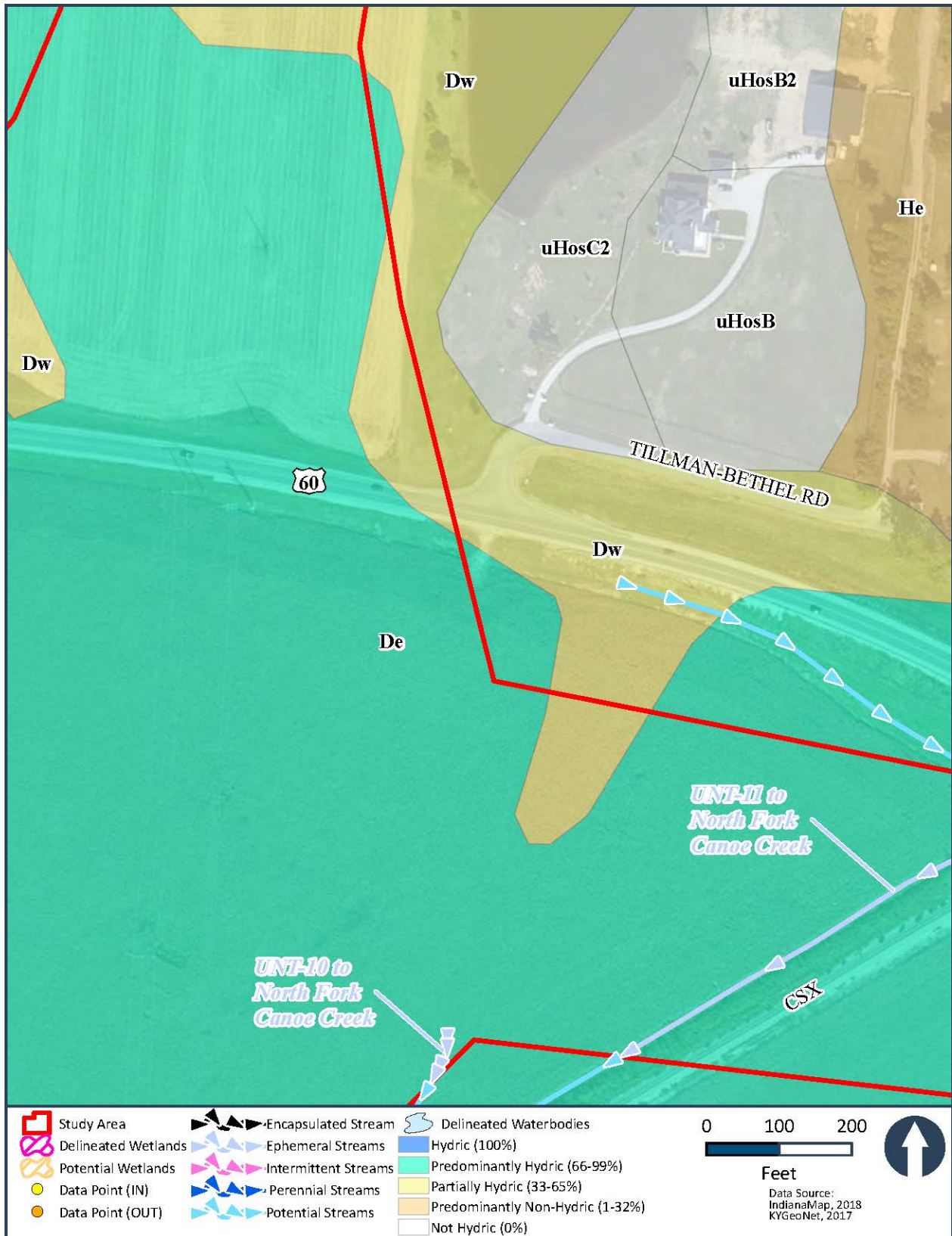


Figure 7. I-69 ORX NRCS Soil Maps (28 of 57)

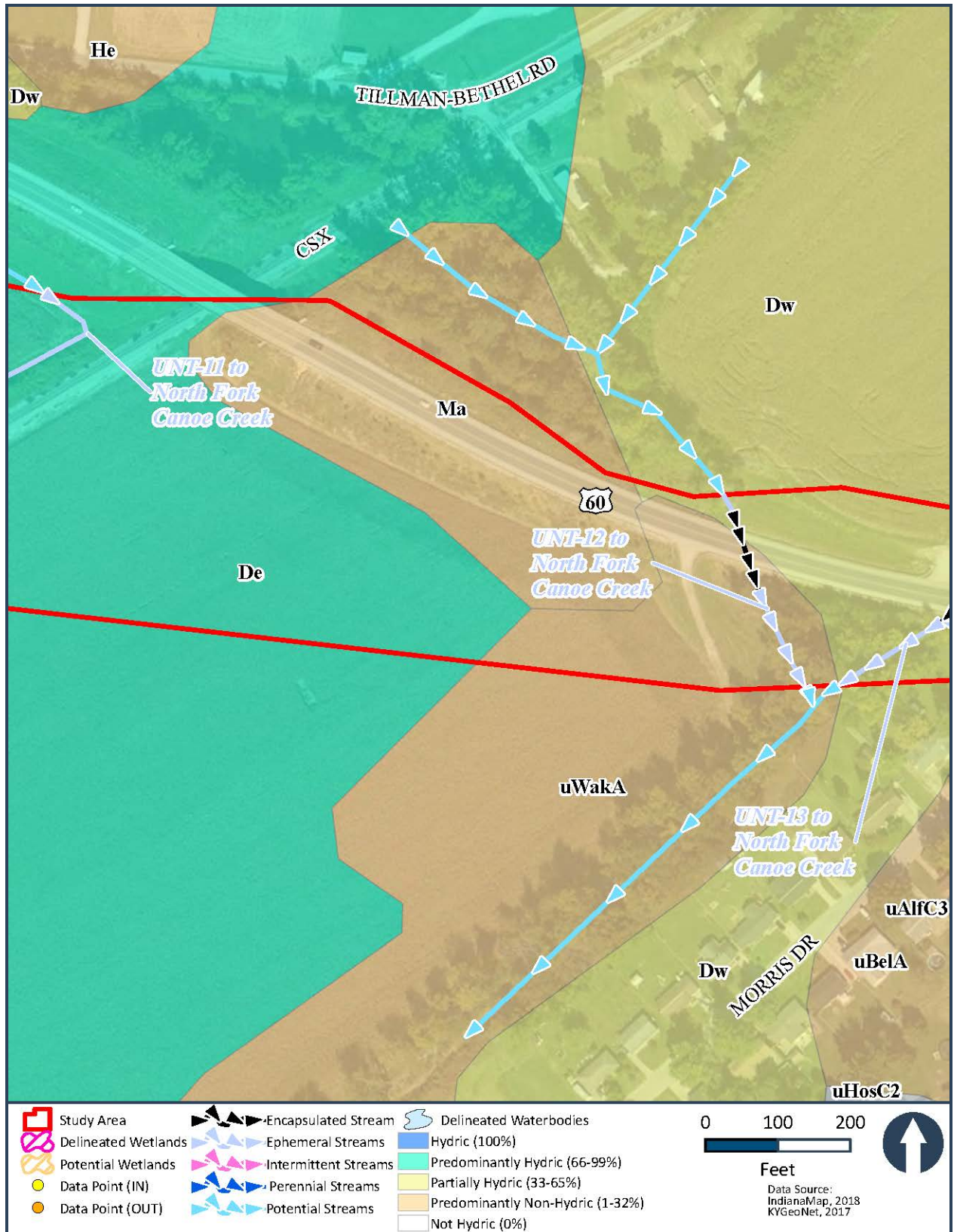


Figure 7. I-69 ORX NRCS Soil Maps (29 of 57)

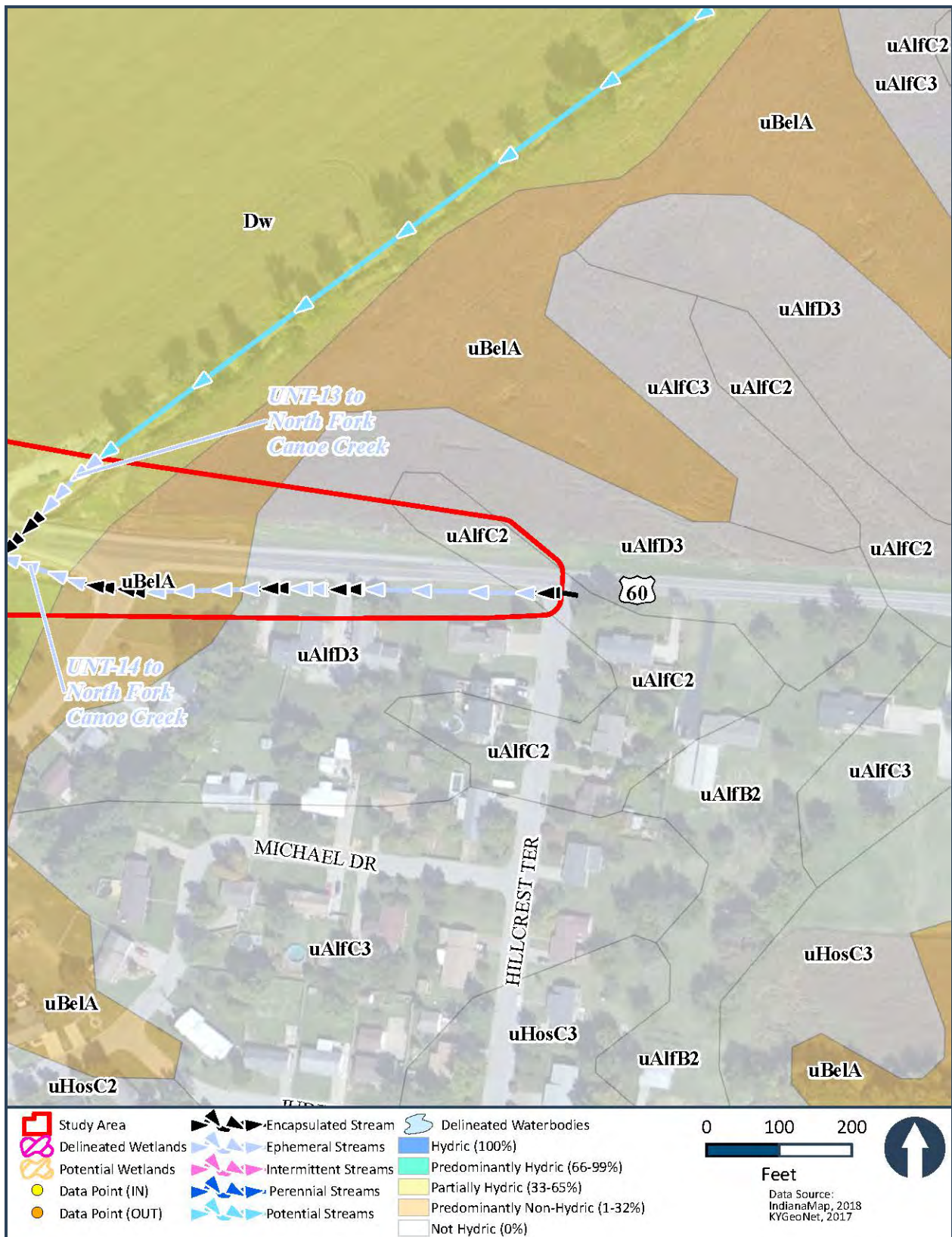


Figure 7. I-69 ORX NRCS Soil Maps (30 of 57)

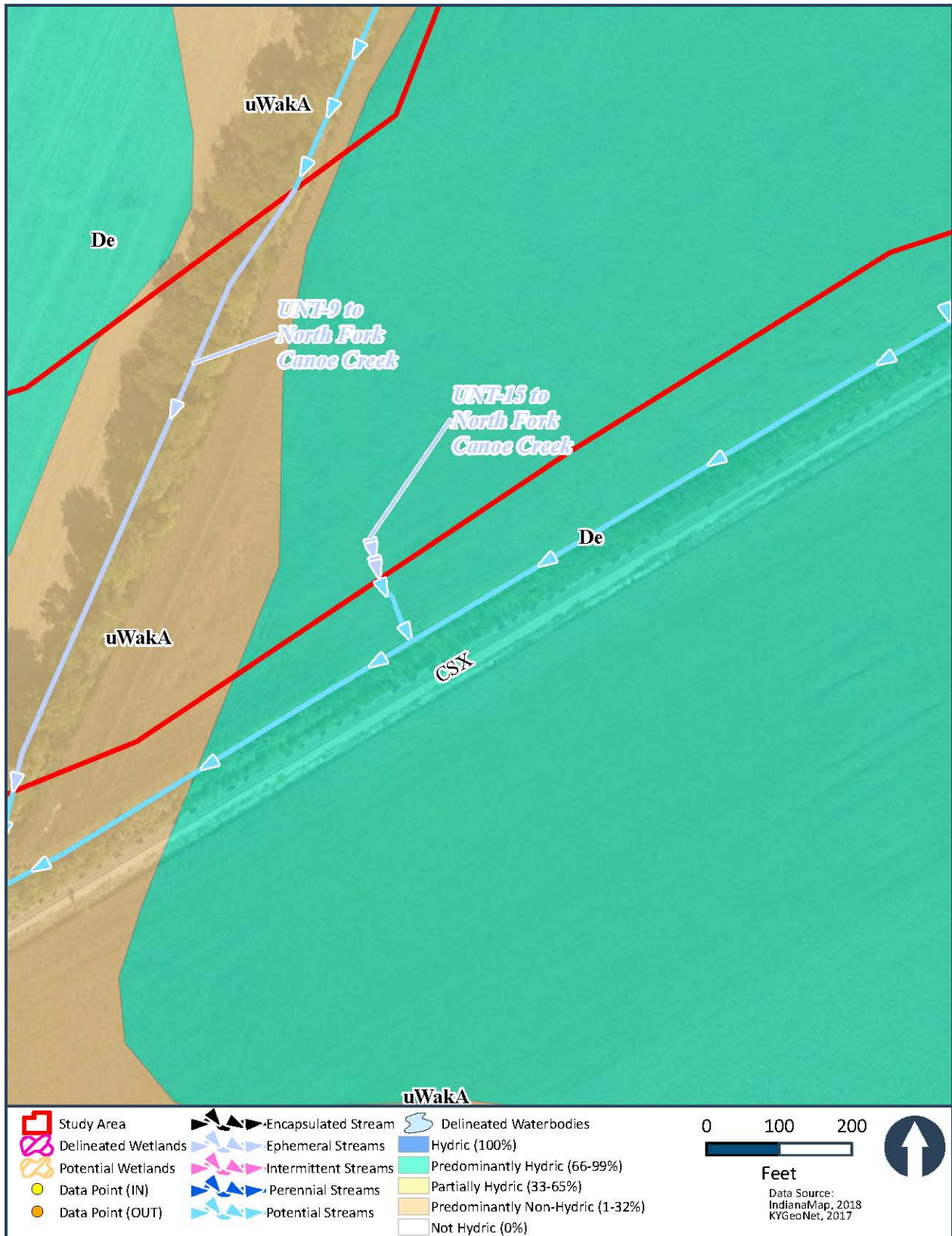


Figure 7. I-69 ORX NRCS Soil Maps (31 of 57)

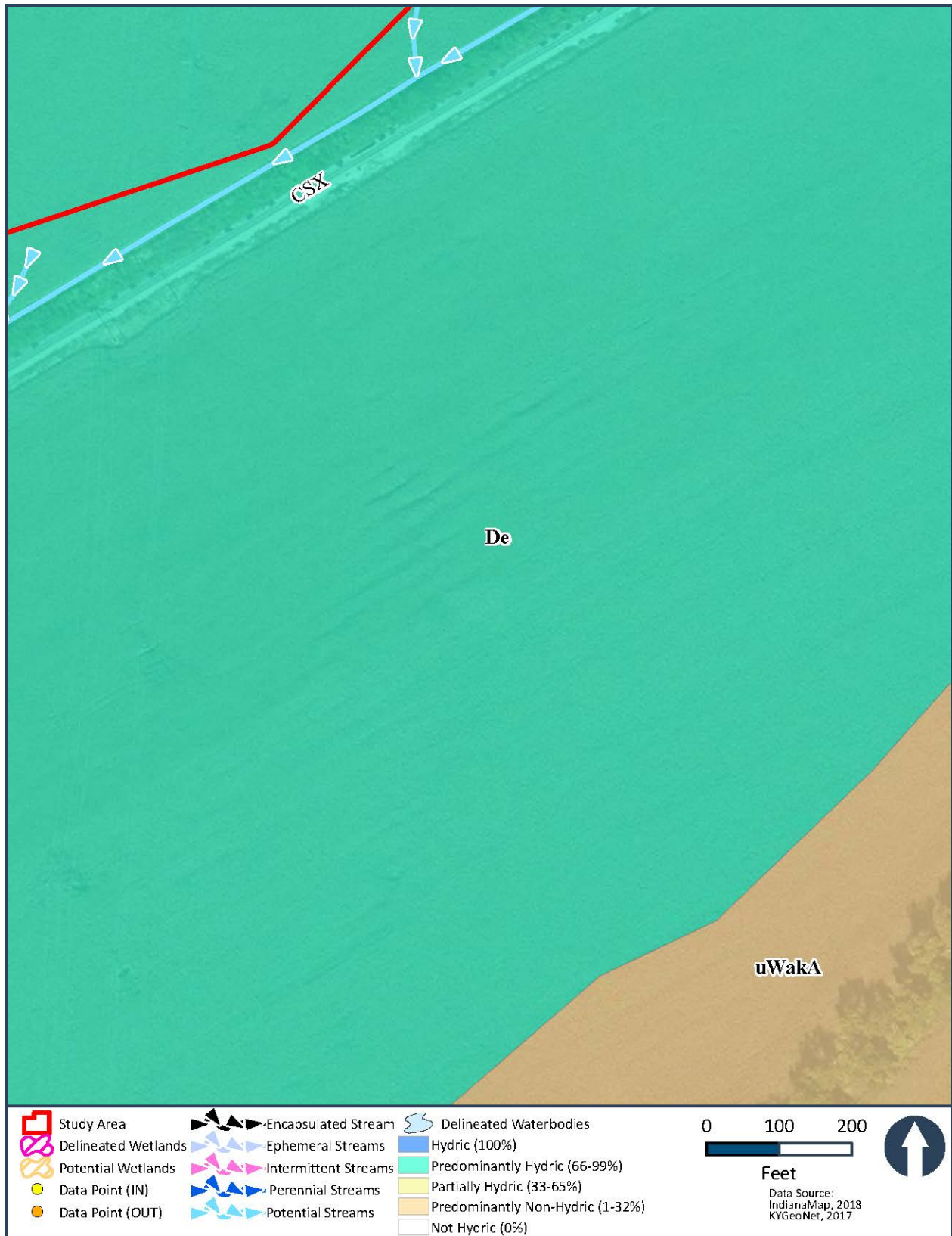


Figure 7. I-69 ORX NRCS Soil Maps (32 of 57)

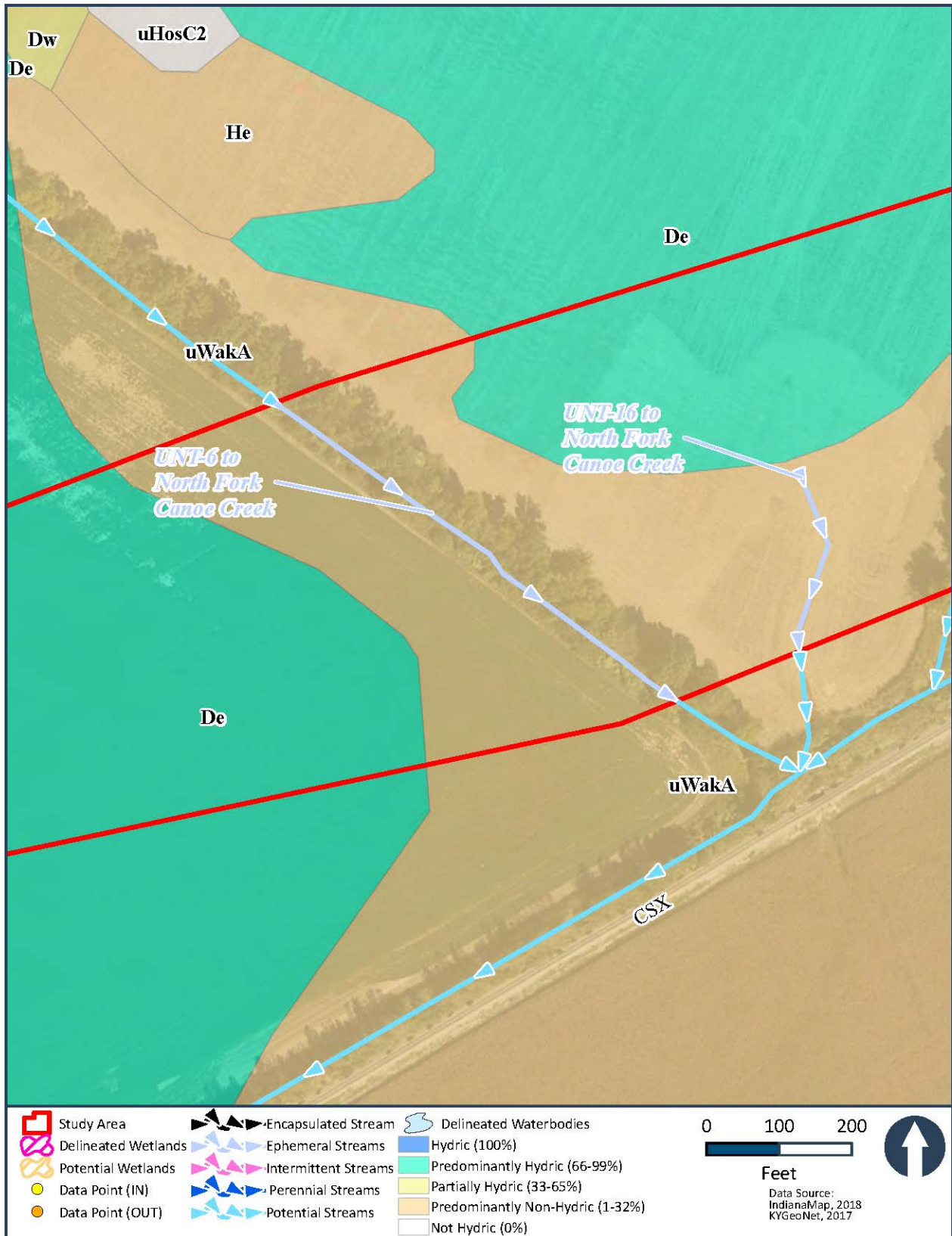


Figure 7. I-69 ORX NRCS Soil Maps (33 of 57)

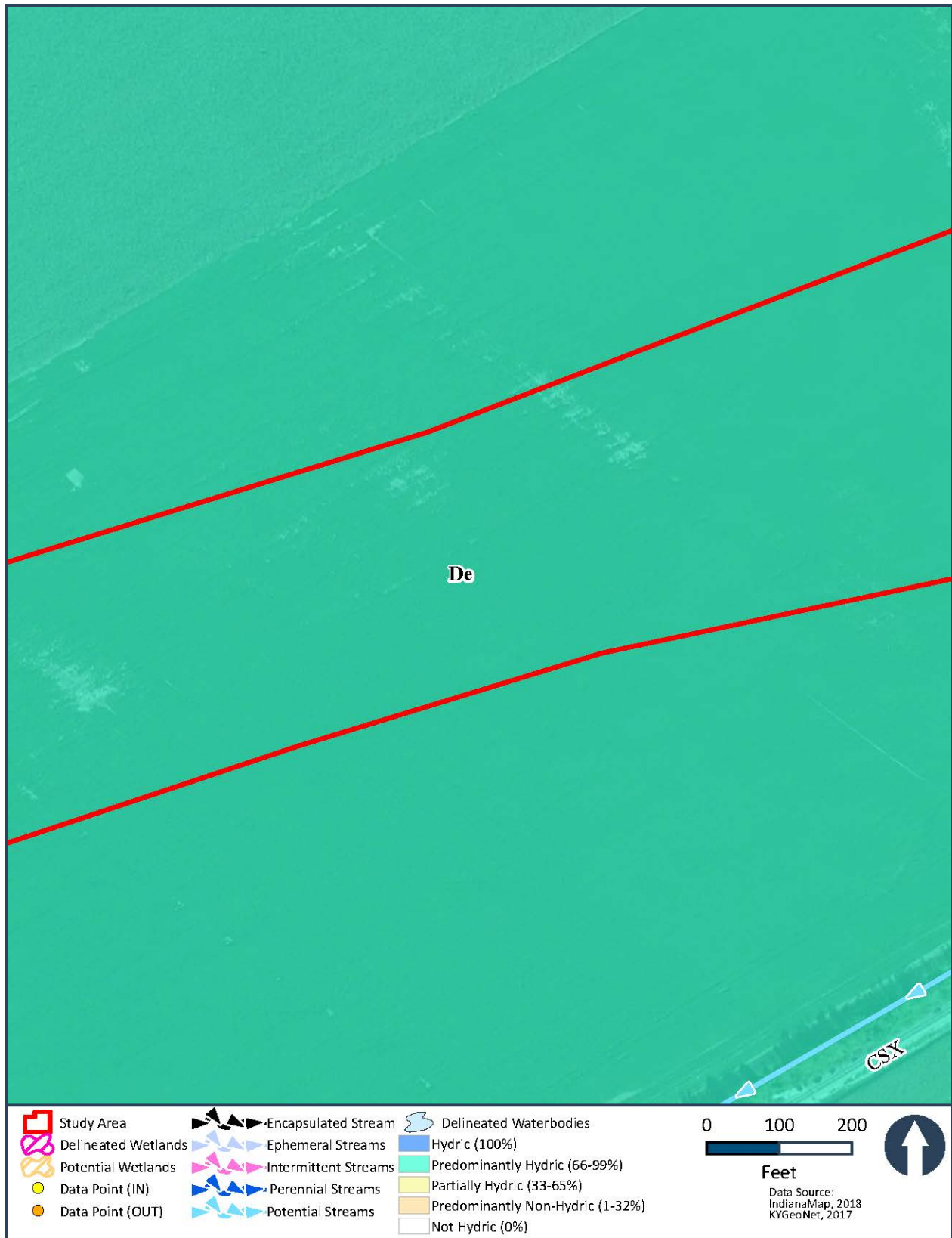


Figure 7. I-69 ORX NRCS Soil Maps (34 of 57)

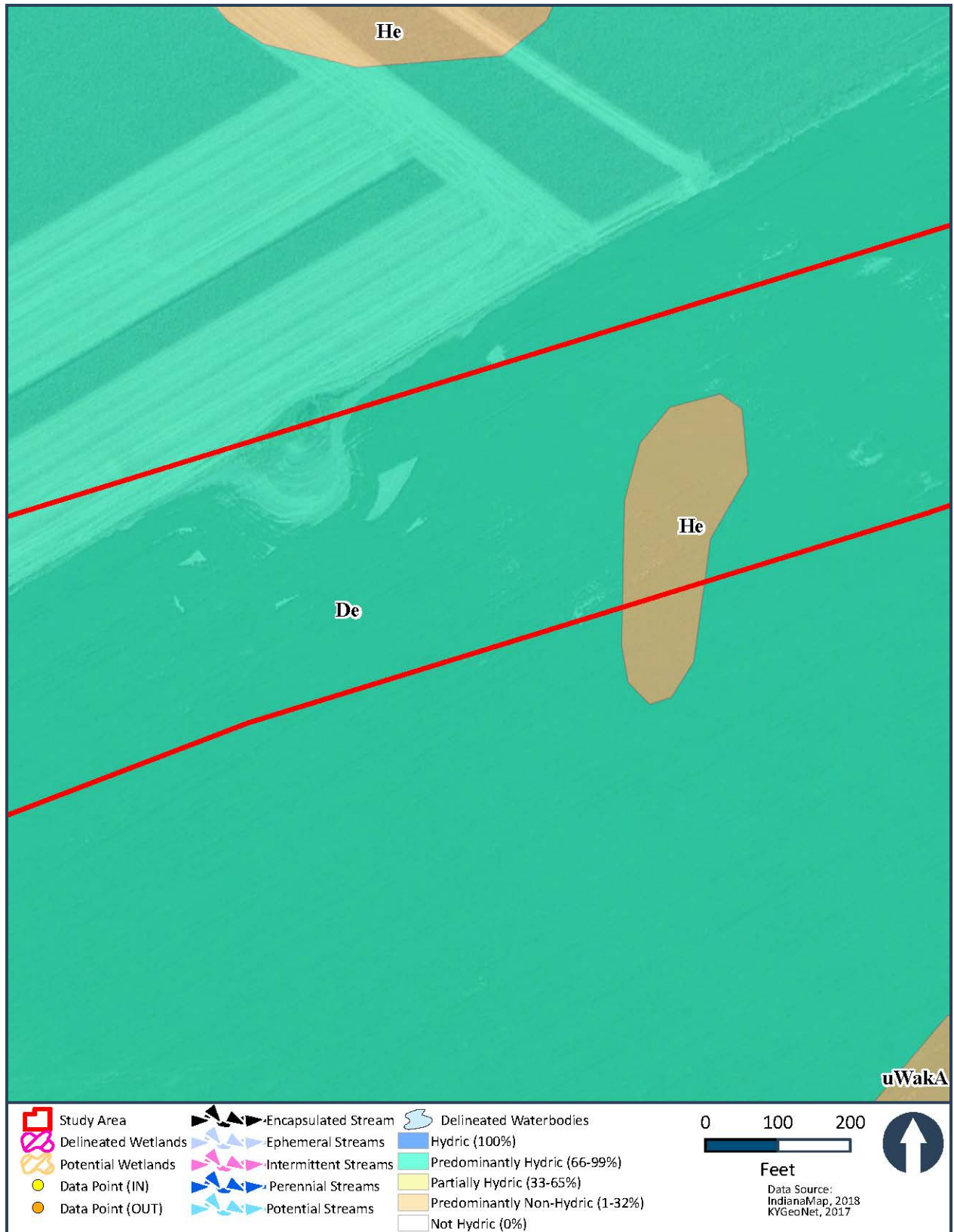


Figure 7. I-69 ORX NRCS Soil Maps (35 of 57)

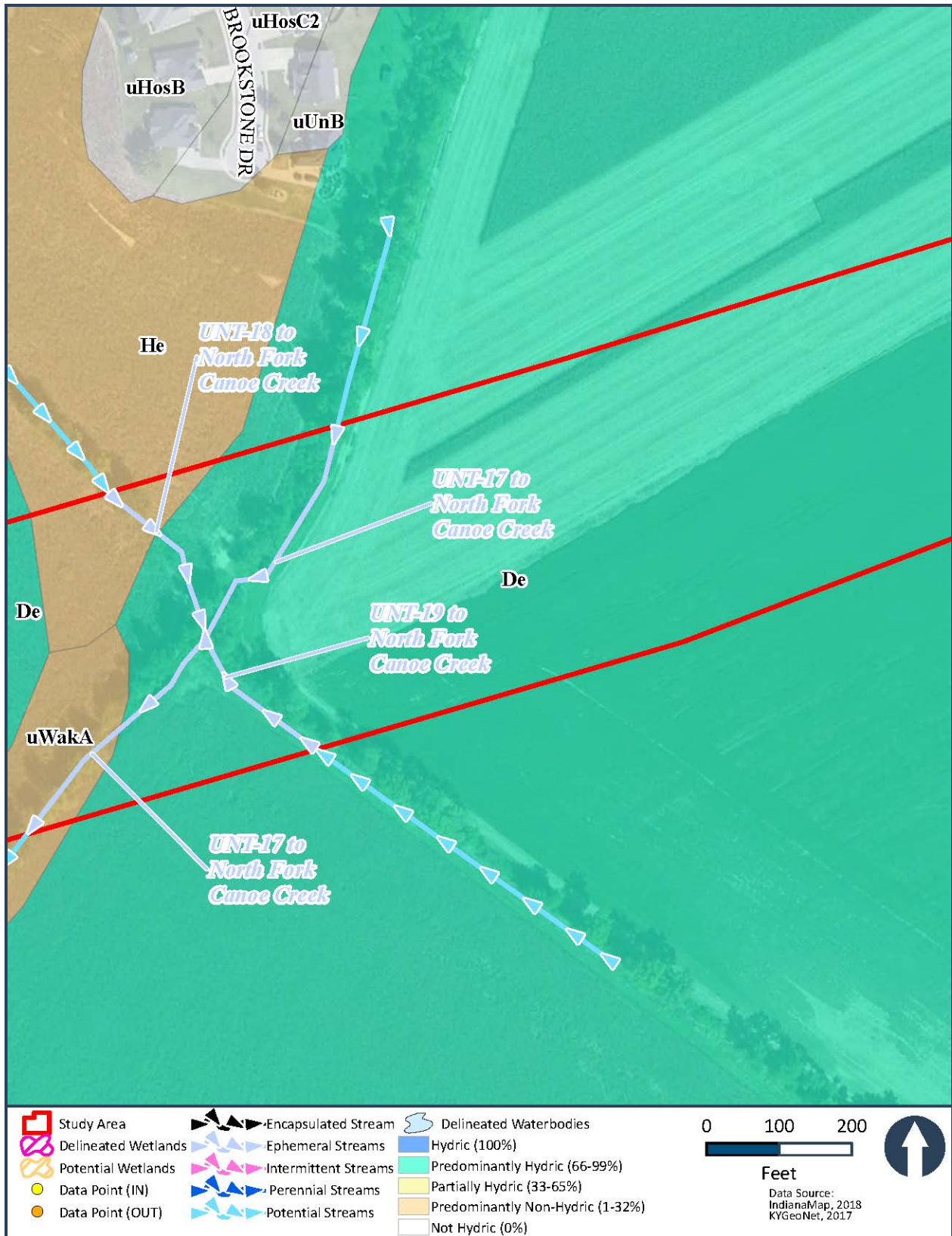


Figure 7. I-69 ORX NRCS Soil Maps (36 of 57)

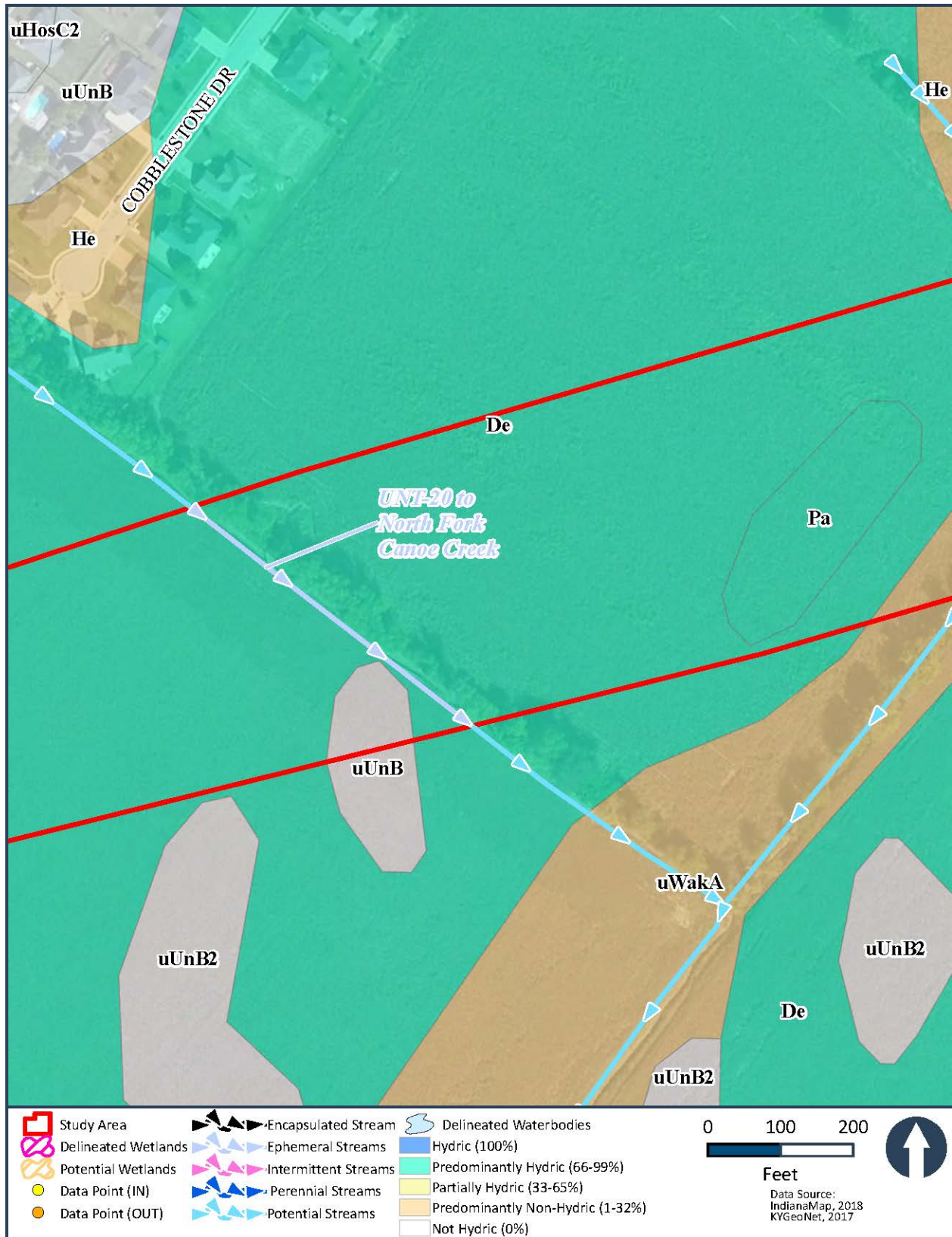


Figure 7. I-69 ORX NRCS Soil Maps (37 of 57)

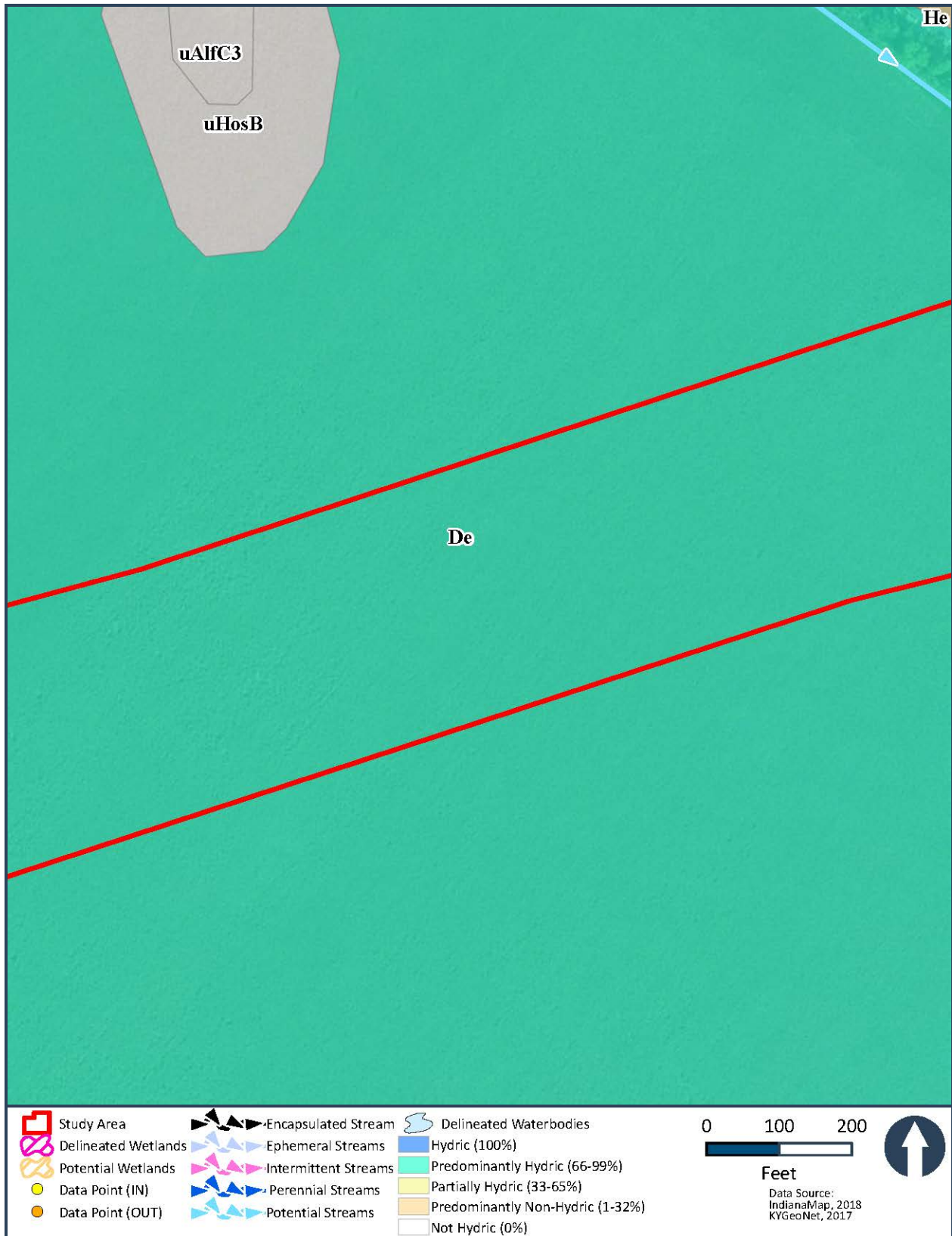


Figure 7. I-69 ORX NRCS Soil Maps (38 of 57)

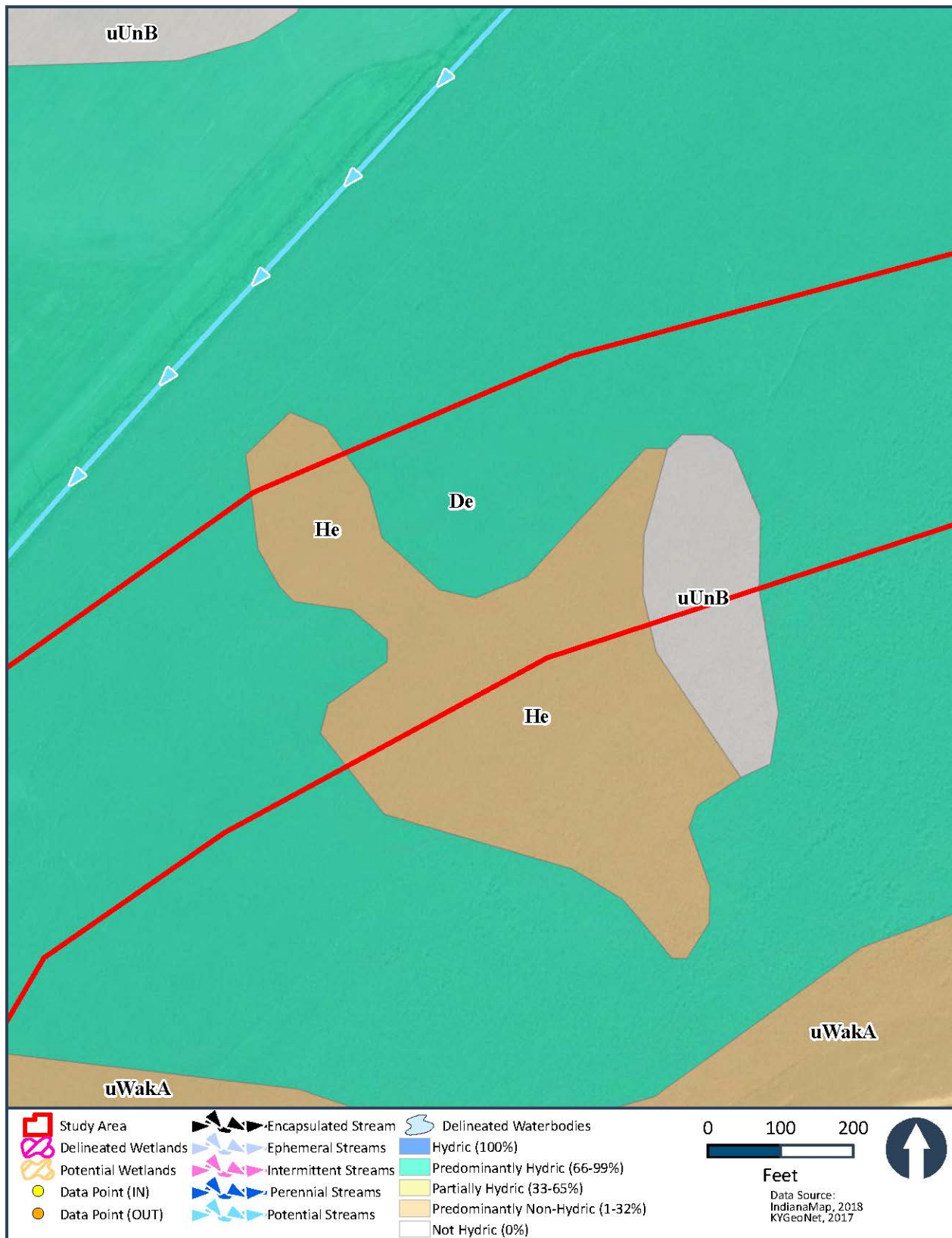


Figure 7. I-69 ORX NRCS Soil Maps (39 of 57)

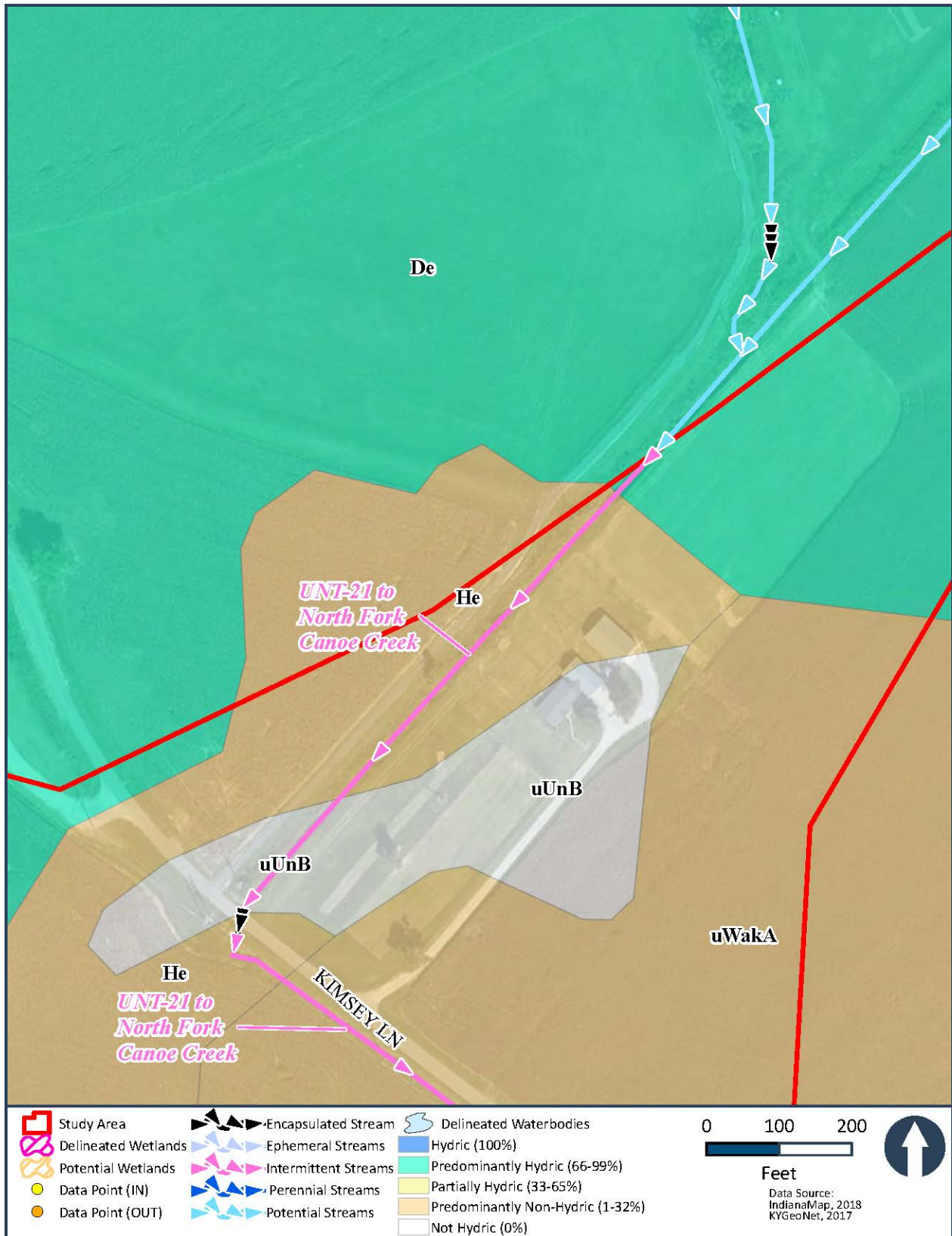


Figure 7. I-69 ORX NRCS Soil Maps (40 of 57)

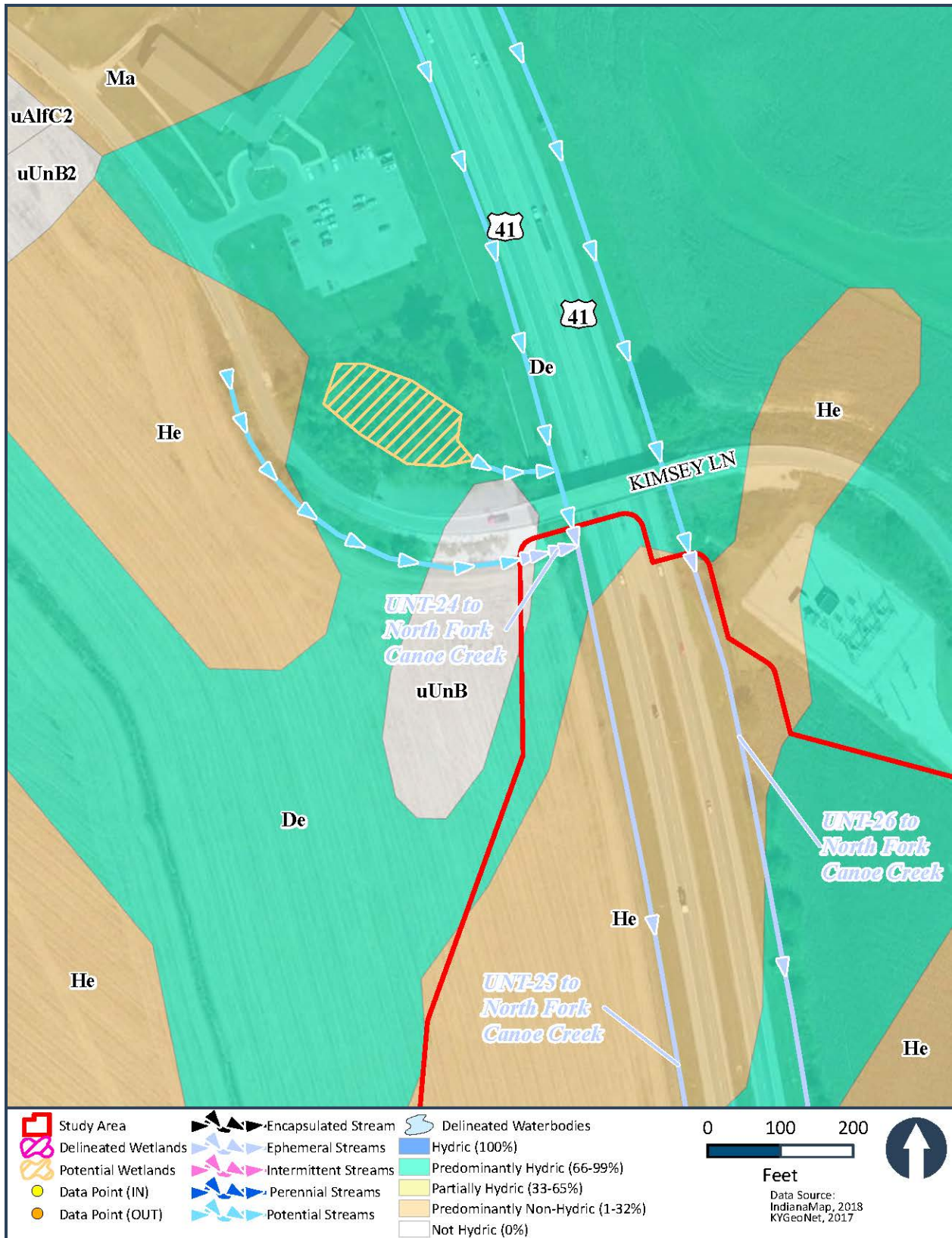


Figure 7. I-69 ORX NRCS Soil Maps (41 of 57)

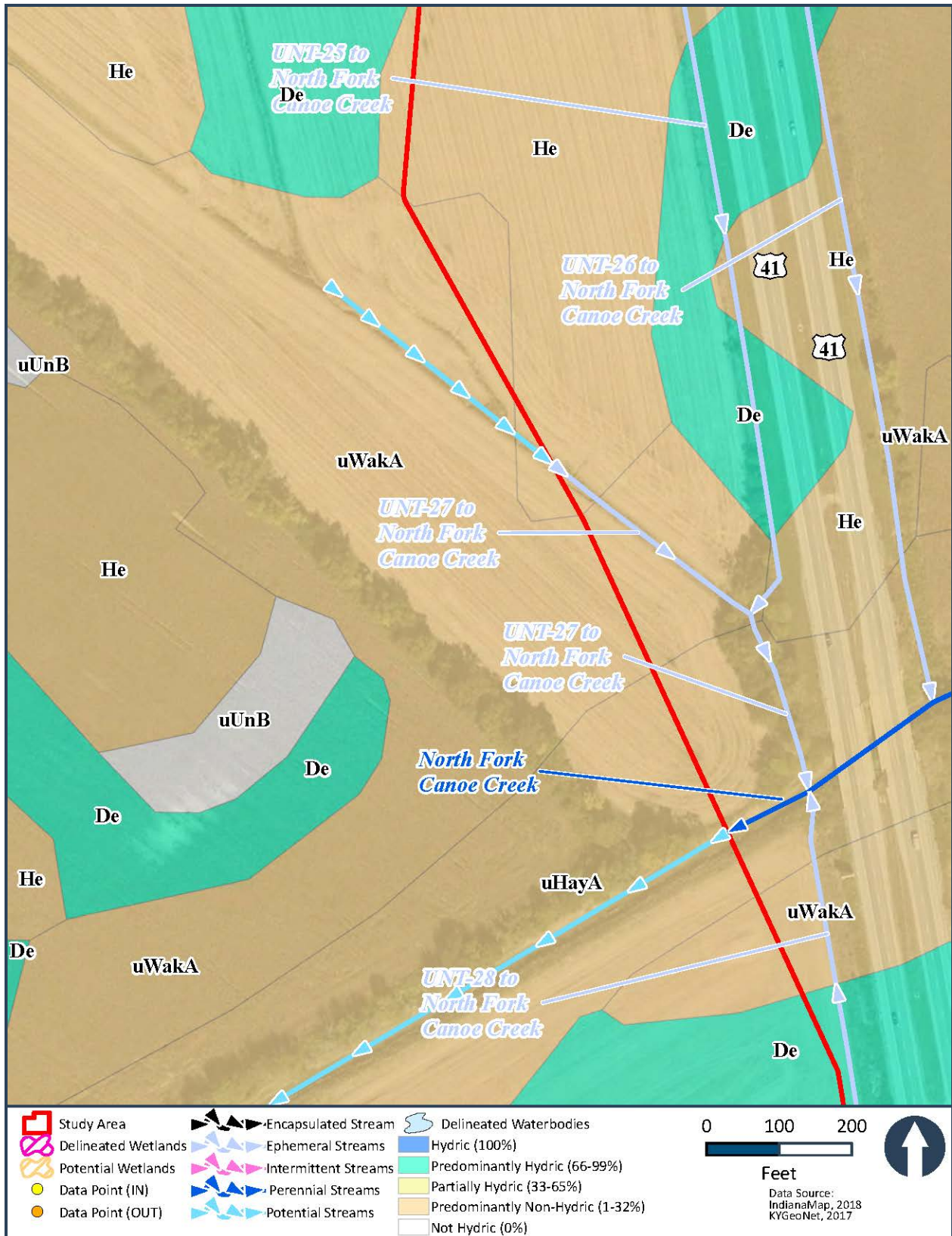


Figure 7. I-69 ORX NRCS Soil Maps (42 of 57)

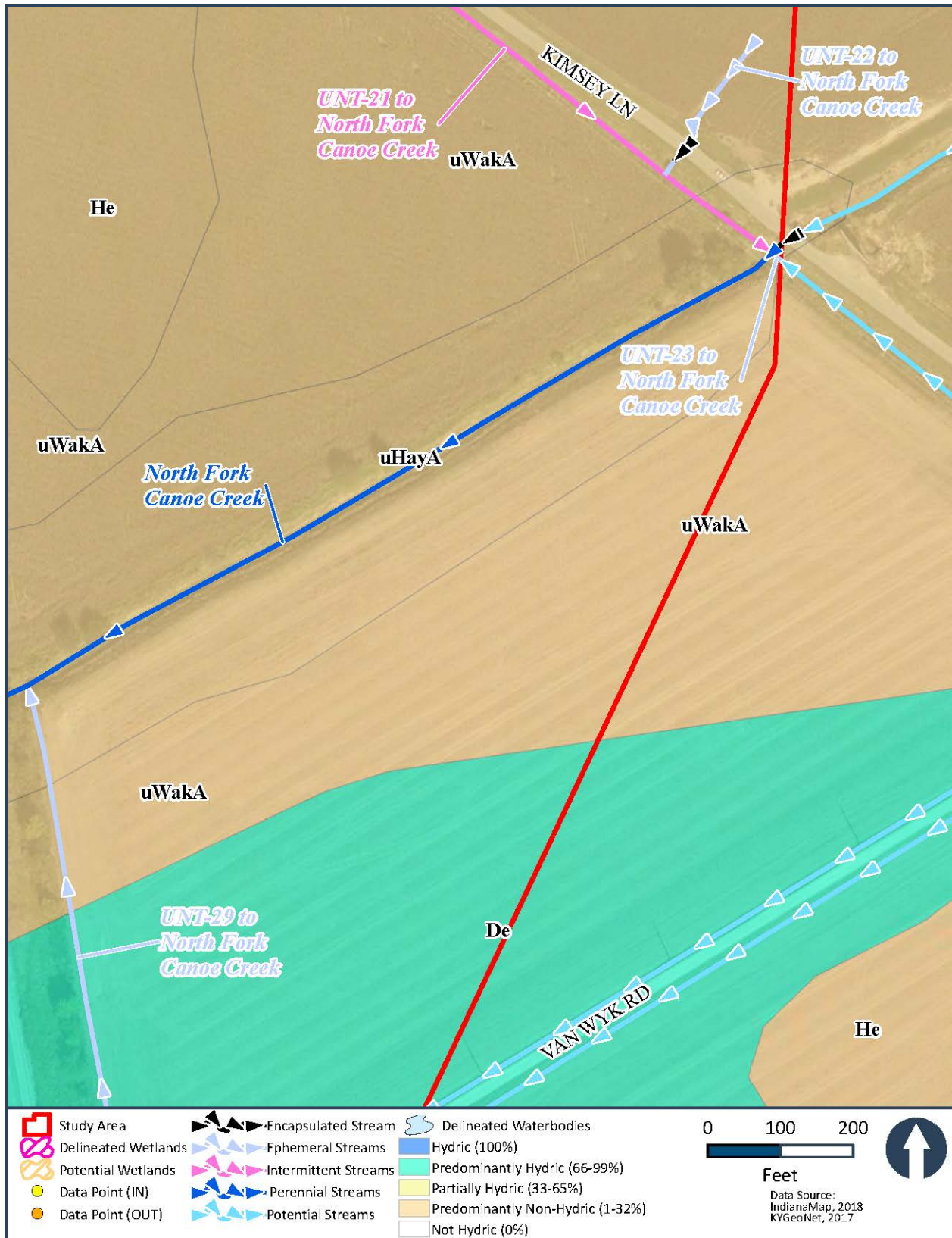


Figure 7. I-69 ORX NRCS Soil Maps (43 of 57)

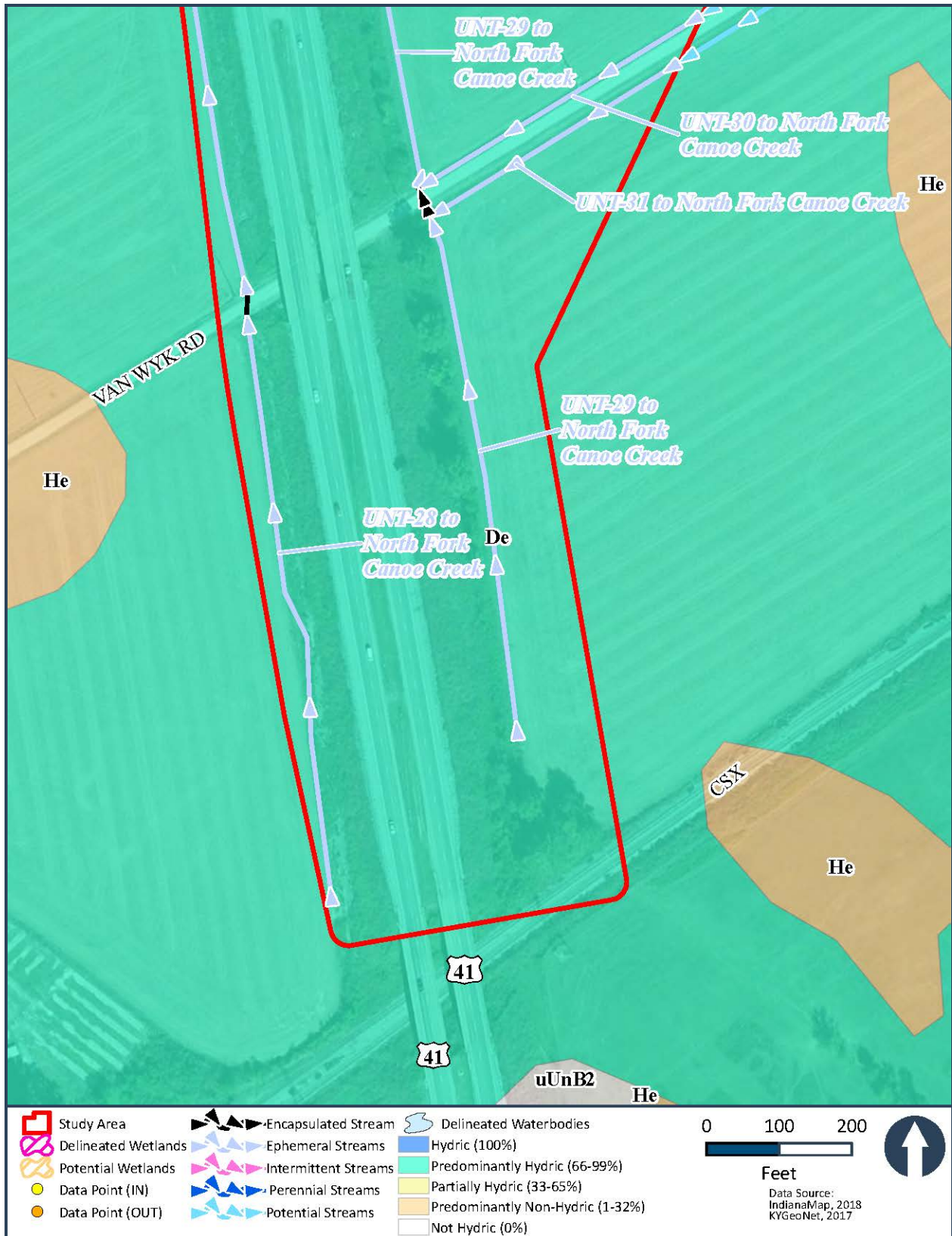


Figure 7. I-69 ORX NRCS Soil Maps (44 of 57)

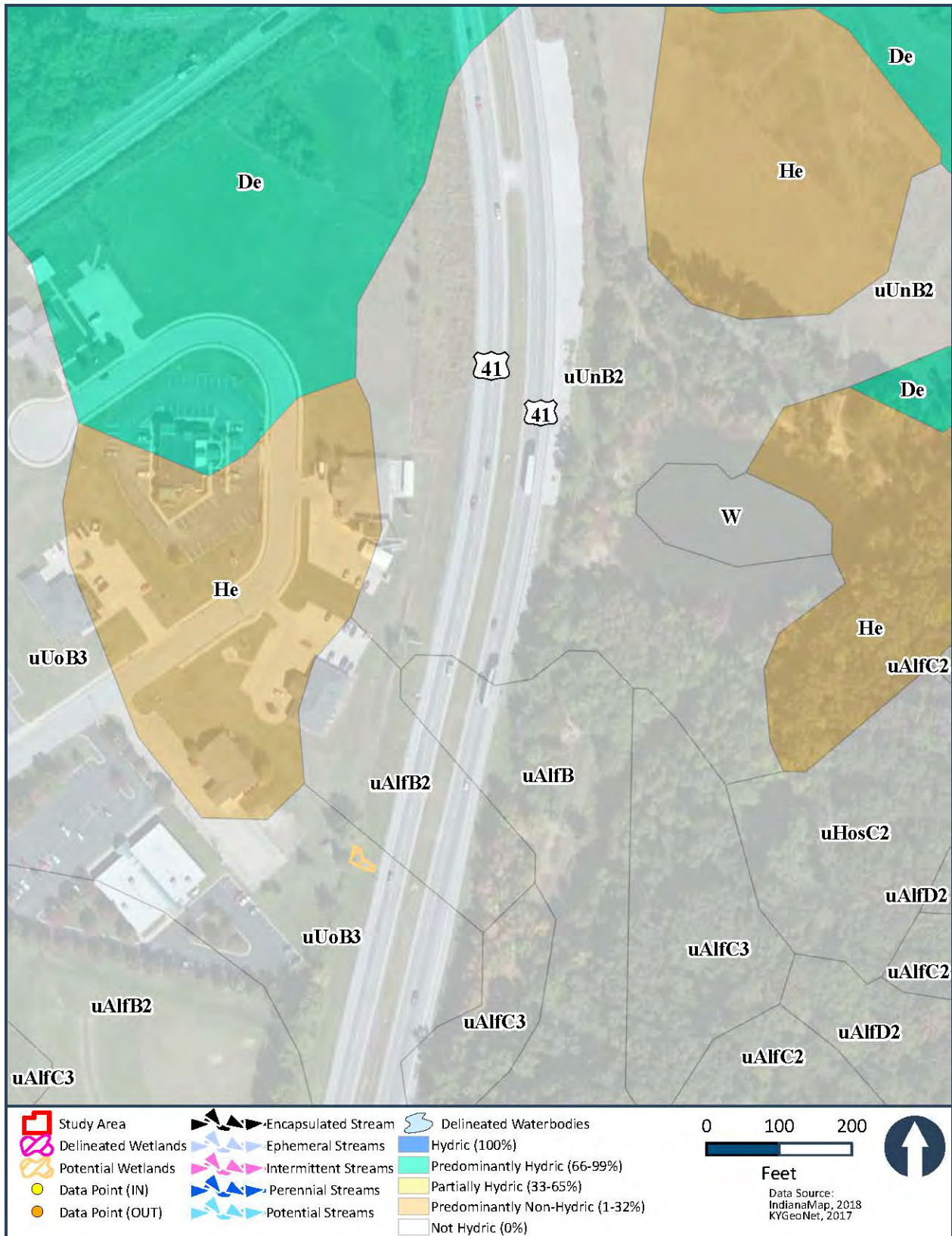


Figure 7. I-69 ORX NRCS Soil Maps (45 of 57)

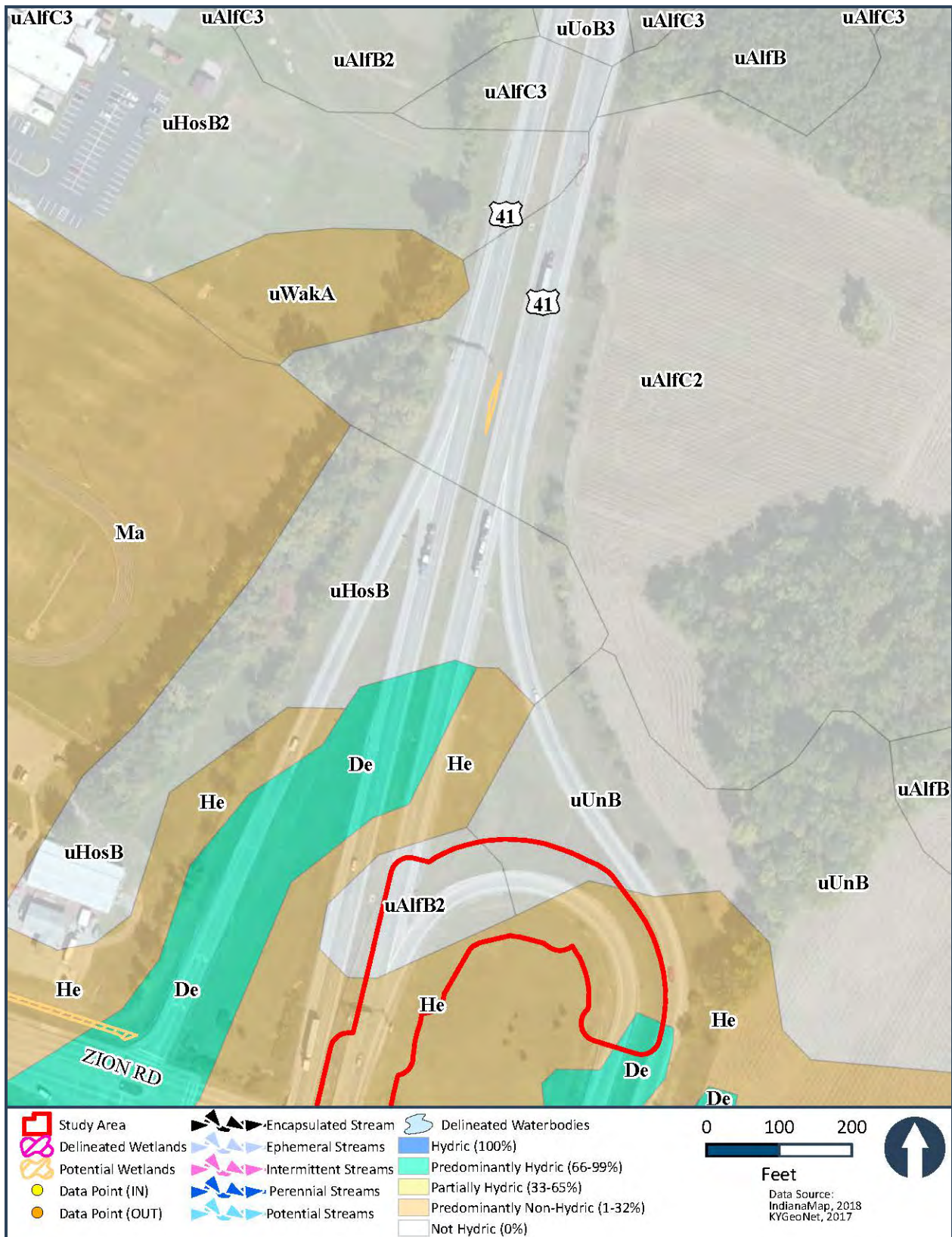


Figure 7. I-69 ORX NRCS Soil Maps (46 of 57)

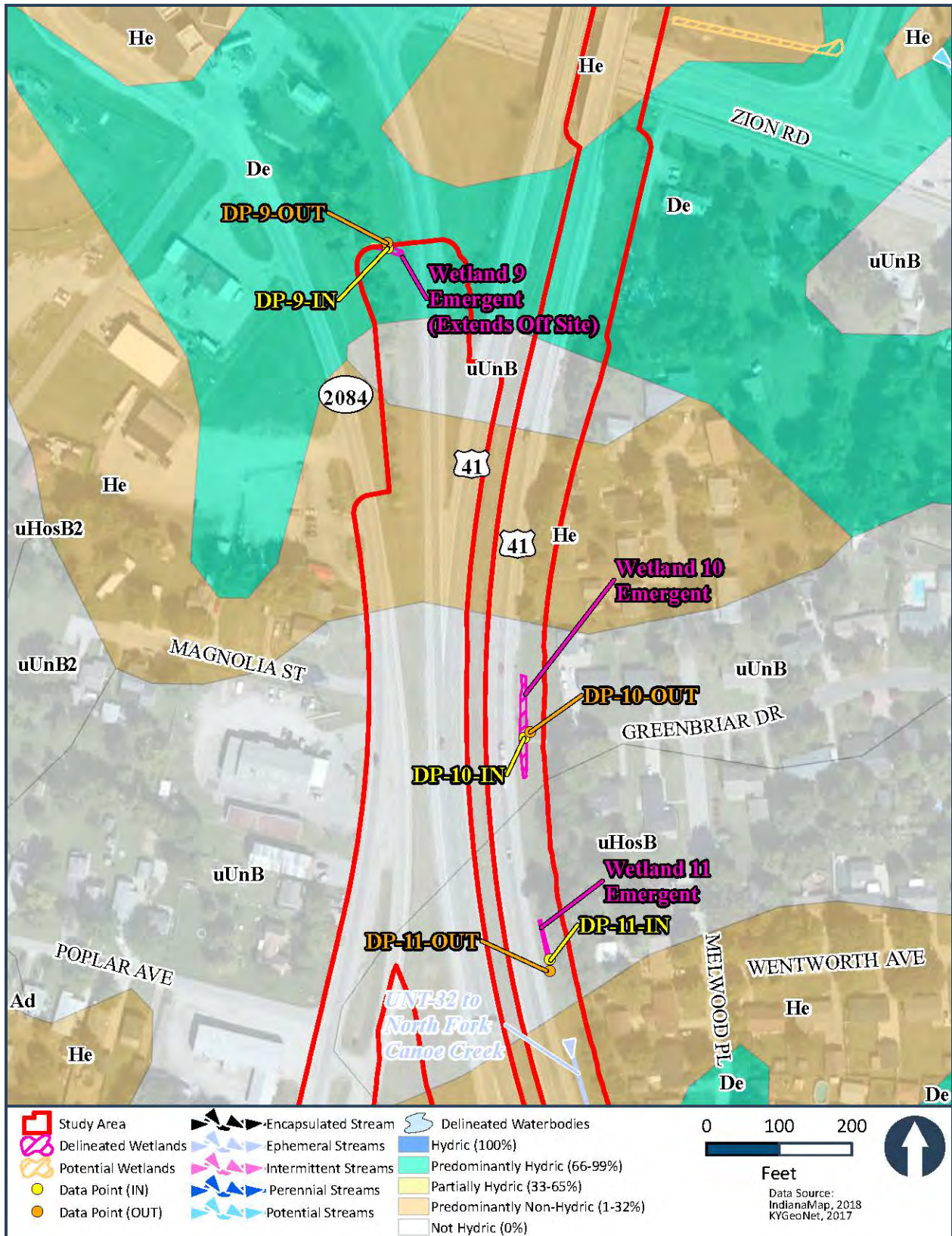


Figure 7. I-69 ORX NRCS Soil Maps (47 of 57)

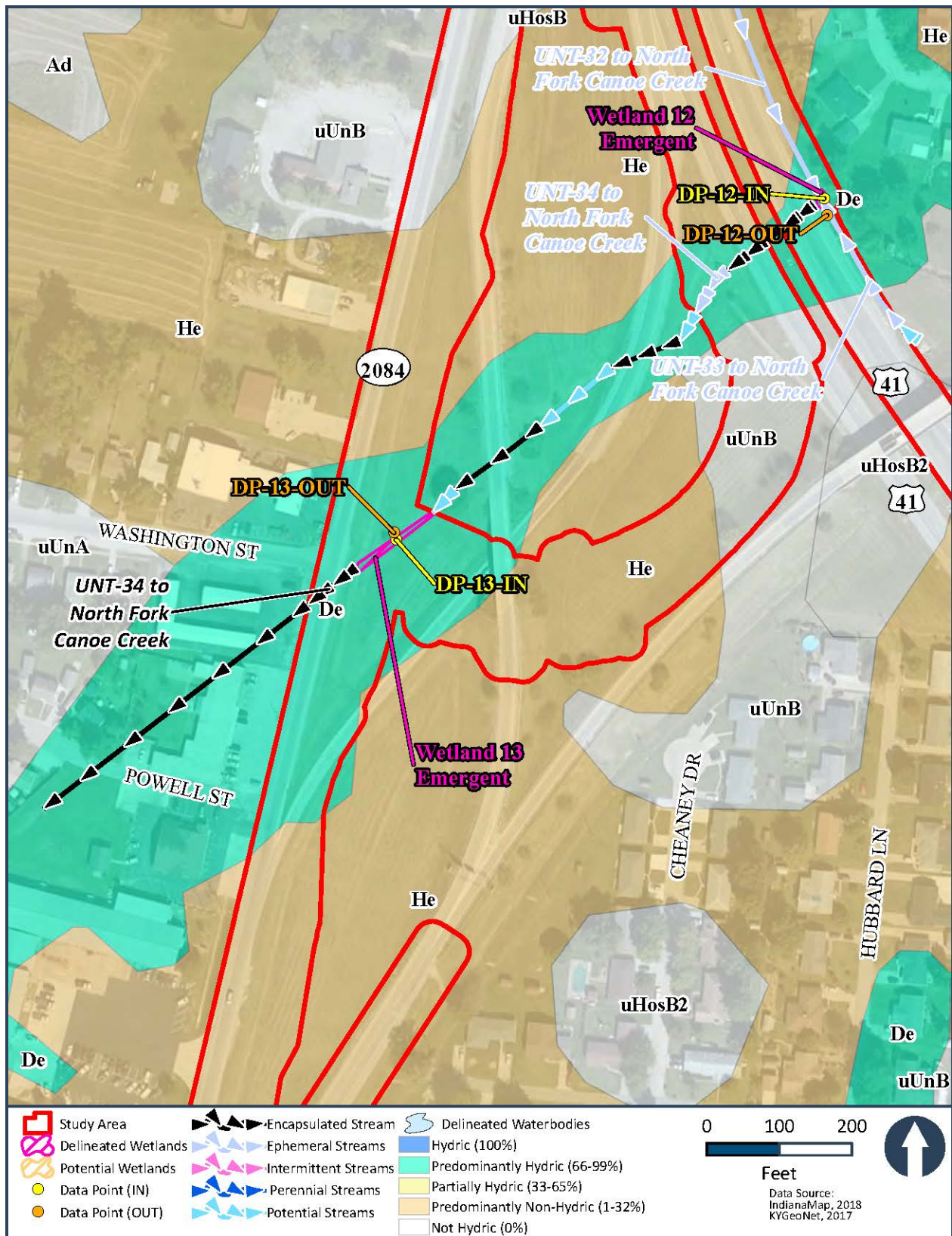


Figure 7. I-69 ORX NRCS Soil Maps (48 of 57)

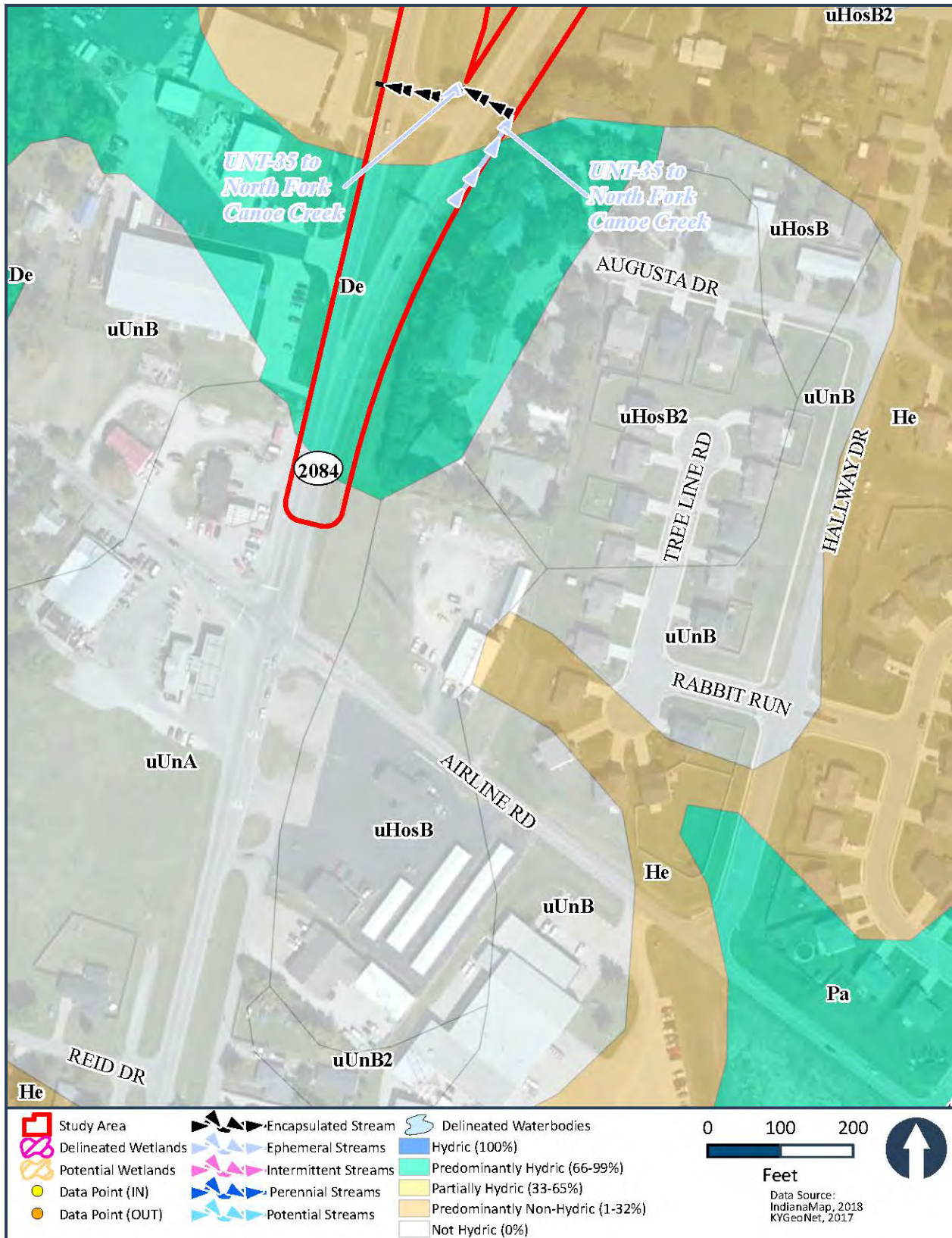


Figure 7. I-69 ORX NRCS Soil Maps (49 of 57)

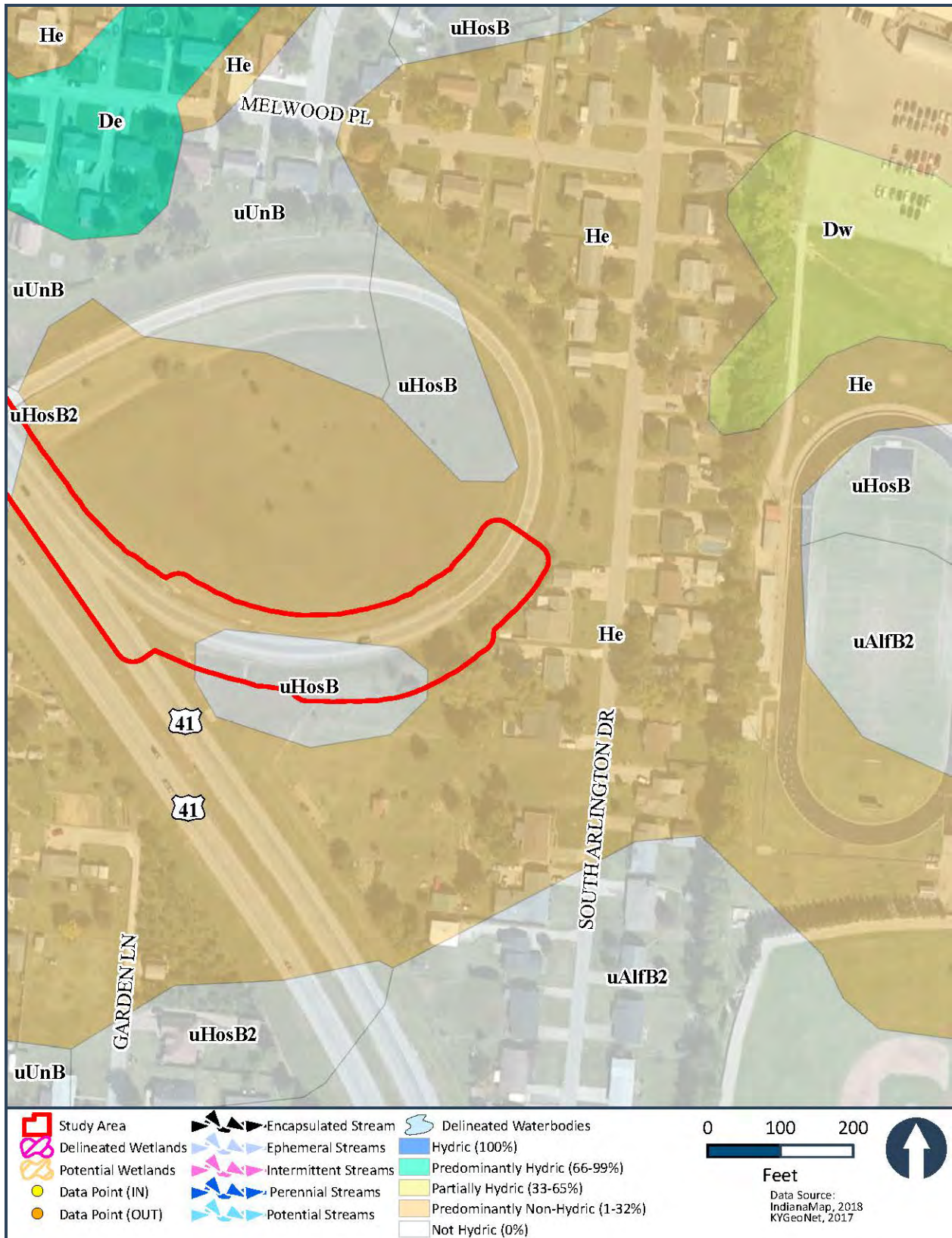


Figure 7. I-69 ORX NRCS Soil Maps (50 of 57)

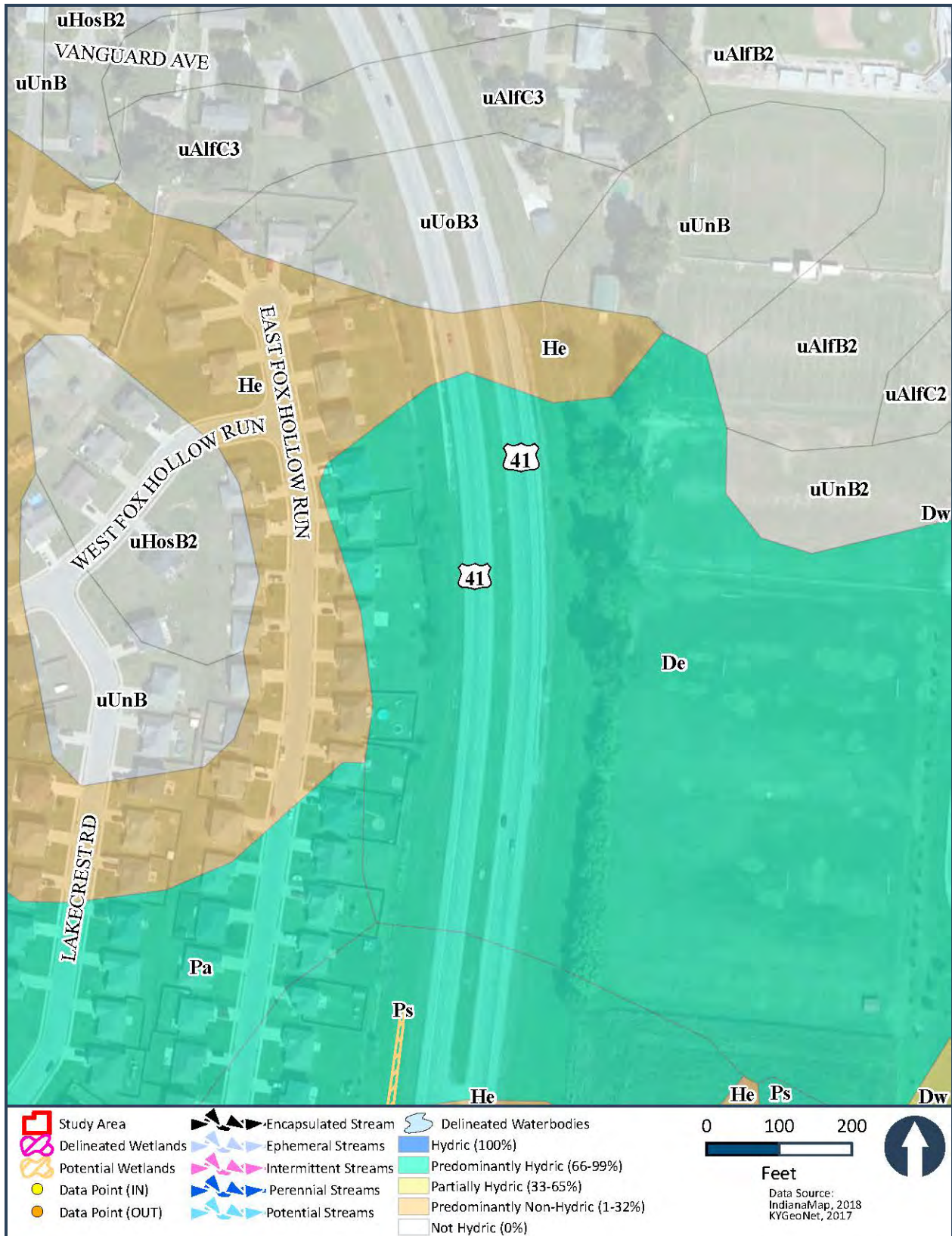


Figure 7. I-69 ORX NRCS Soil Maps (51 of 57)

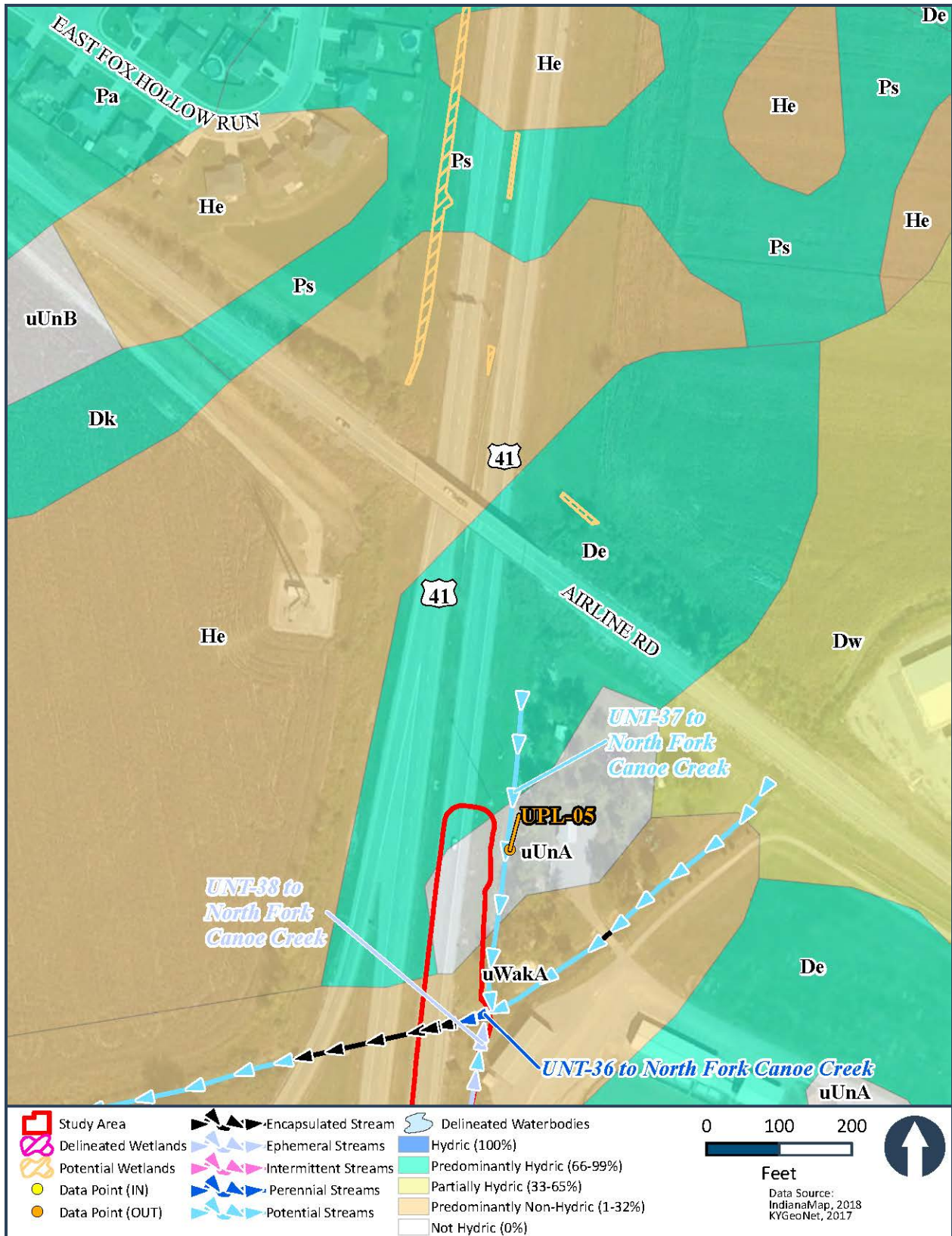


Figure 7. I-69 ORX NRCS Soil Maps (52 of 57)

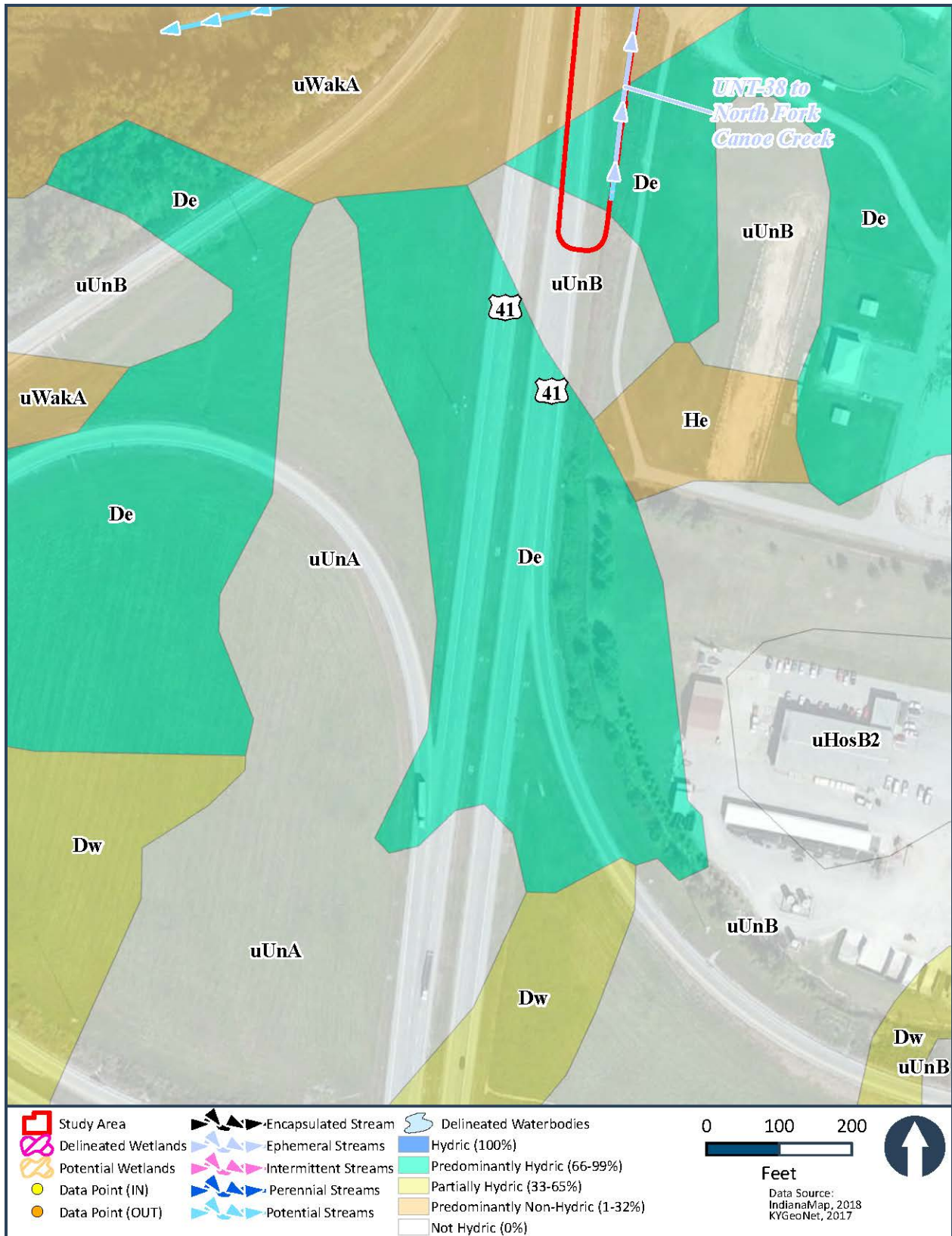


Figure 7. I-69 ORX NRCS Soil Maps (53 of 57)

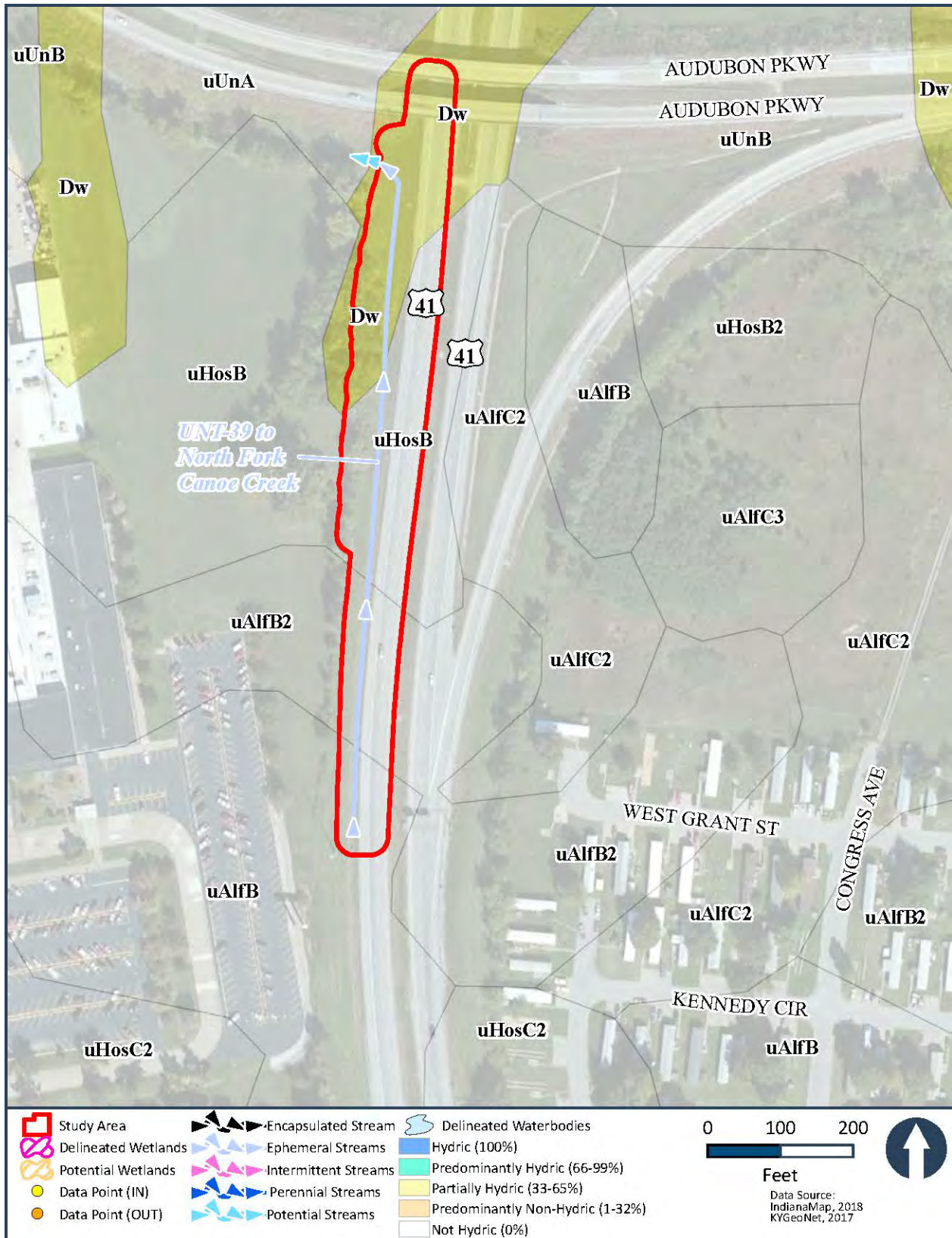


Figure 7. I-69 ORX NRCS Soil Maps (54 of 57)

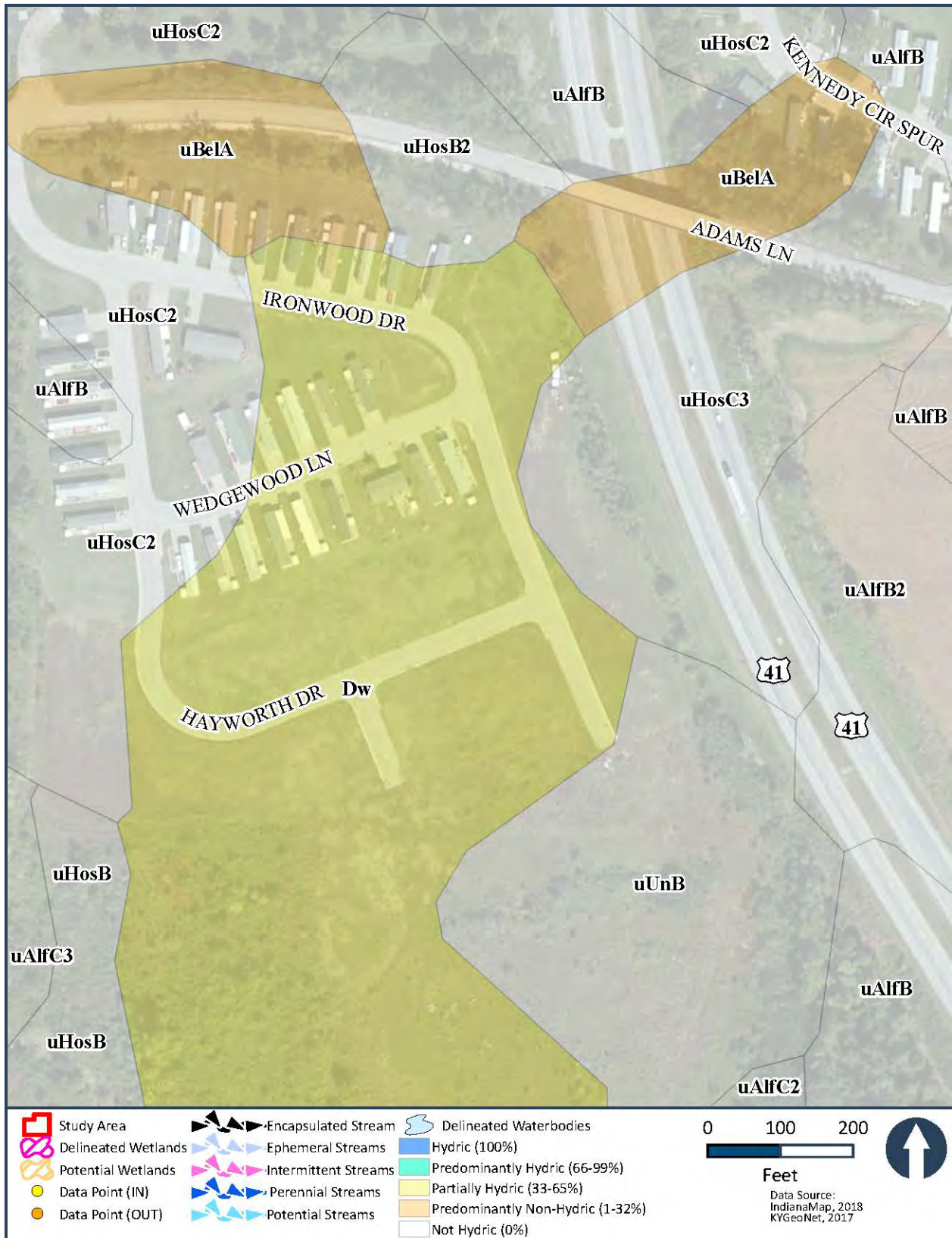


Figure 7. I-69 ORX NRCS Soil Maps (55 of 57)

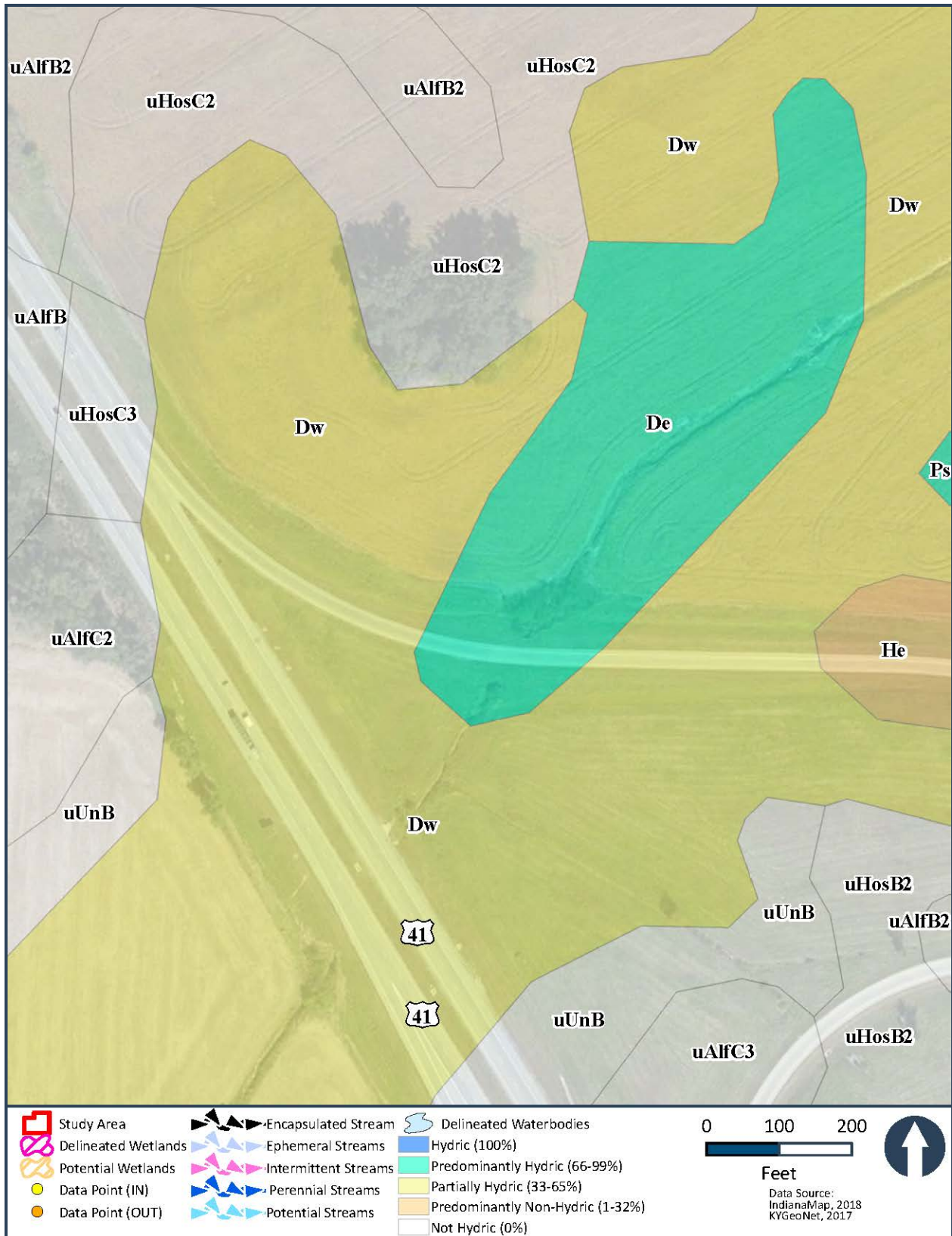


Figure 7. I-69 ORX NRCS Soil Maps (56 of 57)

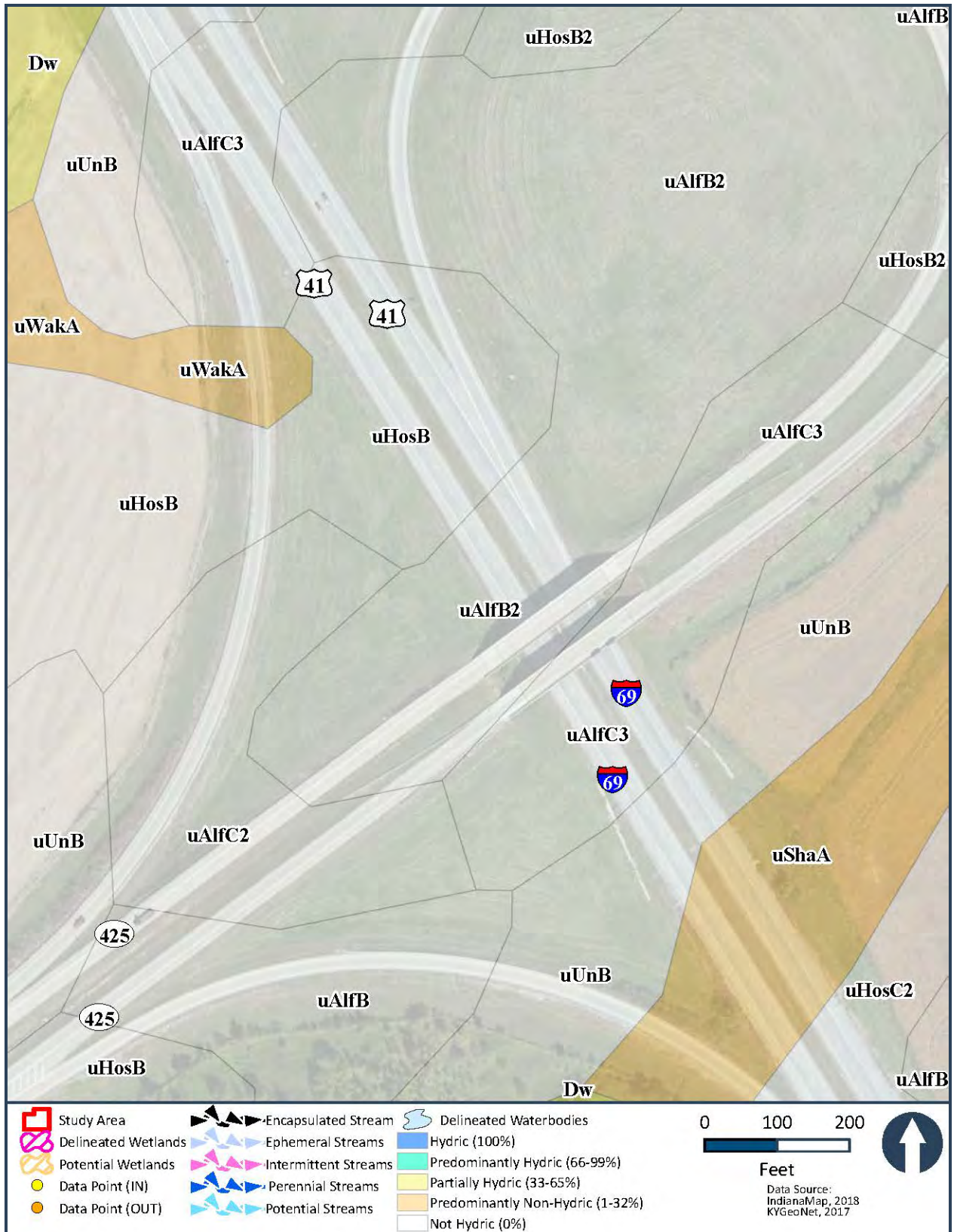


Figure 7. I-69 ORX NRCS Soil Maps (57 of 57)



Figure 8. Field-Identified Resource Maps (1 of 57)



Figure 8. Field-Identified Resource Maps (2 of 57)

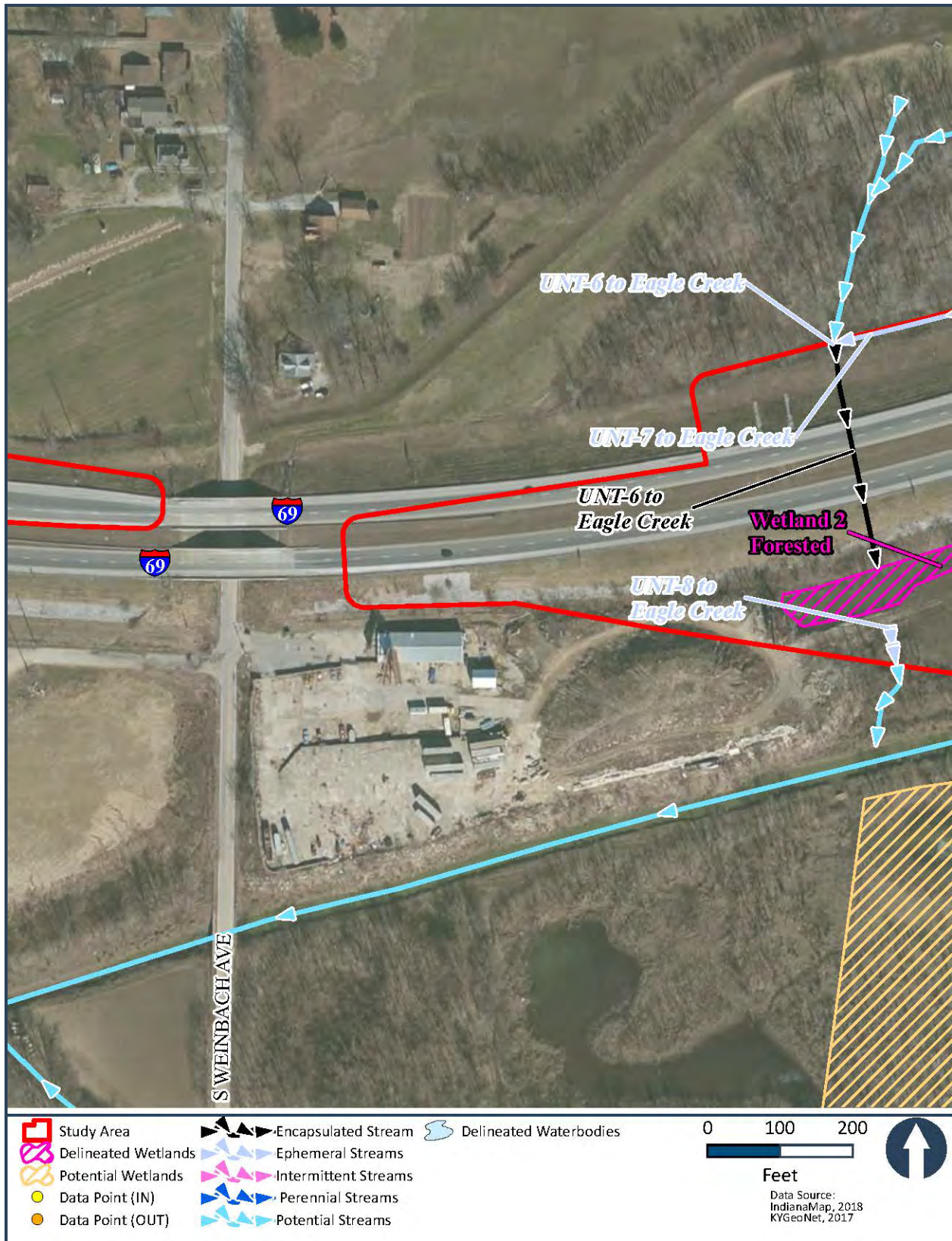


Figure 8. Field-Identified Resource Maps (3 of 57)

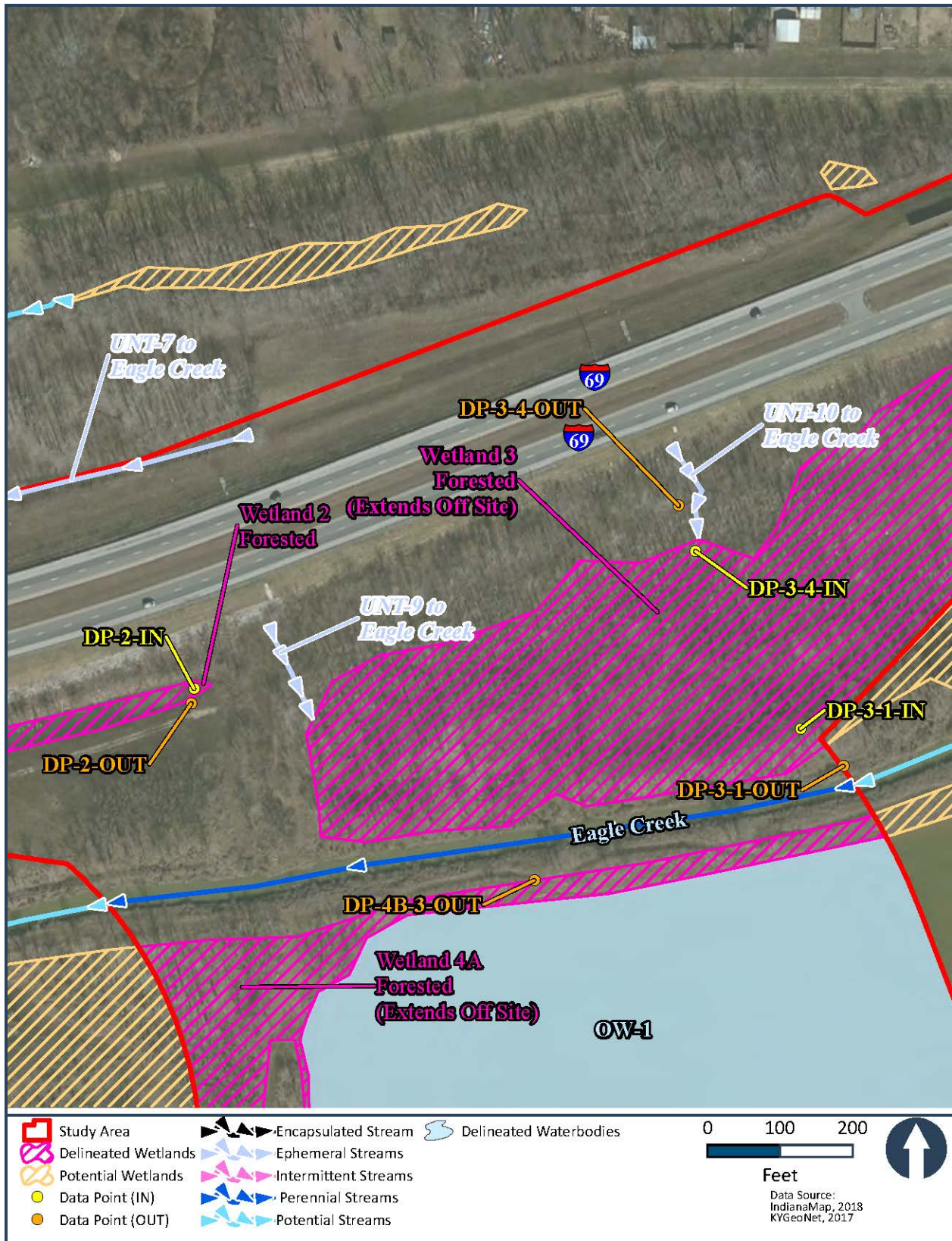


Figure 8. Field-Identified Resource Maps (4 of 57)

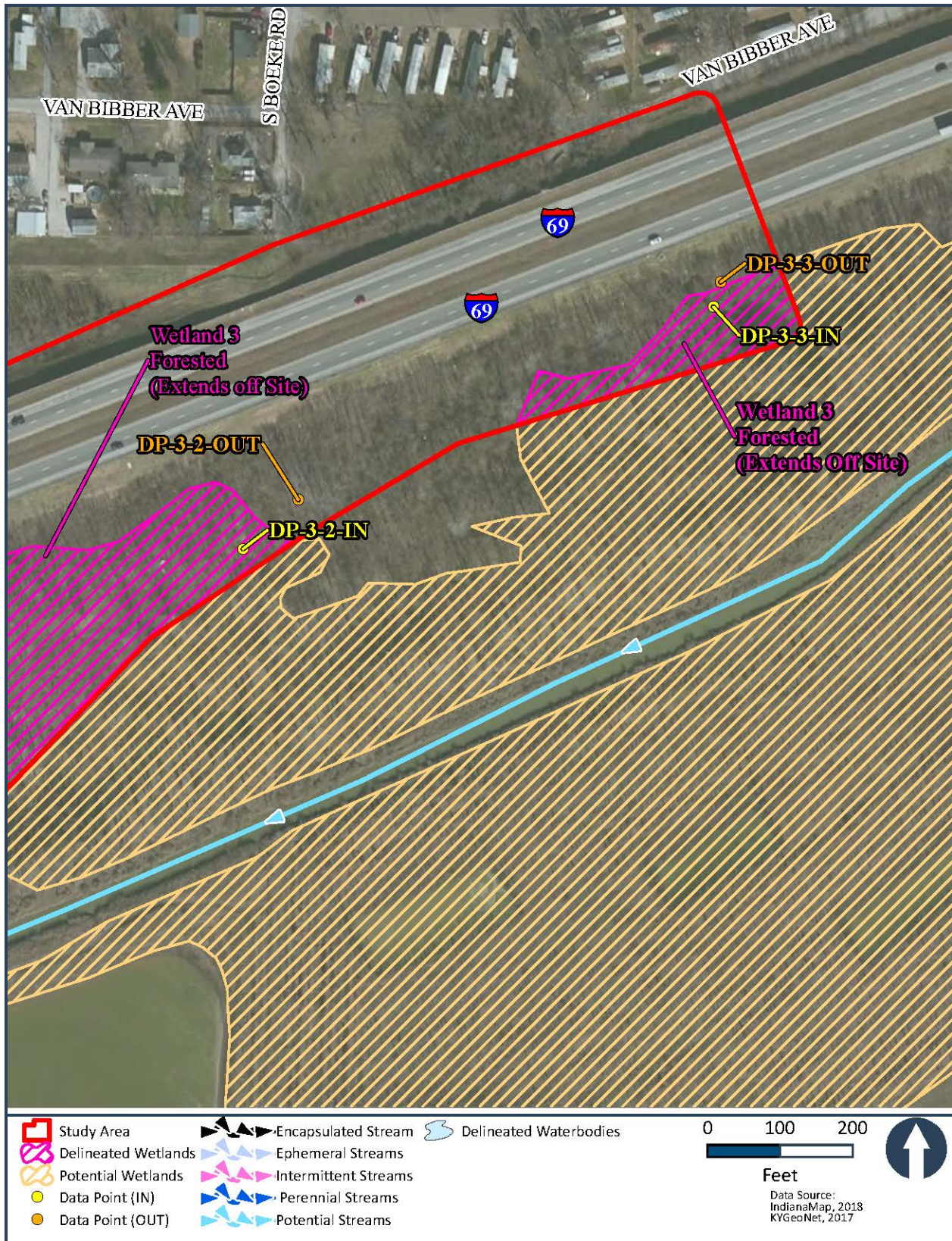


Figure 8. Field-Identified Resource Maps (5 of 57)

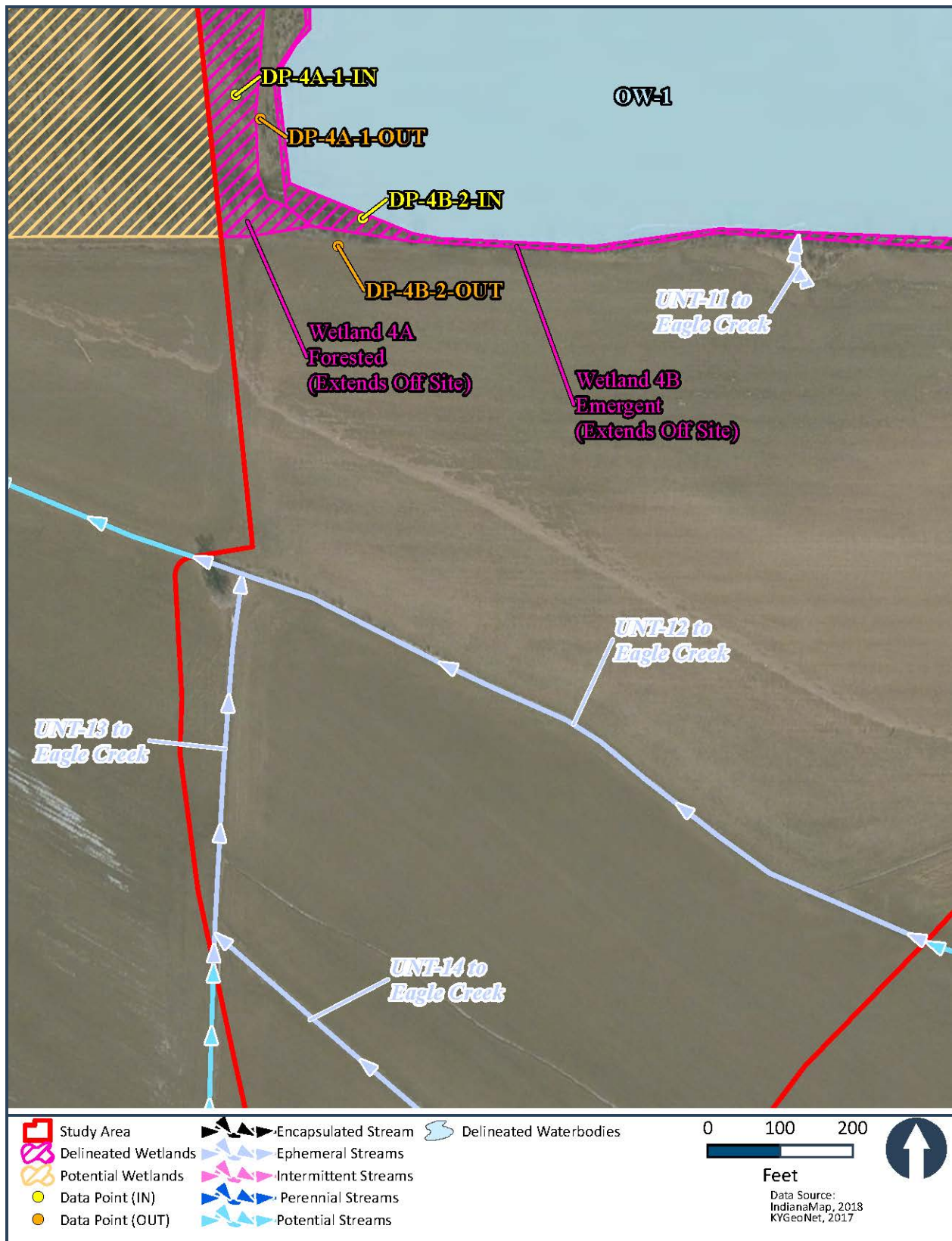


Figure 8. Field-Identified Resource Maps (6 of 57)

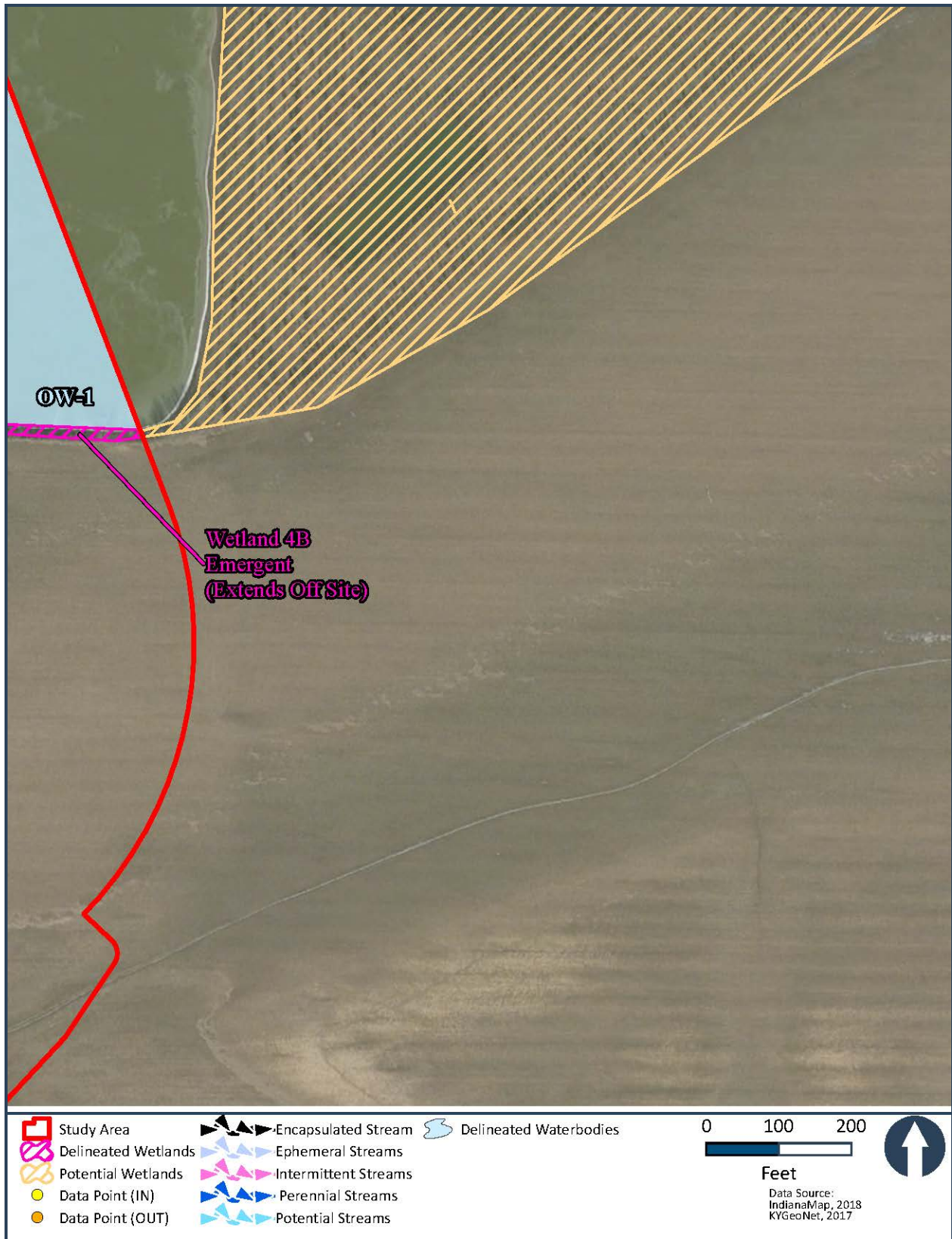


Figure 8. Field-Identified Resource Maps (7 of 57)



Figure 8. Field-Identified Resource Maps (8 of 57)



Figure 8. Field-Identified Resource Maps (9 of 57)



Figure 8. Field-Identified Resource Maps (10 of 57)

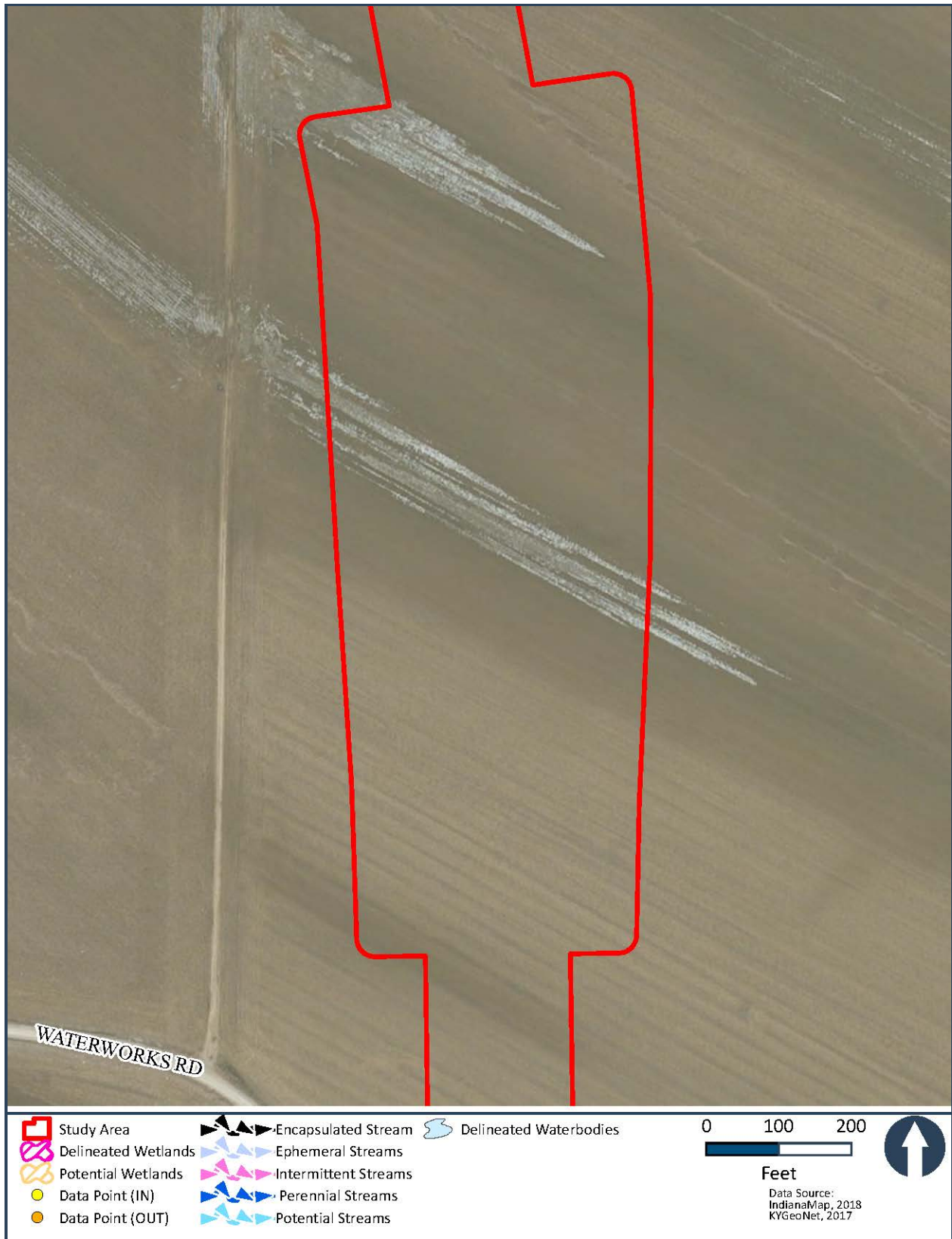


Figure 8. Field-Identified Resource Maps (11 of 57)

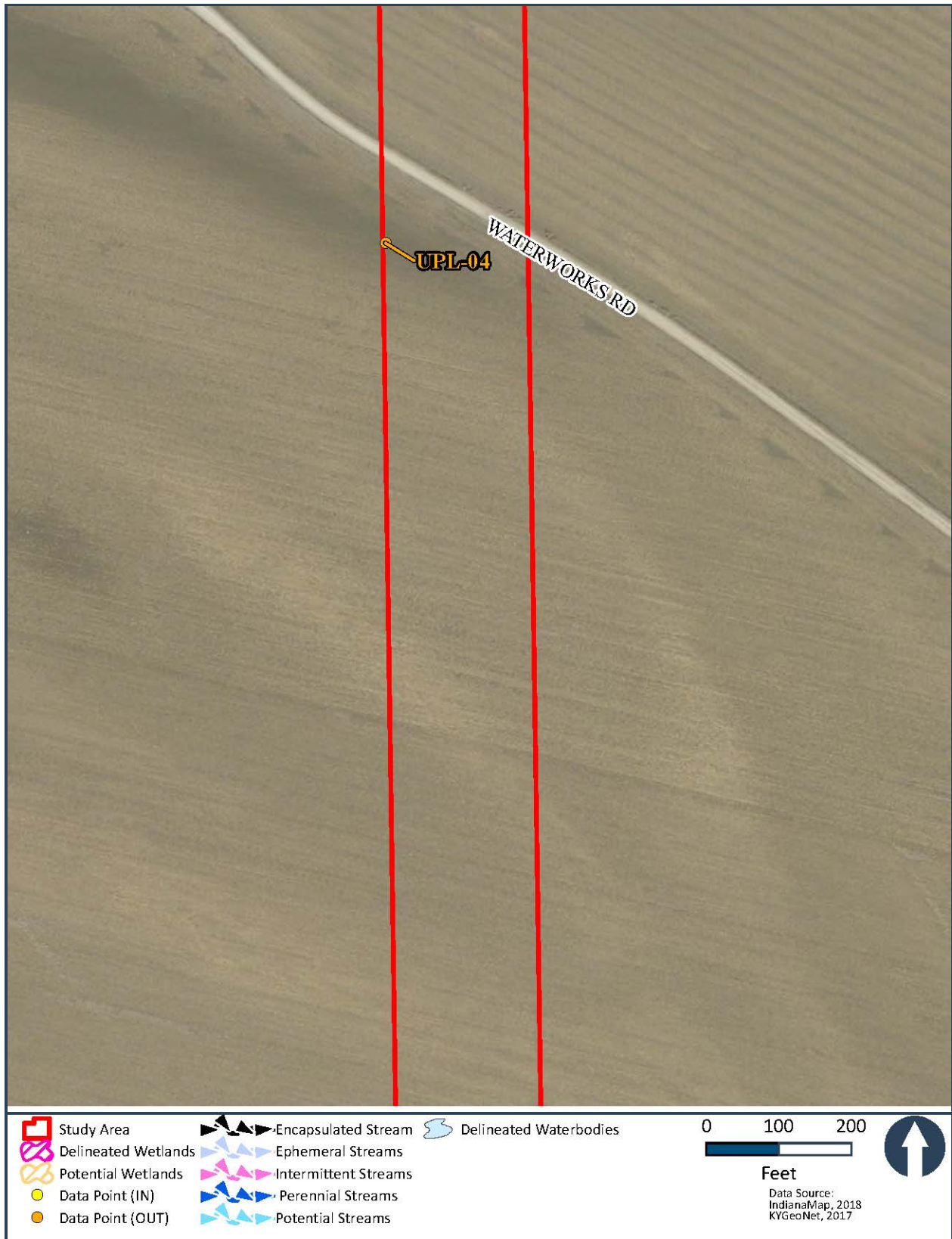


Figure 8. Field-Identified Resource Maps (12 of 57)

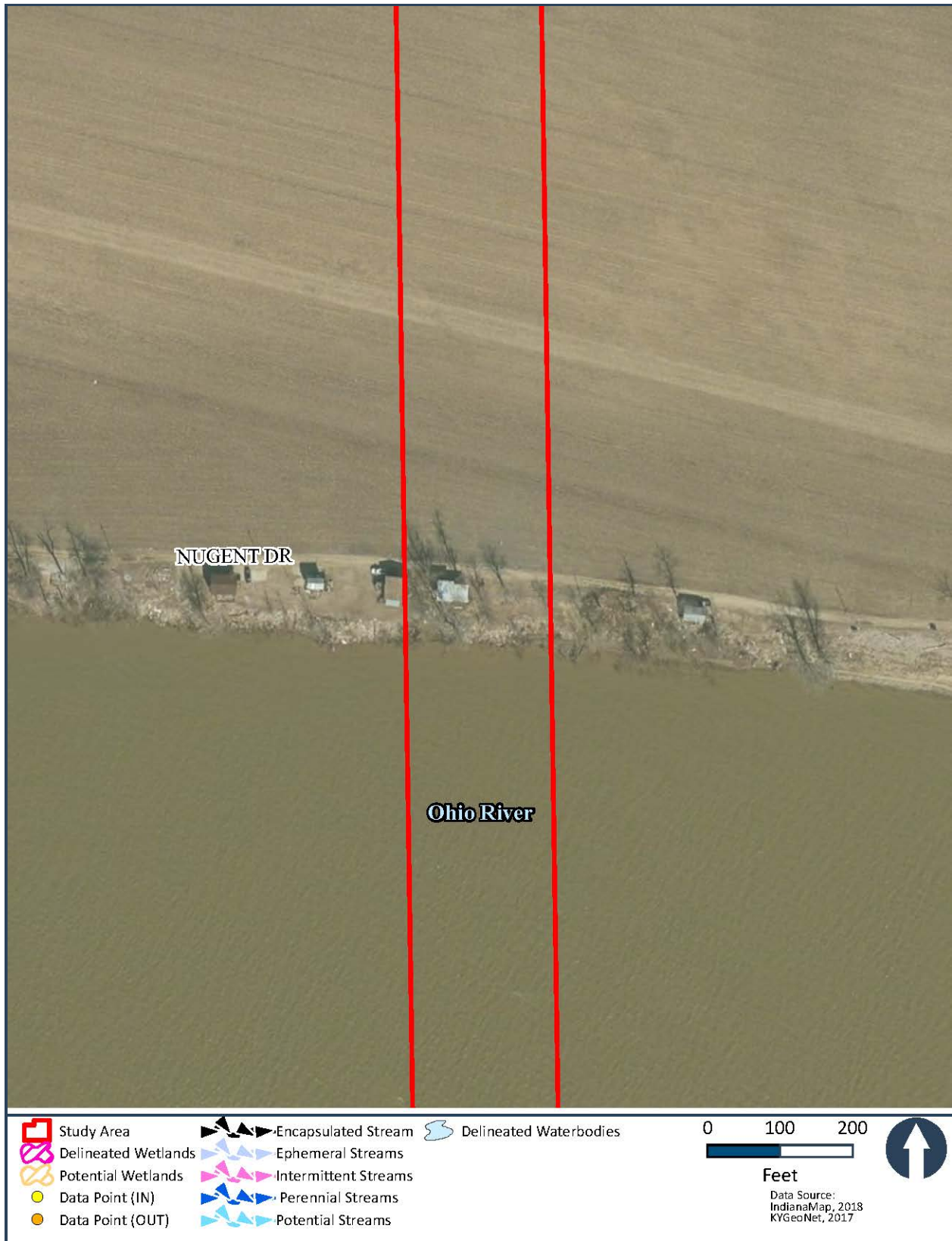


Figure 8. Field-Identified Resource Maps (13 of 57)

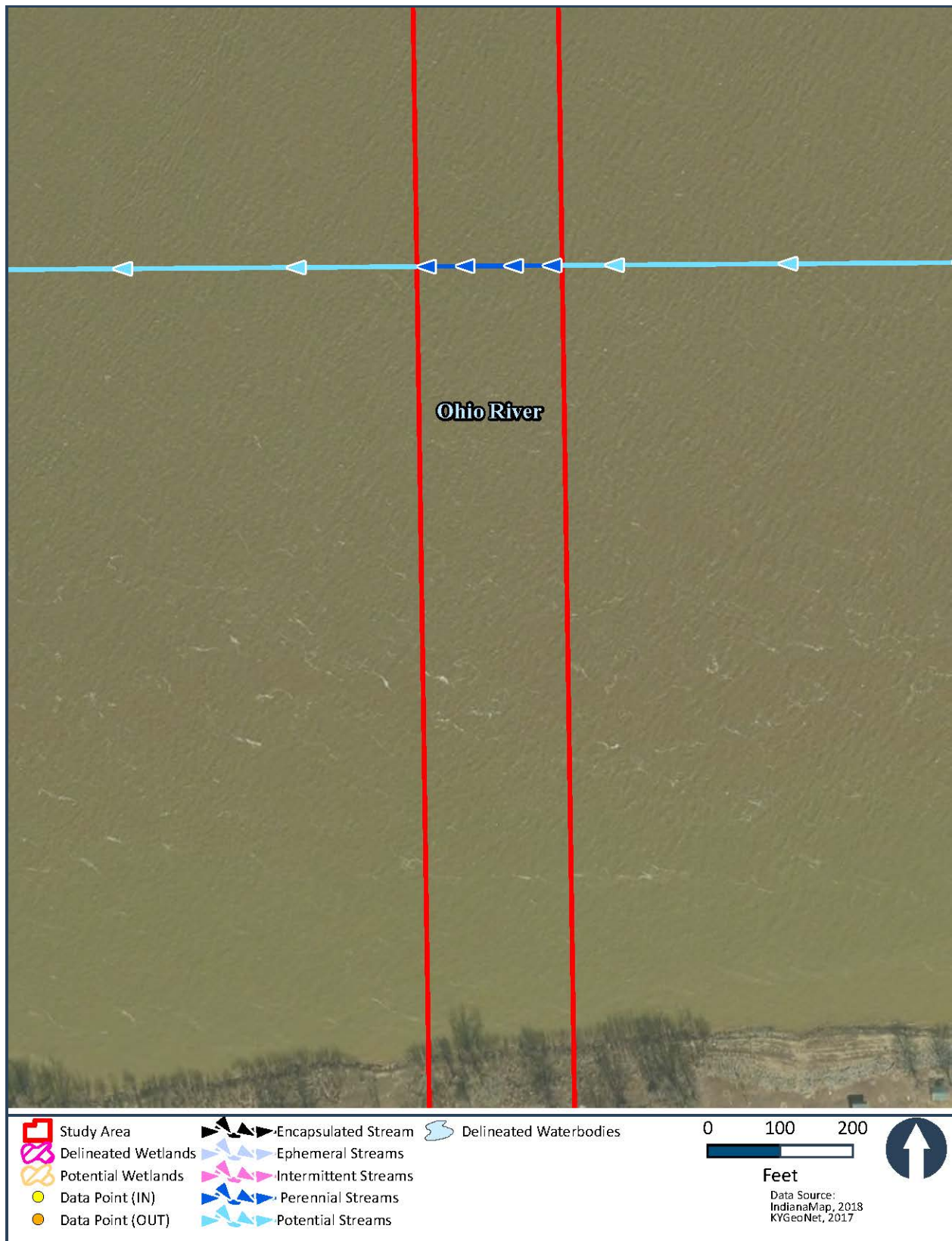


Figure 8. Field-Identified Resource Maps (14 of 57)

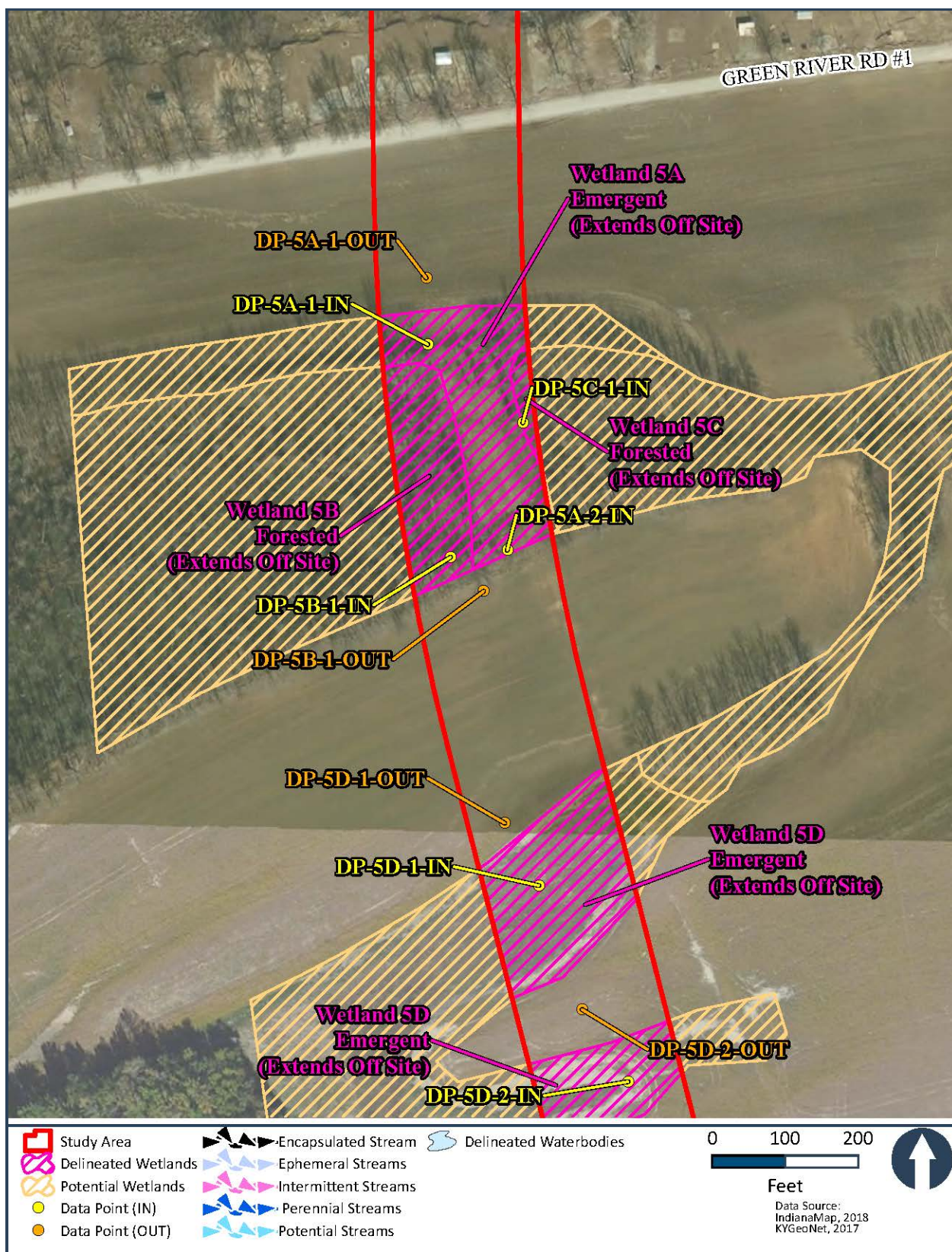


Figure 8. Field-Identified Resource Maps (15 of 57)

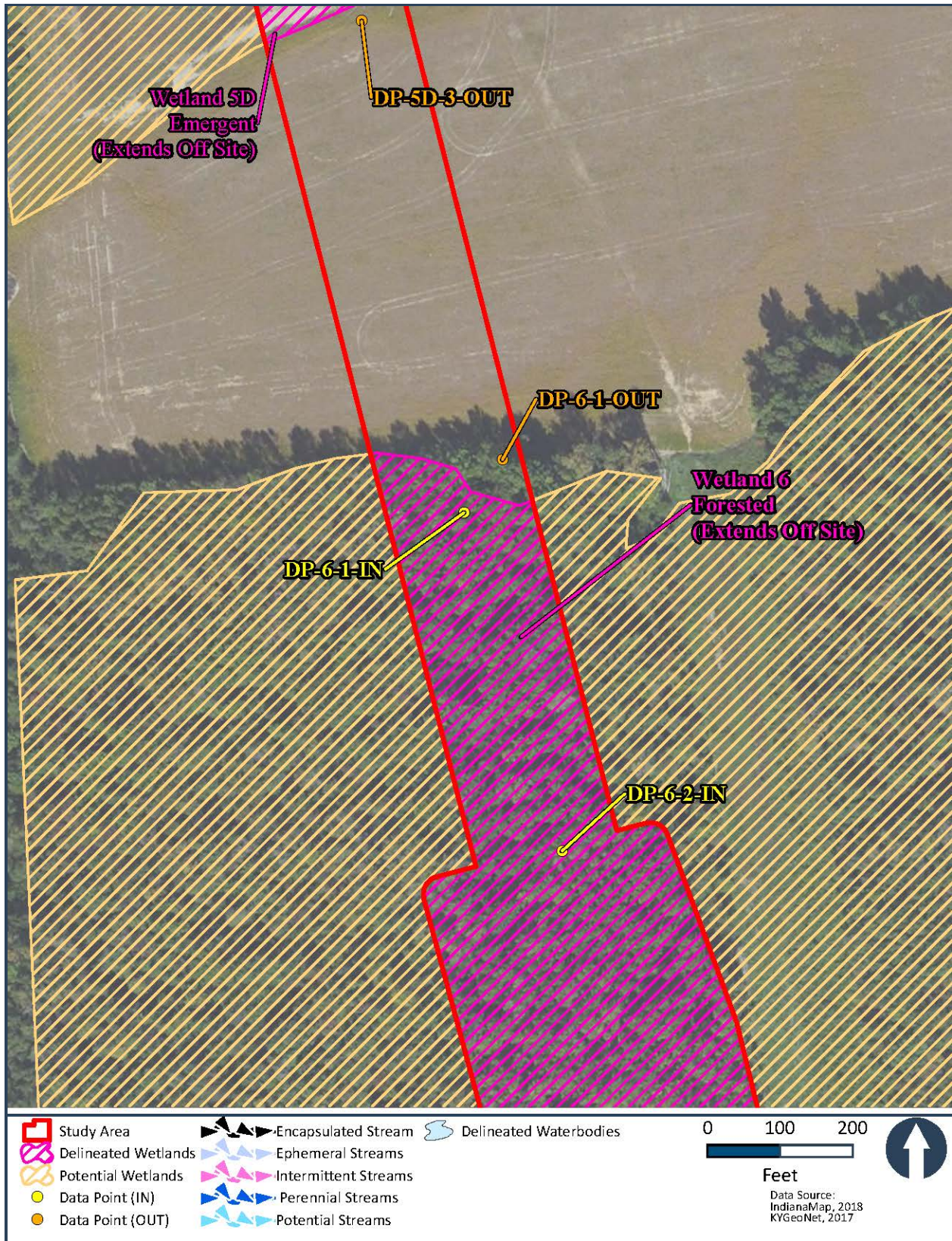


Figure 8. Field-Identified Resource Maps (16 of 57)

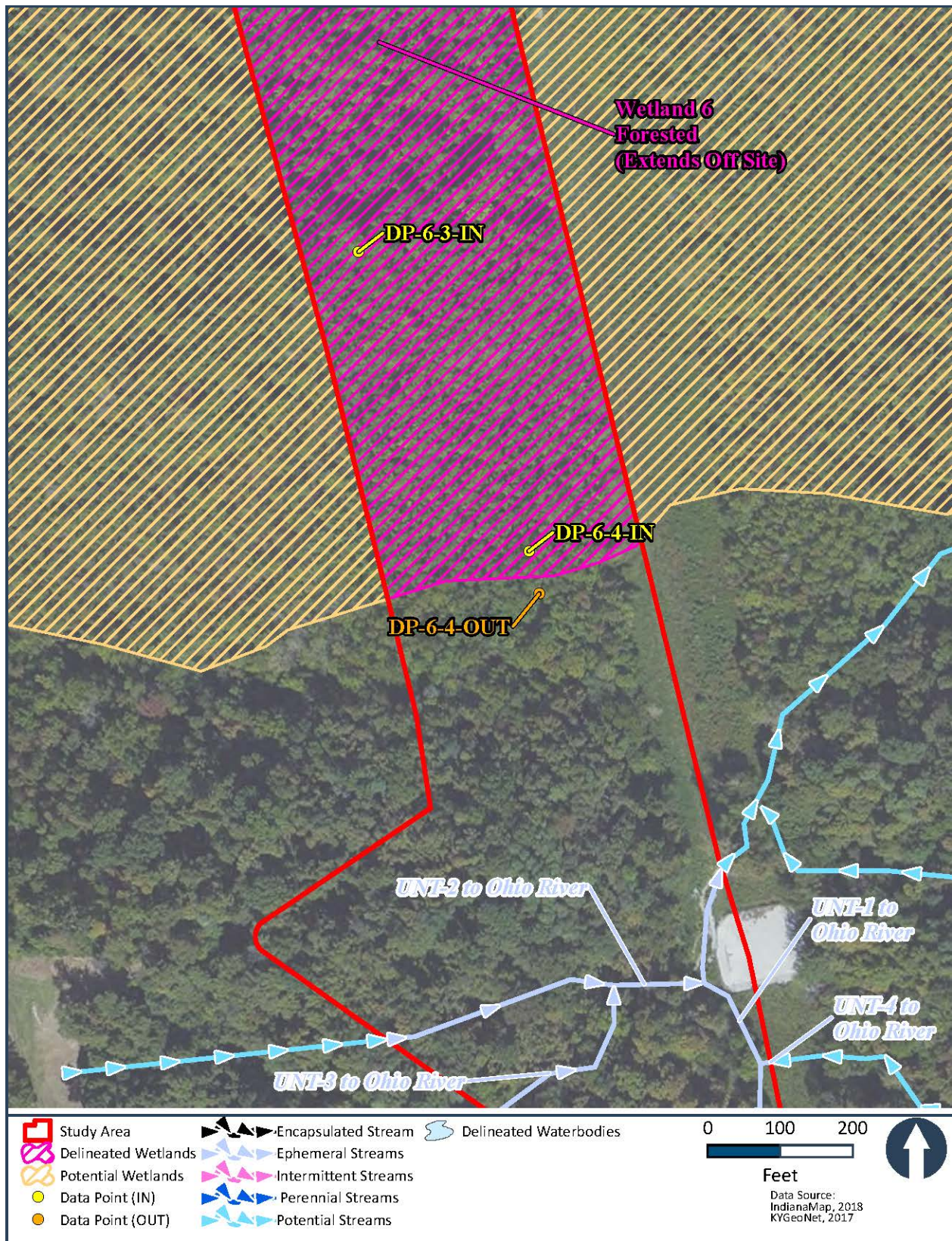


Figure 8. Field-Identified Resource Maps (17 of 57)

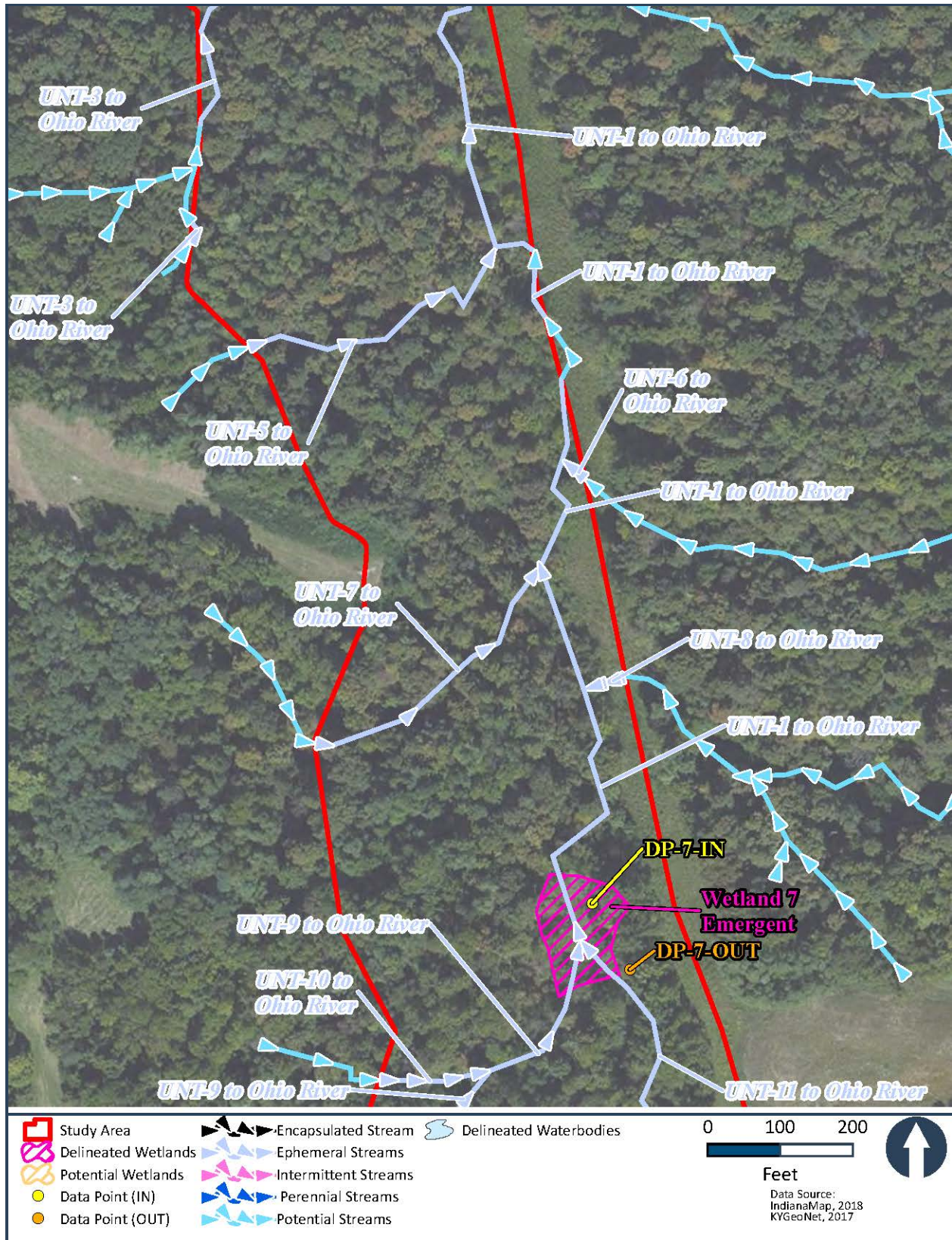


Figure 8. Field-Identified Resource Maps (18 of 57)

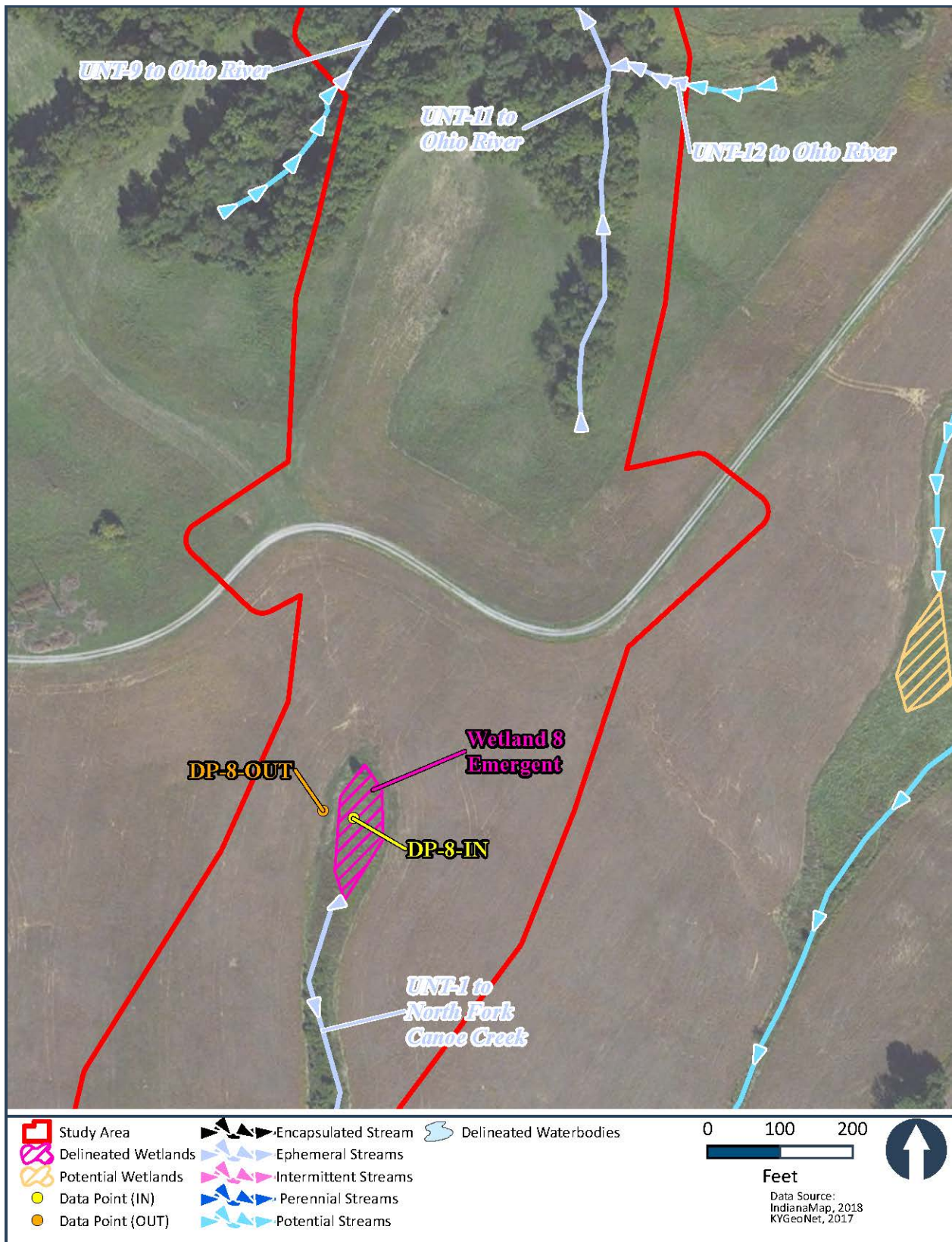


Figure 8. Field-Identified Resource Maps (19 of 57)

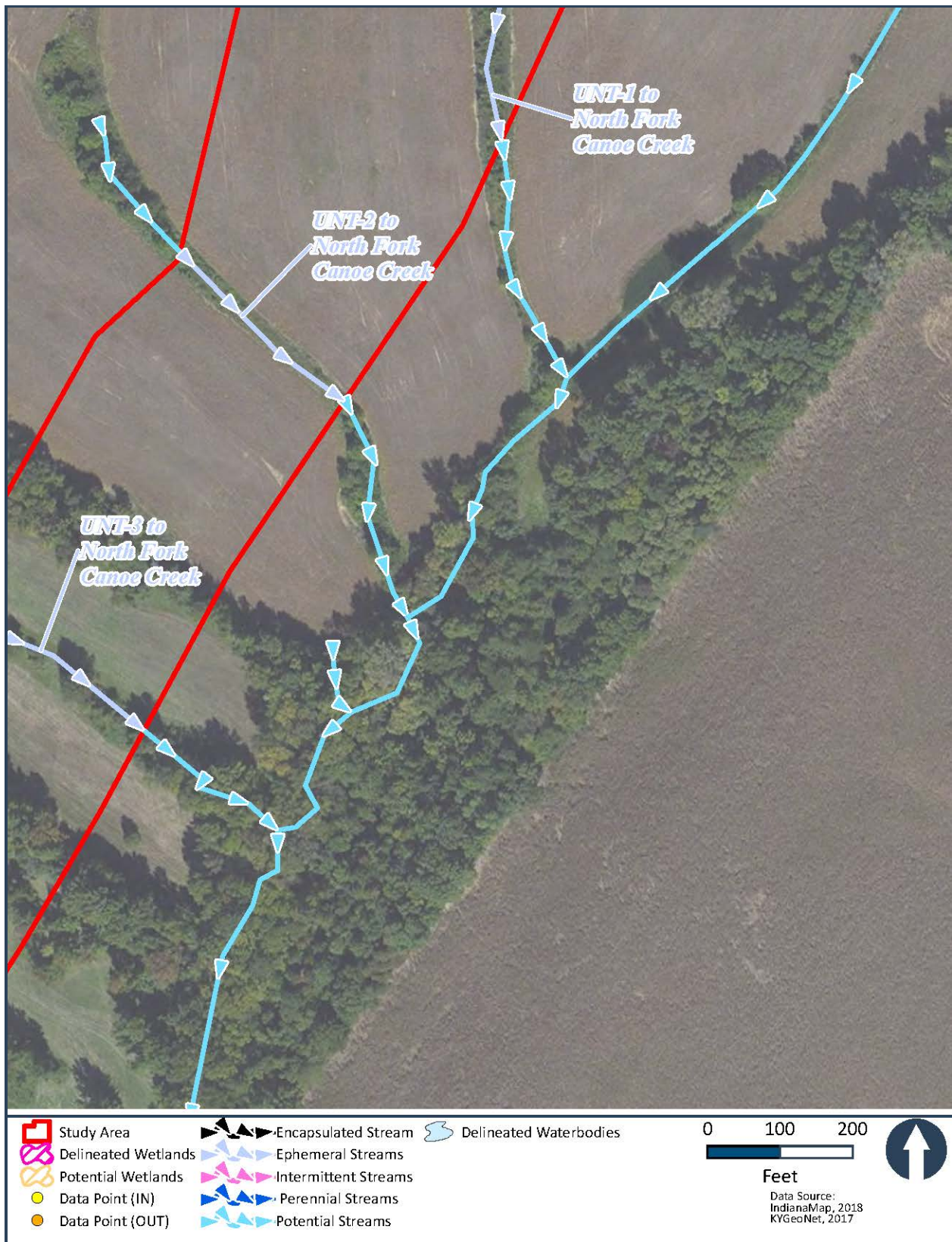


Figure 8. Field-Identified Resource Maps (20 of 57)

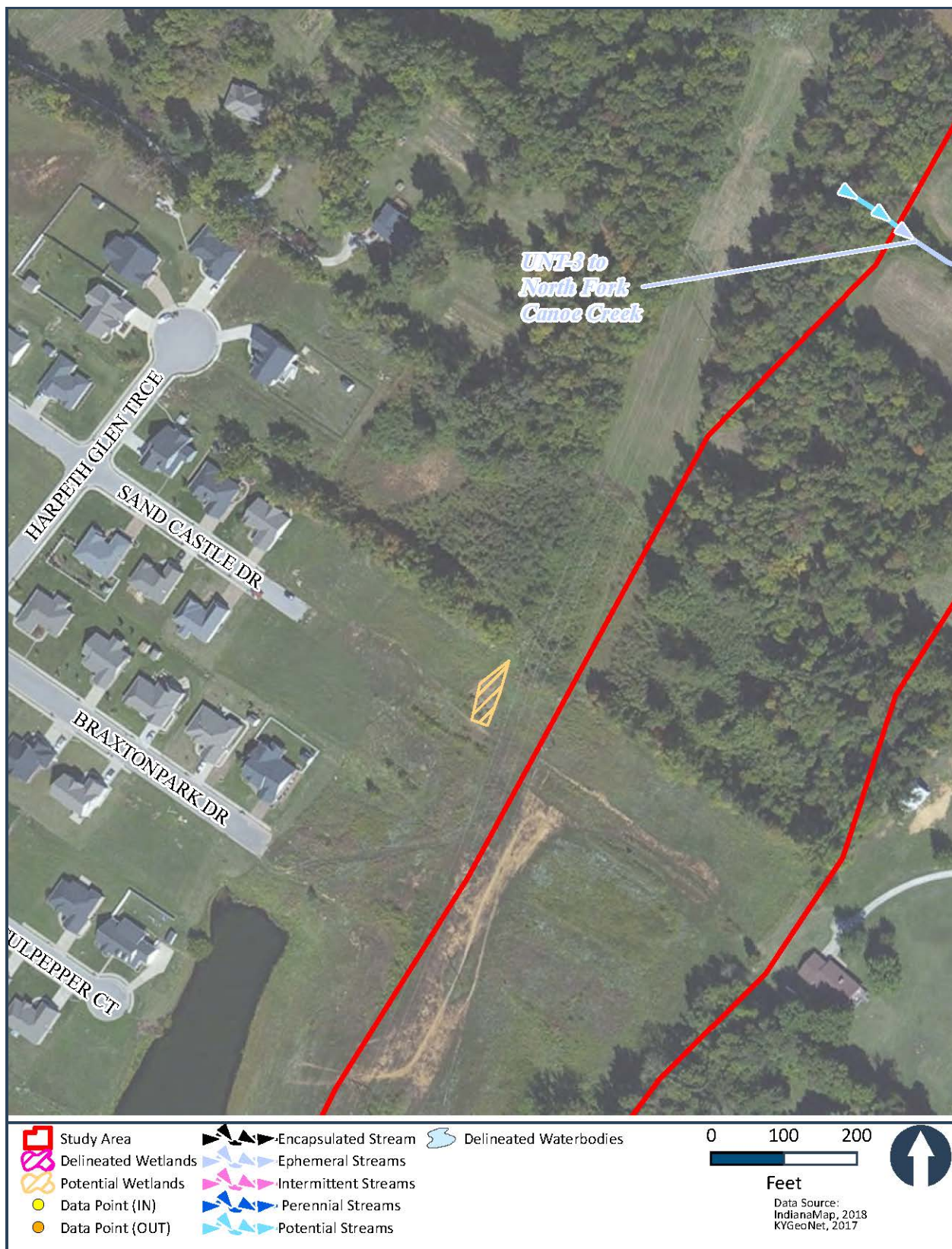


Figure 8. Field-Identified Resource Maps (21 of 57)

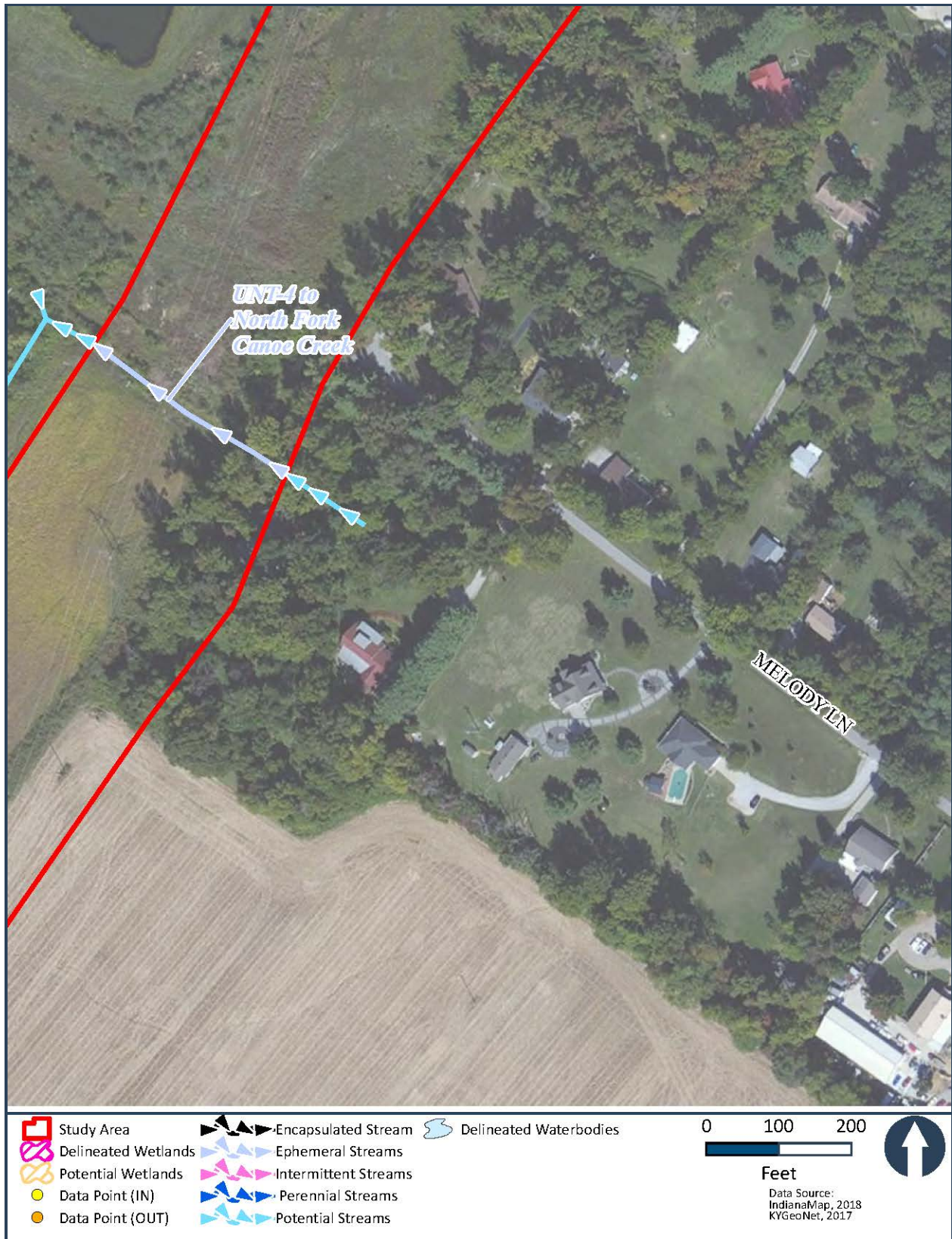


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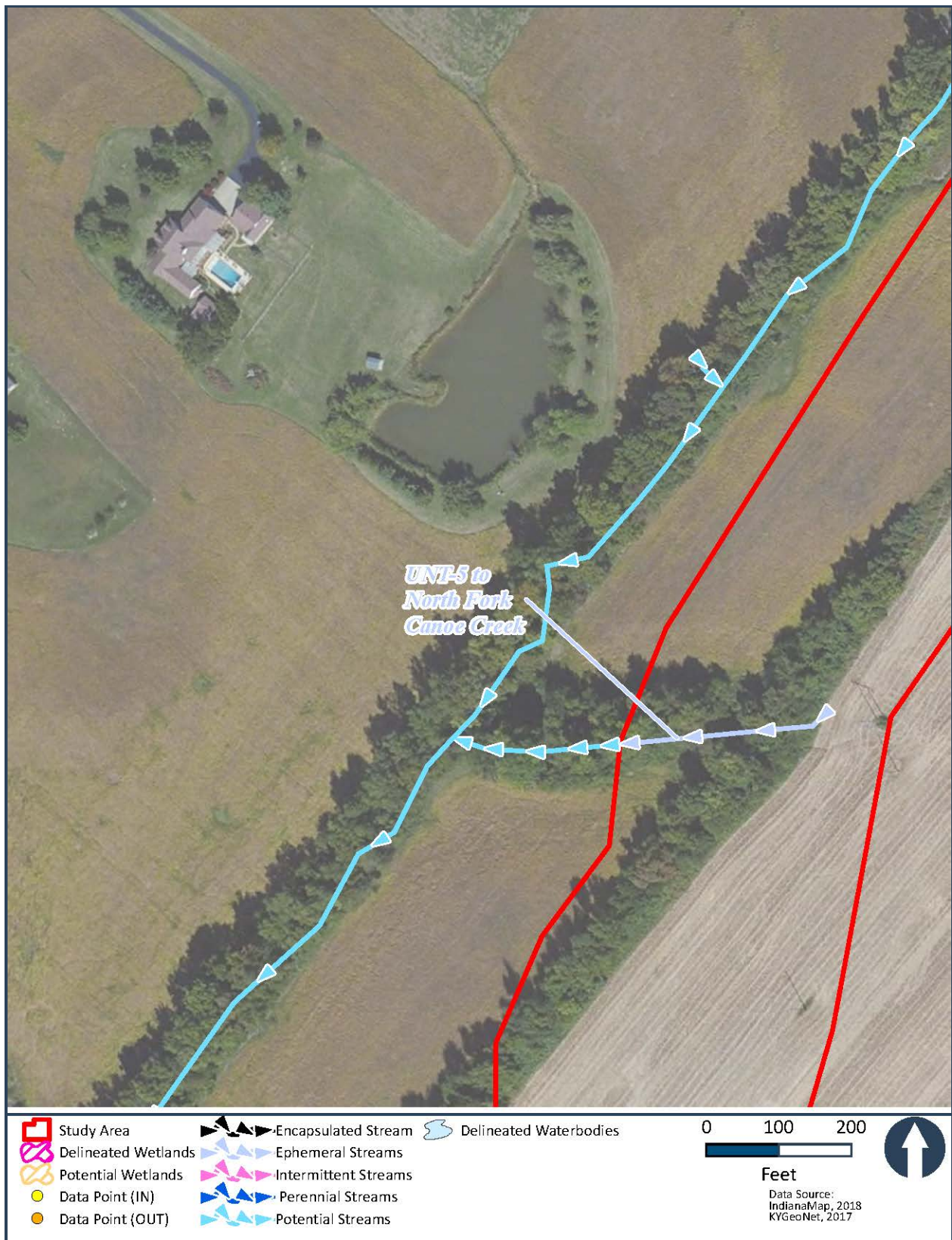


Figure 8. Field-Identified Resource Maps (23 of 57)



Figure 8. Field-Identified Resource Maps (24 of 57)

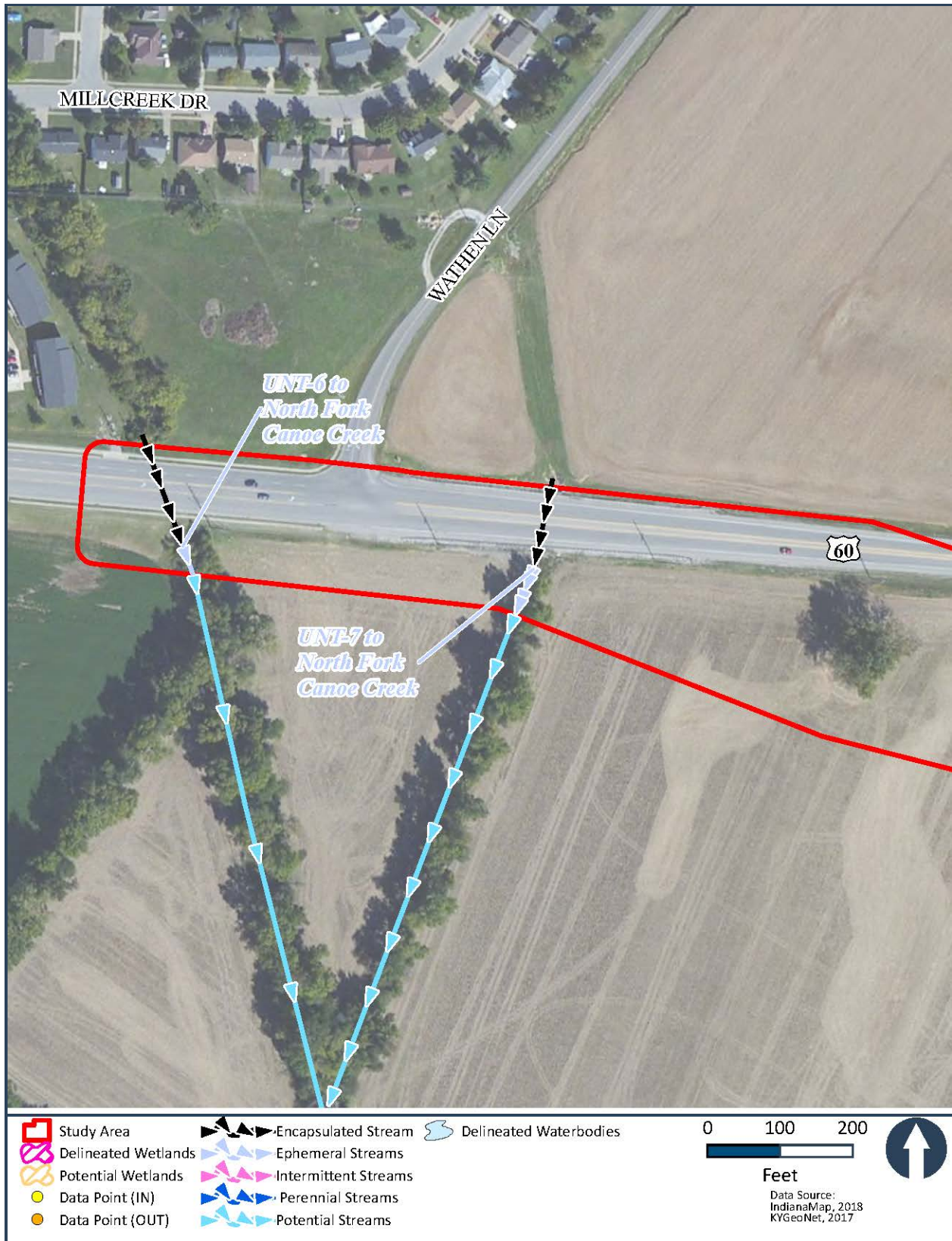


Figure 8. Field-Identified Resource Maps (25 of 57)

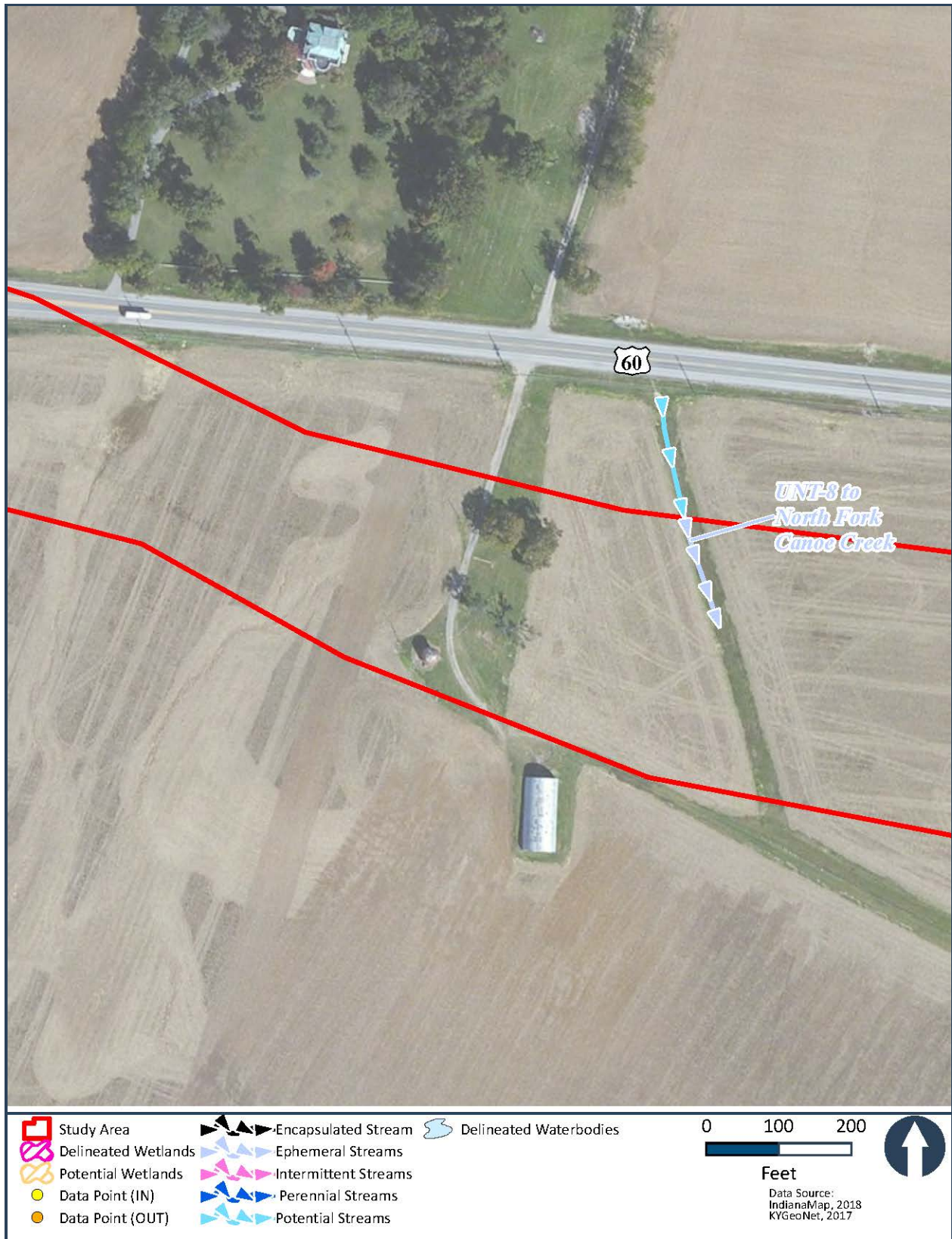


Figure 8. Field-Identified Resource Maps (26 of 57)

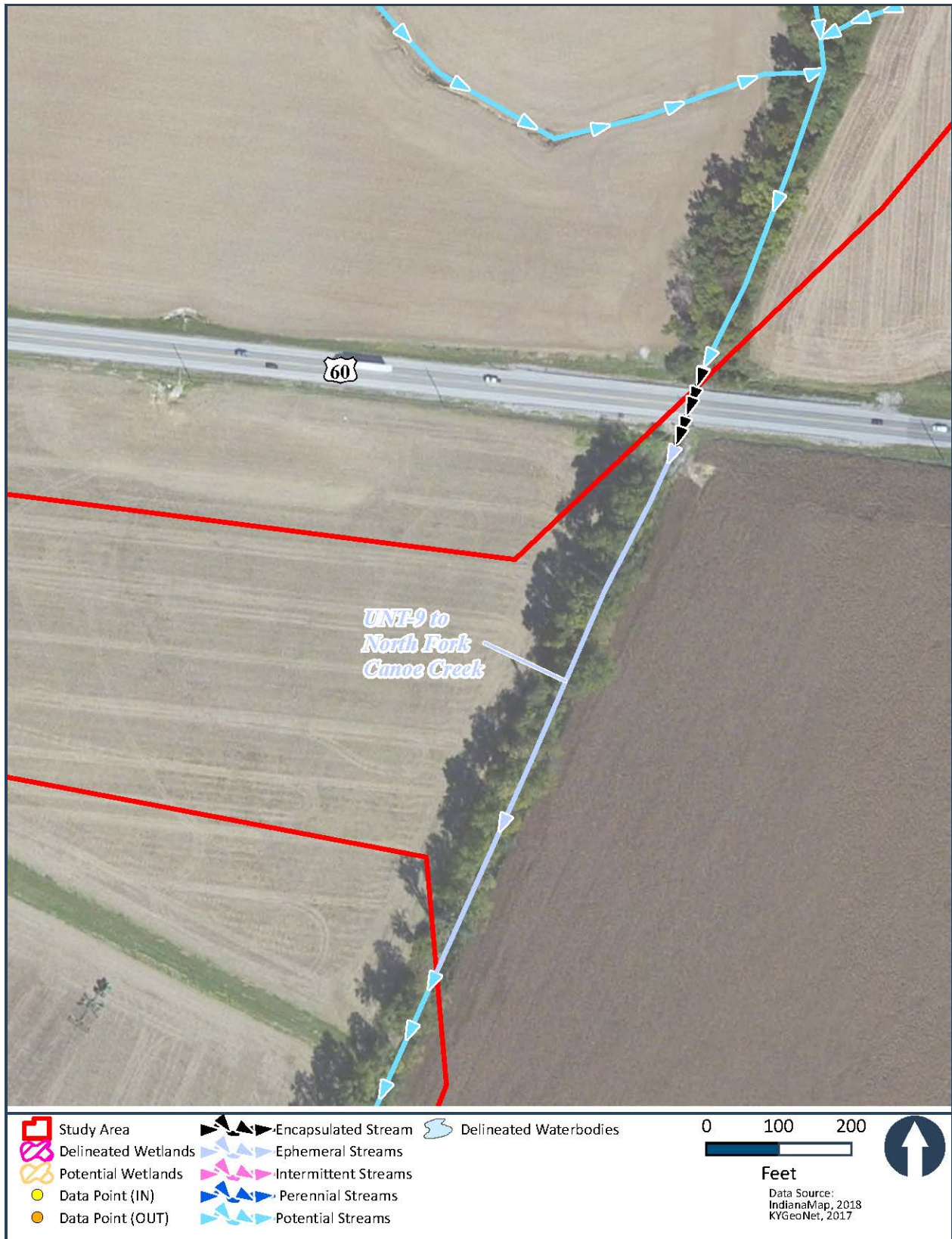


Figure 8. Field-Identified Resource Maps (27 of 57)

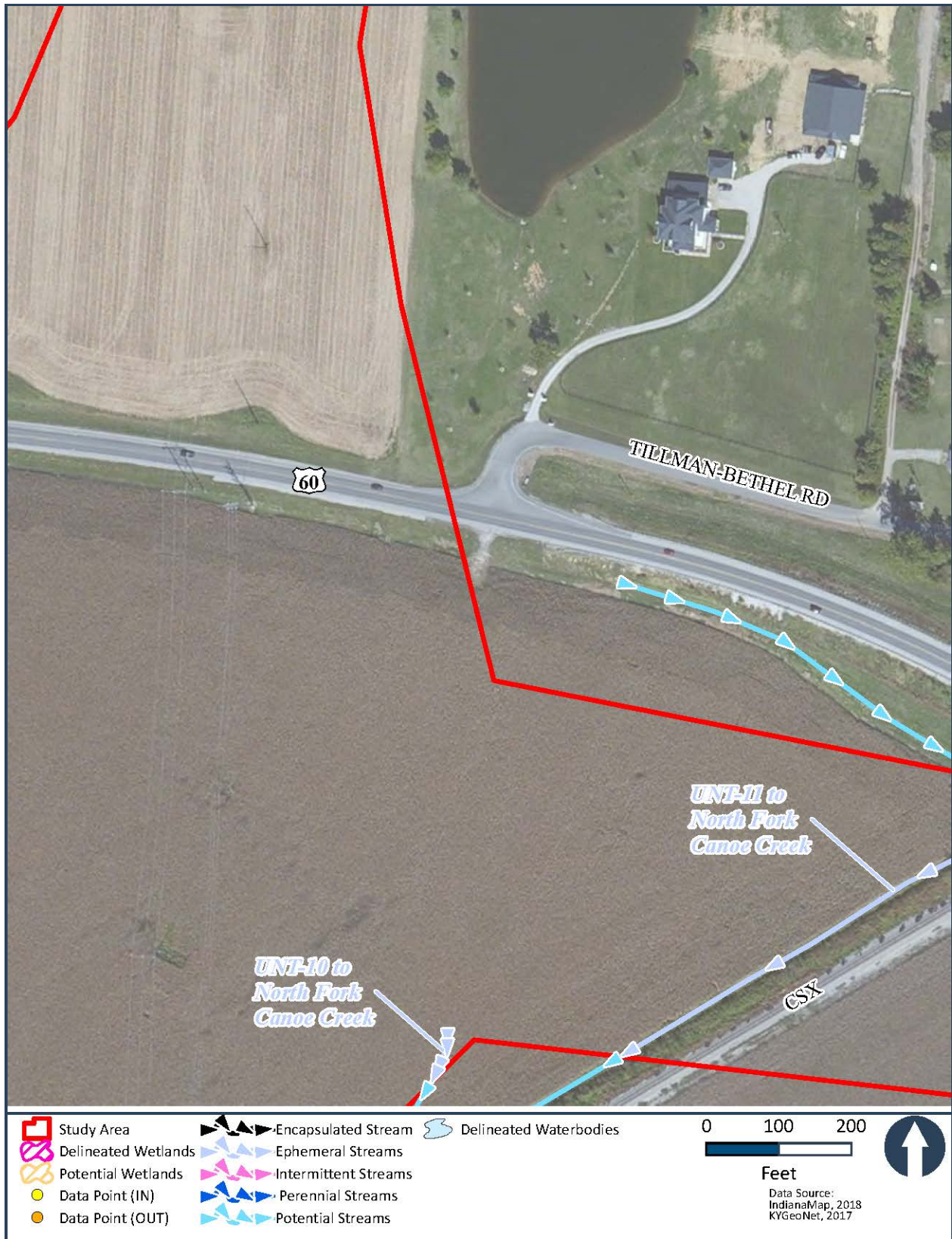


Figure 8. Field-Identified Resource Maps (28 of 57)

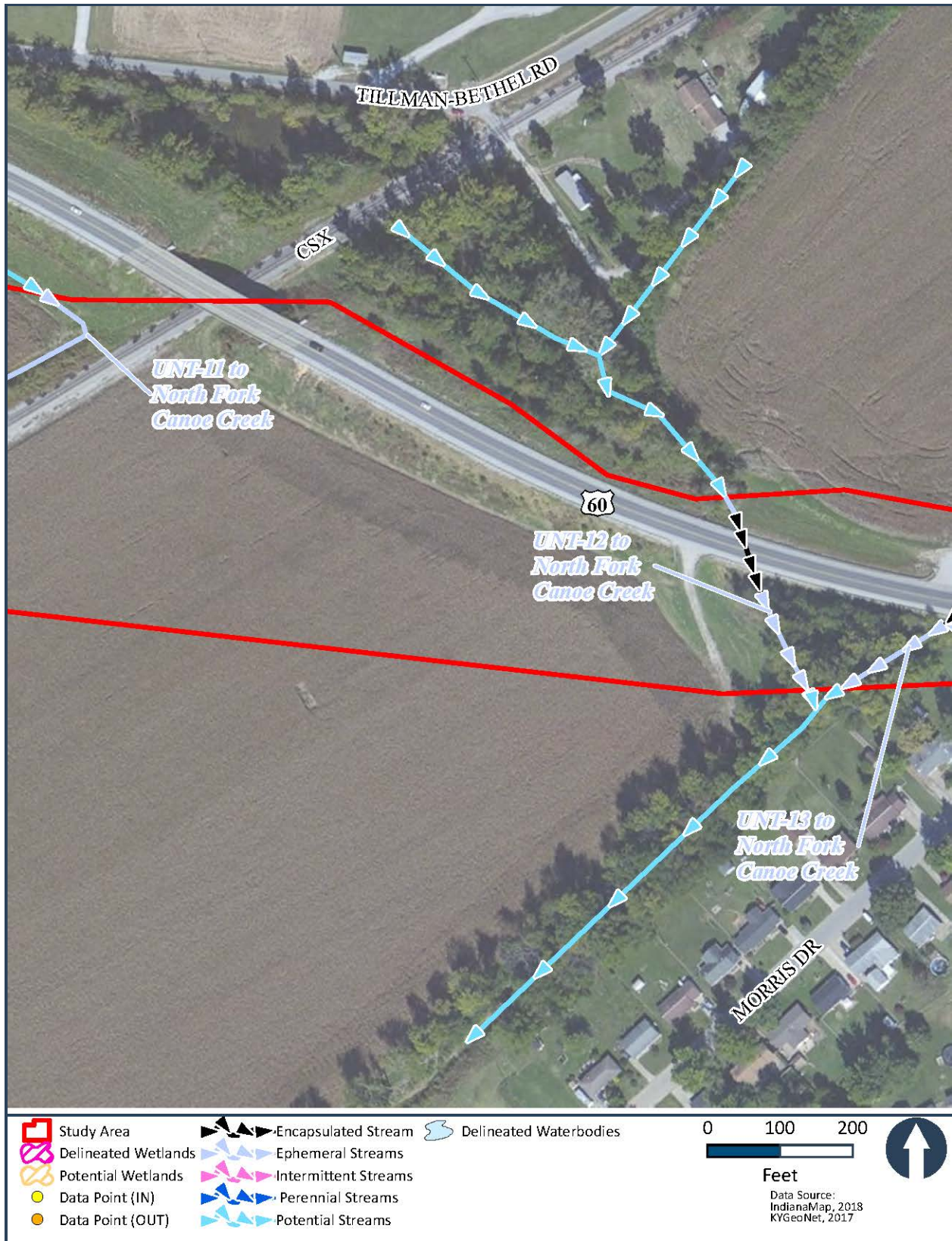


Figure 8. Field-Identified Resource Maps (29 of 57)



Figure 8. Field-Identified Resource Maps (30 of 57)



Figure 8. Field-Identified Resource Maps (31 of 57)



Figure 8. Field-Identified Resource Maps (32 of 57)

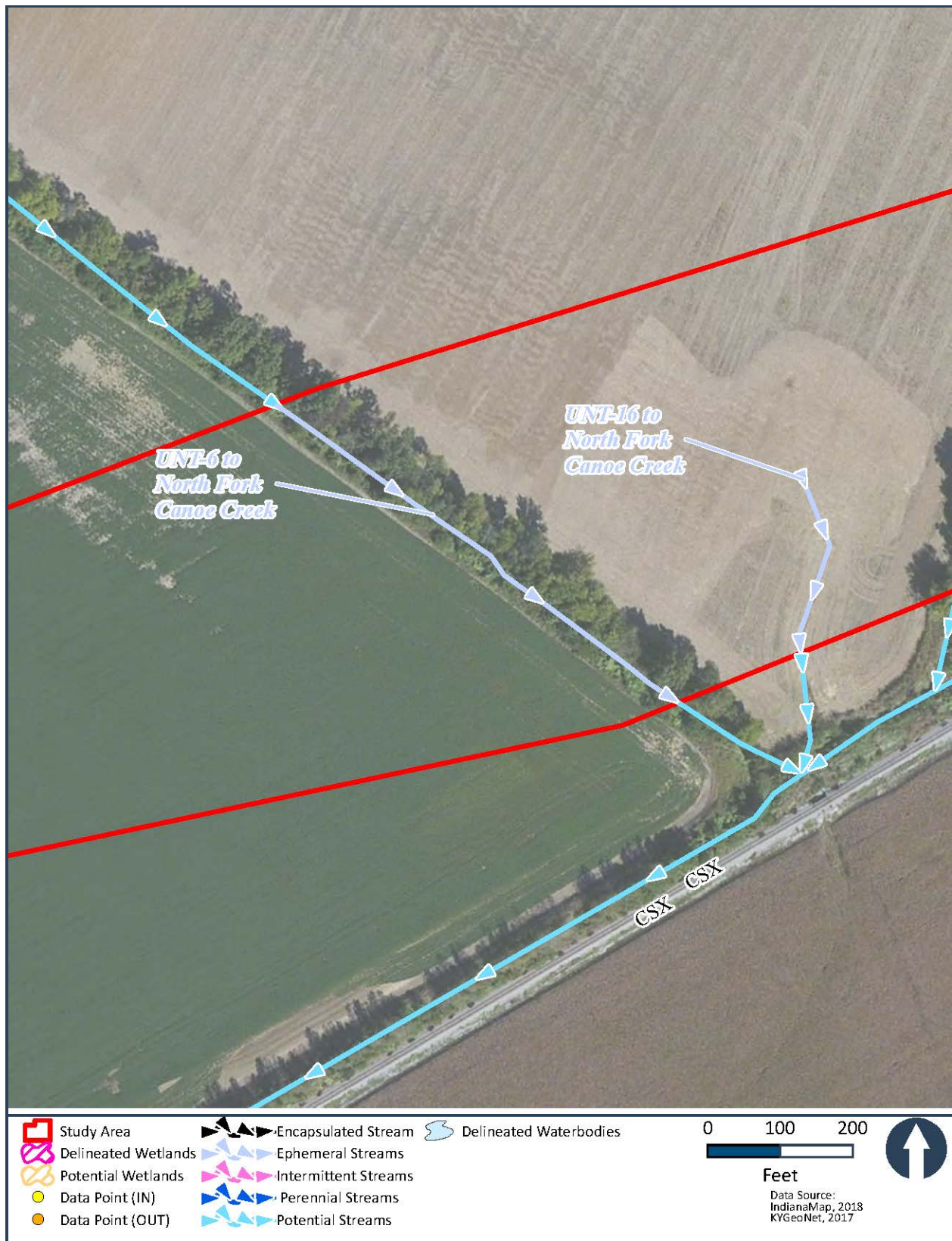


Figure 8. Field-Identified Resource Maps (33 of 57)



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Figure 8. Field-Identified Resource Maps (35 of 57)

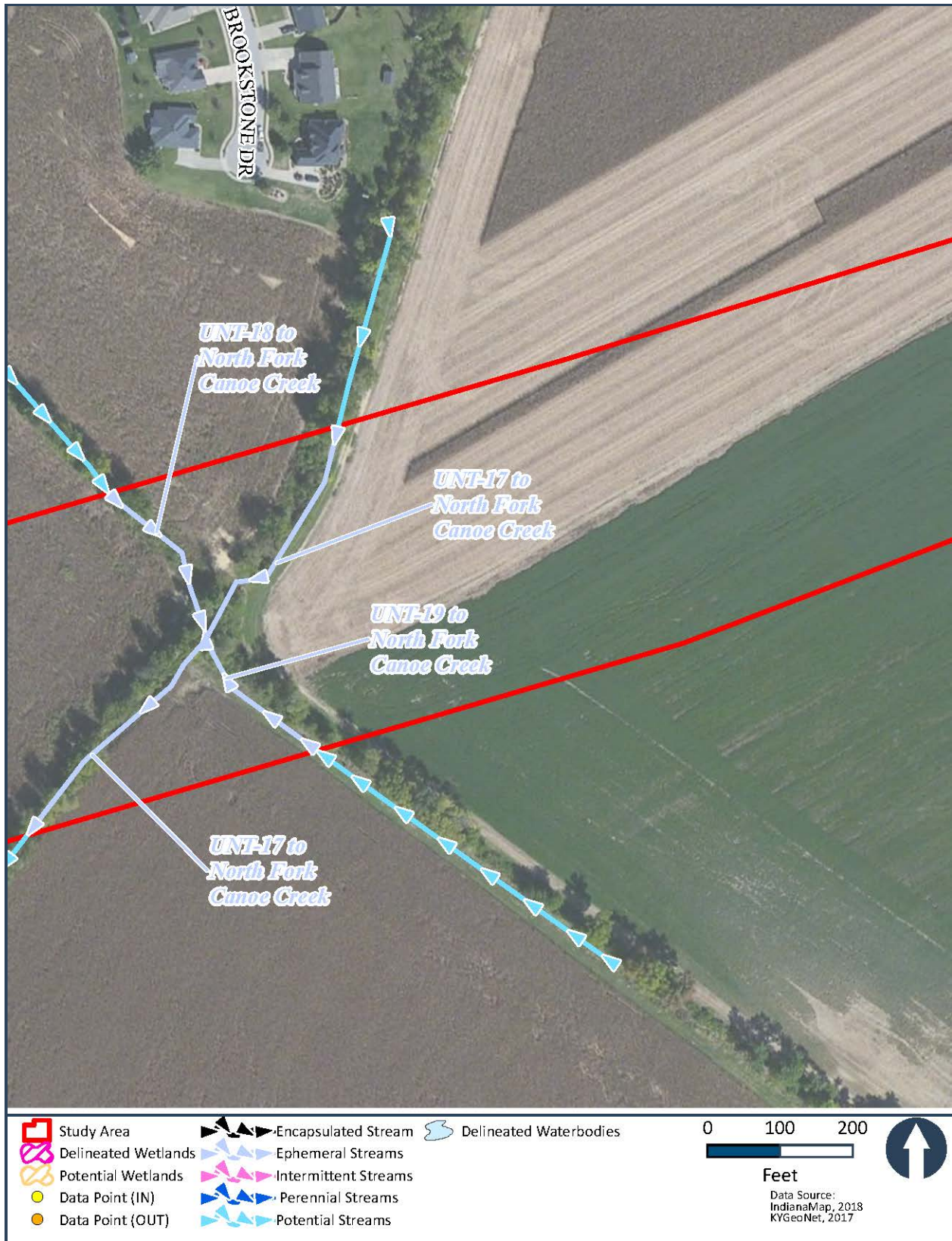


Figure 8. Field-Identified Resource Maps (36 of 57)

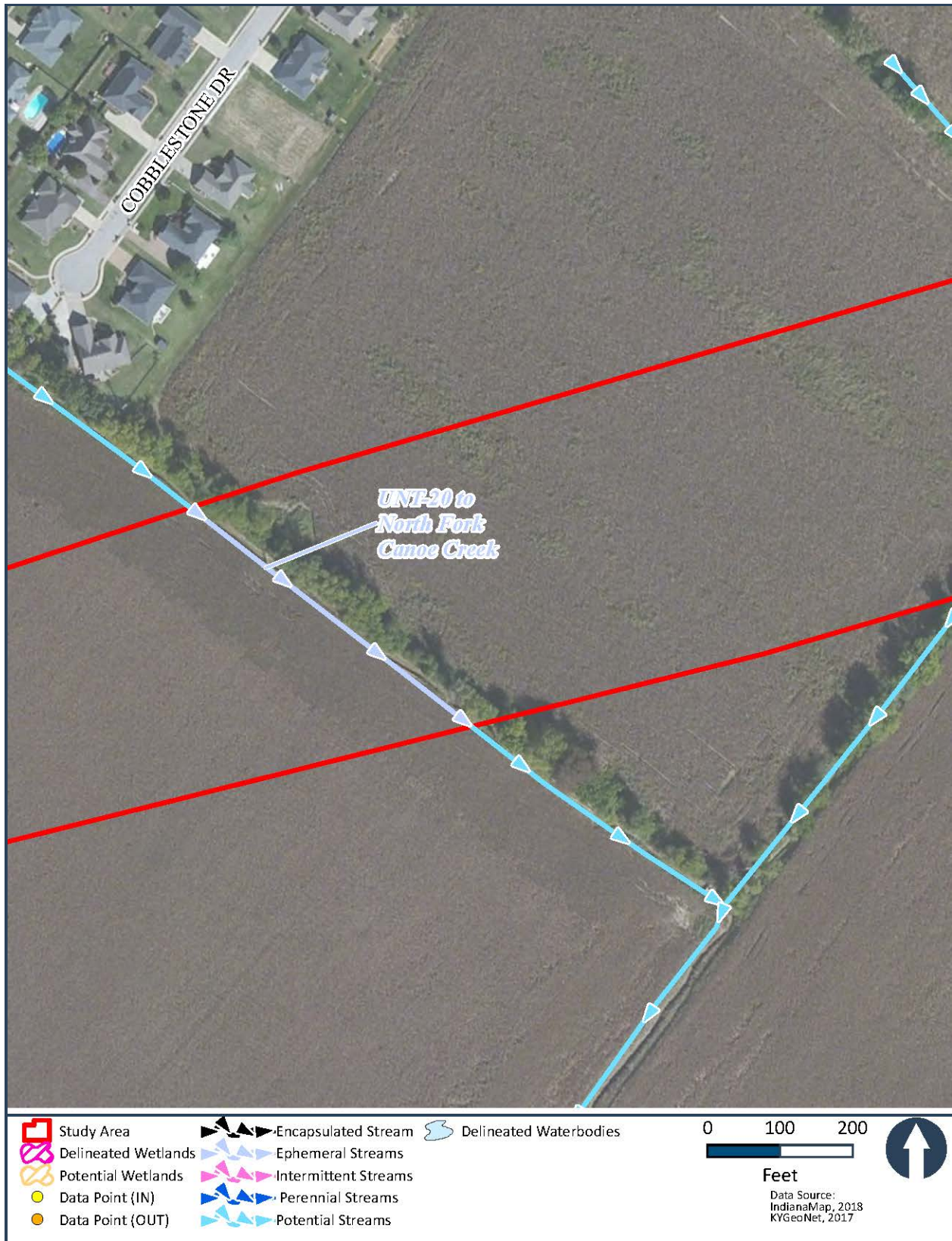


Figure 8. Field-Identified Resource Maps (37 of 57)

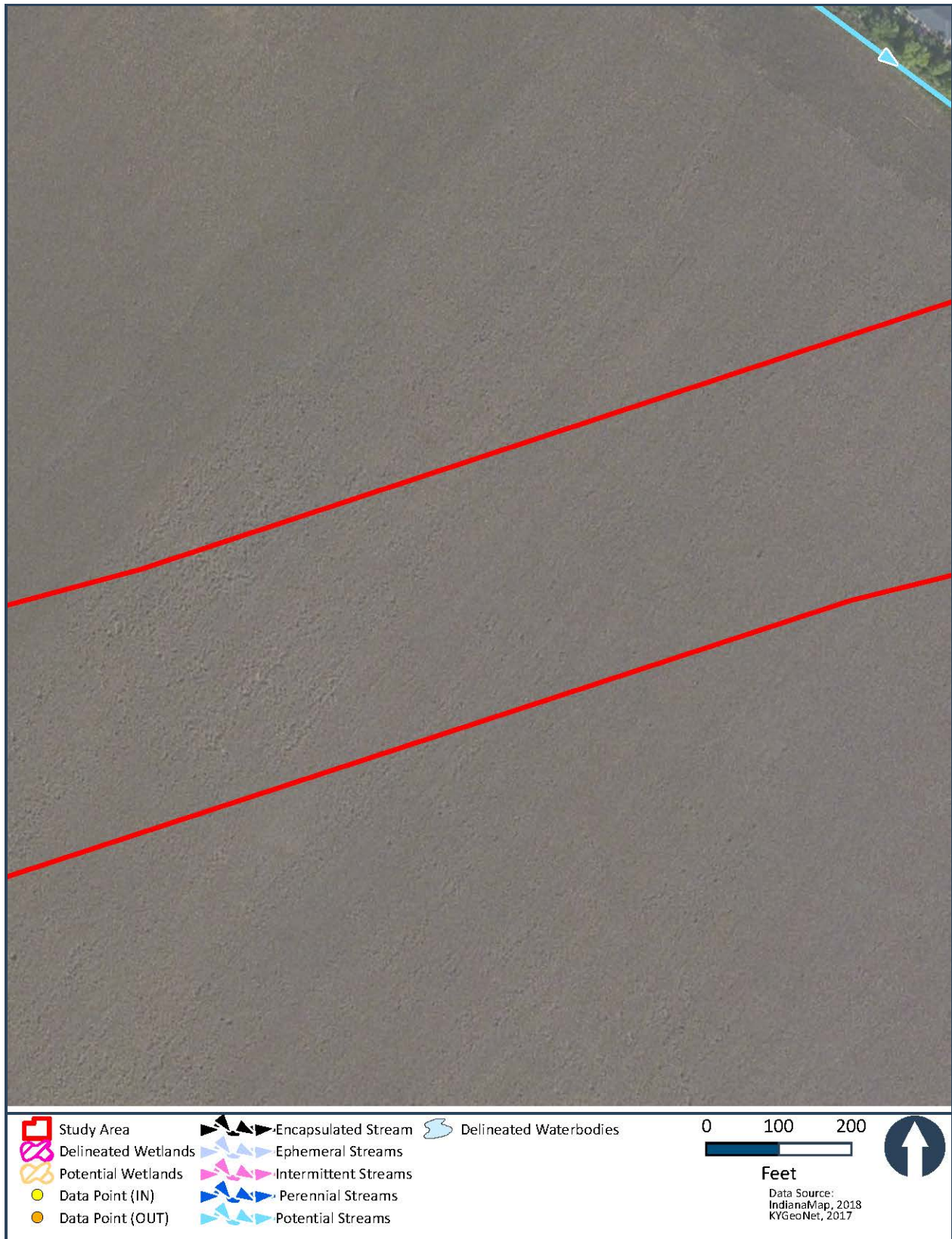


Figure 8. Field-Identified Resource Maps (38 of 57)



Figure 8. Field-Identified Resource Maps (39 of 57)

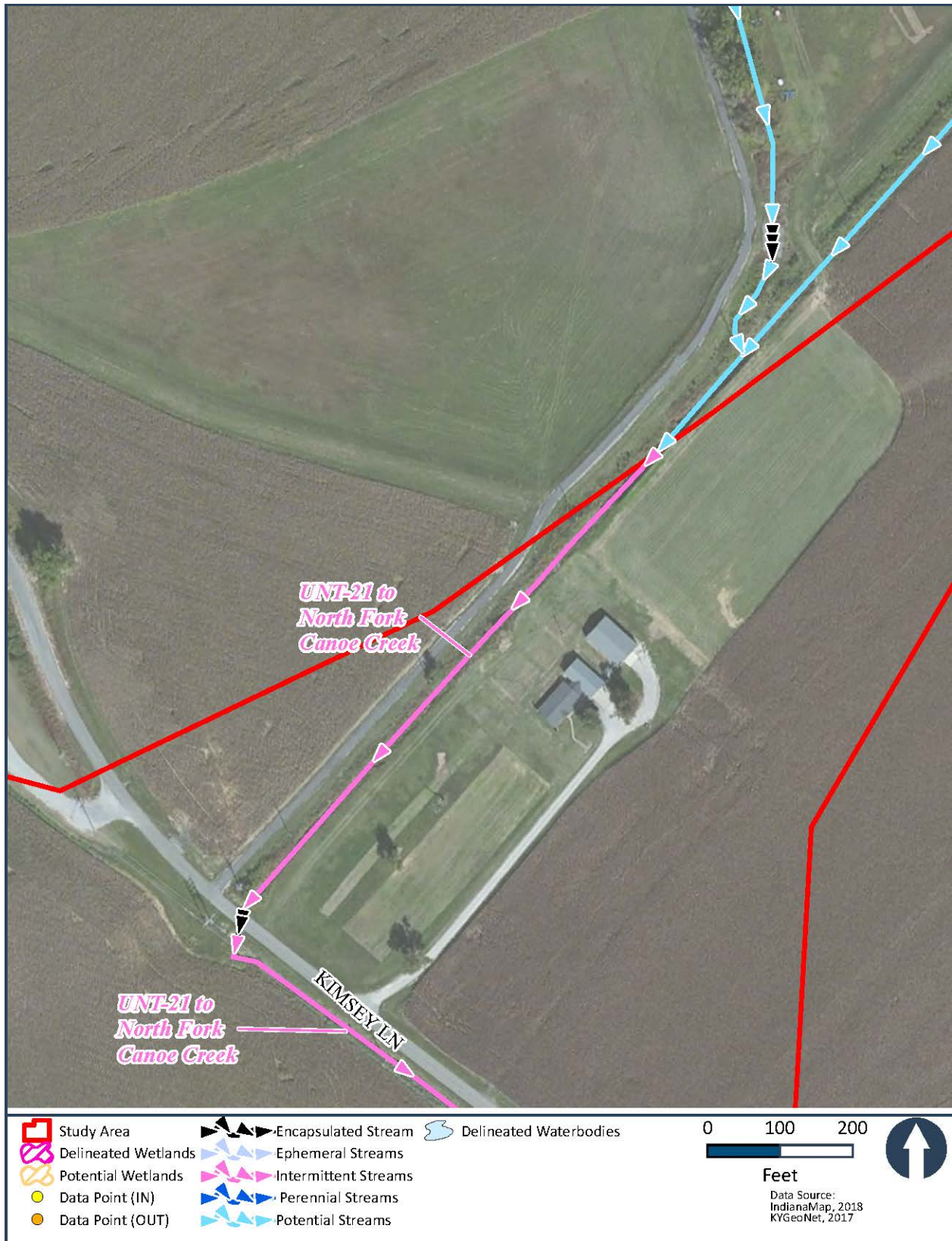


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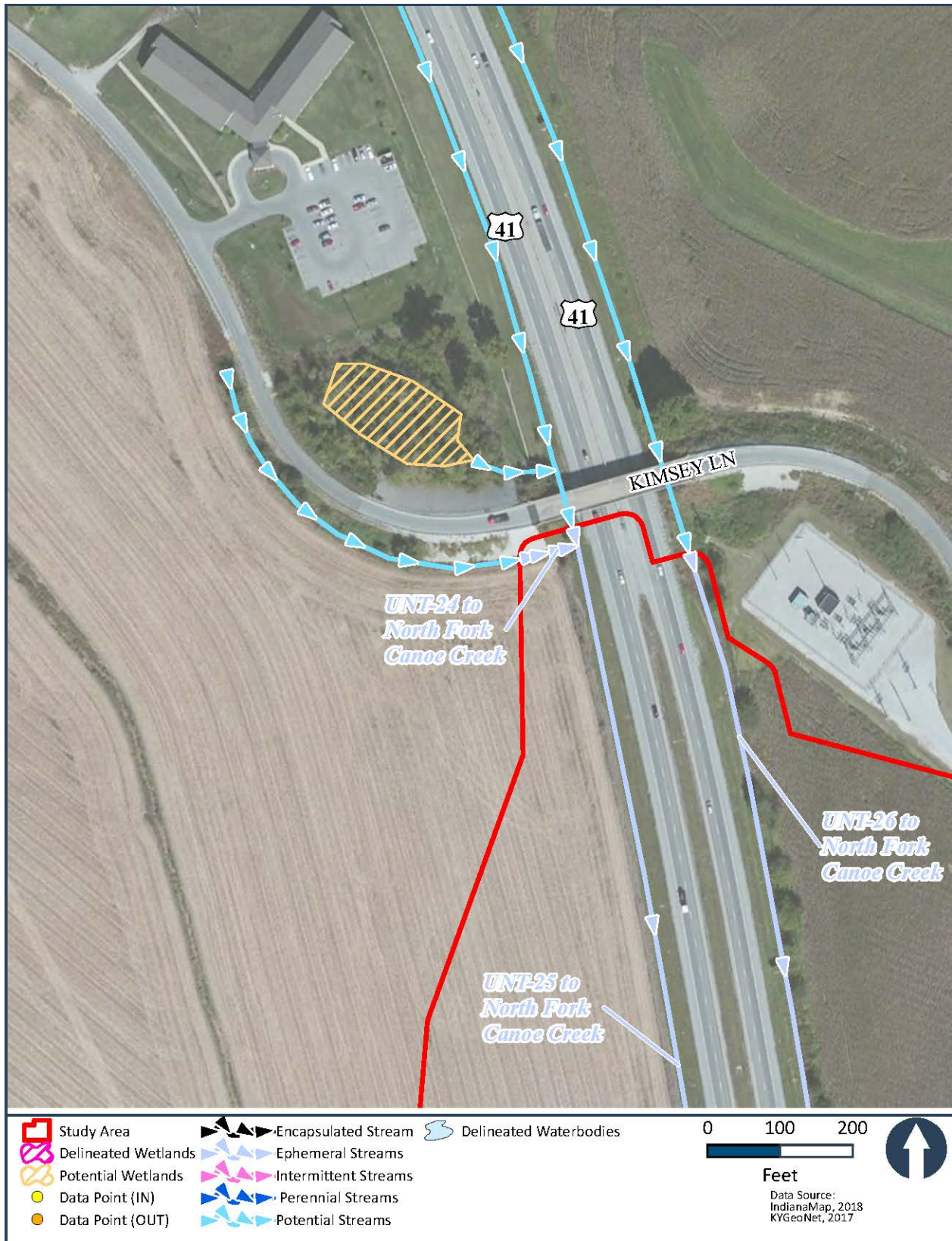


Figure 8. Field-Identified Resource Maps (41 of 57)

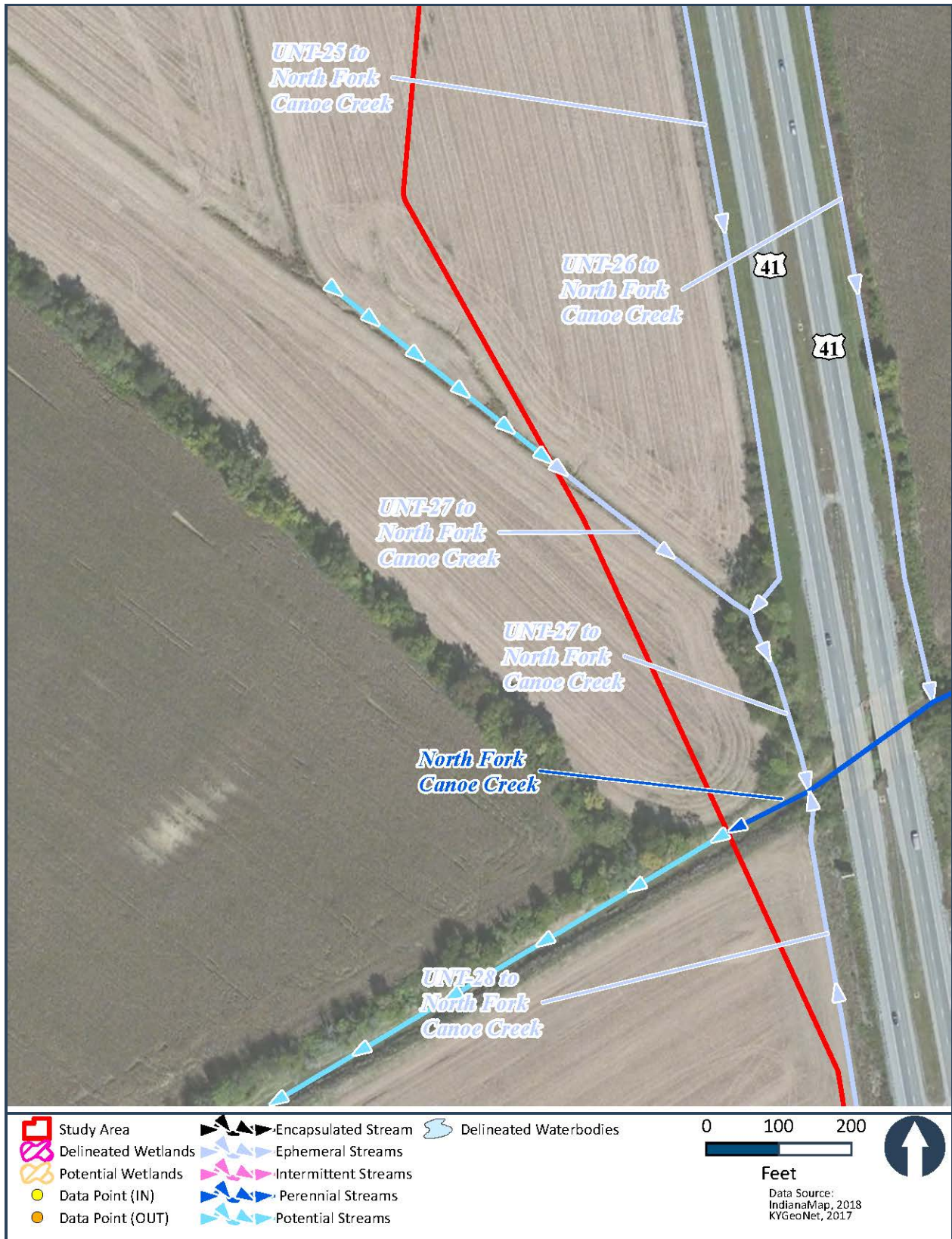


Figure 8. Field-Identified Resource Maps (42 of 57)

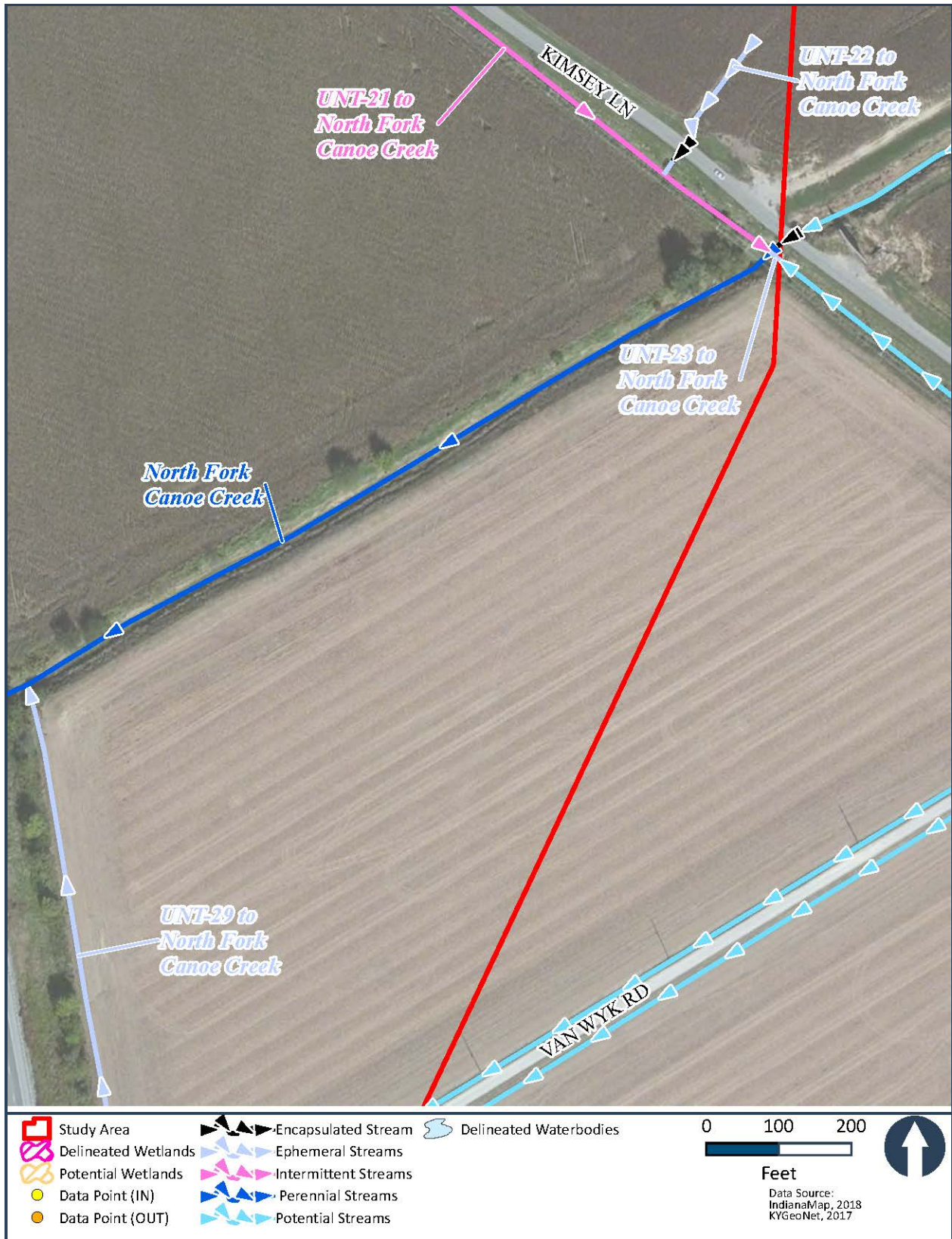


Figure 8. Field-Identified Resource Maps (43 of 57)

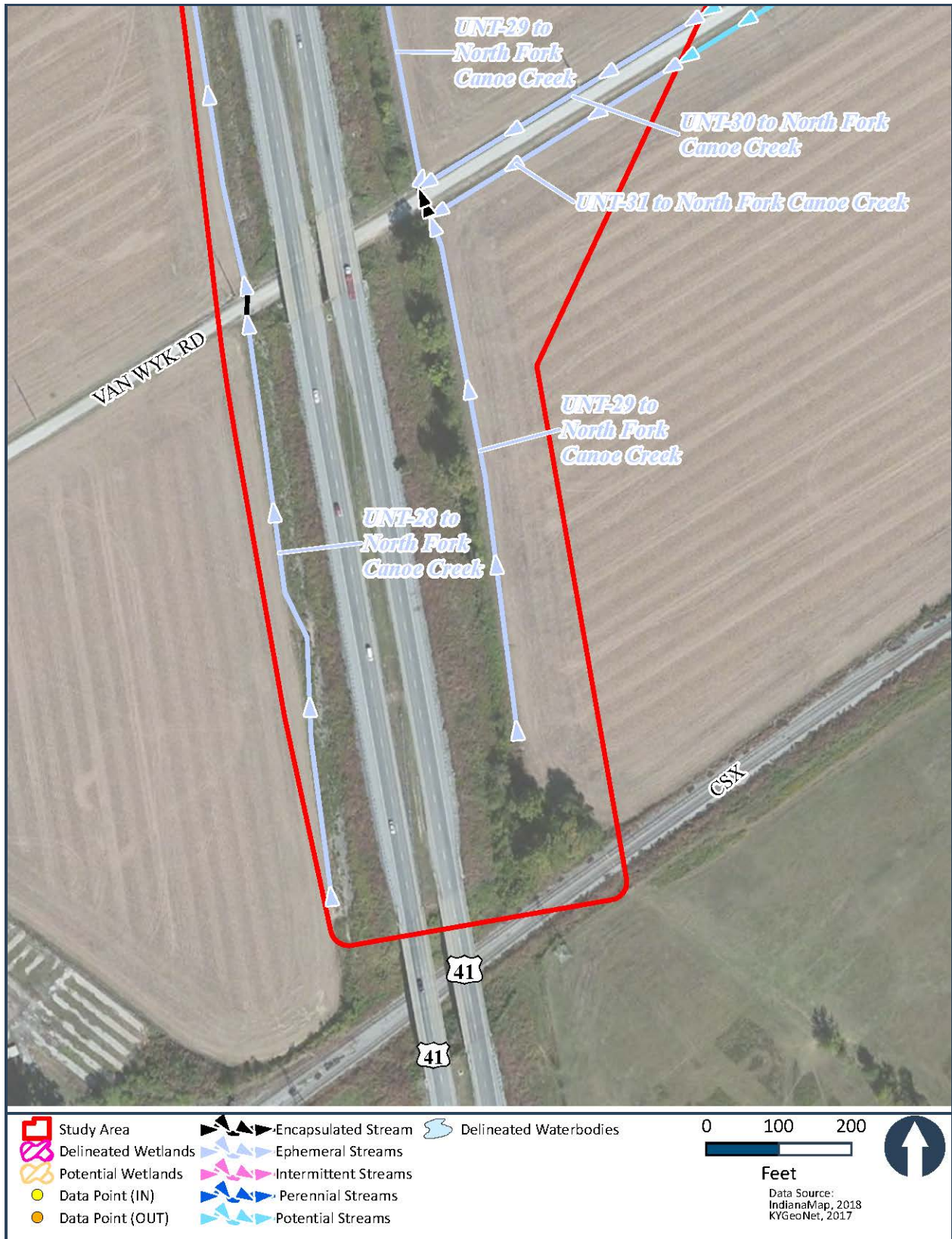


Figure 8. Field-Identified Resource Maps (44 of 57)



Figure 8. Field-Identified Resource Maps (45 of 57)

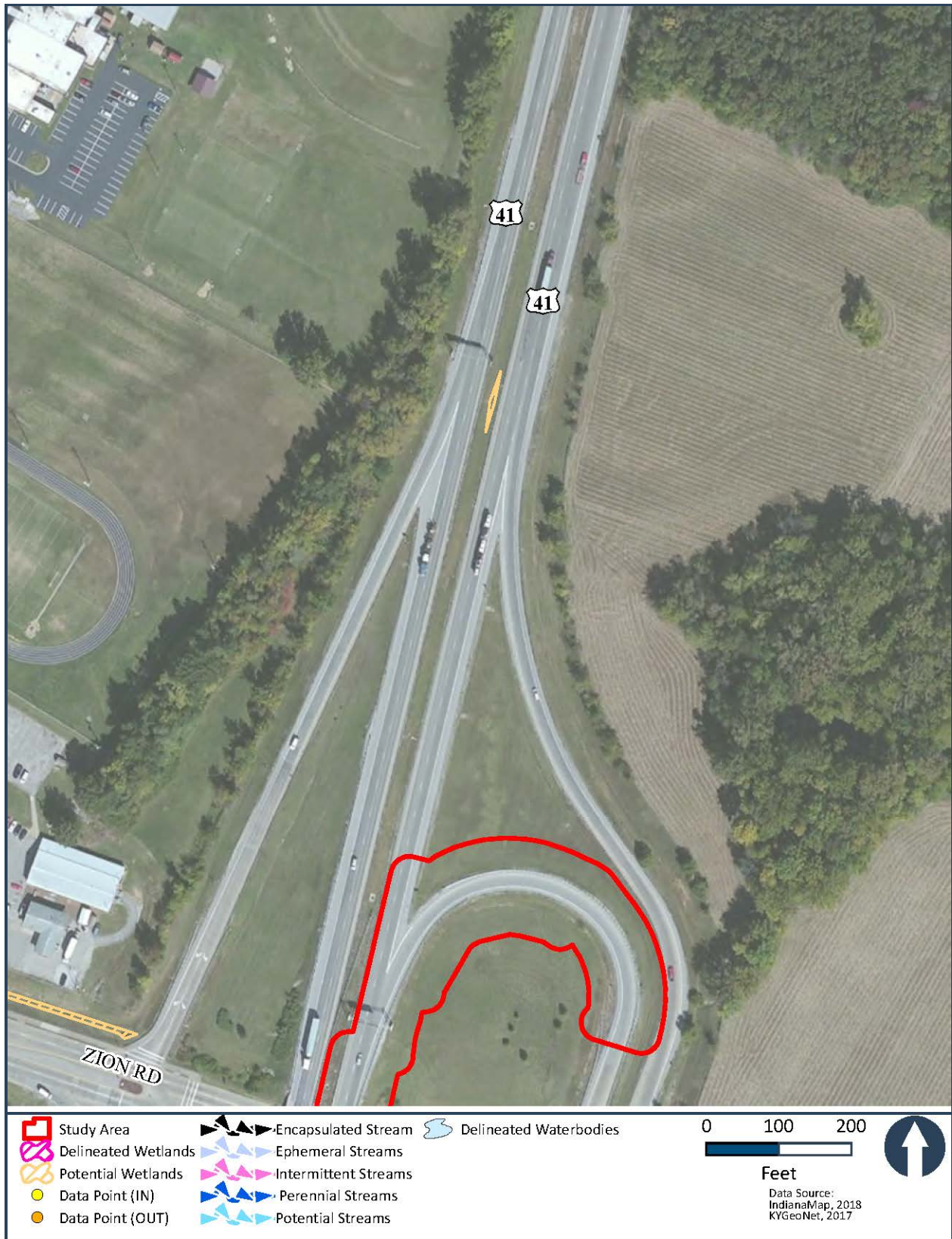


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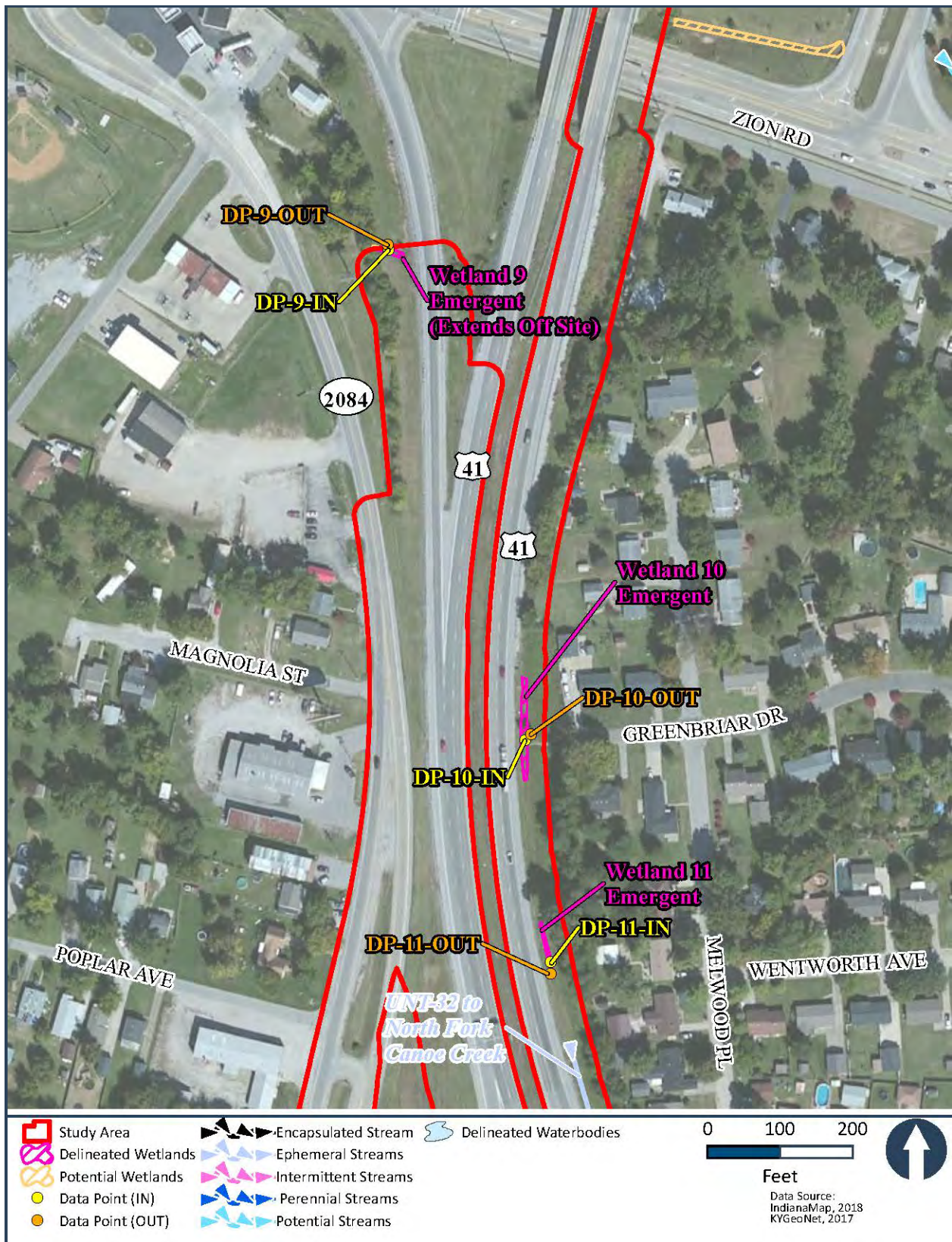


Figure 8. Field-Identified Resource Maps (47 of 57)

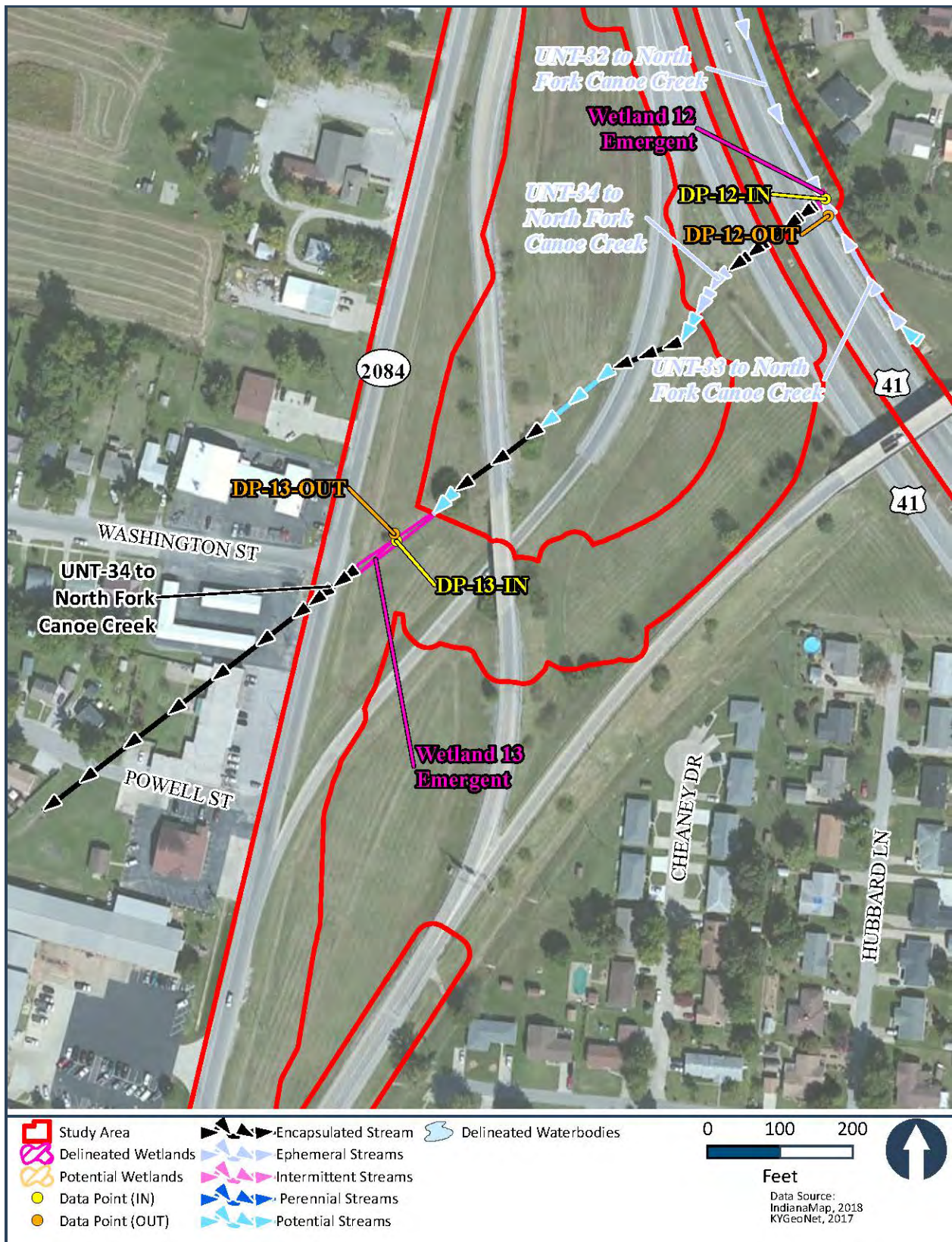


Figure 8. Field-Identified Resource Maps (48 of 57)

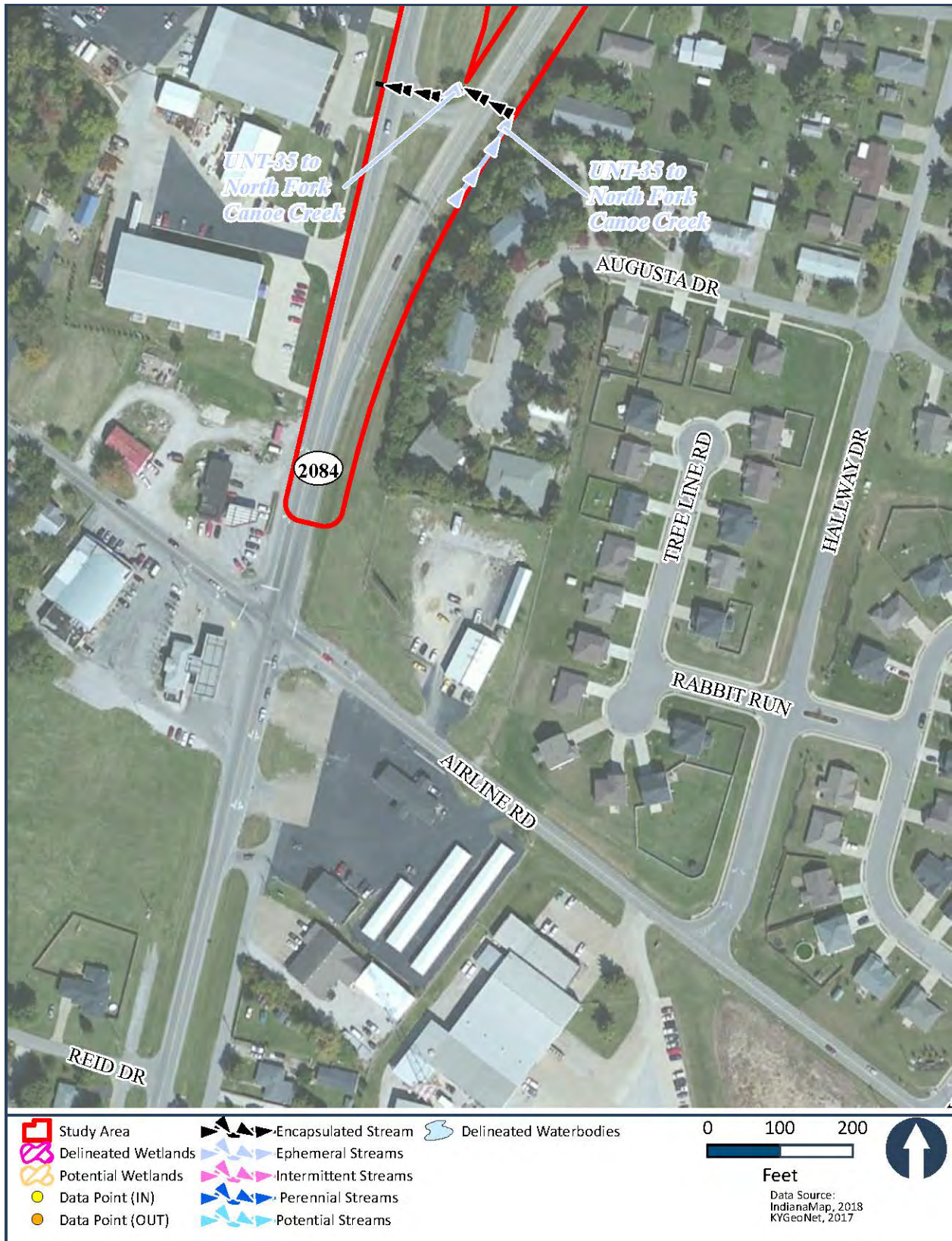


Figure 8. Field-Identified Resource Maps (49 of 57)



Figure 8. Field-Identified Resource Maps (50 of 57)



Figure 8. Field-Identified Resource Maps (51 of 57)

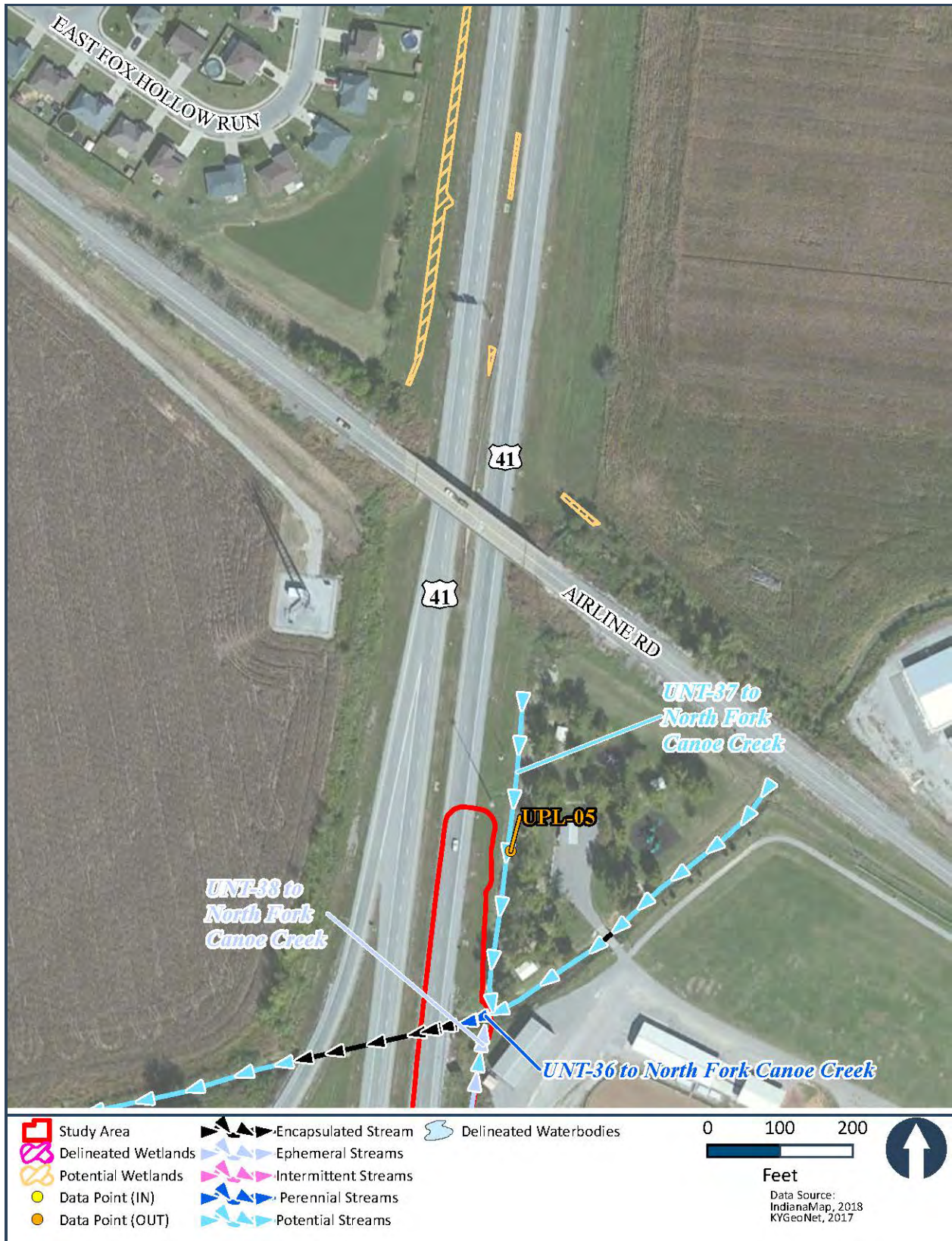


Figure 8. Field-Identified Resource Maps (52 of 57)



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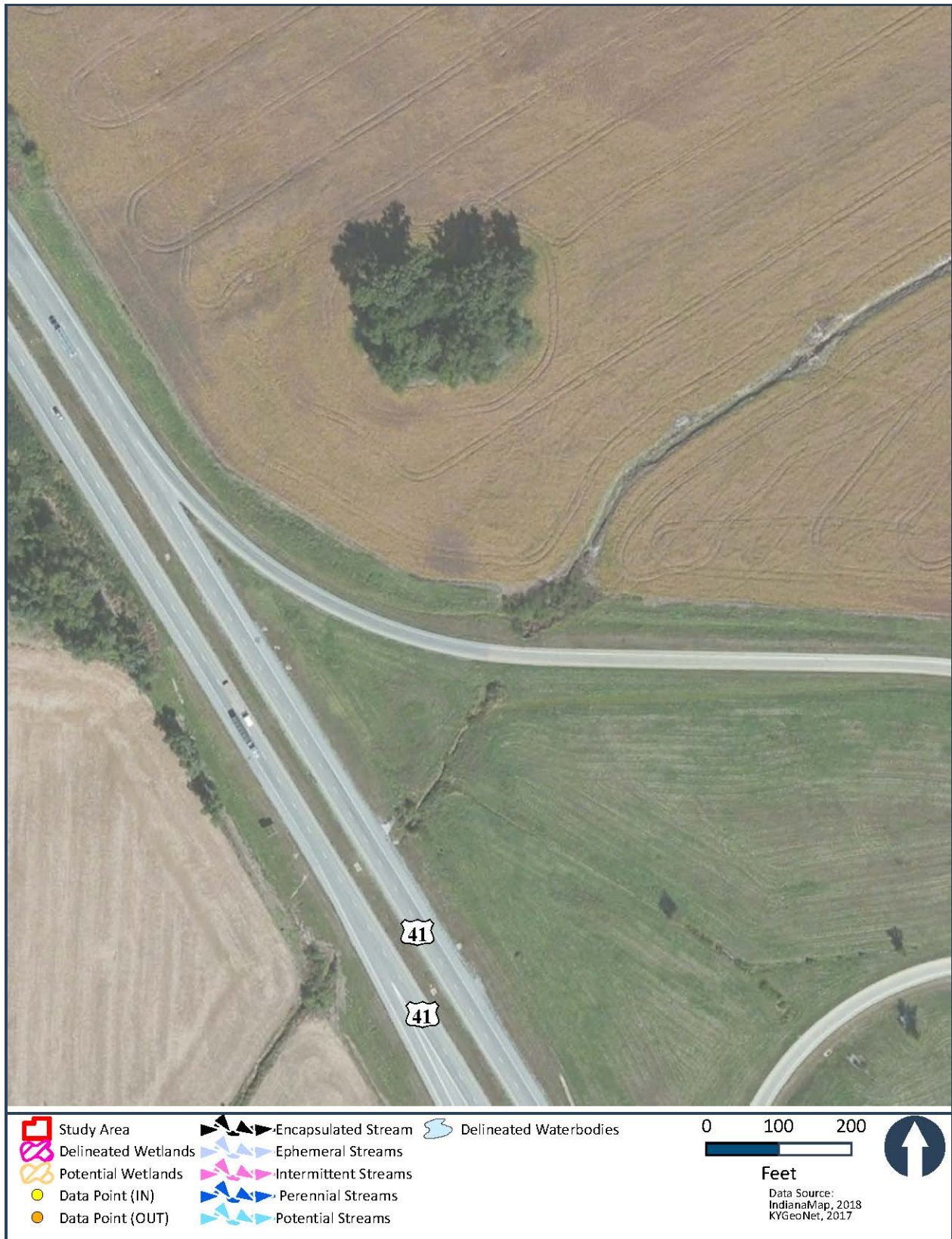


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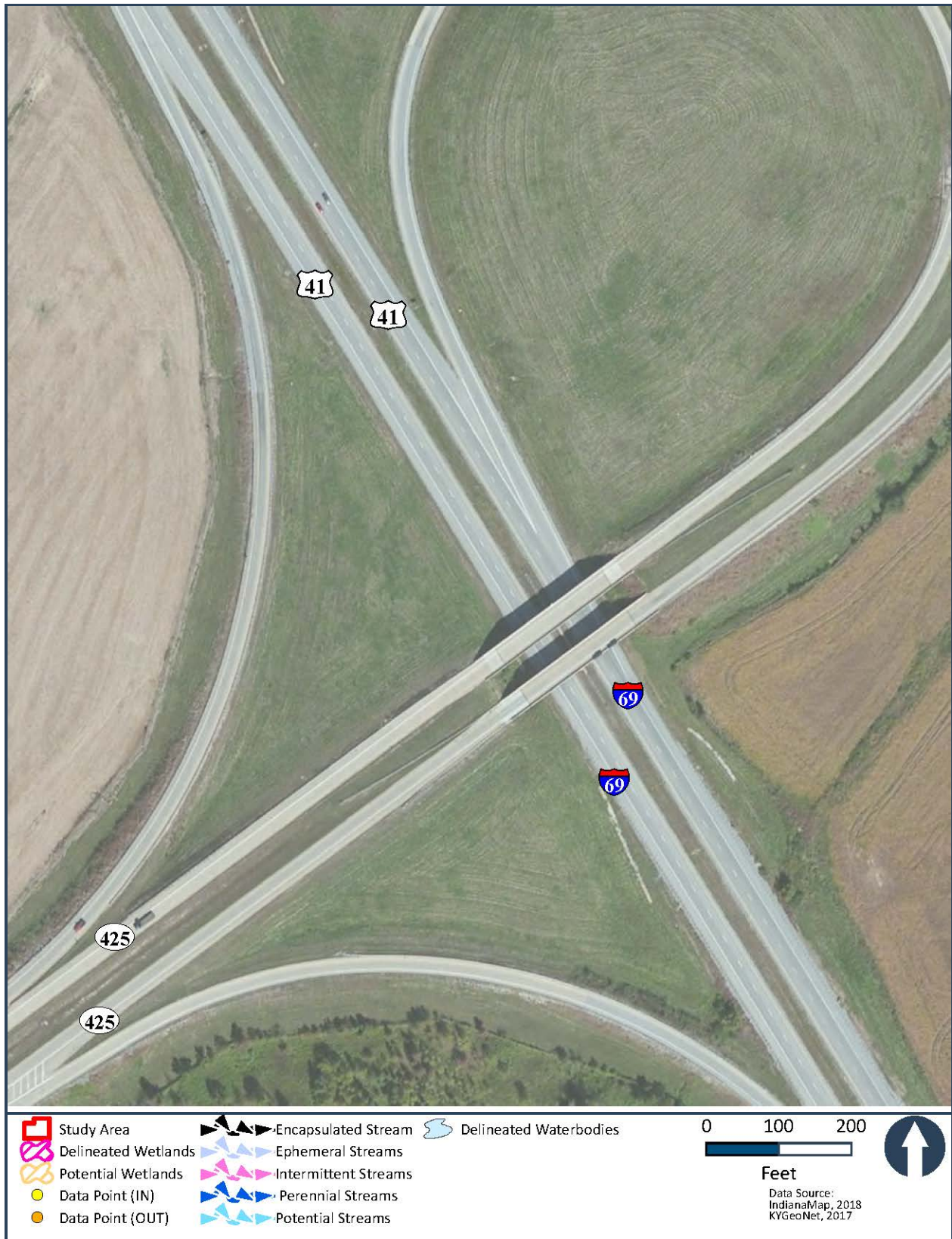


Figure 8. Field-Identified Resource Maps (57 of 57)



Figure 9. Photo Orientation Maps (1 of 57)



Figure 9. Photo Orientation Maps (2 of 57)

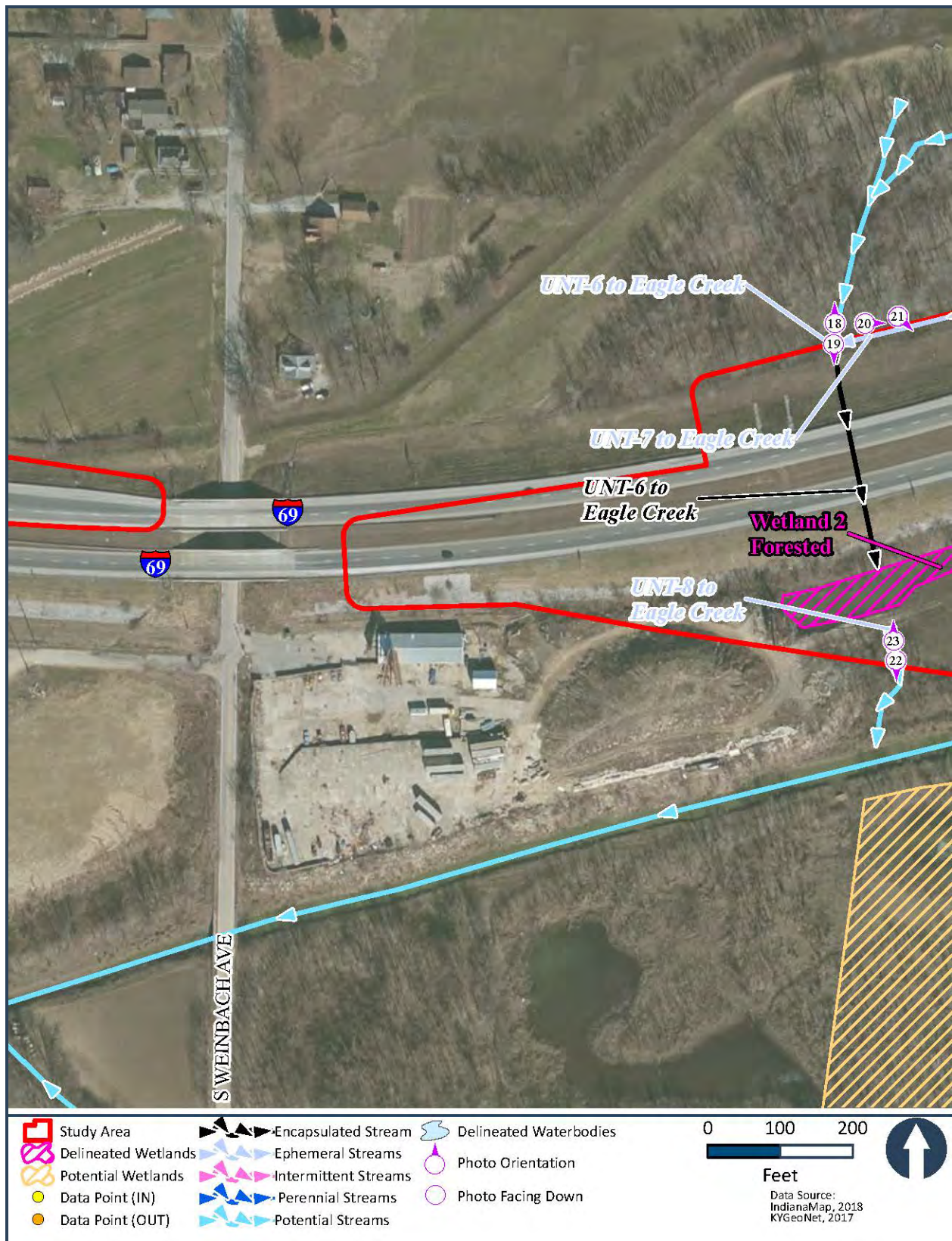


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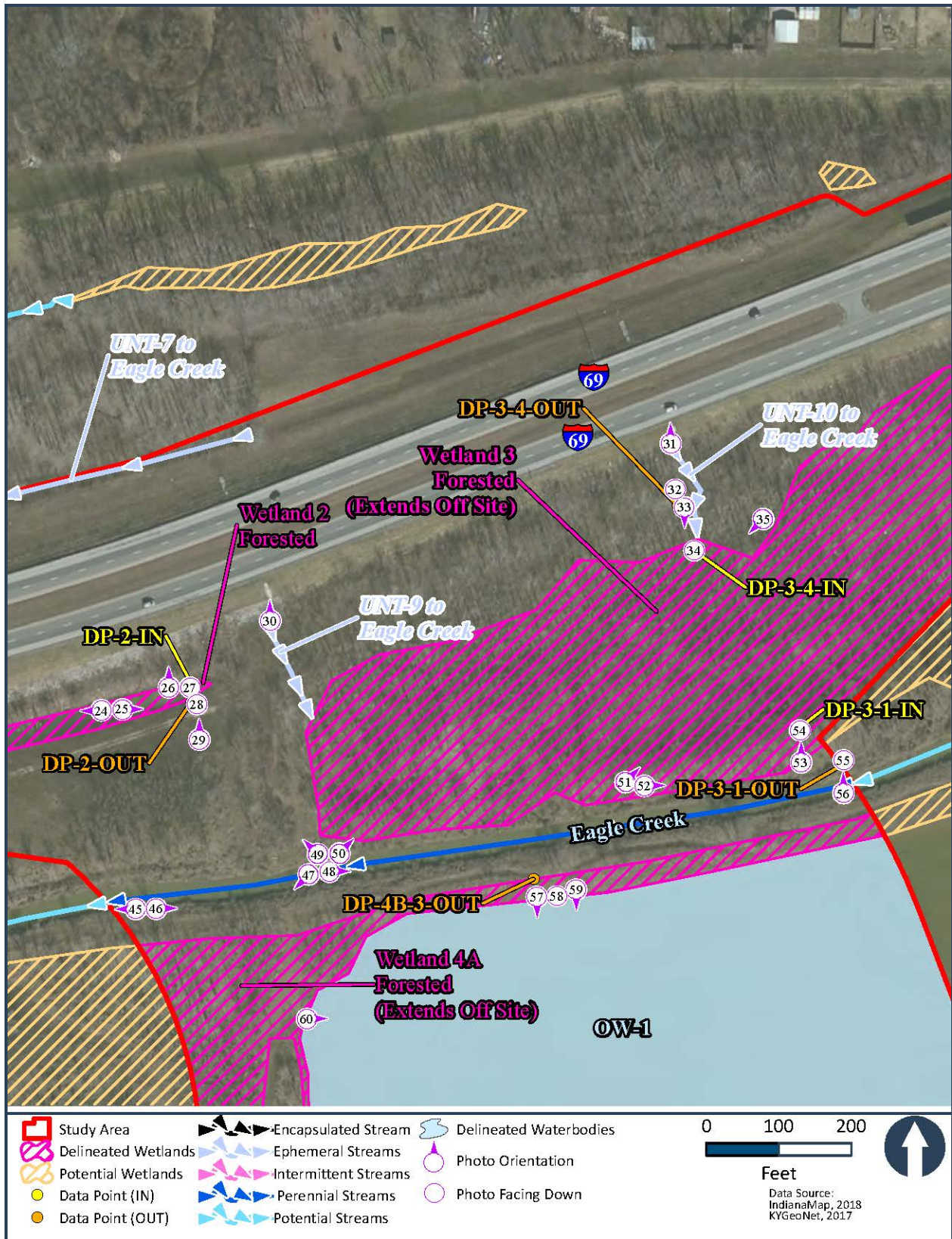


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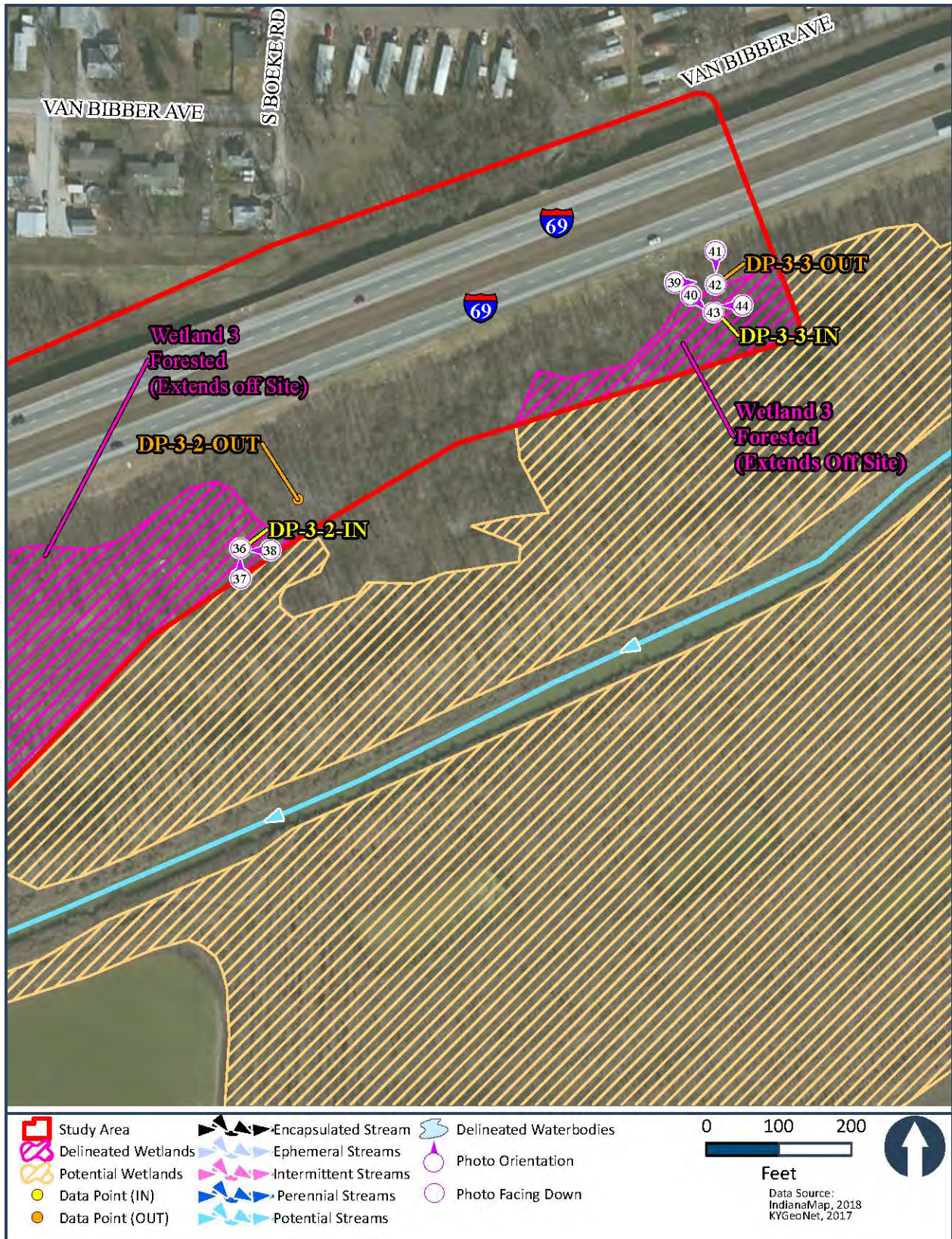


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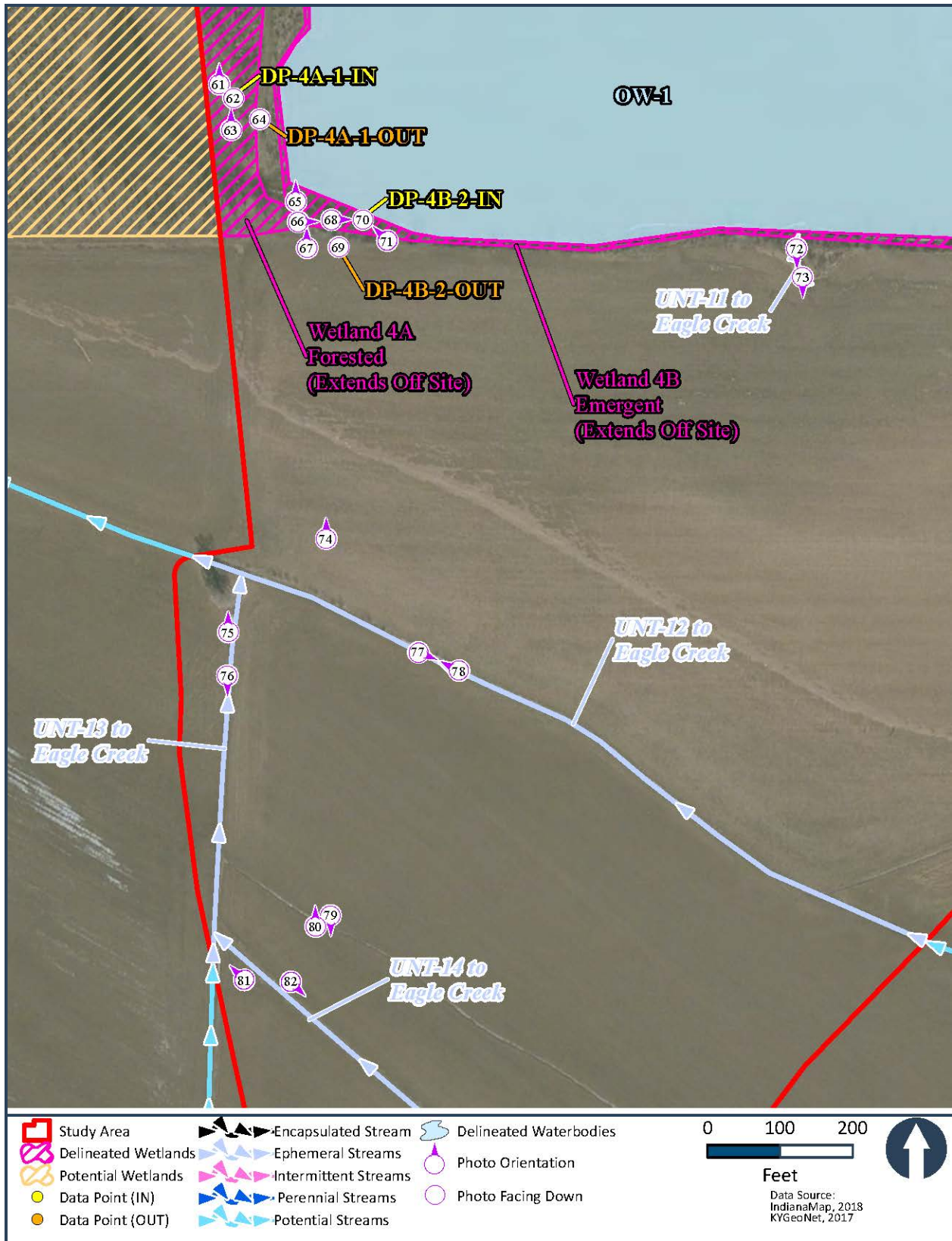


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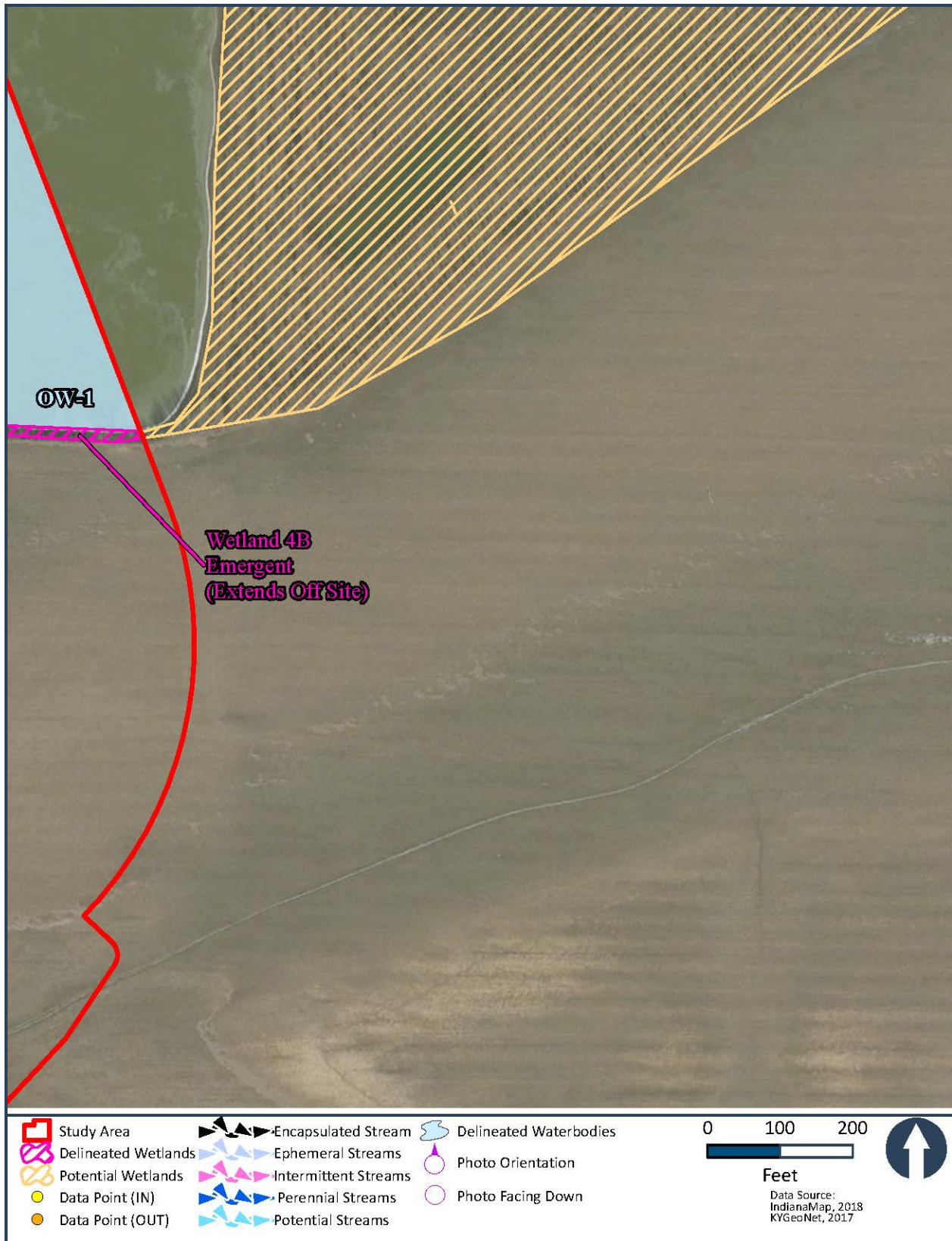


Figure 9. Photo Orientation Maps (7 of 57)

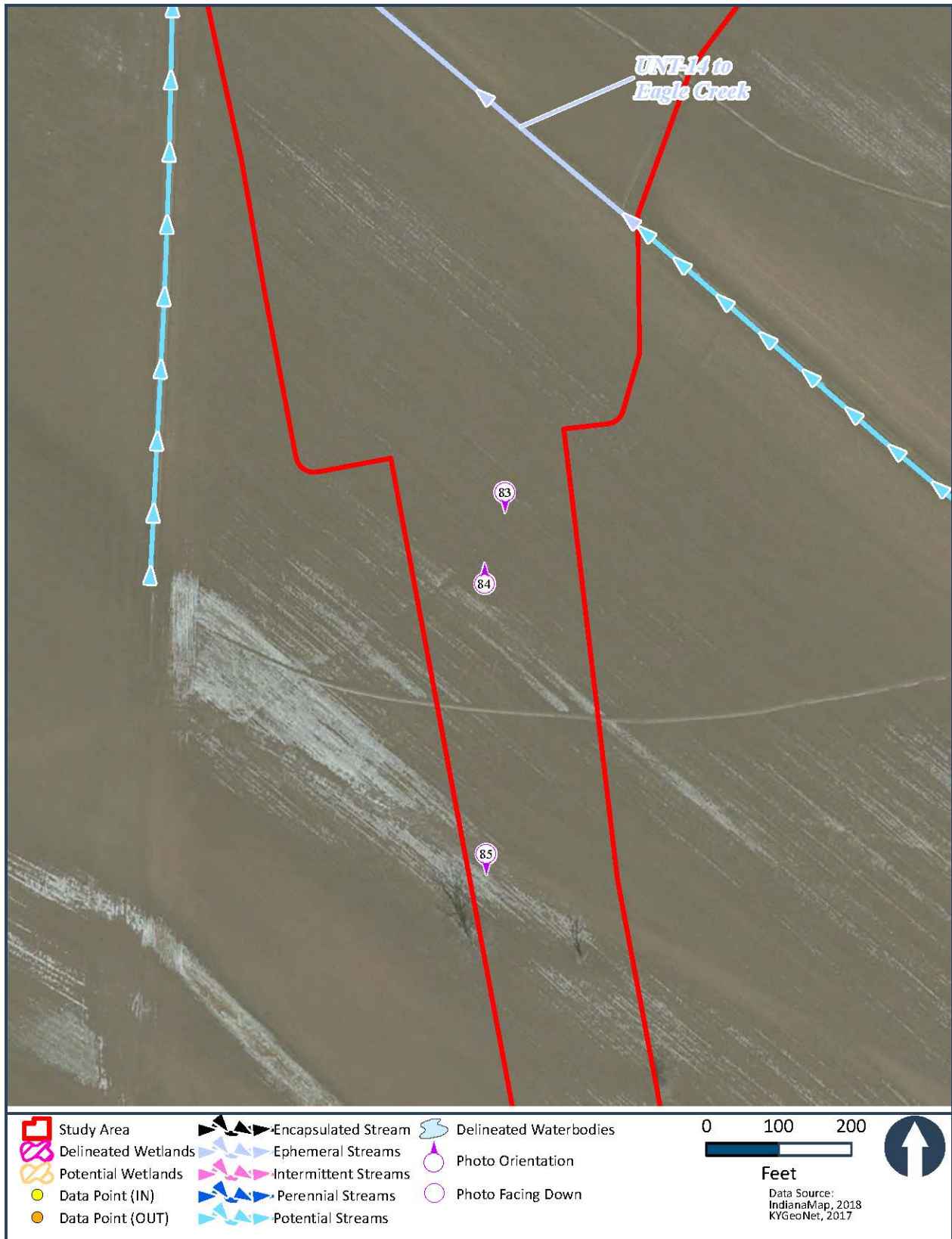


Figure 9. Photo Orientation Maps (8 of 57)



Figure 9. Photo Orientation Maps (9 of 57)

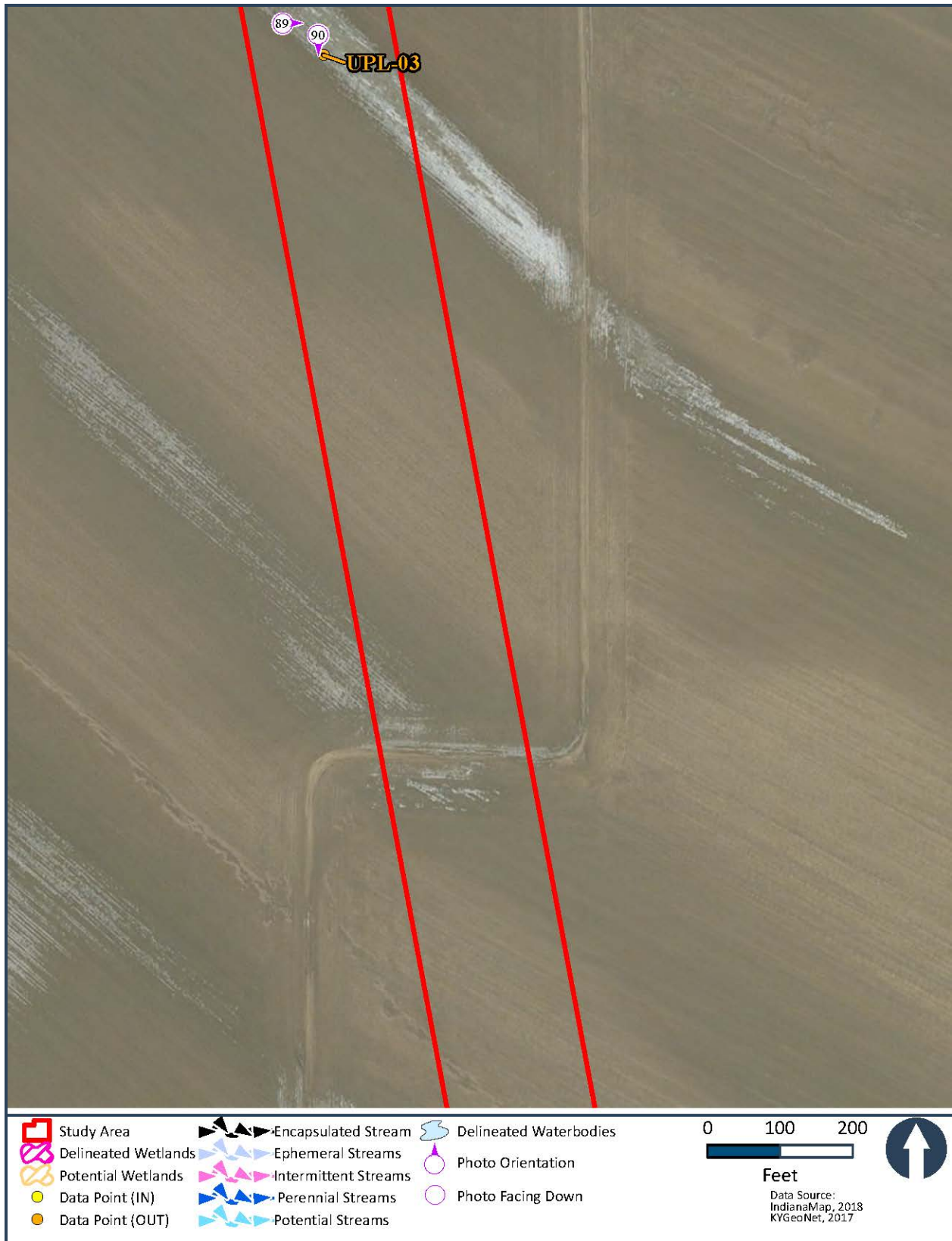


Figure 9. Photo Orientation Maps (10 of 57)

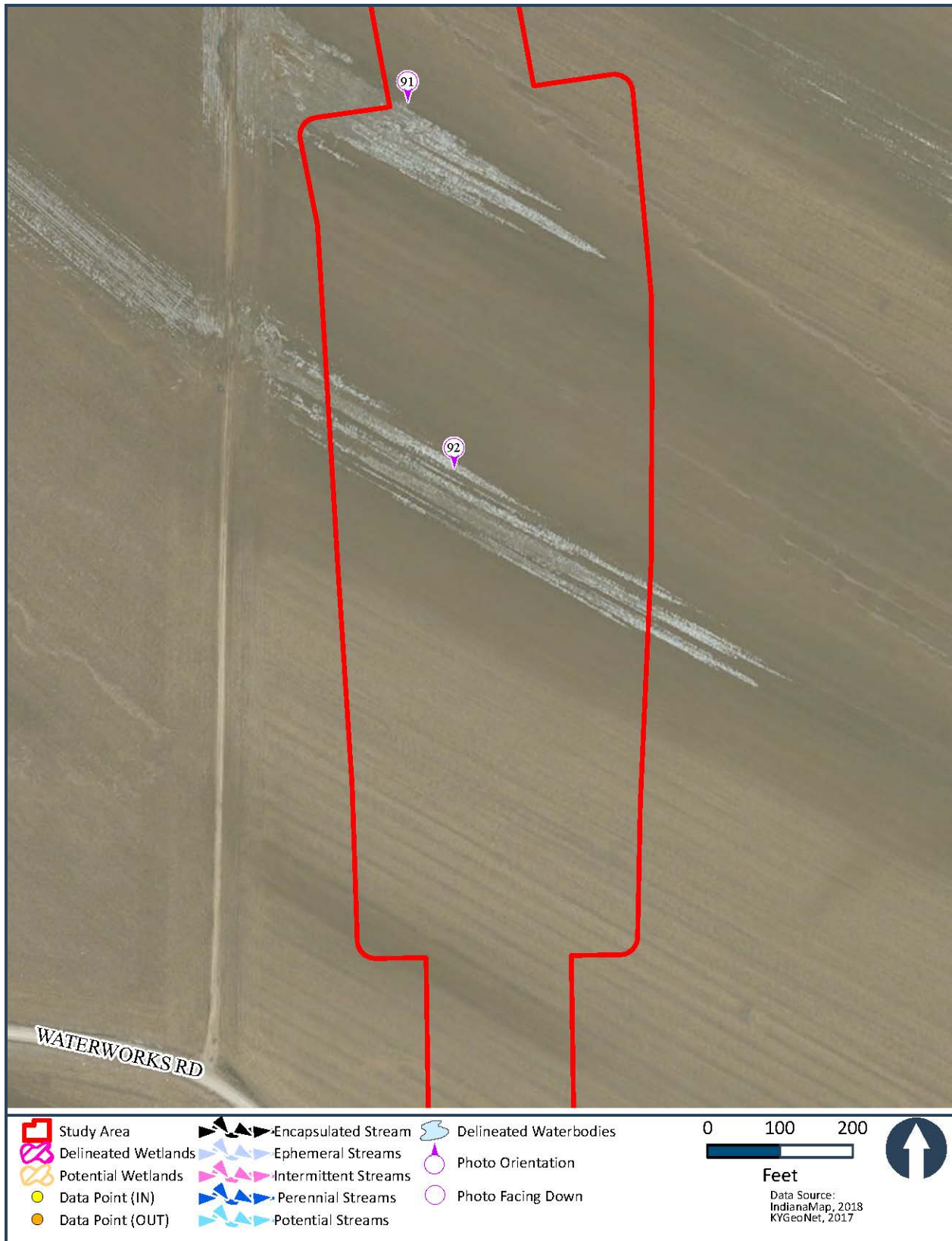


Figure 9. Photo Orientation Maps (11 of 57)

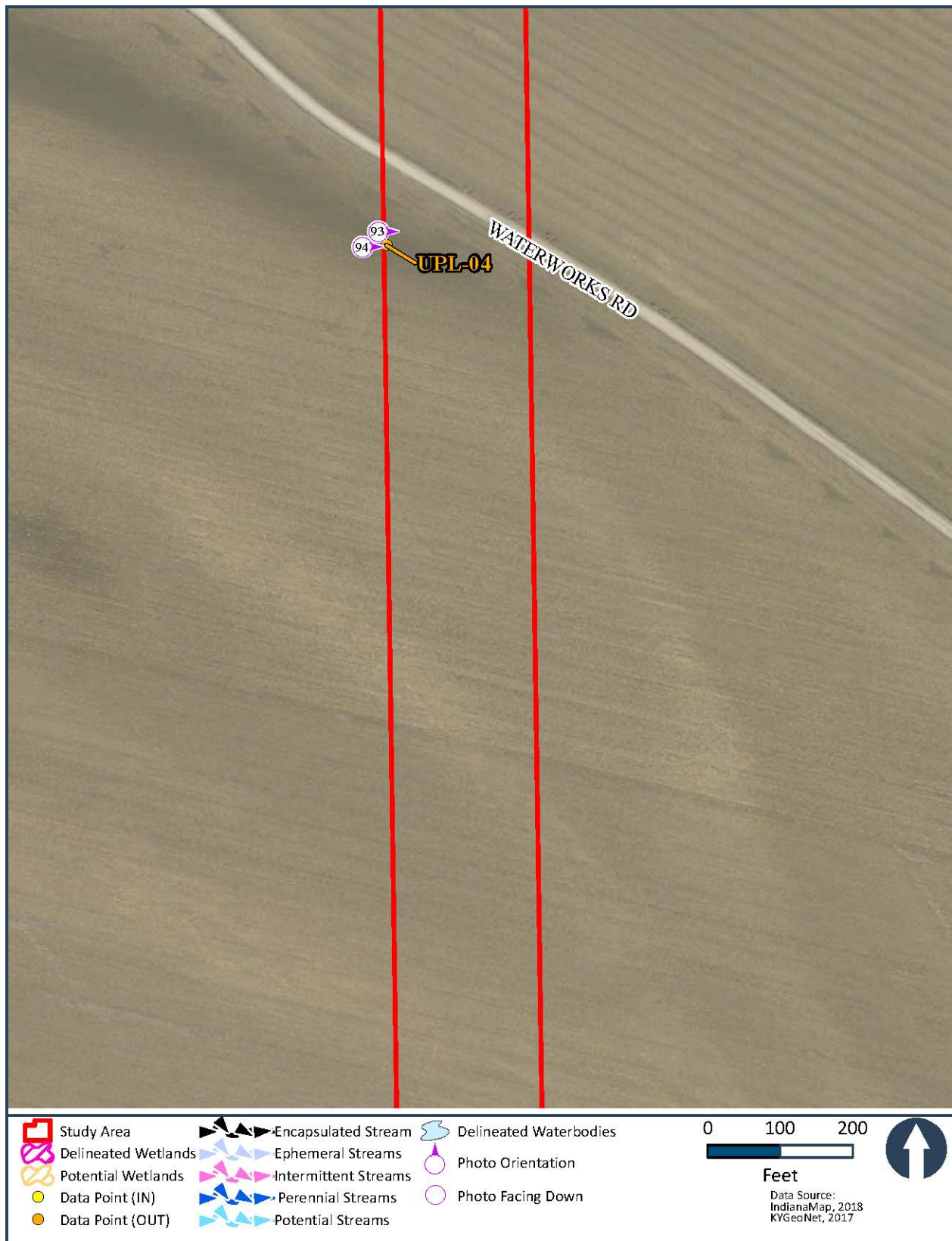


Figure 9. Photo Orientation Maps (12 of 57)

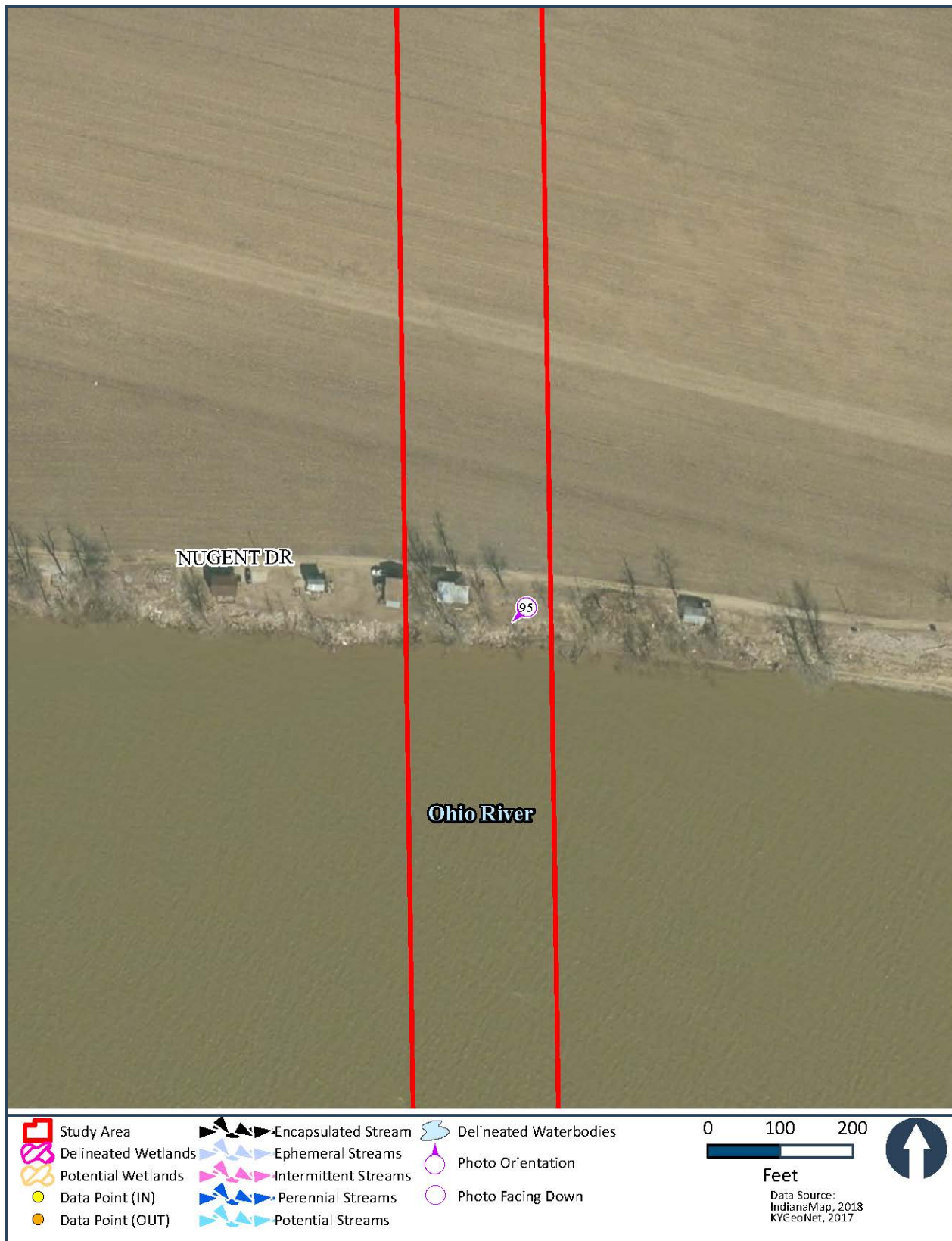


Figure 9. Photo Orientation Maps (13 of 57)

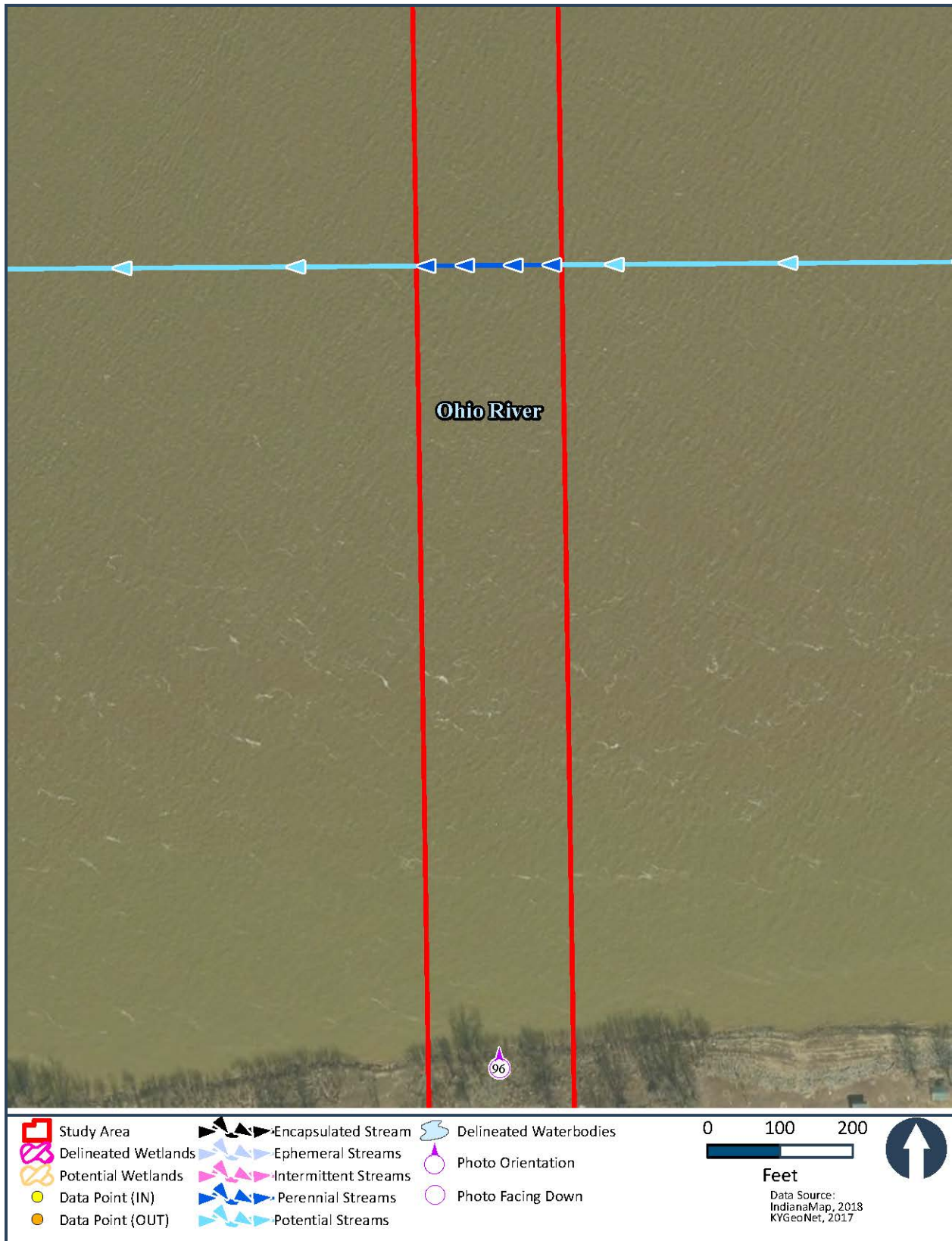


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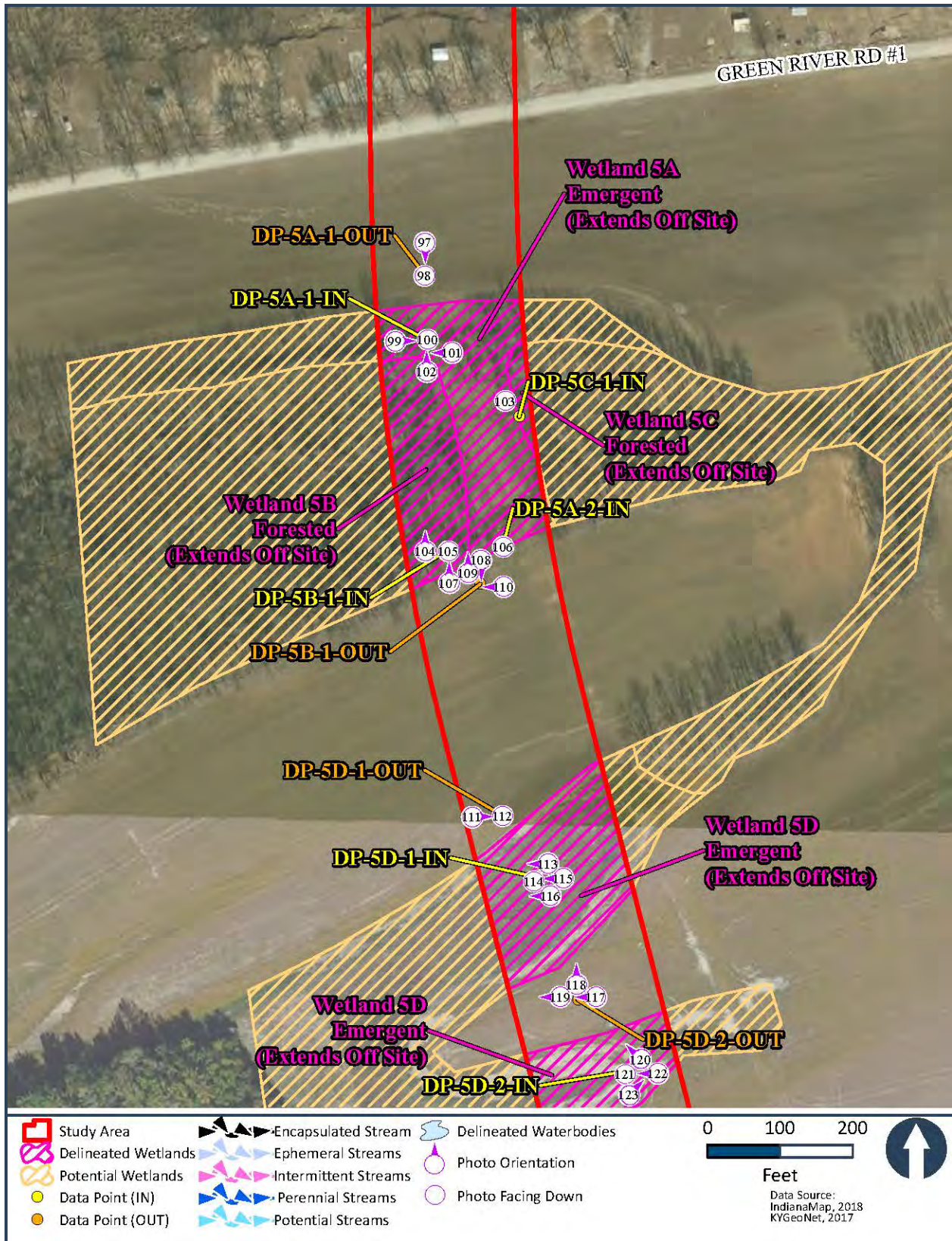


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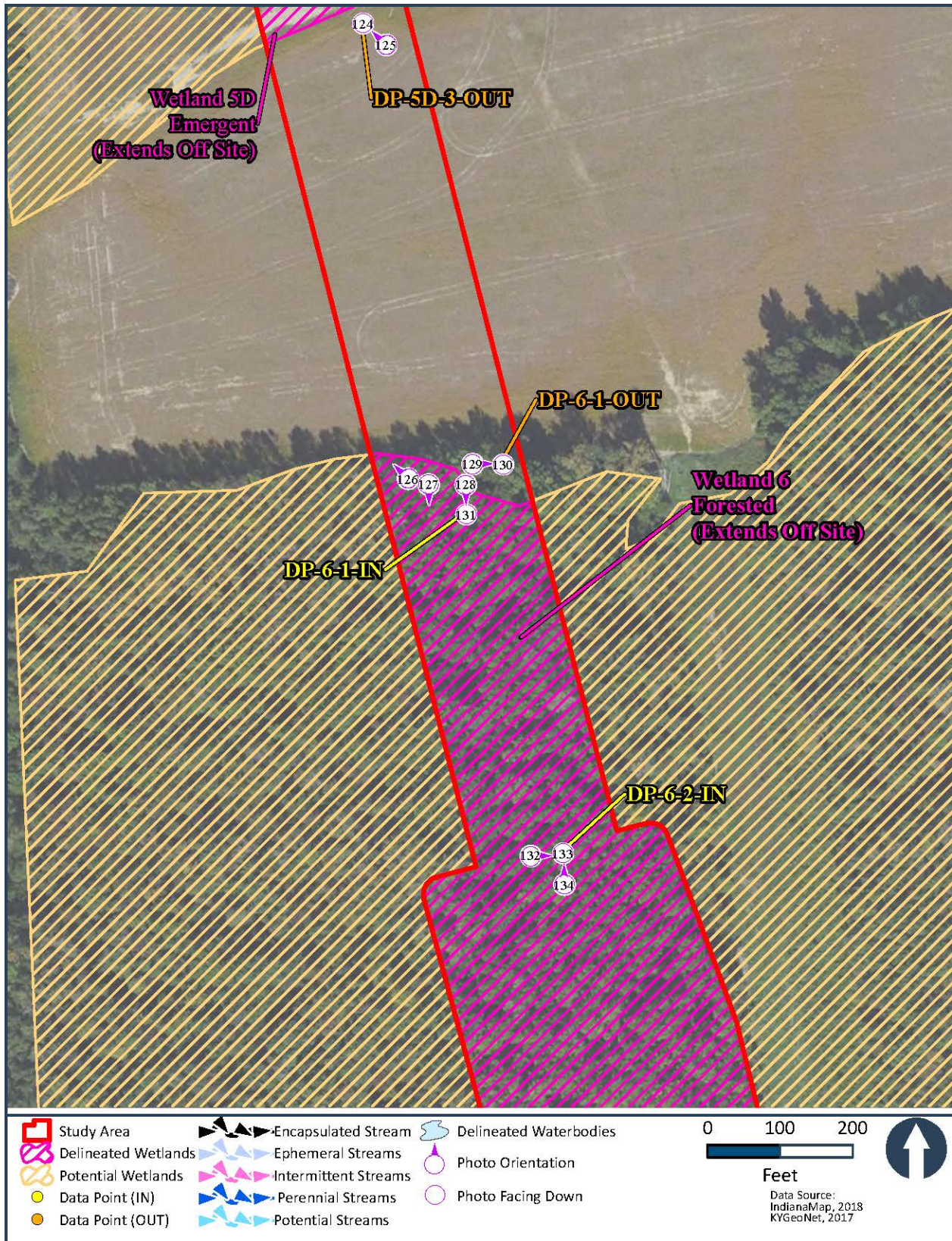


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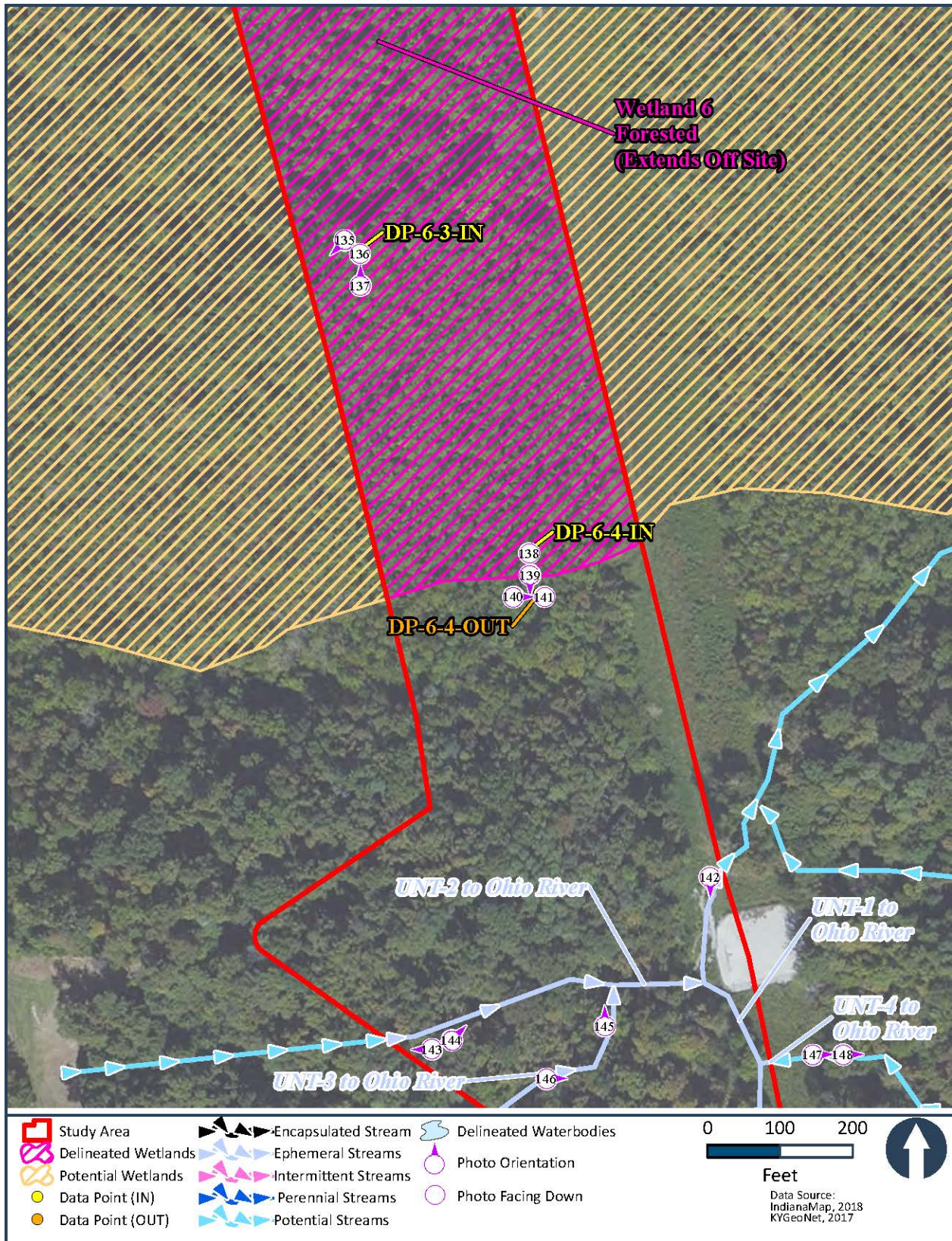


Figure 9. Photo Orientation Maps (17 of 57)

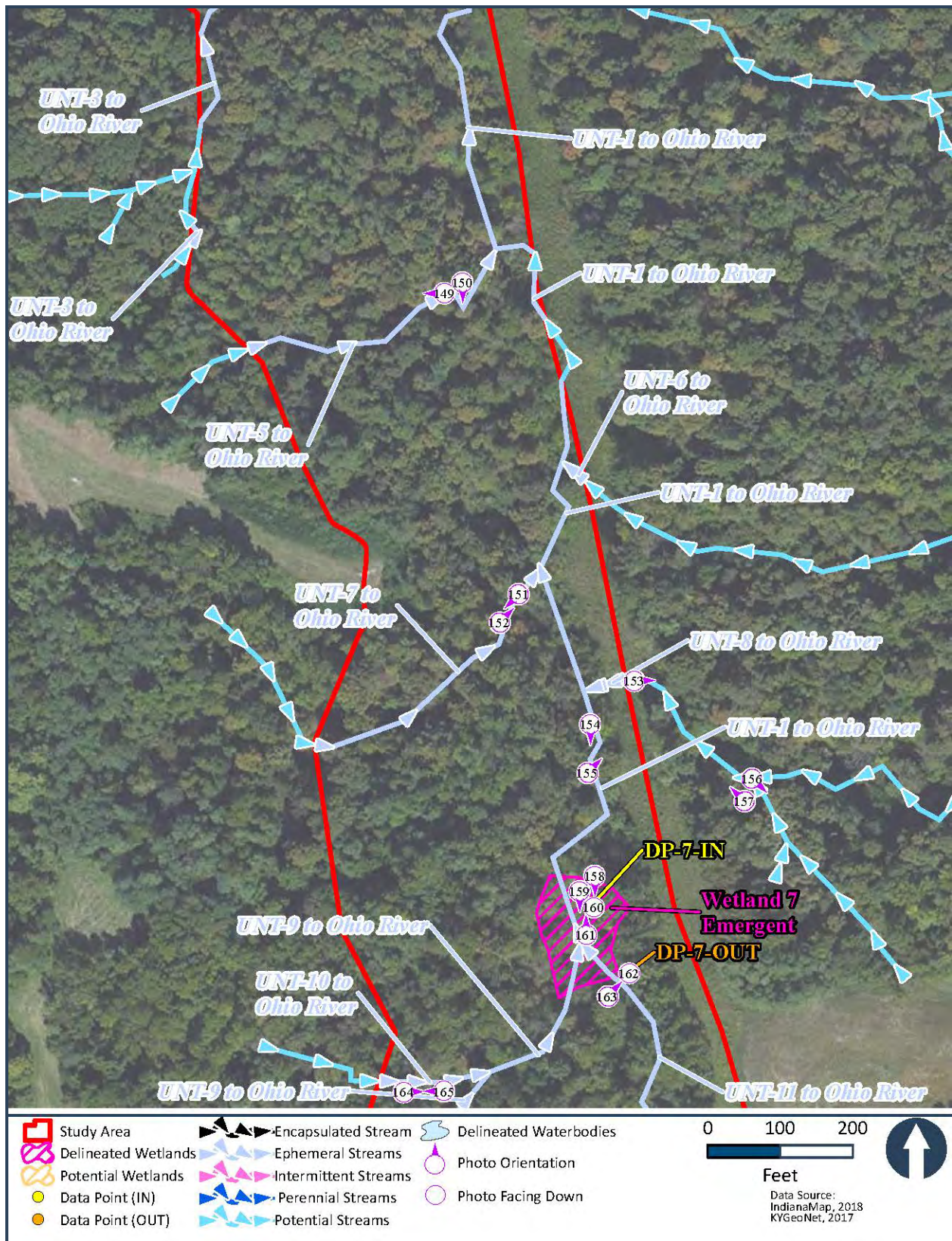


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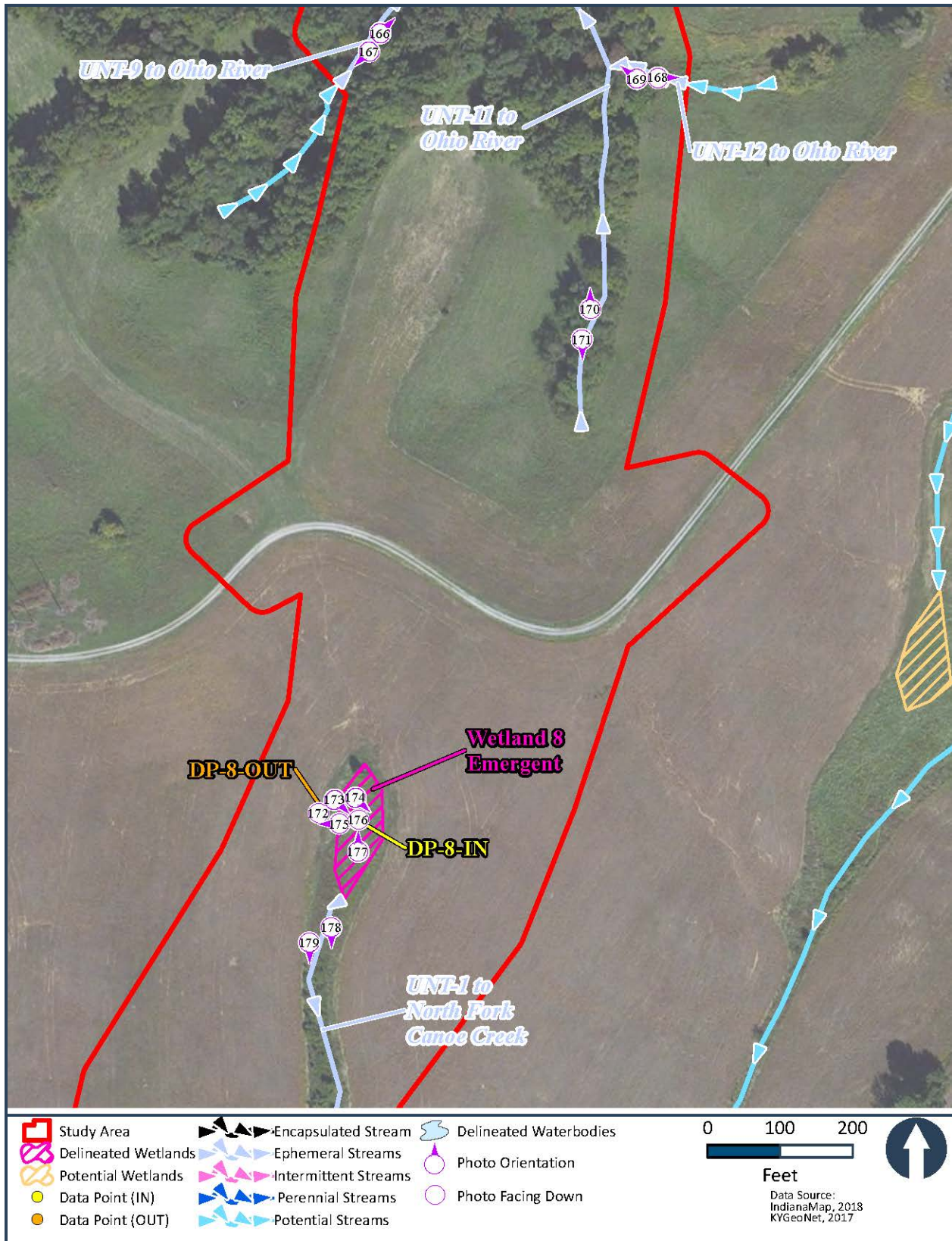


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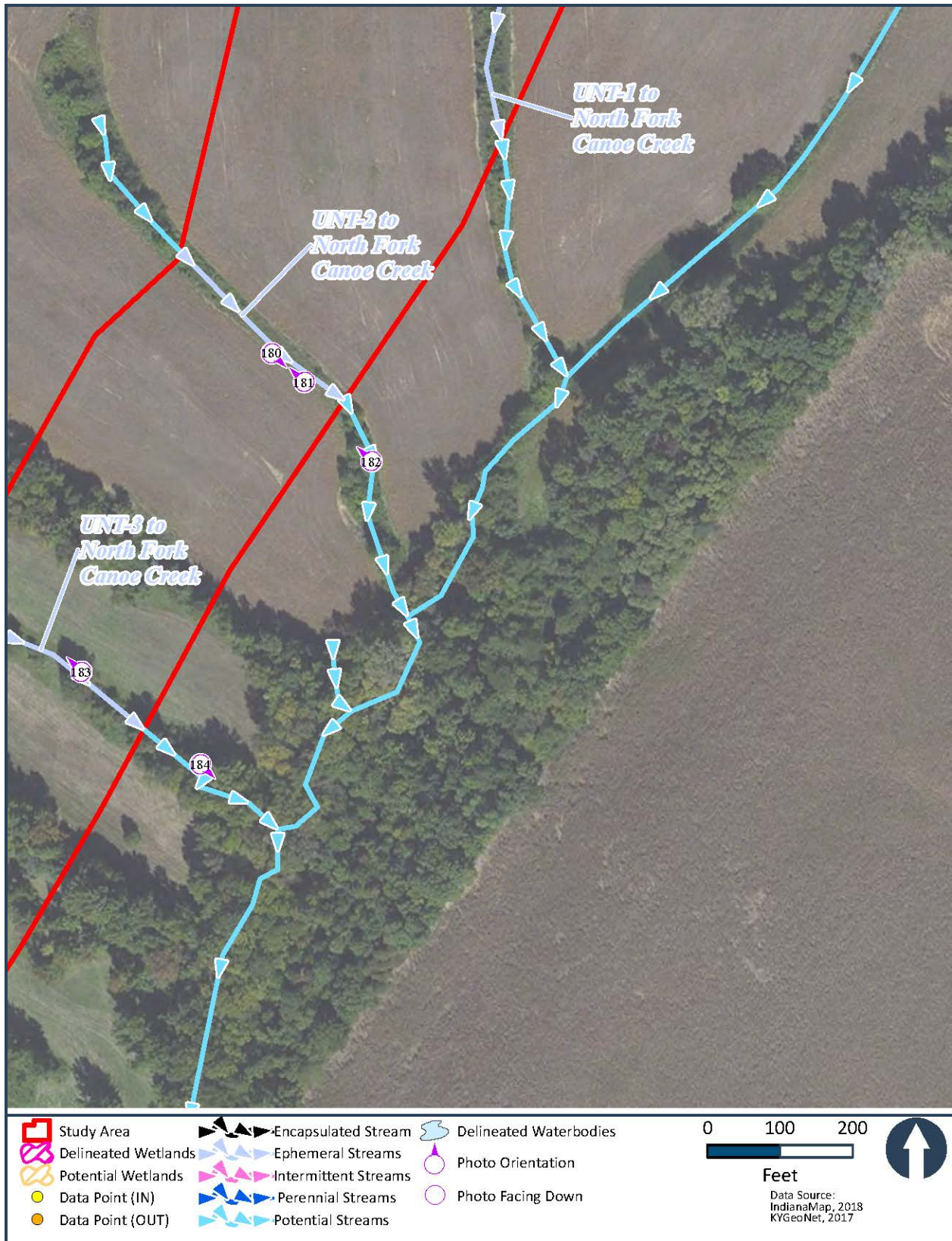


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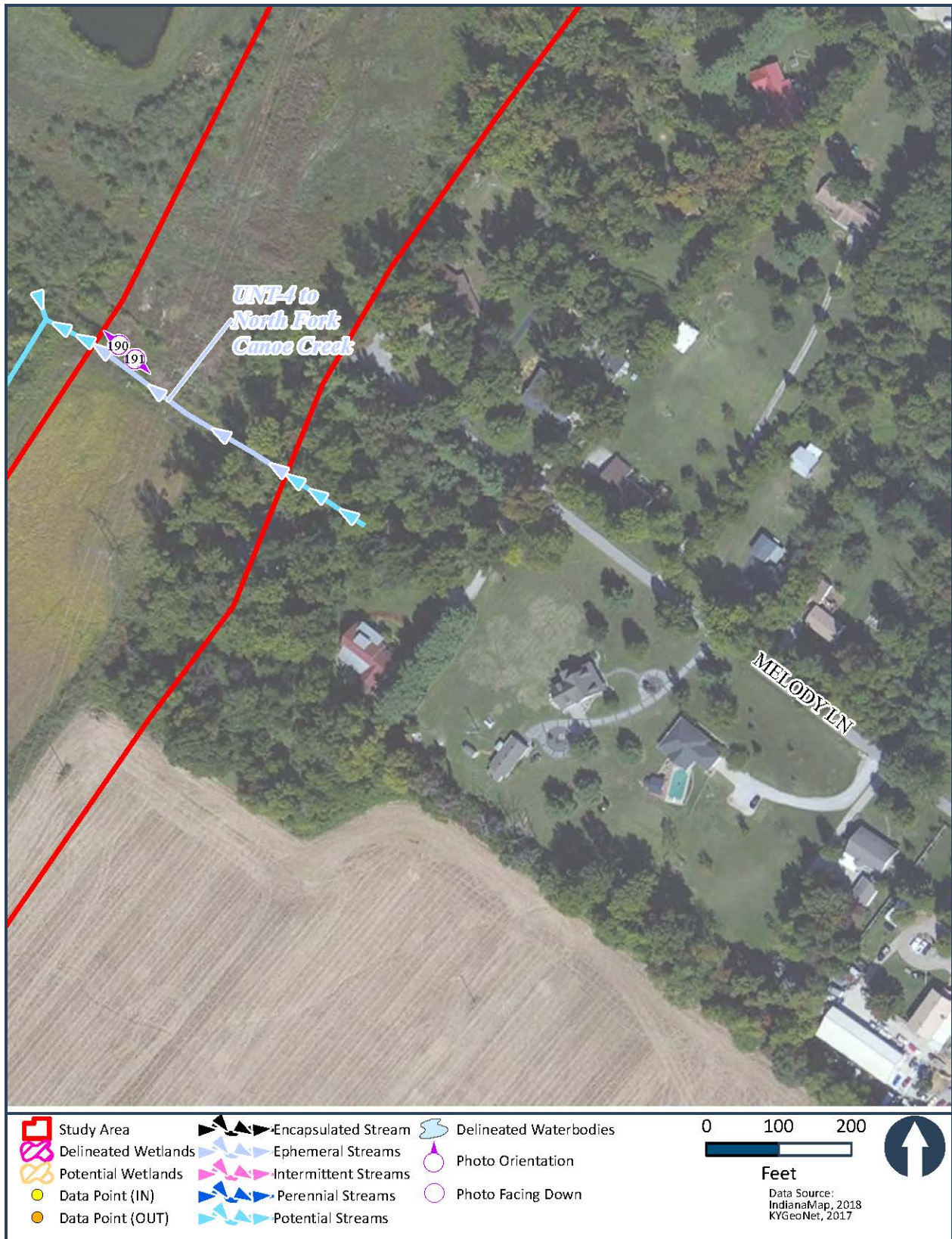


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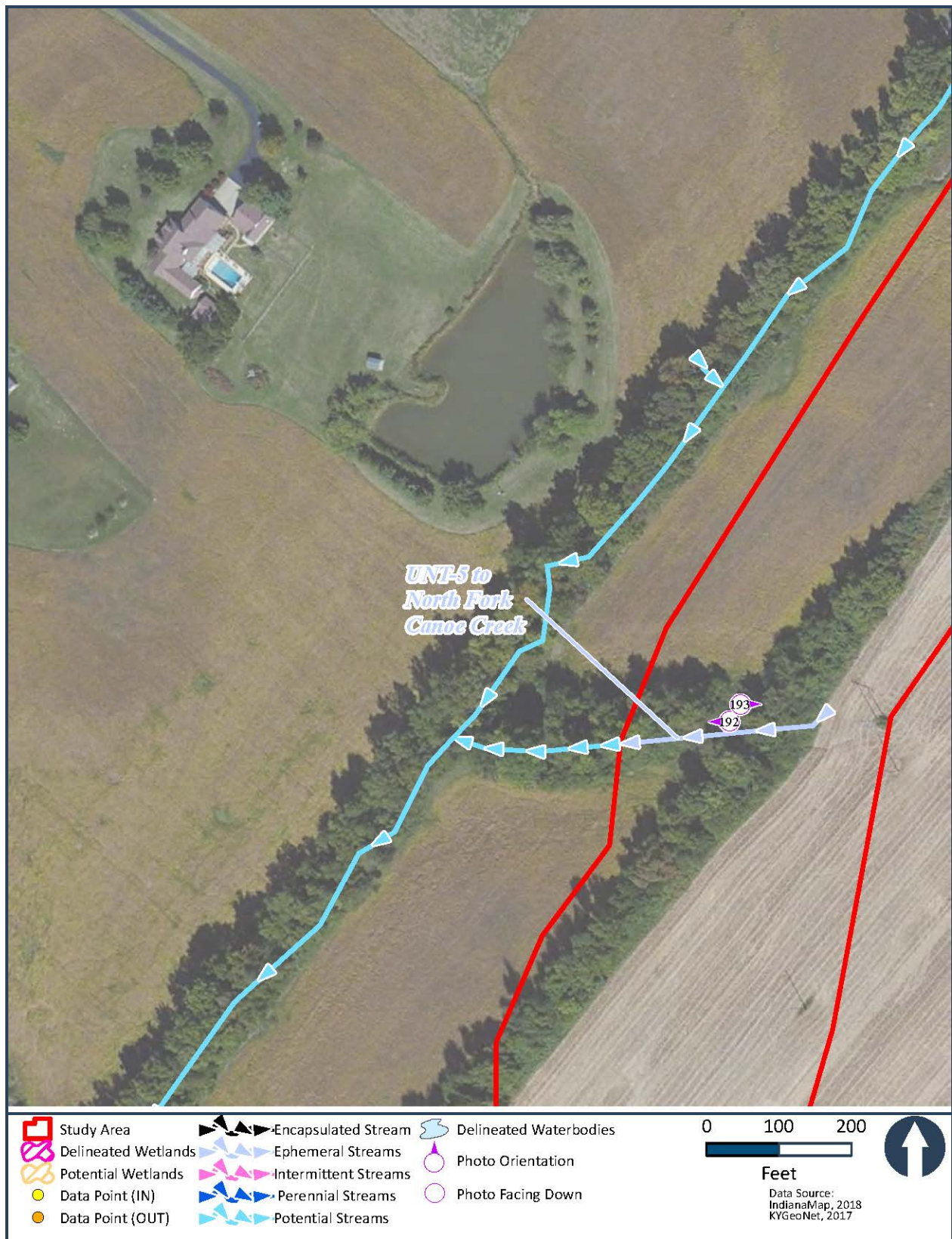


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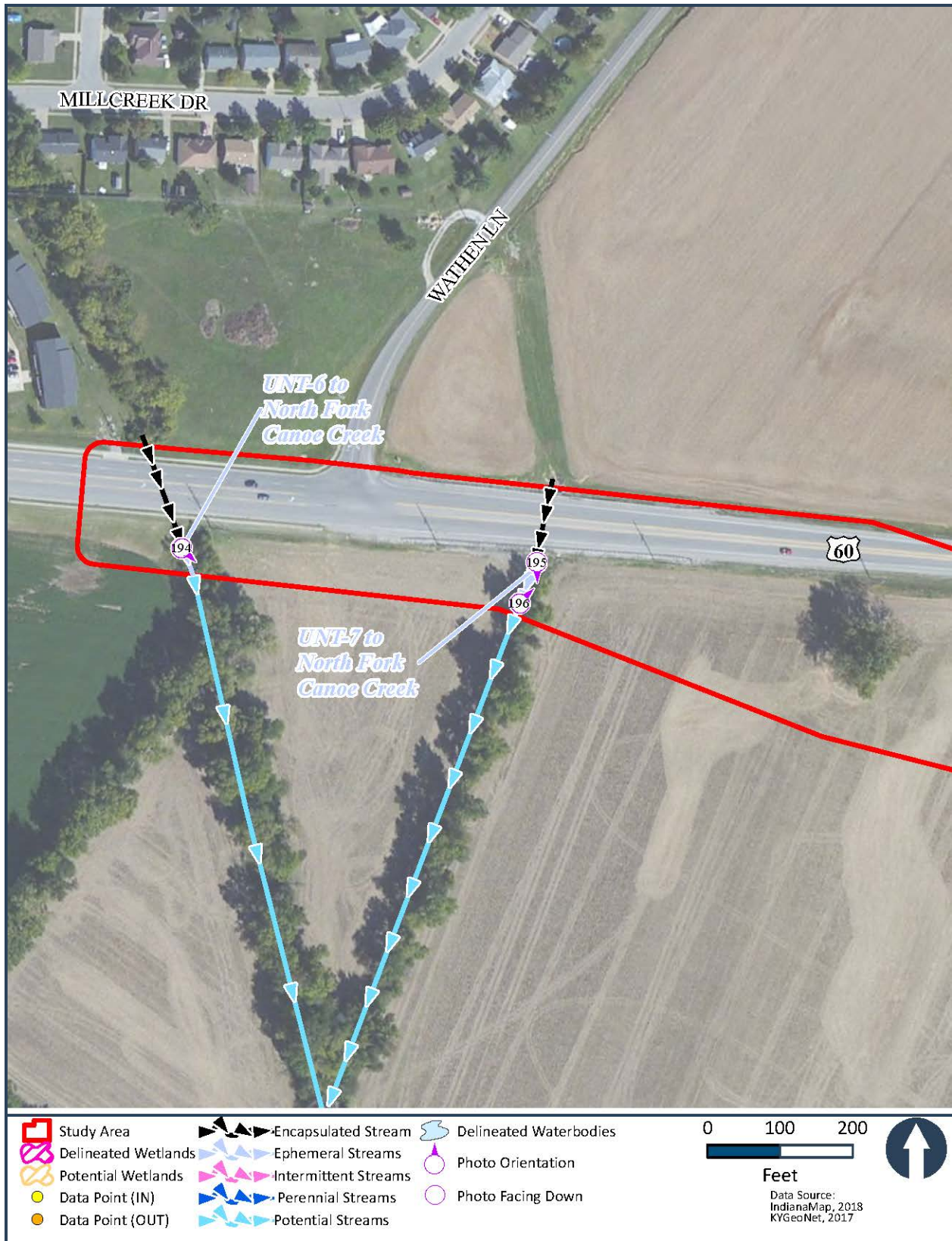


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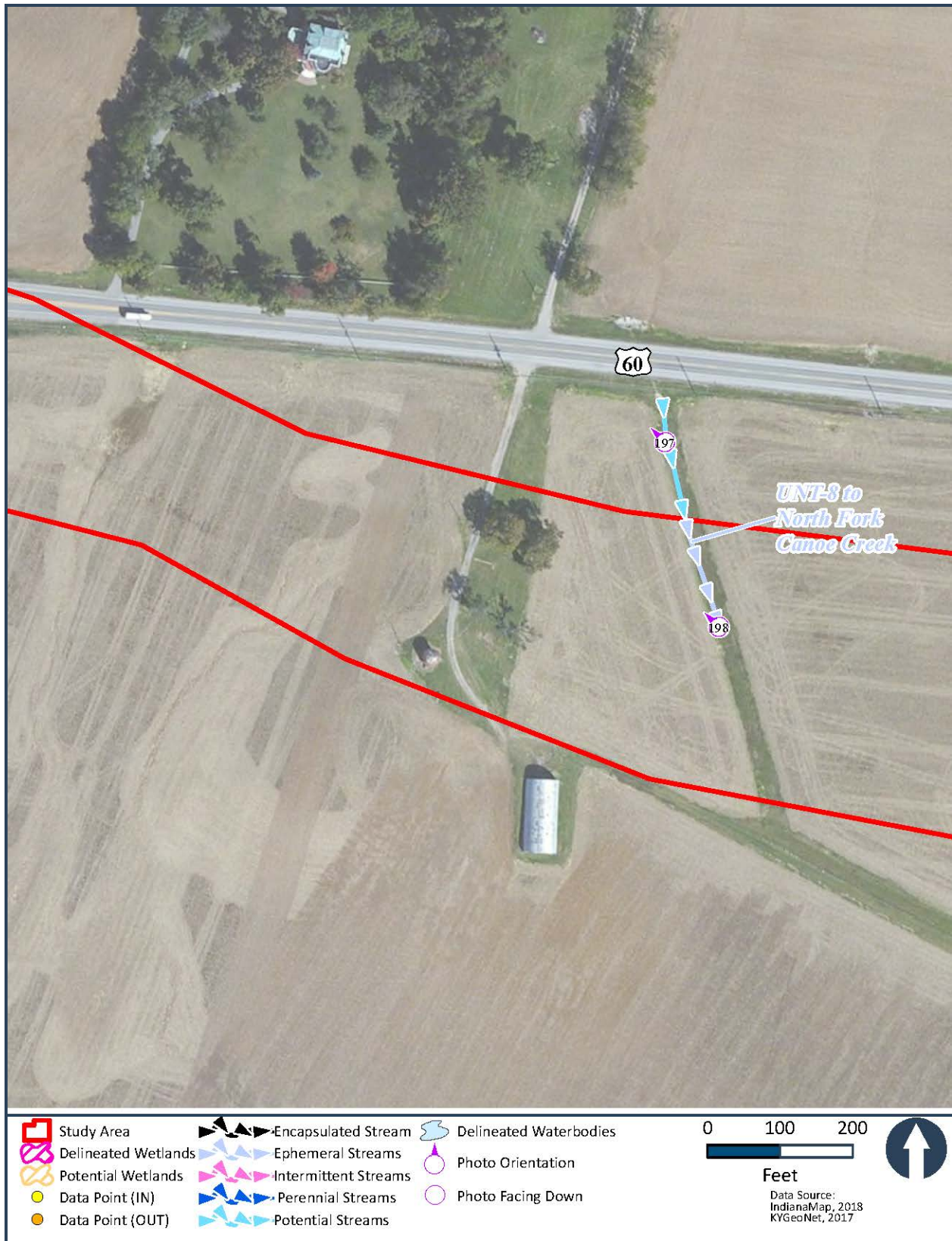


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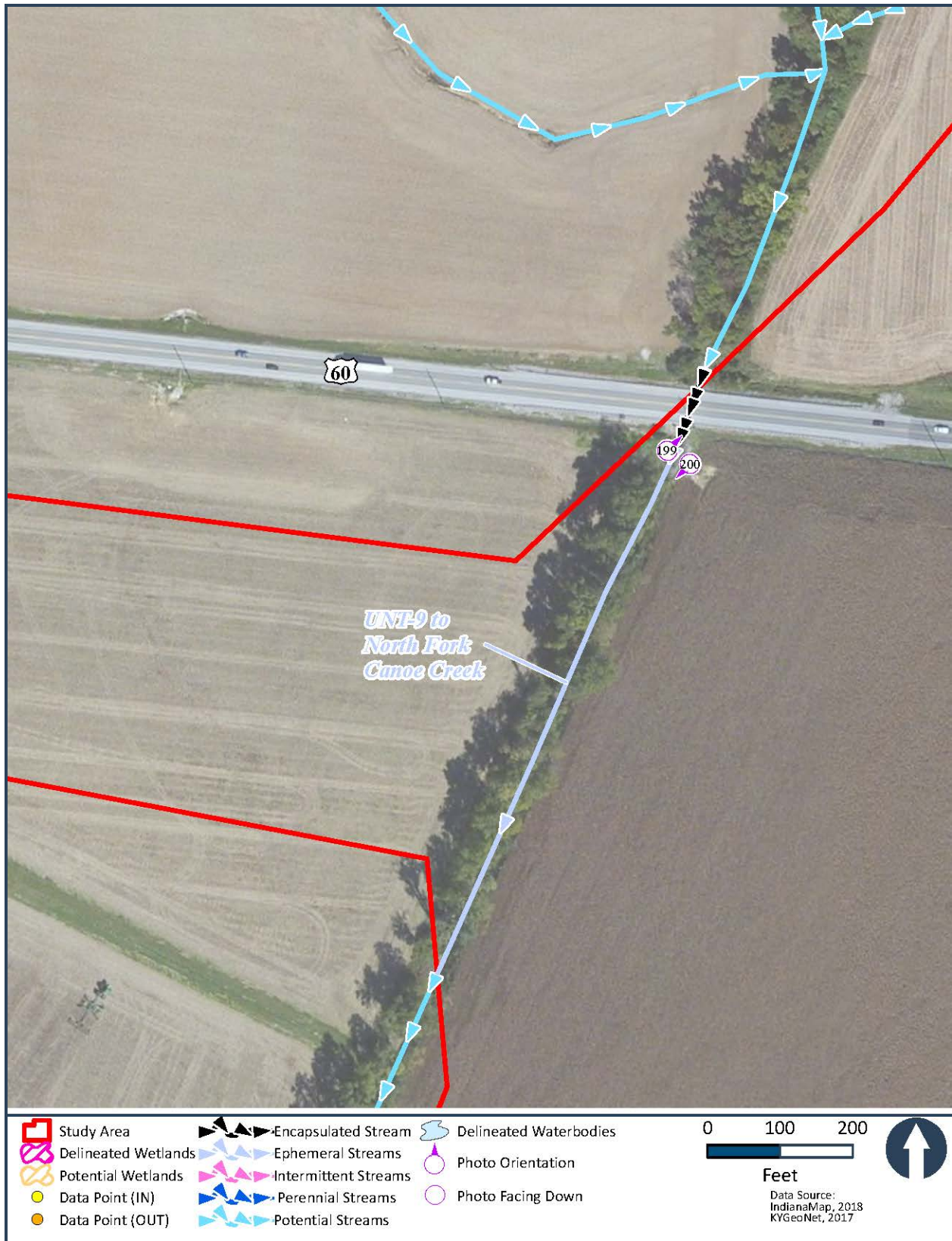


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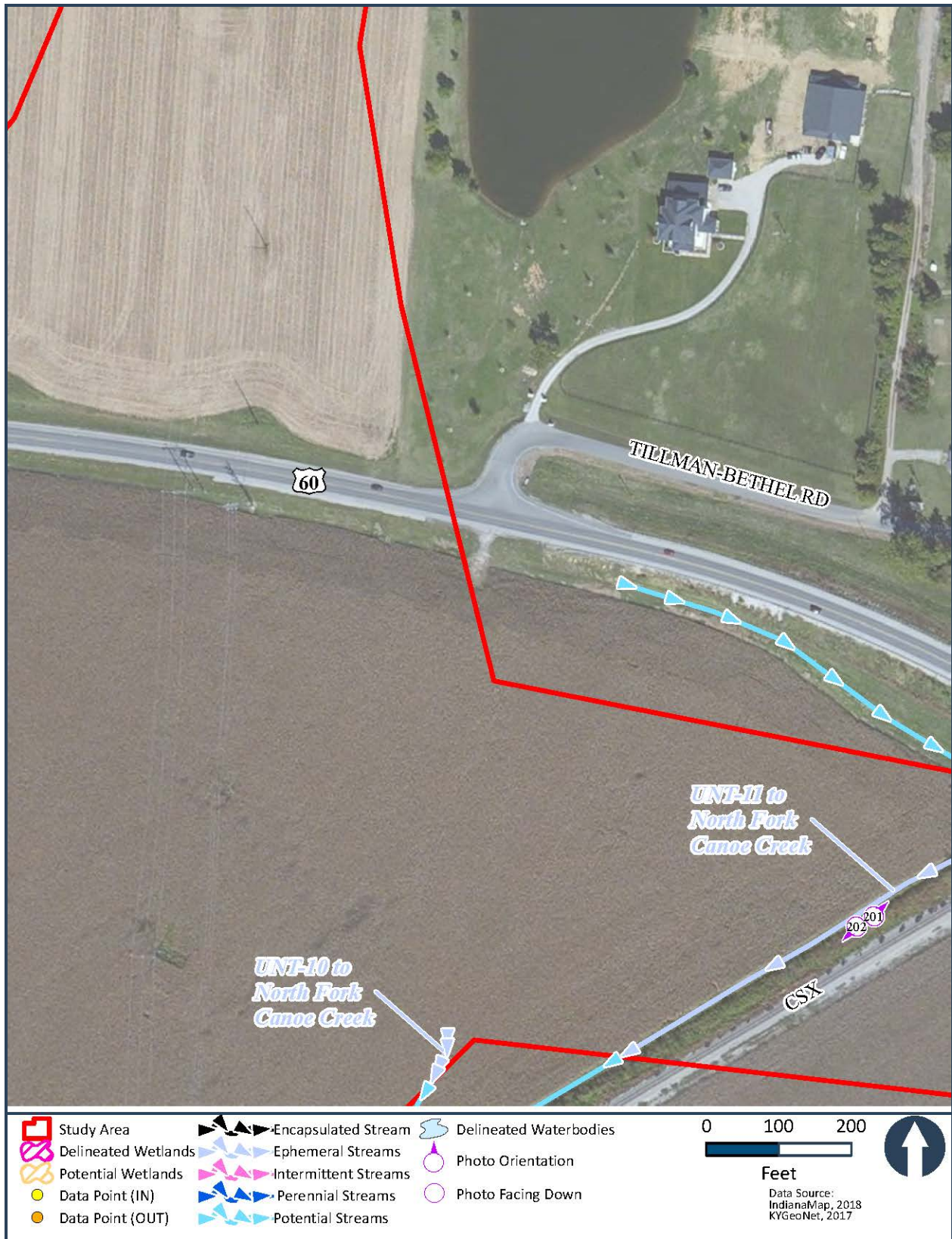


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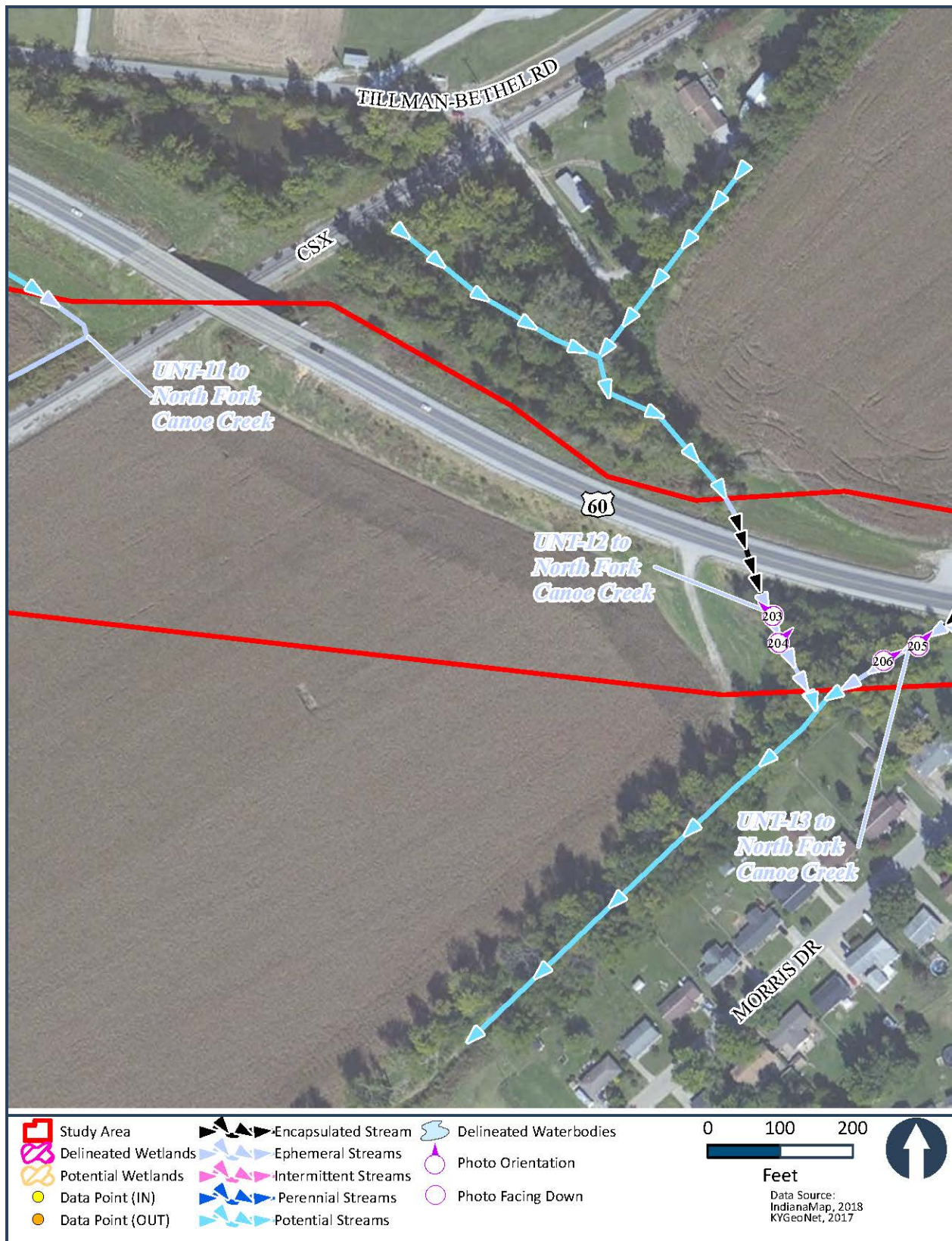


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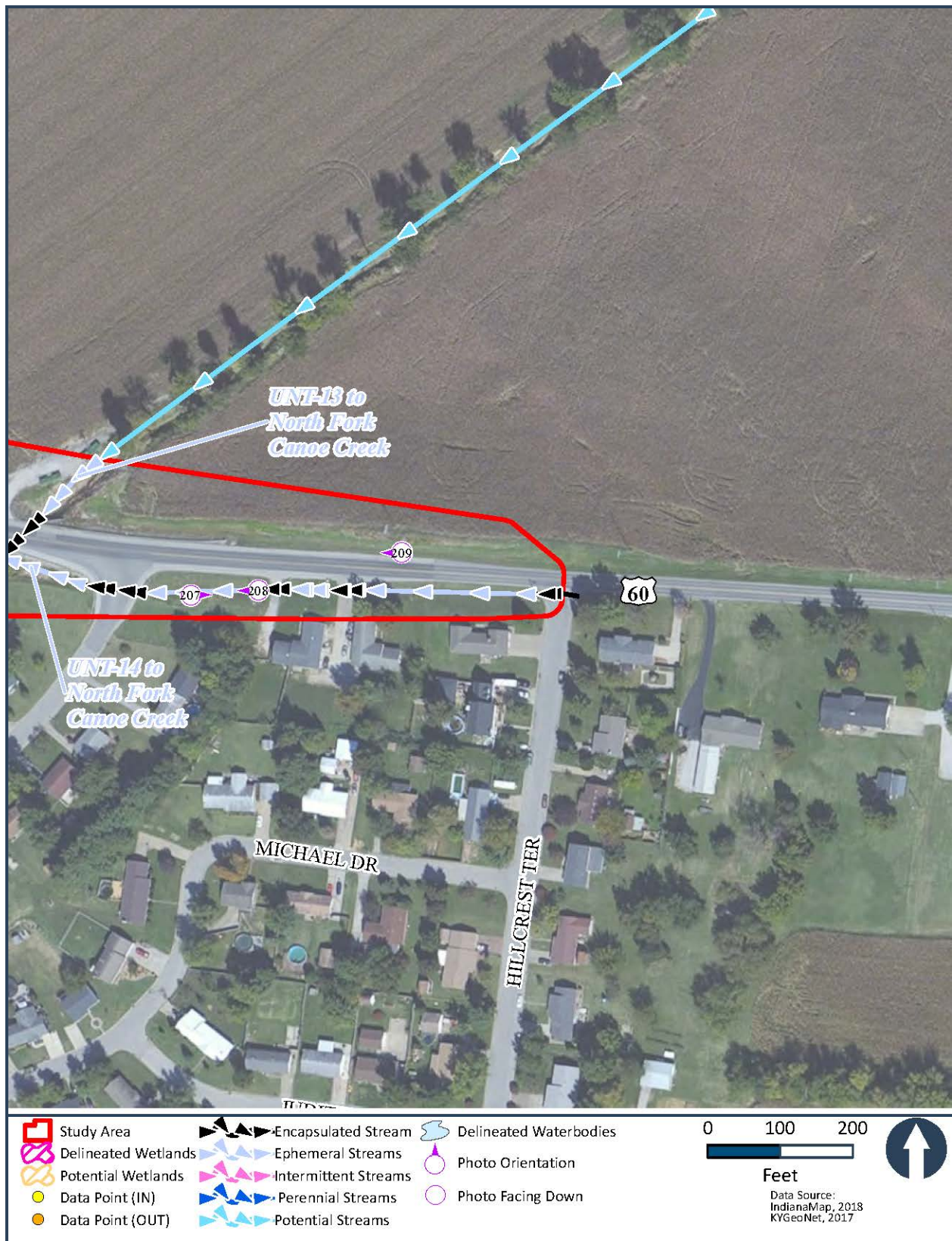


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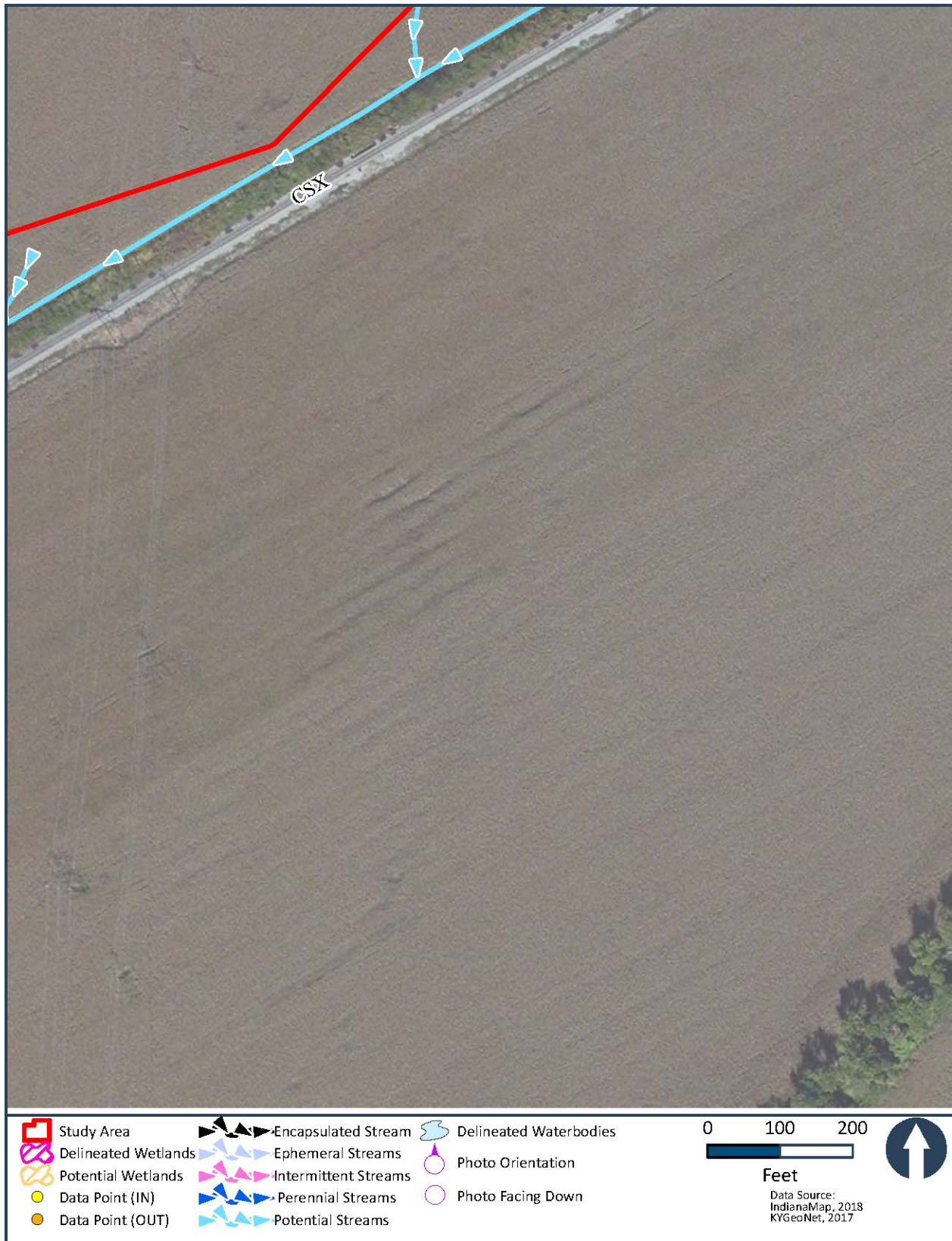


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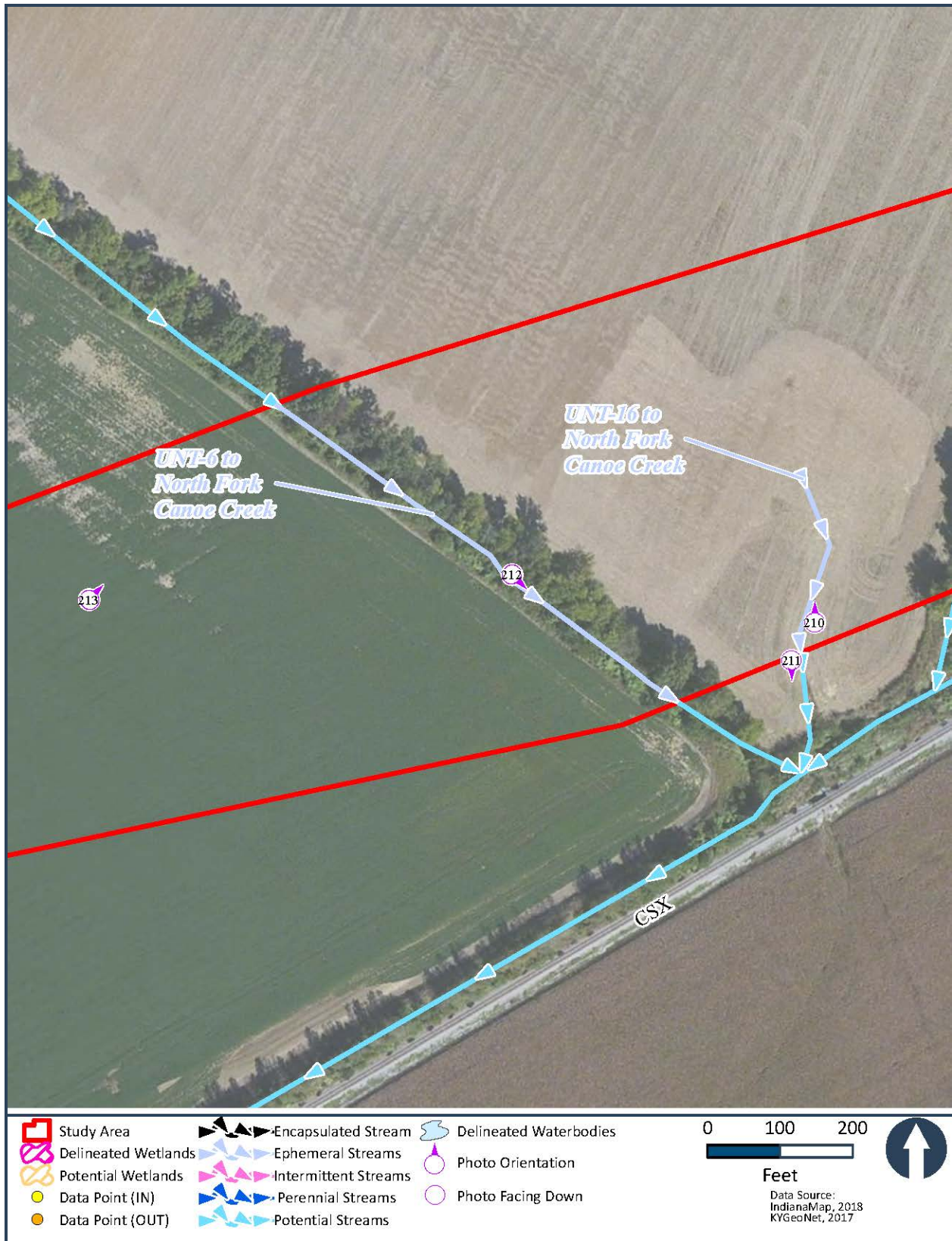


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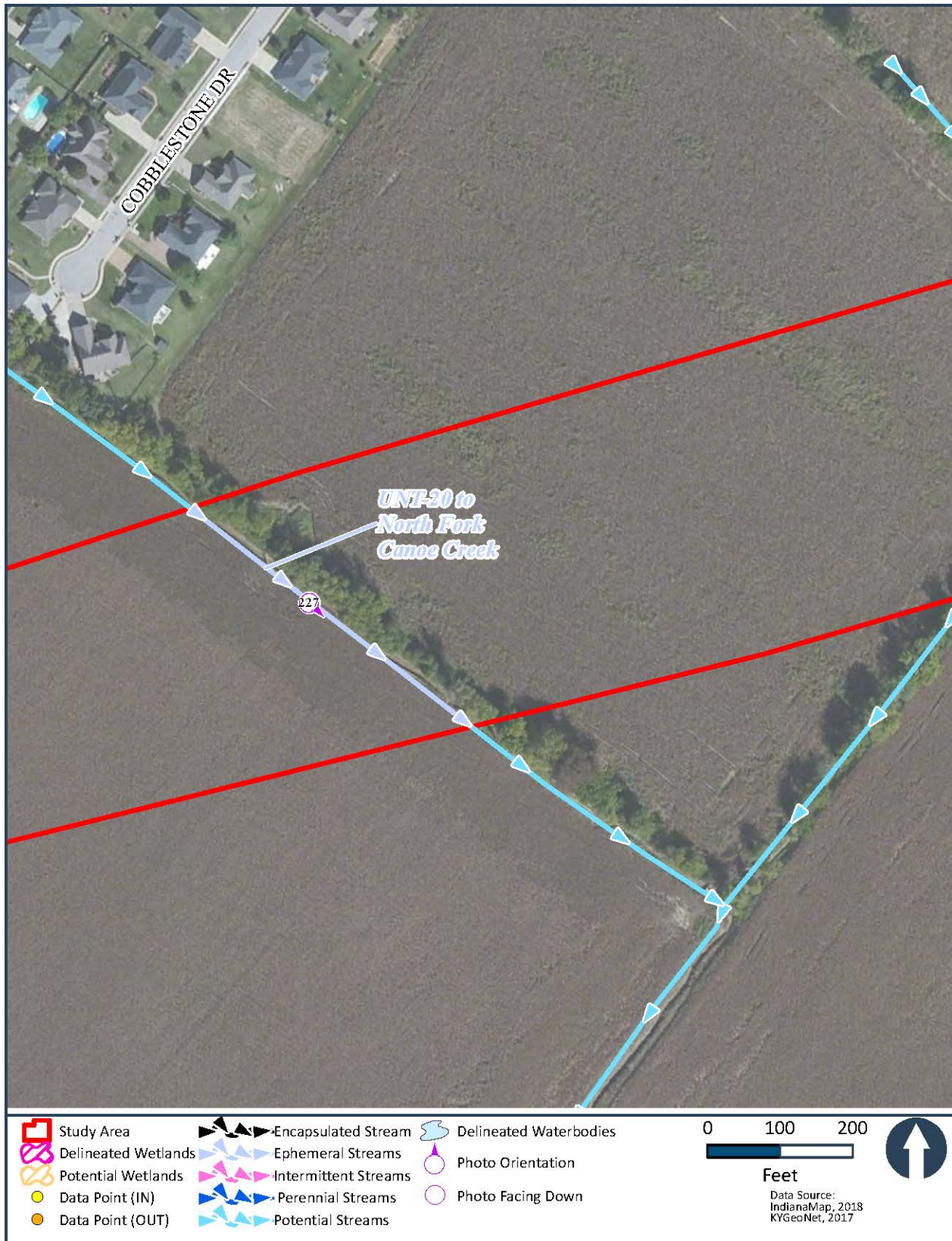


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Figure 9. Photo Orientation Maps (38 of 57)



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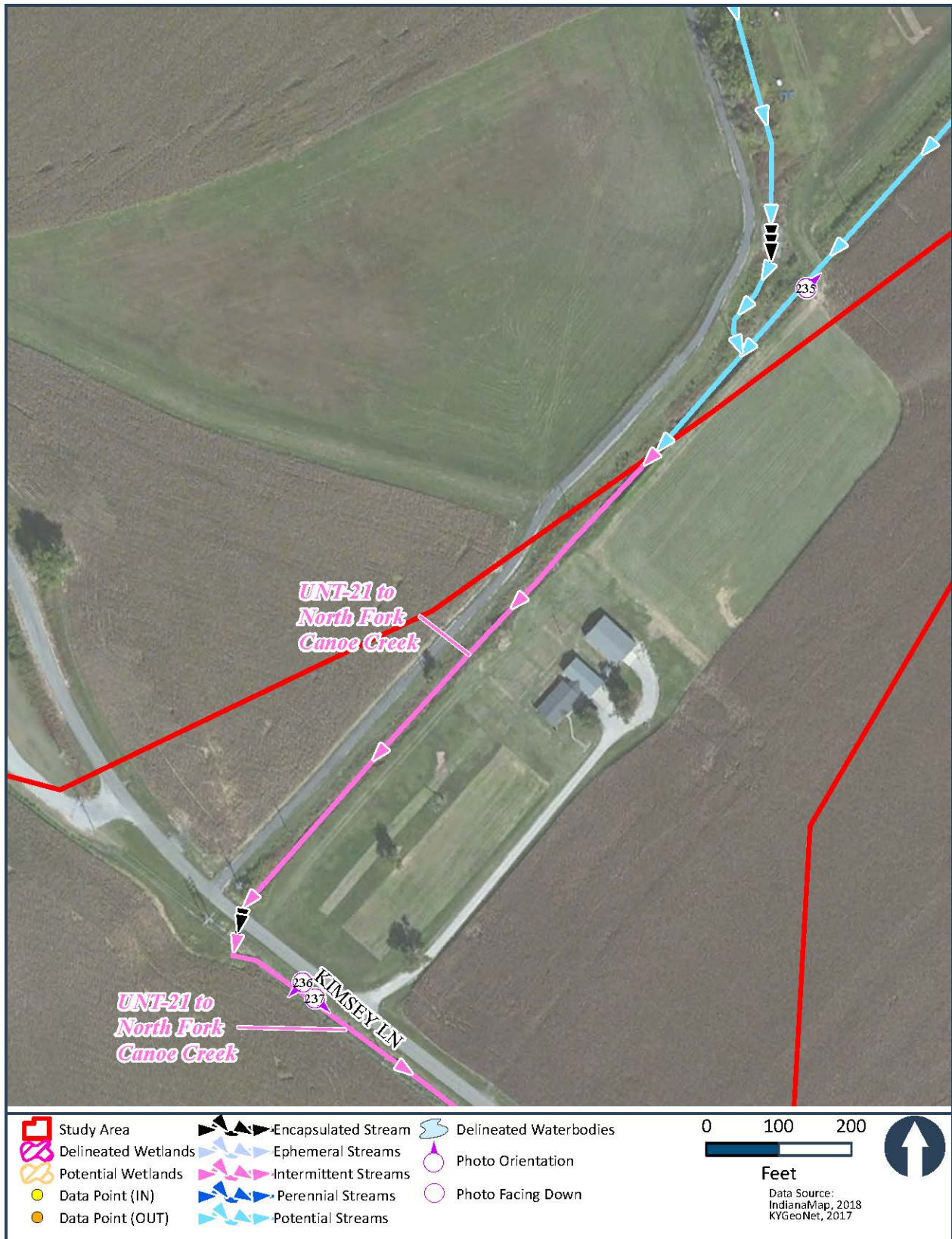


Figure 9. Photo Orientation Maps (40 of 57)

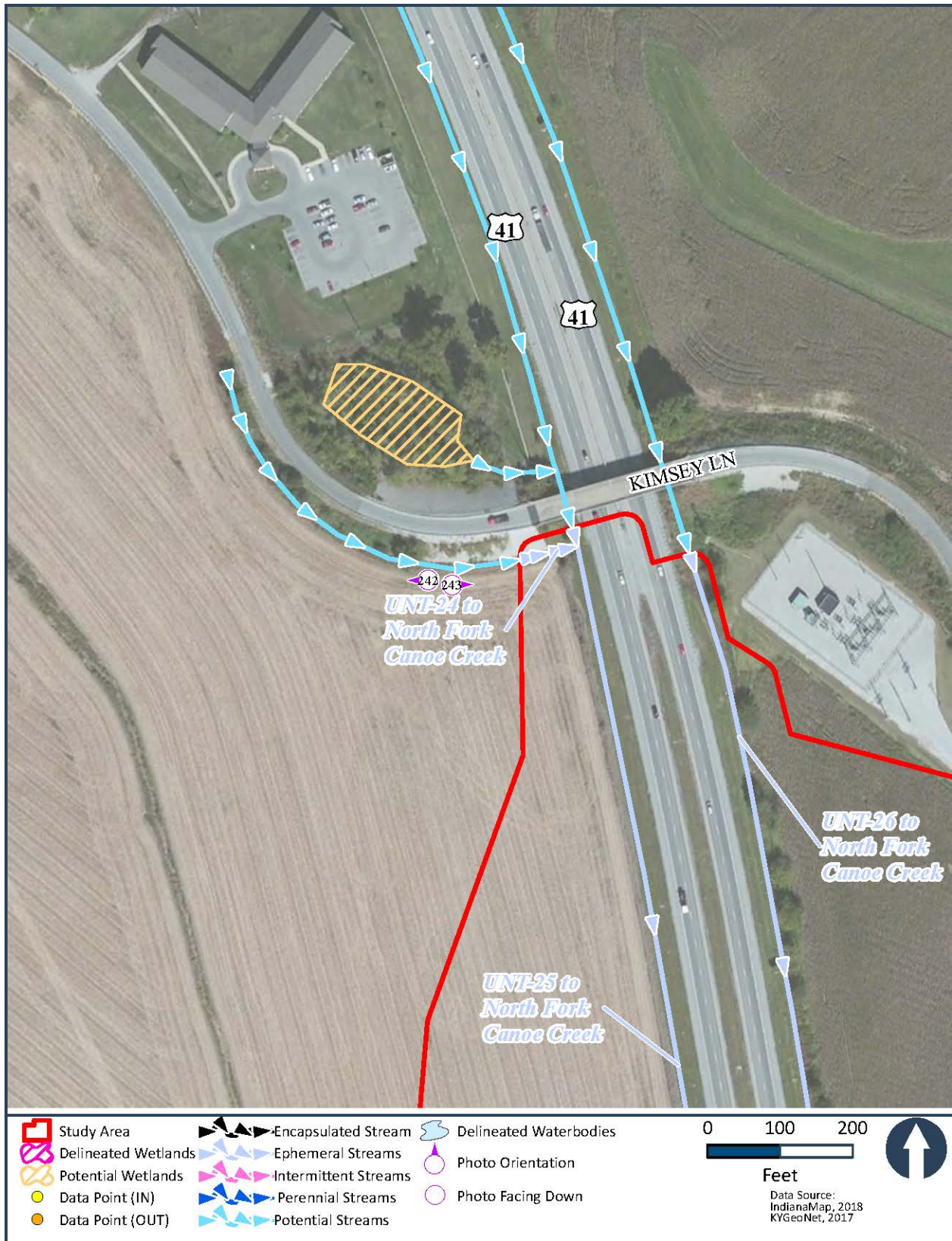


Figure 9. Photo Orientation Maps (41 of 57)

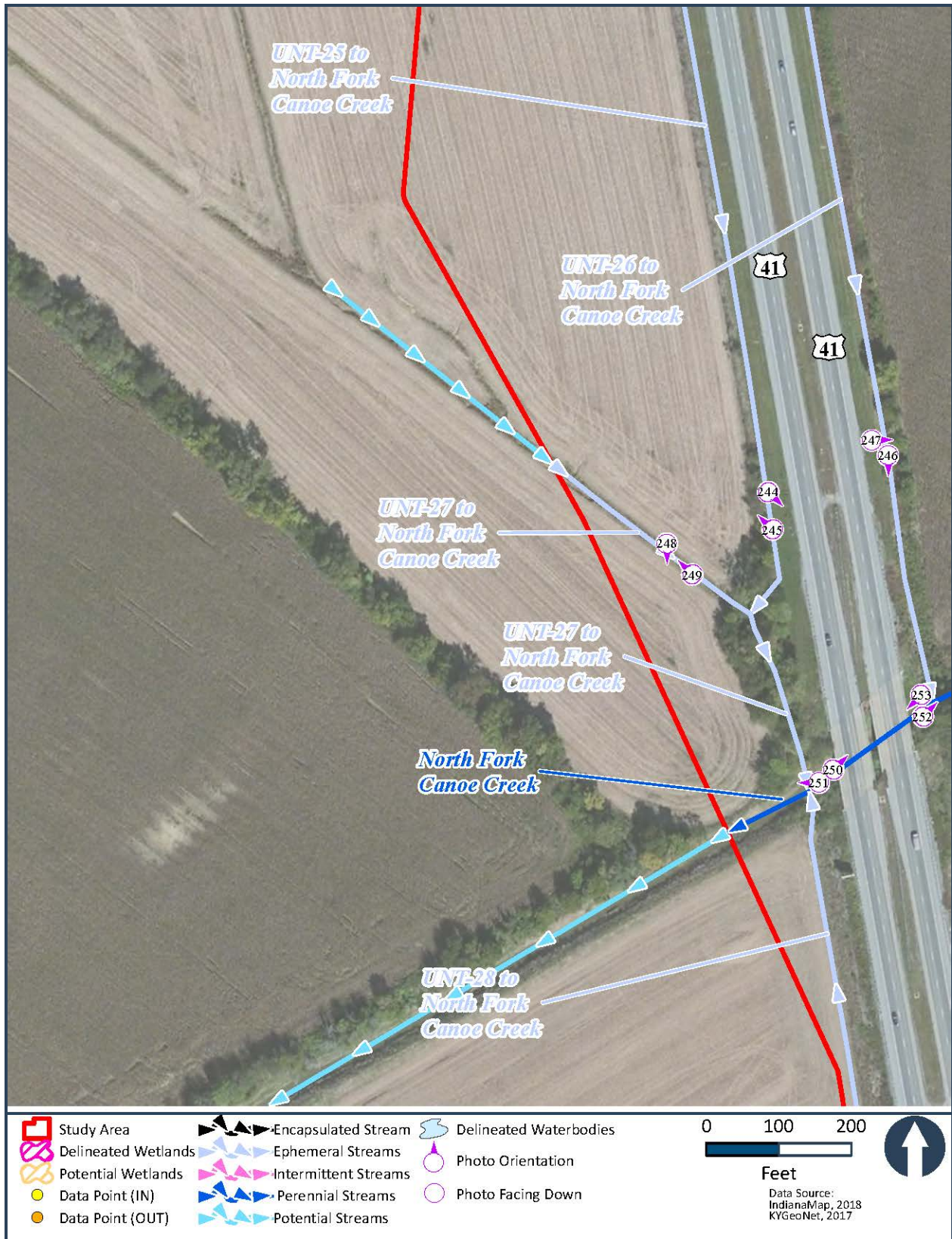


Figure 9. Photo Orientation Maps (42 of 57)

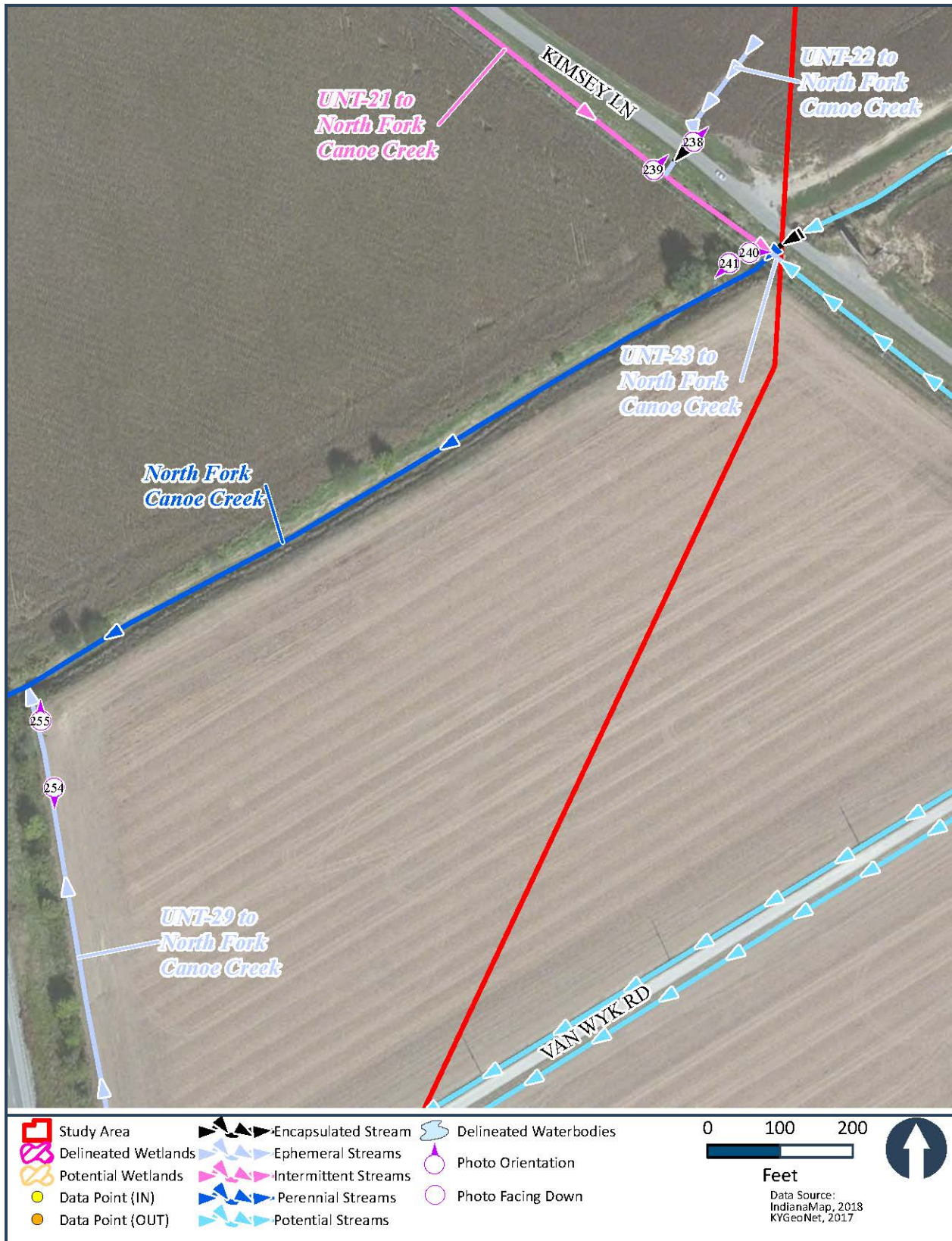


Figure 9. Photo Orientation Maps (43 of 57)

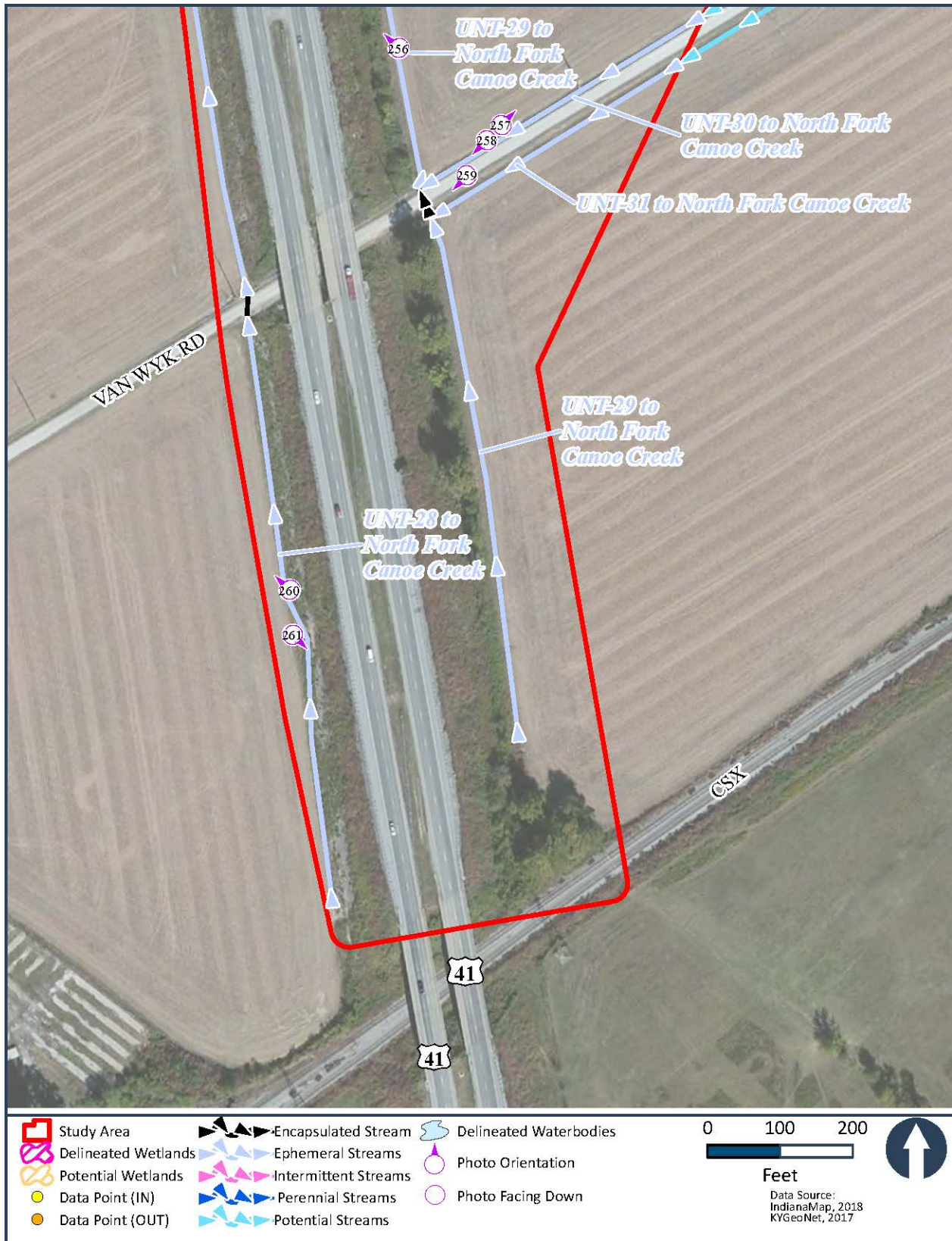
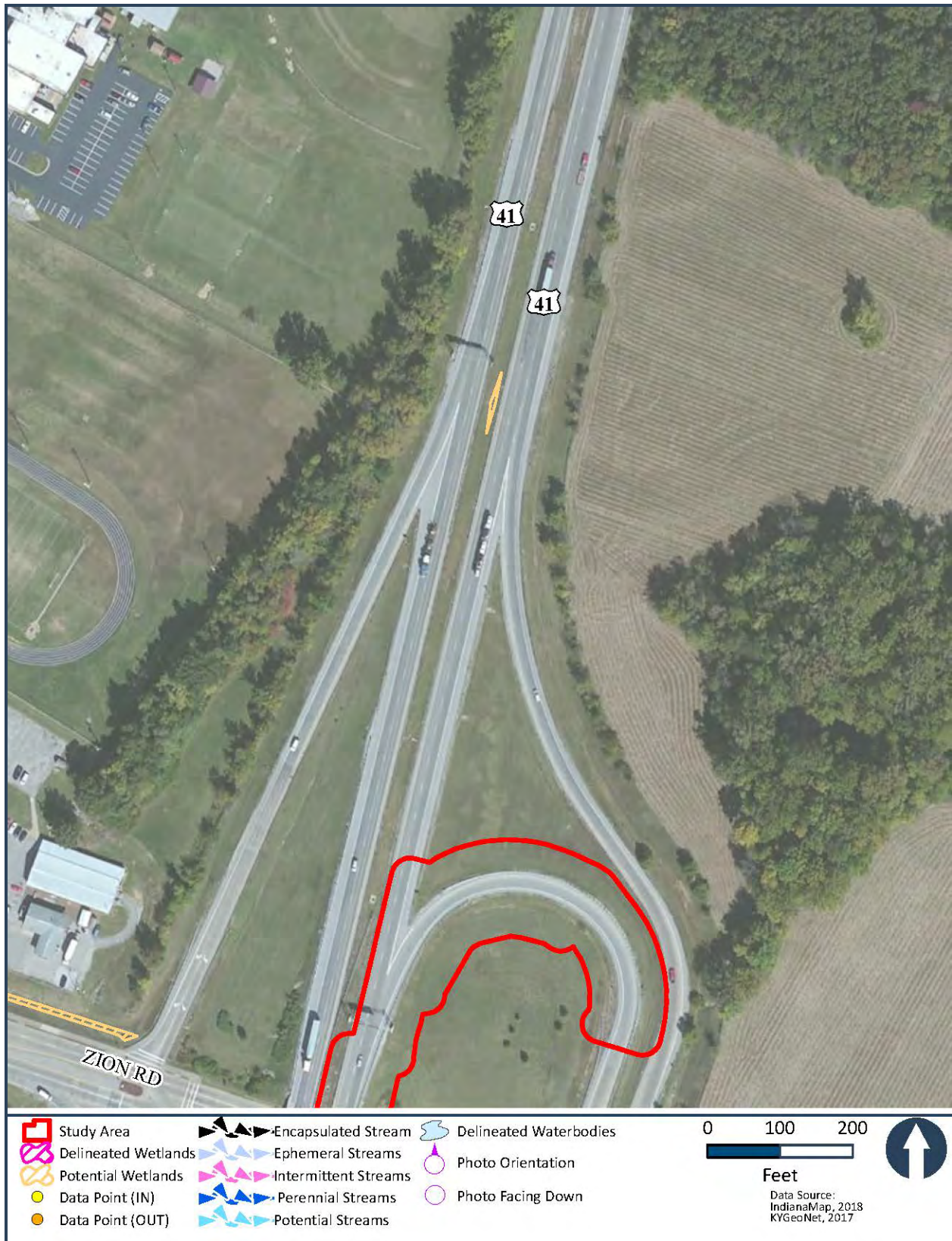


Figure 9. Photo Orientation Maps (44 of 57)



Figure 9. Photo Orientation Maps (45 of 57)



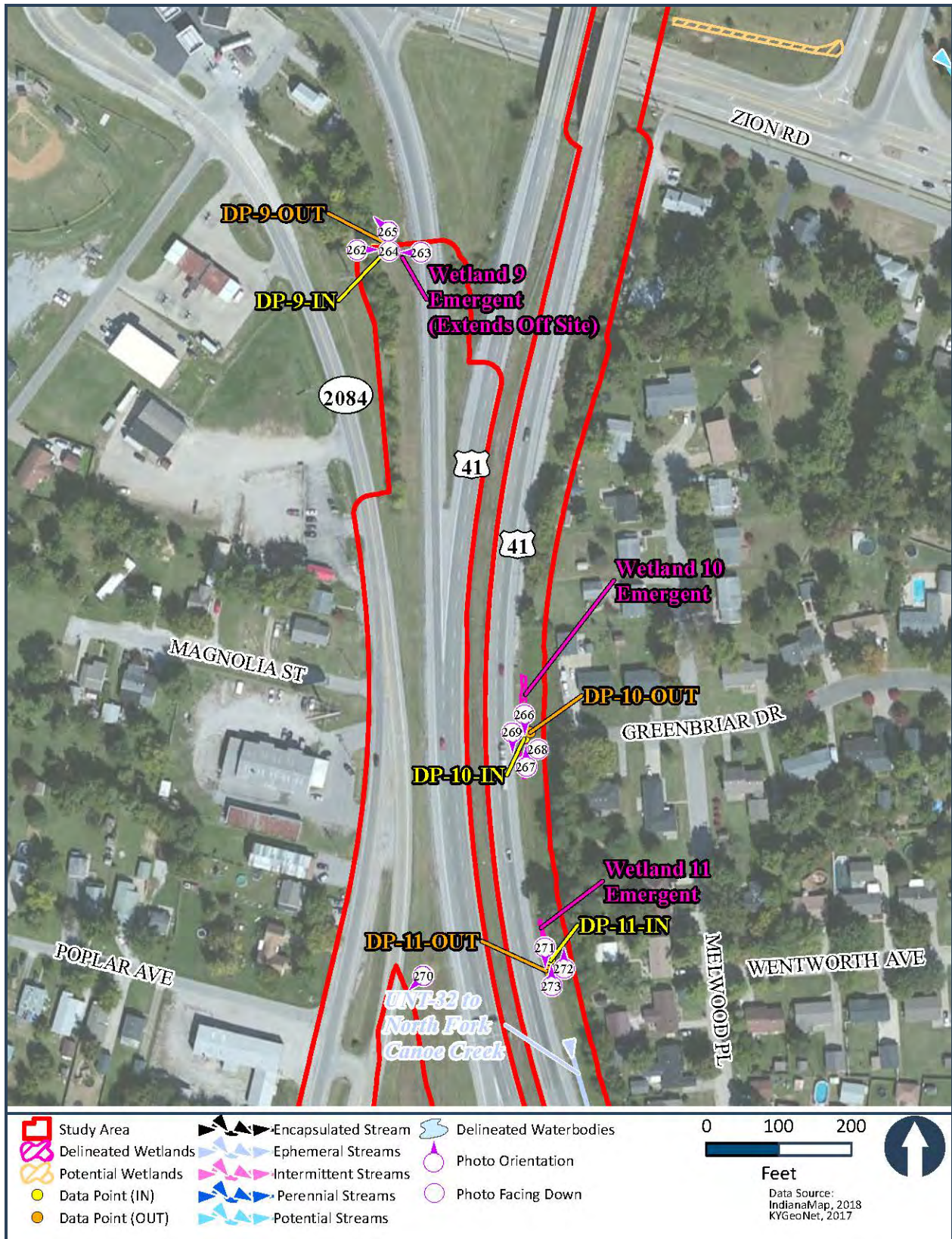


Figure 9. Photo Orientation Maps (47 of 57)

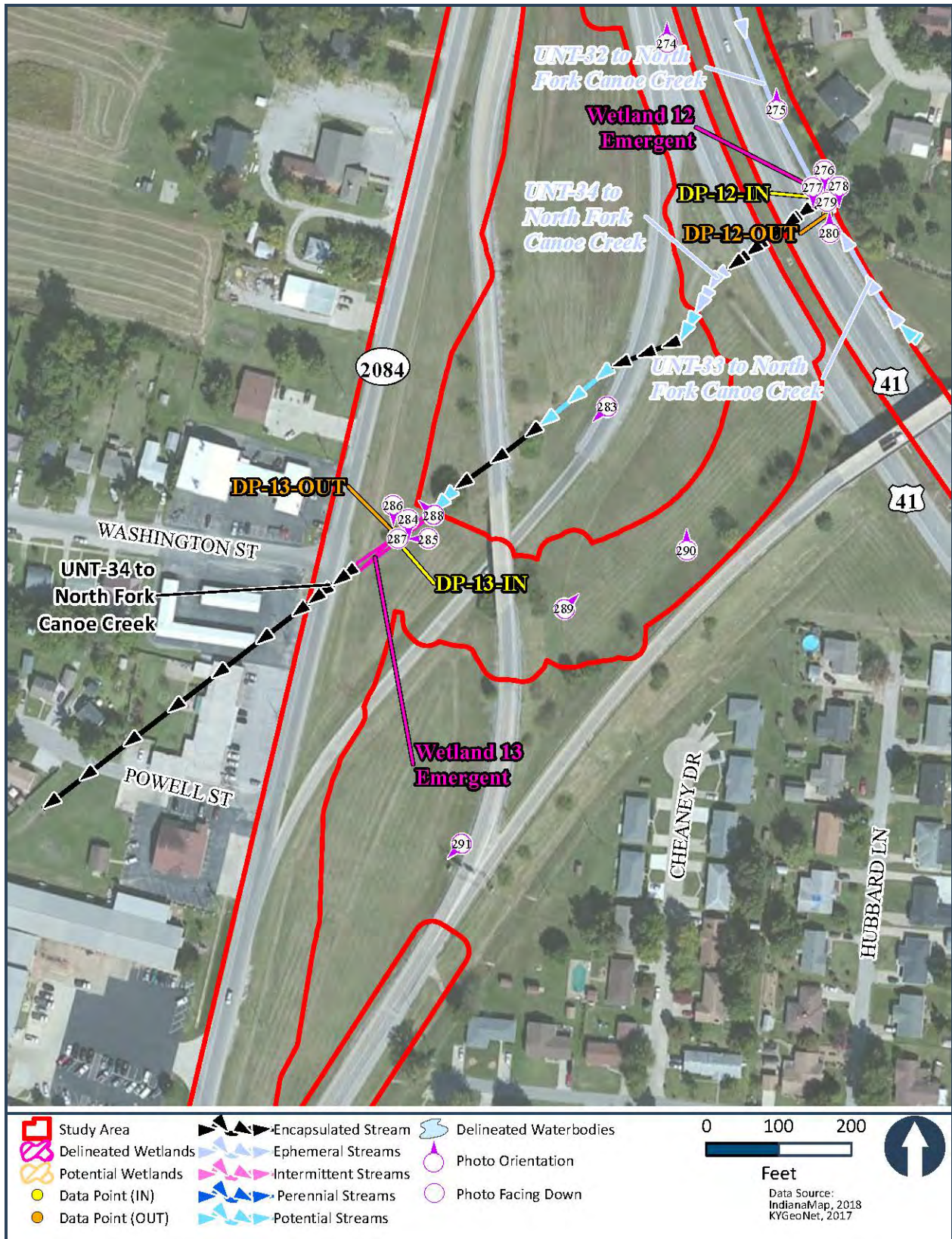


Figure 9. Photo Orientation Maps (48 of 57)

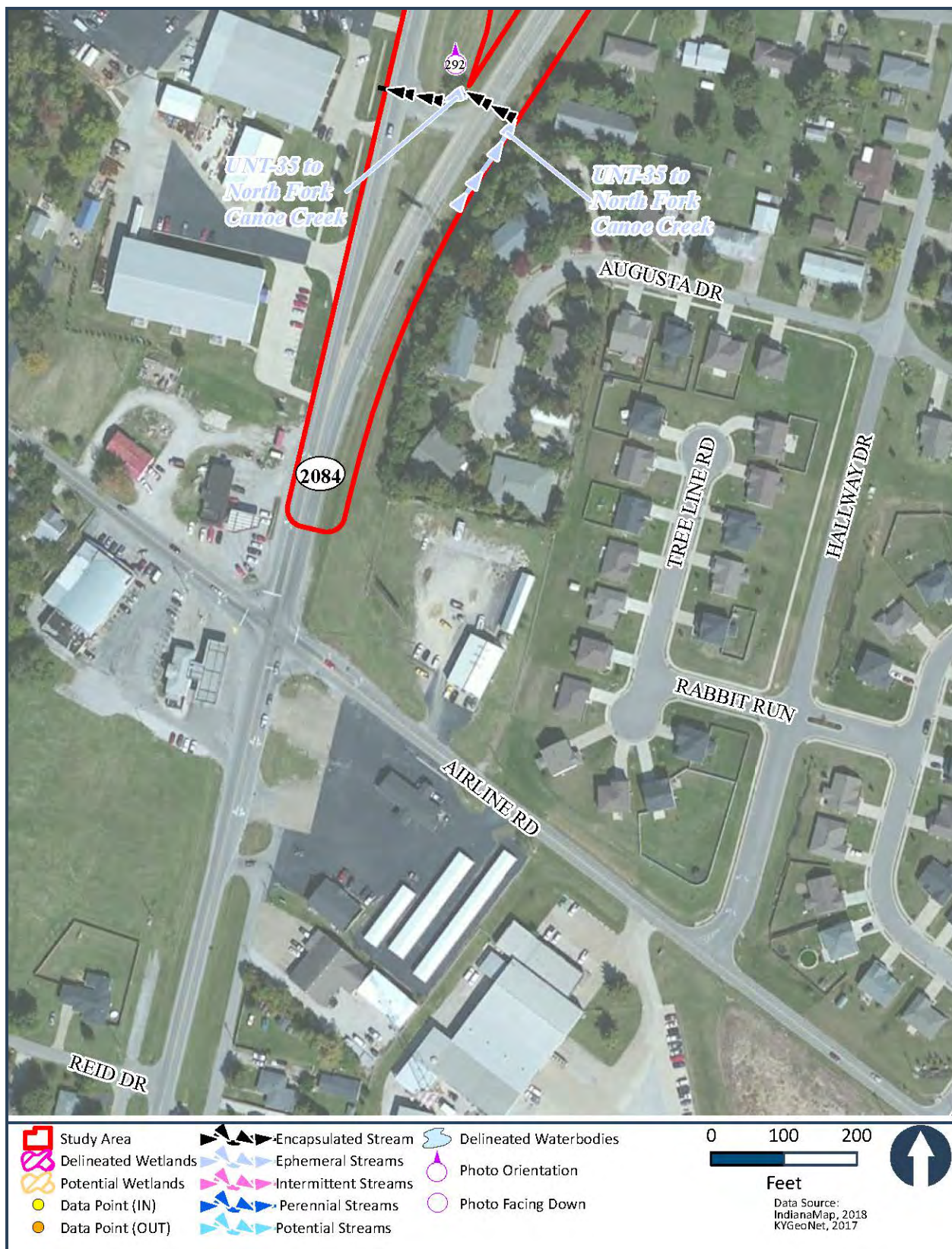


Figure 9. Photo Orientation Maps (49 of 57)



Figure 9. Photo Orientation Maps (50 of 57)



Figure 9. Photo Orientation Maps (51 of 57)

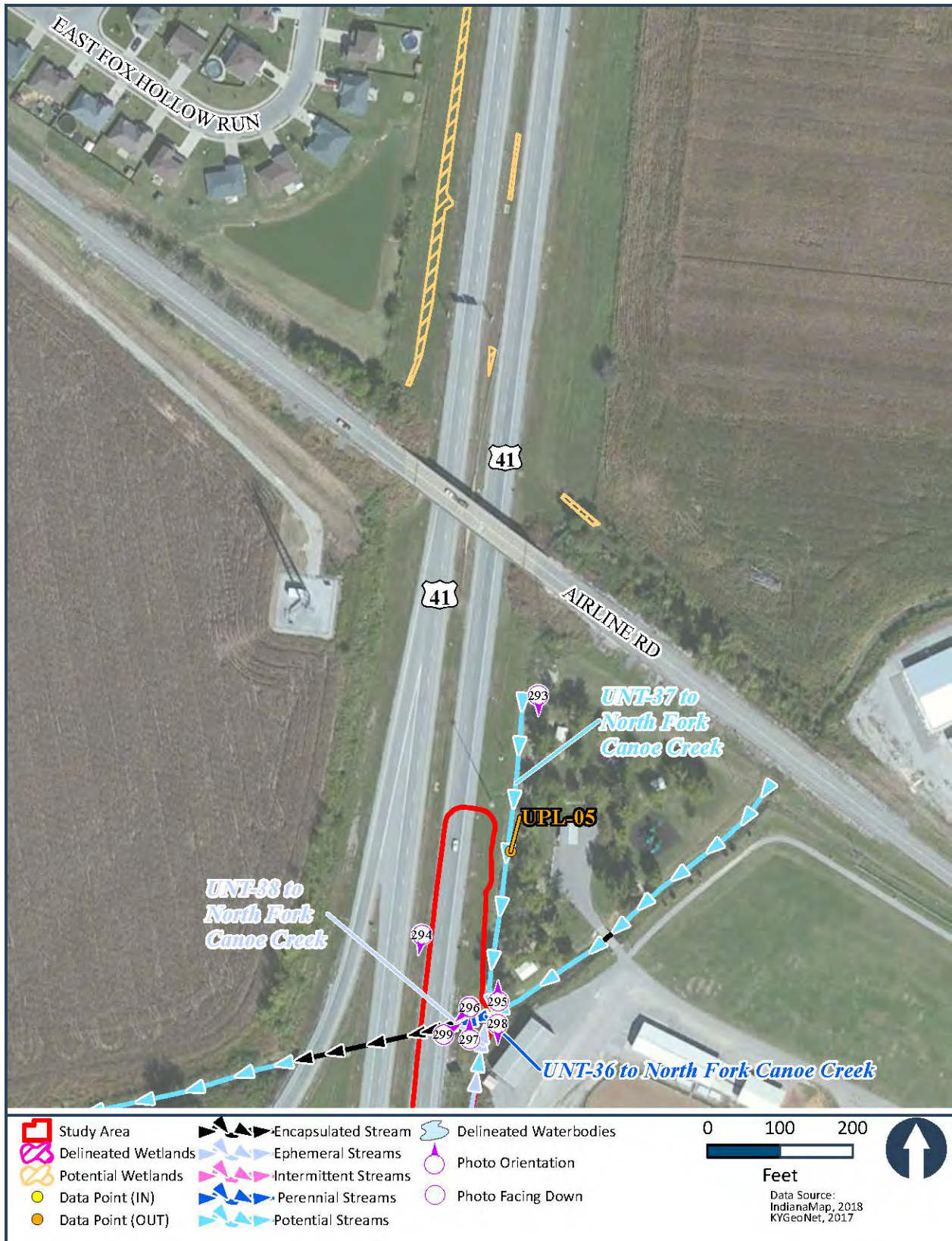


Figure 9. Photo Orientation Maps (52 of 57)



Figure 9. Photo Orientation Maps (53 of 57)



Figure 9. Photo Orientation Maps (54 of 57)



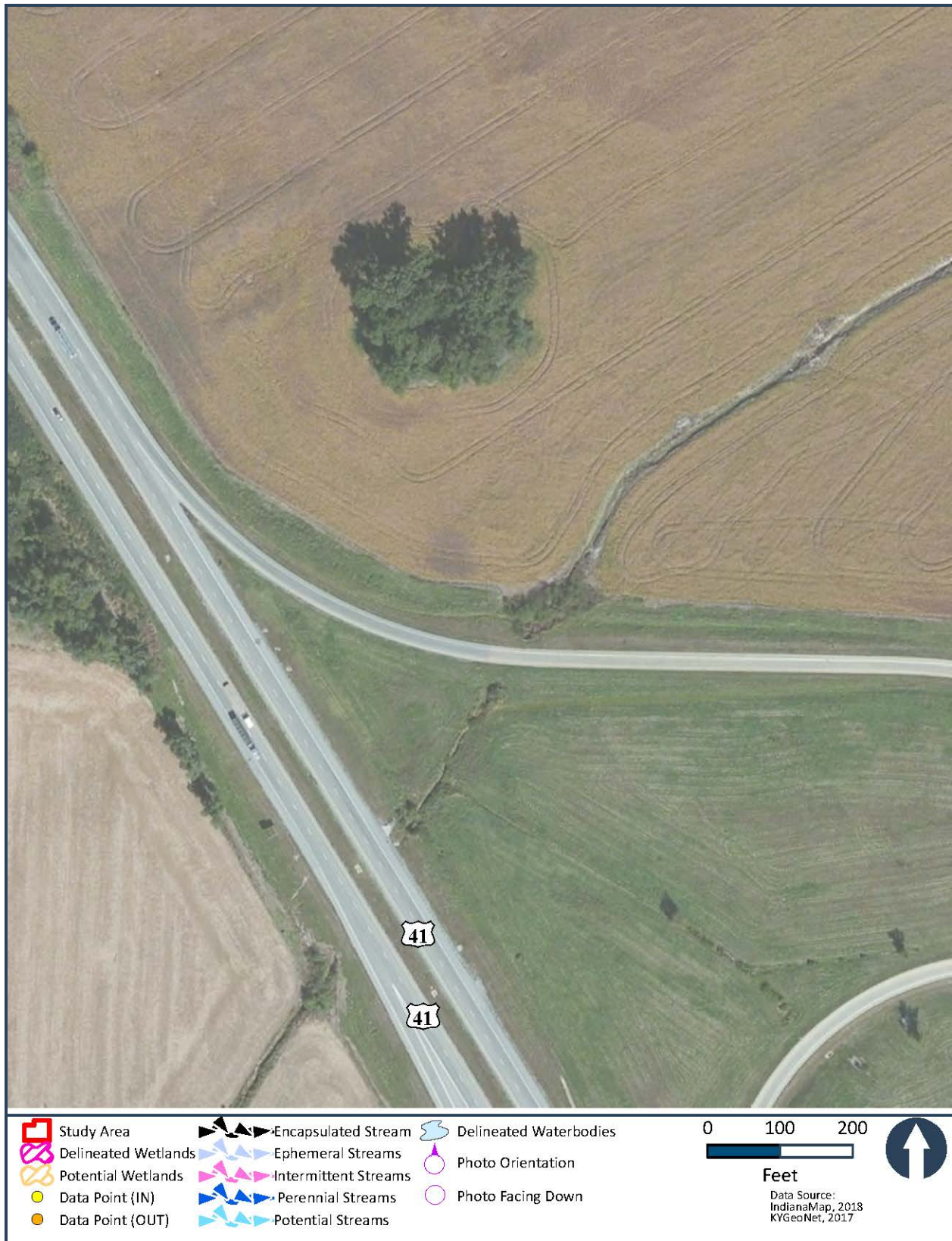


Figure 9. Photo Orientation Maps (56 of 57)

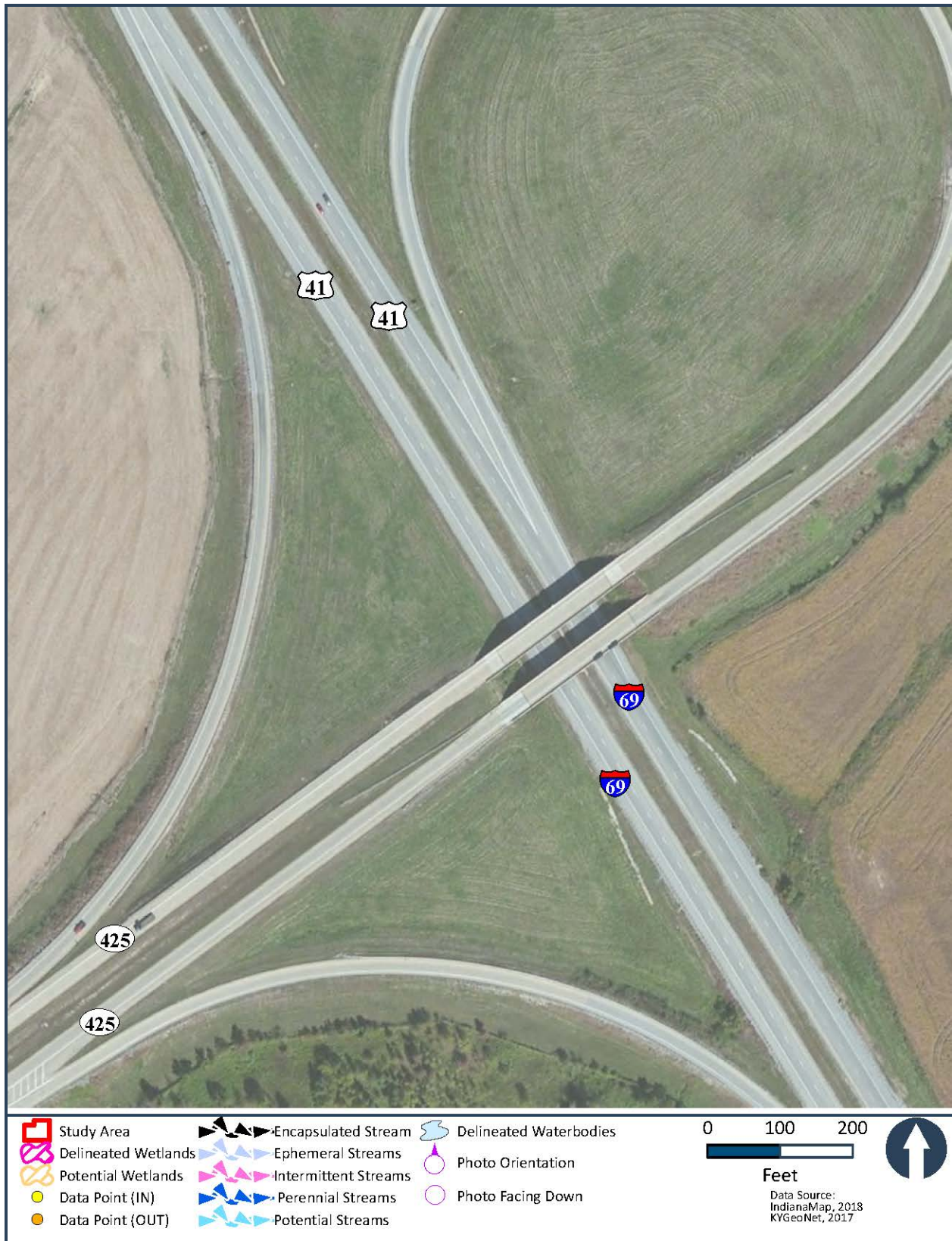


Figure 9. Photo Orientation Maps (57 of 57)

APPENDIX C

Project Area Photographs



Photo 1: Overview of northwest end of project area showing Wetland 1 in foreground facing southeast (04/24/19).



Photo 2: View of the culvert upstream of UNT-1 to Eagle Creek facing west (08/15/17).



Photo 3: View of UNT-1 to Eagle Creek facing northeast. Note the concrete-lined channel (08/17/18).



Photo 4: View of UNT-1 to Eagle Creek facing west. Note the concrete-lined channel (08/17/18).



Photo 5: View of the soil profile observed at Wetland 1 (DP-1-IN). This location met the depleted matrix (F3) indicator (07/25/18).



Photo 6: View of Wetland 1 (DP-1-IN) facing north. This location met all three wetland criteria (07/25/18).



Photo 7: View of Wetland 1 facing southeast (07/25/18).



Photo 8: View of Wetland 1 facing west (07/25/18).



Photo 9: View of highly eroded channel of UNT-2 to Eagle Creek facing south (08/17/18).



Photo 10: View of culvert (arrow) upstream of UNT-2 to Eagle Creek facing south (08/15/17).



Photo 11: View of UNT-2 to Eagle Creek facing north. A portion of this channel is lined with riprap. The channel is deeply eroded/incised north of the riprap (08/17/18).



Photo 12: View of UNT-3 to Eagle Creek facing northwest (08/17/18).



Photo 13: View of UNT-3 to Eagle Creek facing southeast (08/17/18).



Photo 14: View of culvert and riprap upstream of UNT-3 to Eagle Creek facing northwest (08/15/17).



Photo 15: View of a dry stormwater culvert connected to UNT-5 to Eagle Creek facing north. The origin of this culvert is unknown (07/06/17).



Photo 16: UNT-5 to Eagle Creek facing west (07/06/17)



Photo 17: View of a moist stormwater culvert connected to UNT-5 to Eagle Creek facing north. The origin of this culvert is unknown (07/06/17).



Photo 18: View of UNT-6 to Eagle Creek facing north (07/06/17).



Photo 19: Downstream view of the UNT-6 to Eagle Creek culvert under I-69 near the confluence of UNT-6 to Eagle Creek and UNT-7 to Eagle Creek facing south (07/25/18).



Photo 20: View of UNT-7 to Eagle Creek facing east (07/25/18).



Photo 21: View of UNT-7 to Eagle Creek facing southeast (07/25/18).



Photo 22: View of UNT-8 to Eagle Creek facing south just south of an access road (08/17/18).



Photo 23: View of UNT-8 to Eagle Creek facing north. Note the culvert under the access road between Wetland 2 and UNT-6 (08/17/18).

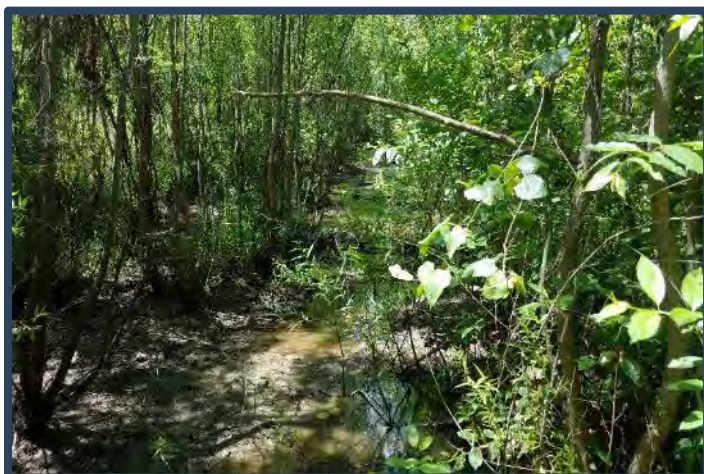


Photo 24: View of Wetland 2 facing west. Note the presence of surface water (06/27/17).



Photo 25: View of Wetland 2 facing east. Note the presence of surface water (06/27/17).



Photo 26: View of Wetland 2 (DP-2-IN) facing north. Note the water table at a depth of six inches (07/24/18).



Photo 27: View of the soil profile observed at Wetland 2 (DP-2-IN). This location met the depleted matrix (F3) and the depleted below dark surface (A11) indicators (07/24).



Photo 28: View of the soil profile observed at DP-2-OUT. This location did not meet any of the hydric soil indicators (07/24/18).



Photo 29: View of DP-2-OUT facing north (07/24/18).



Photo 30: View of culvert upstream of UNT-9 to Eagle Creek facing north (06/27/17).



Photo 31: View of culvert upstream of UNT-10 to Eagle Creek facing north (06/27/17).



Photo 32: View of the soil profile observed at DP-3-4-OUT. This location did not meet any of the hydric soil indicators (07/24/18).



Photo 33: View of UNT-10 to Eagle Creek facing south. Note that the channels braid into Wetland 3 and disappear (06/27/17).



Photo 34: View of the soil profile observed at Wetland 3 (DP-3-4-IN). This location met the depleted matrix (F3) indicator. (07/24/18).



Photo 35: View of Wetland 3 (DP-3-4-IN) facing southwest (05/17/19).



Photo 36: View of the soil profile observed at Wetland 3 (DP-3-2-IN). This location met the depleted matrix (F3) indicator (07/24/18).



Photo 37: View of Wetland 3 (DP-3-2-IN) facing north (07/24/18).



Photo 38: View of Wetland 3 (DP-3-2-IN) facing west (07/24/18).



Photo 39: View of DP-3-3-OUT facing east (07/24/18).



Photo 40: View of Wetland 3 facing southeast (07/24/18).



Photo 41: View of DP-3-1-IN facing south (07/24/18).



Photo 42: View of the soil profile observed at DP-3-3-OUT (07/24/18). No hydric soil indicators were observed.



Photo 43: View of the soil profile observed at Wetland 3 (DP-3-1-IN). This location met the depleted matrix (F3) indicator (07/24/18).



Photo 44: View of Wetland 3 facing west (07/24/18).



Photo 45: View of Eagle Creek facing downstream (west). Note the maintained left descending bank (08/01/18).



Photo 46: View of Eagle Creek facing upstream (east). Note the maintained left descending bank (08/01/18).



Photo 47: View of Eagle Creek facing southwest (08/01/18). Note the concrete debris.



Photo 48: View of Eagle Creek facing upstream (east). Note the maintained left descending bank (08/01/18).



Photo 49: View of Eagle Creek facing downstream (northwest) (05/16/19).



Photo 50: View of Eagle Creek facing upstream (northeast) (05/16/19).



Photo 51: View of Wetland 3 facing northeast (07/24/18).



Photo 52: View of Wetland 3 facing east near Eagle Creek (07/24/18).



Photo 53: View of Wetland 3 (DP-3-1-IN) facing north (07/24/18).



Photo 54: View of the soil profile observed at Wetland 3 (DP-3-1-IN). This location met the depleted matrix (F3) and depleted below dark surface (A11) indicators. Note the crayfish burrow, a wetland hydrology indicator (07/24/18).



Photo 55: View of the soil profile observed at DP-3-1-OUT (07/24/18). No hydric soil indicators were observed.



Photo 56: View of DP-3-1-OUT facing north. The data point was located on an Eagle Creek spoil pile that was well drained (07/24/18).



Photo 57: View of DP-4B-3-OUT with OW-1, a borrow pit, in the background, facing south (05/16/19).



Photo 58: View of the soil profile at DP-4B-3-OUT north of OW-1. No hydric soil indicators were observed (05/16/19).



Photo 59: View of OW-1, a borrow pit, facing south (07/25/18).



Photo 60: View of OW-1, a borrow pit, facing east (08/01/18).



Photo 61: View of Wetland 4A facing north (07/25/18).



Photo 62: View of the soil profile observed at Wetland 4A (DP-4A-1-IN). This location met the depleted matrix (F3) indicator. Note the surface soil cracks (07/25/18).



Photo 63: View of Wetland 4A (DP-4A-1-IN) facing north (07/25/18).



Photo 64: View of the soil profile observed at DP-4A-1-OUT. No hydric soil indicators were observed.

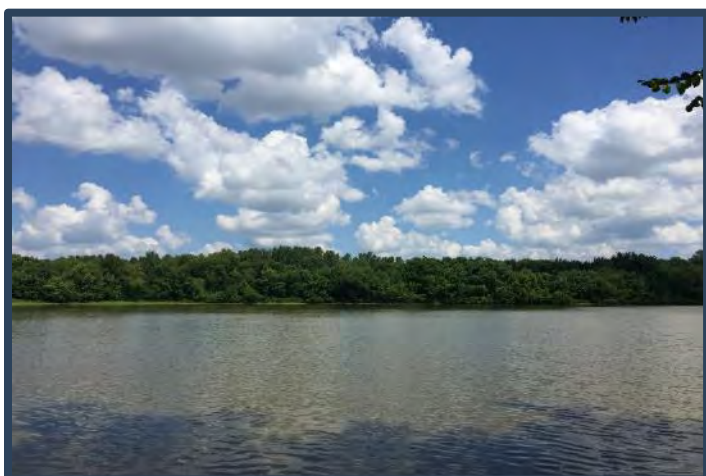


Photo 65: View of OW-1, a borrow pit, facing north (08/01/18).



Photo 66: View of OW-1, a borrow pit, facing east near the outlet that drains through Wetland 4 to Eagle Creek. Taken near herbaceous fringe Wetland 4B (DP-4B-2-IN) (08/01/18).



Photo 67: View of DP-4B-2-OUT facing north. Notice OW-1 in background of photograph (07/25/18).



Photo 68: View of Wetland 4 (DP-4B-2-IN) with OW-1 on the left facing east (07/25/18).



Photo 69: View of the soil profile for DP-4B-2-OUT. This location met the depleted matrix (F3) indicator (07/25/18).



Photo 70: View of the soil profile for Wetland 4B (DP-4B-2-IN). This location met the depleted matrix (F3) indicator (07/25/18).



Photo 71: View of Wetland 4B (DP-4B-2-IN) facing northwest (07/25/18). This location met all three wetland criteria.

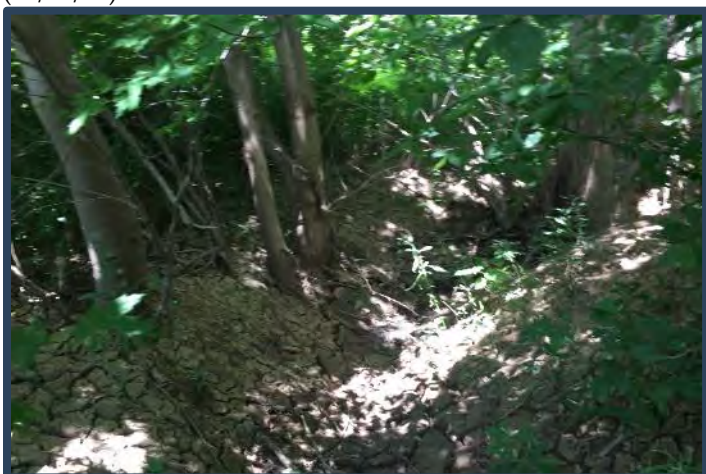


Photo 72: View of UNT-11 to Eagle Creek facing south (07/25/18).

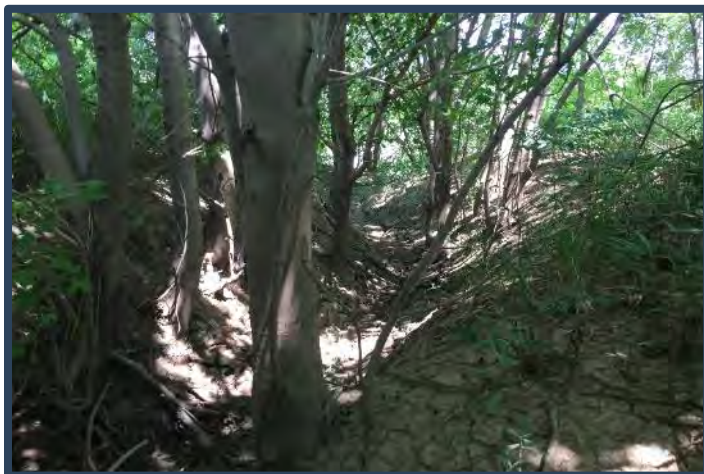


Photo 73: View of UNT-11 to Eagle Creek facing south (07/25/18).



Photo 74: View of well-drained agricultural field facing north (05/16/19).



Photo 75: View of UNT-13 to Eagle Creek facing north. The OHWM is obscured by vegetation (08/01/18).



Photo 76: View of UNT-13 to Eagle Creek facing south (08/01/18).



Photo 77: View of UNT-12 to Eagle Creek facing southeast (08/01/18).



Photo 78: View of UNT-12 to Eagle Creek facing northwest (08/01/18).



Photo 79: View of fields, facing south. No features present (05/16/19).



Photo 80: View of fields, facing north. No features present (05/16/19).



Photo 81: View of UNT-14 to Eagle Creek facing northwest. The OHWM is obscured by vegetation (08/01/18).



Photo 82: View of UNT-14 to Eagle Creek facing southeast. The OHWM is obscured by vegetation (08/01/18).



Photo 83: View of field, facing south. No features present (05/16/19).



Photo 84: View of field, facing north. No features present (05/16/19).



Photo 85: View of field, facing south. No features present (05/16/19).



Photo 86: View of a non-wet swale (UPL-01), facing north (05/16/19).



Photo 87: View of Upland 2 (UPL-02) facing east after an Ohio River flood. Notice soybean stubble from 2017 (07/25/18).



Photo 88: View of Upland 2 (UPL-02) facing west (07/25/18). This area only met the hydrophytic vegetation criterion.



Photo 89: View of soil pit at a non-wet swale (UPL-03), facing east (05/16/19).



Photo 90: View of a non-wet swale (UPL-03), facing south (05/16/19).



Photo 91: View of well-drained agricultural swale, facing south. (05/16/19).



Photo 92: View of well-drained agricultural swale facing south (05/16/19).



Photo 93: View of agricultural swale (UPL-04) facing east (07/25/18). None of the three wetland criteria were met.



Photo 94: View of agricultural swale (UPL-04) facing east (07/25/18).



Photo 95: View of the Ohio River facing southwest (07/12/17).



Photo 96: View of the Ohio River facing north (01/23/19).



Photo 97: View of DP-5A-1-OUT facing south. This location was well drained (07/26/18).



Photo 98: View of the soil profile observed at DP-5A-1-OUT (07/26/18). No hydric soil indicators were observed.



Photo 99: View of Wetland 5A (DP-5A-1-IN) facing east. This location is near a pipeline ROW and failed to meet all three wetland criteria (07/26/18).



Photo 100: View of the soil profile observed at Wetland 5A (DP-5A-1-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 101: View of Wetland 5A near DP-5A-1-IN facing west. (07/26/18)



Photo 102: View of Wetland 5A (DP-5A-1-IN) facing north (07/26/18).



Photo 103: View of soil profile observed at Wetland 5C (DP-5C-1-IN). This location met the depleted matrix (F3) indicator. (05/17/19).



Photo 104: View of Wetland 5B facing north (07/26/18).



Photo 105: View of the soil profile observed at Wetland 5B (DP-5B-1-IN). This location met the depleted matrix (F3) and the depleted below dark matrix (A11) indicators (07/26/18).



Photo 106: View of soil profile at Wetland 5A (DP-5A-2-IN)- This location met the depleted matrix (F3) indicator (05/17/19).



Photo 107: View of Wetland 5B (DP-5B-1-IN) facing north (07/26/18)



Photo 108: View of an upland area near DP-5B-1-OUT facing south (07/26/18).



Photo 109: View of Wetland 5A near DP-5A-2-IN facing north (05/17/19).



Photo 110: View of DP-5B-1-OUT facing west. This location was well drained (07/26/18).



Photo 111: View of DP-5D-1-OUT in a corn field facing east. This location did not meet all three wetland criteria (07/26/18).



Photo 112: View of the soil profile observed at DP-5D-1-OUT (07/26/18). No hydric soil indicators were observed.



Photo 113: View of Wetland 5D (DP-5D-1-IN) facing west (07/26/18). This location met all three wetland criteria



Photo 114: View of the soil profile observed at Wetland 5D (DP-5D-1-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 115: View of Wetland 5D facing west (07/26/18).



Photo 116: View of Wetland 5D (DP-5D-1-IN) facing west (07/26/18).



Photo 117: View of upland ridge at DP-5D-2-OUT between swales of Wetland 5D, facing west (05/17/19).



Photo 118: View of at DP-5D-2-OUT soil profile along upland ridge between swales of Wetland 5D (05/17/19).



Photo 119: View of upland ridge at DP-5D-2-OUT between swales of Wetland 5D, facing west (05/17/19).



Photo 120: View of Wetland 5D facing northwest. Note surface soil cracks and herbicide impact on vegetation (07/26/18).



Photo 121: View of the soil profile observed at Wetland 5D (DP-5D-2-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 122: View of Wetland 5D (DP-5D-2-IN) facing west. This location met all three wetland criteria (07/26/18).



Photo 123: View of Wetland 5D facing northeast (07/26/18).



Photo 124: View of the soil profile observed at DP-5D-2-OUT (07/26/18).



Photo 125: View of DP-5D-2-OUT facing northwest. This location did not meet all three wetland criteria (07/26/18).



Photo 126: View of Wetland 6 facing northwest (07/26/18).



Photo 127: View of Wetland 6 facing south (07/26/18).



Photo 128: View of Wetland 6 (DP-6-1-IN) facing south. This location met all three wetland criteria (07/26/18).



Photo 129: View of DP-6-1-OUT facing east. This location was well-drained and did not have hydric soils (07/26/18).



Photo 130: View of the soil profile observed at DP-6-1-OUT (07/26/18).



Photo 131: View of the soil profile observed at Wetland 6 (DP-6-1-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 132: View of Wetland 6 (DP-6-2-IN) facing east (07/26/18). This location met all three wetland criteria.



Photo 133: View of the soil profile observed at Wetland 6 (DP-6-2-IN). This location met the depleted matrix (F3) and the depleted below dark surface (A11) indicators (07/26/18).



Photo 134: View of Wetland 6 facing north (07/26/18).



Photo 135: View of Wetland 6 facing southwest (07/26/18).



Photo 136: View of the soil profile observed at Wetland 6 (DP-6-3-IN). This location met the depleted matrix (F3) and depleted below dark surface (A11) indicator (07/26/18).



Photo 137: View of Wetland 6 (DP-6-3-IN) facing north. This location met all three wetland criteria (07/26/18).



Photo 138: View of the soil profile observed at Wetland 6 (DP-6-4-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 139: View of Wetland 6 (DP-6-4-IN) facing south. This location met all three wetland criteria (07/26/18).



Photo 140: View of DP-6-4-OUT facing east (07/26/18). Only the hydric soil criterion was met at this location.



Photo 141: View of the soil profile observed at DP-6-4-OUT. This location met the depleted matrix (F3) indicator (07/26/18).



Photo 142: View of UNT-1 to Ohio River facing south (08/02/18).



Photo 143: View of UNT-2 to Ohio River facing west (08/02/18).



Photo 144: View of UNT-2 to Ohio River facing northeast (08/02/18).



Photo 145: View of UNT-3 to Ohio River facing north (08/02/18).

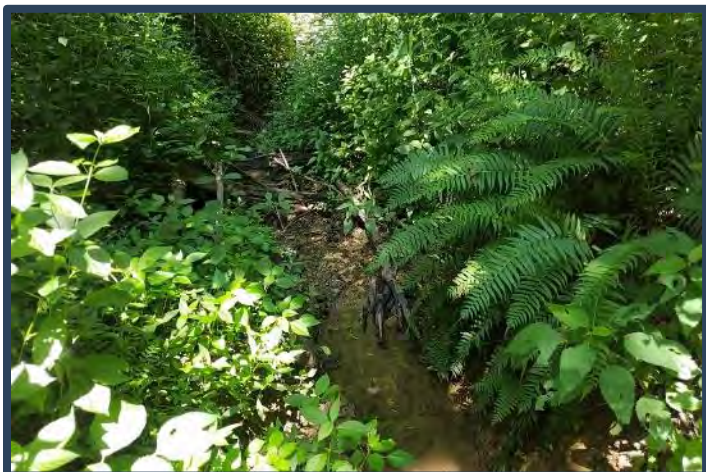


Photo 146: View of UNT-3 to Ohio River facing east (08/02/18).



Photo 147: View of a culvert and riprap along UNT-4 to Ohio River facing east (07/19/17).



Photo 148: View of UNT-4 to Ohio River facing east (07/19/17).

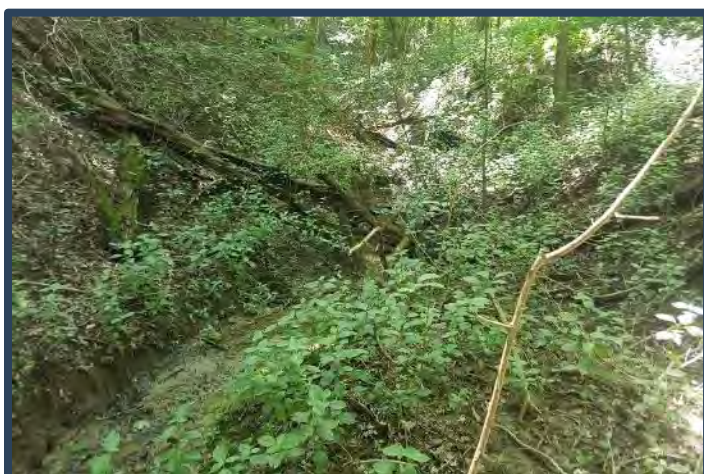


Photo 149: View of UNT-5 to Ohio River facing west (08/02/18).



Photo 150: View of UNT-5 to Ohio River facing south (08/02/18).



Photo 151: View of UNT-7 to Ohio River facing southwest (08/02/18).

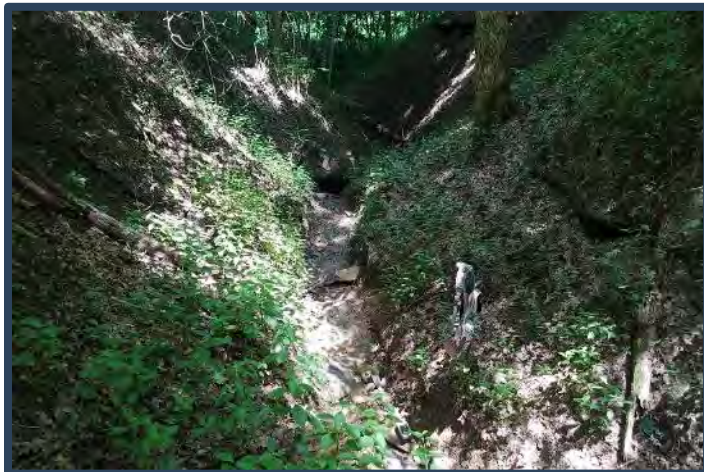


Photo 152: View of UNT-7 to Ohio River facing northeast (08/02/18).



Photo 153: View of UNT-8 to Ohio River facing east (08/02/18).

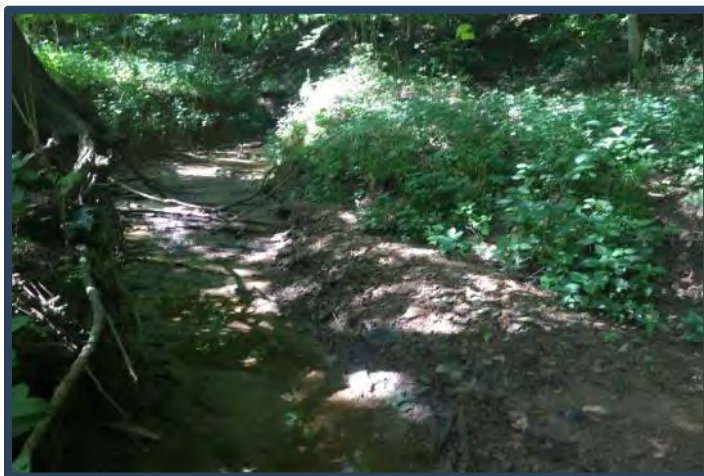


Photo 154: View of UNT-1 to Ohio River facing south (08/02/18).



Photo 155: View of UNT-1 to Ohio River facing northeast (08/02/18).



Photo 156: View of culvert on UNT-8 to Ohio River facing southeast. Note the culvert goes under an access road to the utility right-of-way (07/19/17).



Photo 157: View of UNT-8 to Ohio River facing northwest (07/19/17).



Photo 158: View of Wetland 7 (DP-7-IN) facing south. This location met all three wetland criteria (07/26/18).



Photo 159: View of Wetland 7 facing south. Soil is bare in areas not dominated by rice cutgrass (*Leersia oryzoides*) (07/26/18).



Photo 160: View of the soil profile observed at Wetland 7 (DP-7-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 161: View of Wetland 7 facing north (07/26/18).



Photo 162: View of the soil profile observed at DP-7-OUT. This well-drained soil is not hydric (07/26/18).



Photo 163: View of DP-7-OUT facing northeast. This upland data point was well drained (07/26/18).



Photo 164: View of UNT-10 to Ohio River facing east (08/02/18).



Photo 165: View of UNT-10 to Ohio River facing west (08/02/18).



Photo 166: View of UNT-9 to Ohio River facing northeast (08/02/18).



Photo 167: View of UNT-9 to Ohio River facing southwest (08/02/18).



Photo 168: View of UNT-12 to Ohio River facing east (08/02/18).



Photo 169: View of UNT-12 to Ohio River facing northwest (08/02/18).



Photo 170: View of UNT-11 to Ohio River facing north (08/02/18).



Photo 171: View of UNT-11 to Ohio River facing south (08/02/18).



Photo 172: View of the soil profile observed at DP-8-OUT. This location did not meet any of the hydric soil indicators (07/26/18).



Photo 173: View of Wetland 8 facing southeast (07/26/18).



Photo 174: View of Wetland 8 (DP-8-IN) facing southeast. This location met all three wetland criteria (07/26/18).



Photo 175: View of DP-8-OUT facing west. This location did not meet all three wetland criteria (07/26/18).



Photo 176: View of the soil profile observed at Wetland 8 (DP-8-IN). This location met the depleted matrix (F3) indicator (07/26/18).



Photo 177: View of Wetland 8 (DP-8-IN) facing north (07/26/18). This area met all three wetland criteria.



Photo 178: View of UNT-1 to North Fork Canoe Creek facing south (08/02/18).



Photo 179: View of UNT-1 to North Fork Canoe Creek facing south (08/02/18).



Photo 180: View of UNT-2 to North Fork Canoe Creek facing downstream (southeast) (08/03/18).



Photo 181: View of UNT-2 to North Fork Canoe Creek facing upstream (northwest) (08/03/18).



Photo 182: View of UNT-2 to North Fork Canoe Creek facing northwest (08/03/18).



Photo 183: View of UNT-3 to North Fork Canoe Creek facing northwest. The OHWM is obscured by vegetation (08/03/18).

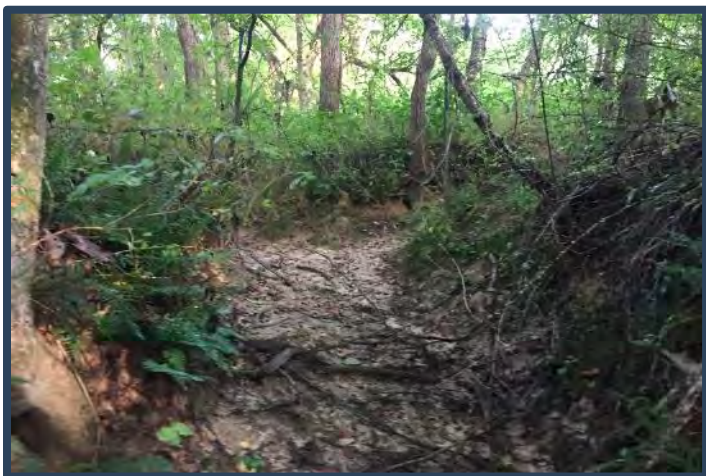


Photo 184: View of UNT-3 to North Fork Canoe Creek facing southeast (08/03/18).



Photo 185: View of upland forest facing north (04/24/19).



Photo 186: View of upland forest facing north (04/24/19).



Photo 187: View of upland forest facing north (04/24/19).



Photo 188: View of upland old-field habitat, facing south (04/24/19).



Photo 189: View of upland old-field habitat facing southwest (04/24/19).



Photo 190: View of UNT-4 to North Fork Canoe Creek facing northwest (08/03/18).



Photo 191: View of UNT-4 to North Fork Canoe Creek facing southeast. The OHWM is obscured by vegetation (08/03/18).



Photo 192: View of UNT-5 to North Fork Canoe Creek facing west (09/20/18).



Photo 193: View of UNT-5 to North Fork Canoe Creek facing east (09/20/18).



Photo 194: View of UNT-6 to North Fork Canoe Creek facing southeast (09/20/18).



Photo 195: View of UNT-7 to North Fork Canoe Creek facing south (09/20/18).



Photo 196: View of UNT-7 to North Fork Canoe Creek culvert under US 60 facing northeast (09/20/18).



Photo 197: View of UNT-8 to North Fork Canoe Creek with US 60 in the background facing northwest (09/20/18).



Photo 198: View of UNT-8 to North Fork Canoe Creek facing northwest. Note that this is the end of the eroded channel and OHWM (09/20/18).



Photo 199: View of UNT-9 to North Fork Canoe Creek with US 60 in the background facing northeast (09/20/18).



Photo 200: View of UNT-9 to North Fork Canoe Creek facing southwest (09/20/18).



Photo 201: View of UNT-11 to North Fork Canoe Creek facing northeast. Note the US 60 bridge over a railroad in the background (08/03/18).



Photo 202: View of UNT-11 to North Fork Canoe Creek facing southwest (08/03/18).



Photo 203: View of UNT-12 to North Fork Canoe Creek with US 60 in the background facing northwest (09/20/18).



Photo 204: View of UNT-12 to North Fork Canoe Creek facing northeast (09/20/18).

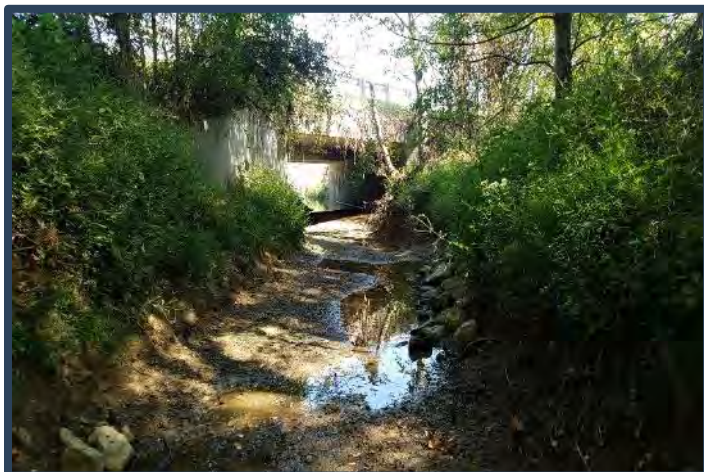


Photo 205: View of UNT-13 to North Fork Canoe Creek with US 60 in the background facing northeast (08/03/18).



Photo 206: View of UNT-13 to North Fork Canoe Creek facing northeast (8/03/18).



Photo 207: View of UNT-14 to North Fork Canoe Creek facing east. The OHWM is obscured by vegetation (10/02/17).



Photo 208: View of UNT-14 to North Fork Canoe Creek with US 60 in the background facing west (10/02/17).



Photo 209: View of US 60 road ditch swale facing west (04/23/19). Notice that there is no OHWM or channel.



Photo 210: View of UNT-16 to North Fork Canoe Creek facing north (09/20/18).



Photo 211: View of UNT-16 to North Fork Canoe Creek facing south (09/20/18).



Photo 212: View of UNT-6 to North Fork Canoe Creek facing southeast (10/02/17).



Photo 213: View of well-drained agricultural field facing northeast (04/24/19).



Photo 214: View of well-drained agricultural field facing east (04/24/19).



Photo 215: View of well-drained agricultural field facing west (04/24/19).



Photo 216: View of depression with agricultural drain facing northeast (04/24/19).



Photo 217: View of well-drained agricultural field facing southwest (04/24/19).



Photo 218: Broken agricultural drainage tiles present in fields near North Fork Canoe Creek (04/24/19).



Photo 219: View of well-drained agricultural field facing east (04/24/19).

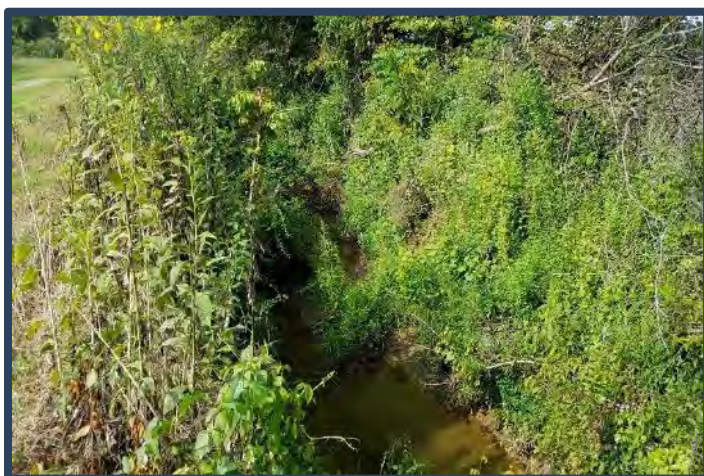


Photo 220: View of UNT-17 to North Fork Canoe Creek facing southwest (09/20/18).

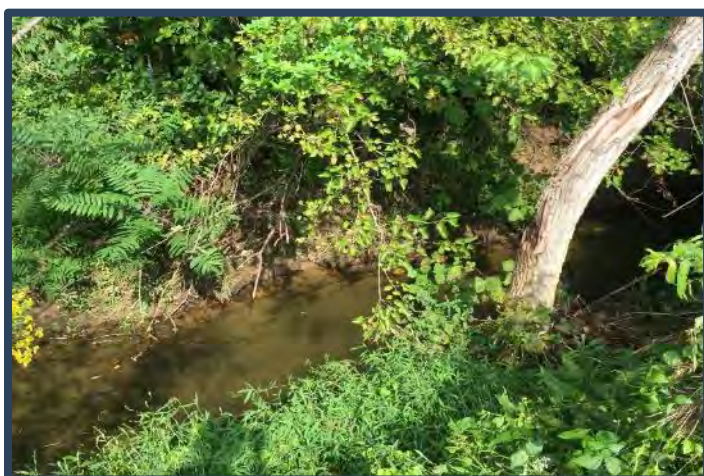


Photo 221: View of UNT-17 to North Fork Canoe Creek facing north (09/20/18).

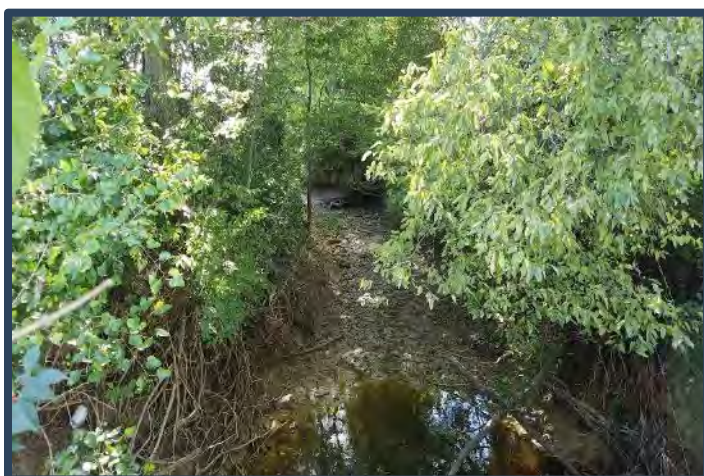


Photo 222: View of UNT-18 to North Fork Canoe Creek facing northwest (09/20/18).



Photo 223: View of culvert at UNT-17 to North Fork Canoe Creek facing west (04/24/19).



Photo 224: View of UNT-19 to North Fork Canoe Creek facing southeast. The OHWM is obscured by vegetation (09/21/18).



Photo 225: View of UNT-19 to North Fork Canoe Creek facing northwest (09/21/18).



Photo 226: View of well-drained agricultural field facing west (004/24/19).



Photo 227: View of UNT-20 to North Fork Canoe Creek facing southeast (09/21/18).



Photo 228: View of agricultural field swale facing northeast (04/24/19).



Photo 229: View of field erosional channels in agricultural field facing southwest (04/24/19).



Photo 230: View of field erosional channels facing northeast (04/24/19).



Photo 231: View of well-drained agricultural field facing east (04/24/19).



Photo 232: View of field erosional channels facing east (04/24/19).



Photo 233: View of erosion channels in agricultural field facing southwest (04/24/19).



Photo 234: View of well-drained agricultural field facing east (04/24/19).



Photo 235: View of culvert at UNT-21 to North Fork Canoe Creek facing northeast (04/24/19).



Photo 236: View of UNT-21 to North Fork Canoe Creek facing southwest (08/30/18).

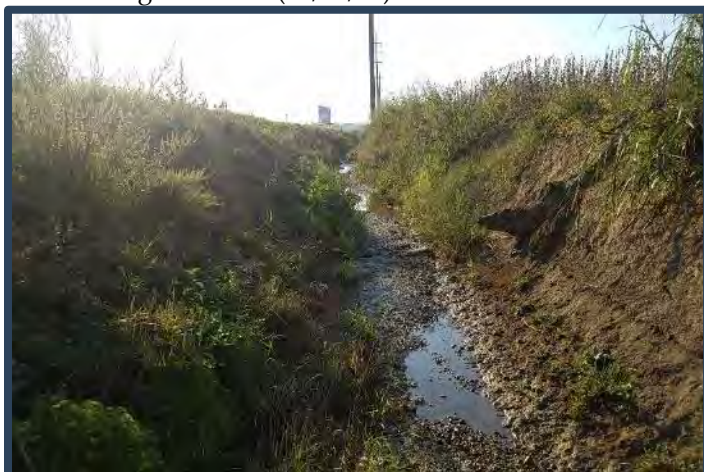


Photo 237: View of UNT-21 to North Fork Canoe Creek facing southeast (08/30/18).



Photo 238: View of UNT-22 to North Fork Canoe Creek facing northeast (08/30/18).



Photo 239: View of culverts that carry UNT-22 to North Fork Canoe Creek under Kimsey Lane facing northeast (08/30/18).



Photo 240: View of North Fork Canoe Creek under Kimsey Lane facing east (08/30/18).



Photo 241: View of North Fork Canoe Creek facing southwest (08/30/18).



Photo 242: View of UNT-24 to North Fork Canoe Creek facing west. The OHWM is obscured by vegetation (08/30/18).



Photo 243: View of UNT-24 to North Fork Canoe Creek facing southeast (08/30/18).



Photo 244: View of UNT-25 to North Fork Canoe Creek facing southeast (09/21/18).



Photo 245: View of the riparian corridor along UNT-25 to North Fork Canoe Creek facing northwest (08/30/18).



Photo 246: View of UNT-26 to North Fork Canoe Creek facing south (09/21/18).



Photo 247: View of UNT-26 to North Fork Canoe Creek facing east (09/21/18).



Photo 248: View of UNT-27 to North Fork Canoe Creek facing south (09/21/18).



Photo: 249: View of UNT-27 to North Fork Canoe Creek facing northwest (9/21/18).



Photo 250: View of North Fork Canoe Creek facing upstream toward US 41 bridge, facing northeast (05/16/19).



Photo 251: View of North Fork Canoe Creek facing downstream, facing west (05/16/19).

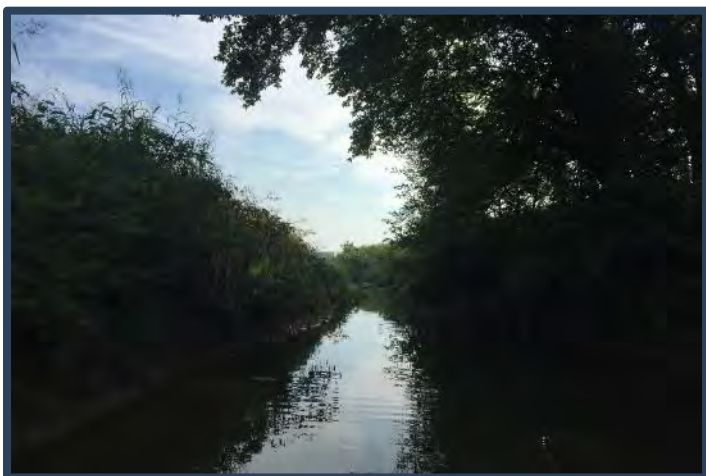


Photo 252: View of North Fork Canoe Creek facing upstream (northeast) (09/21/18).



Photo 253: View of North Fork Canoe Creek under US 41 bridge facing downstream (southwest) (09/21/18).



Photo 254: View of UNT-29 to North Fork Canoe Creek facing south (09/21/18).



Photo 255: View of UNT-29 to North Fork Canoe Creek facing north (09/21/18).



Photo 256: View of UNT-29 to North Fork Canoe Creek facing northwest (09/21/18).



Photo 257: View of UNT-30 to North Fork Canoe Creek facing northeast with Van Wyk Road on the right (9/21/18).



Photo 258: View of UNT-30 to North Fork Canoe Creek facing southwest with Van Wyk road in the background (9/21/18).



Photo 259: View of UNT-31 to North Fork Canoe Creek facing southwest with US 40 overpass in the background and Van Wyk Road on the right (09/21/18).



Photo 260: View of UNT-28 to North Fork Canoe Creek facing northwest. The OHWM is obscured by vegetation (10/02/18).



Photo 261: View of UNT-28 to North Fork Canoe Creek facing southeast (10/02/18).



Photo 262: View Wetland 9 (DP-9-IN) facing east (10/02/18). This location met all three wetland criteria.



Photo 263: View Wetland 9 (DP-9-IN) facing west. This location met all three wetland criteria (10/02/18).



Photo 264: View of soil profile at Wetland 9 (DP-9-IN). This location met the depleted below dark surface (A11) indicator (10/02/18).



Photo 265: View at DP-9-OUT facing northwest (10/02/18).



Photo 266: View of Wetland 10 (DP-10-IN) facing south (10/02/18). This location met all three wetland criteria.



Photo 267: View of Wetland 10 facing north (10/02/18).



Photo 268: View soil profile at Wetland 10 (DP-10-IN). This location met the depleted below dark surface (A11) indicator (10/02/18).



Photo 269: View of Wetland 10 facing south (10/02/18).



Photo 270: View of well-drained US 41 infield interchange area facing southwest (04/24/19).



Photo 271: View of Wetland 11 and adjacent upland area (DP-11-OUT) facing south (10/02/18).



Photo 272: View of Wetland 11 (DP-11-IN) facing north (10/02/18). This location met all three wetland criteria.



Photo 273: View of Wetland 11 facing north (10/02/18).



Photo 274: View of US 41 median facing north (04/24/19).



Photo 275: View of UNT-32 to North Fork Canoe Creek facing north (10/02/18).

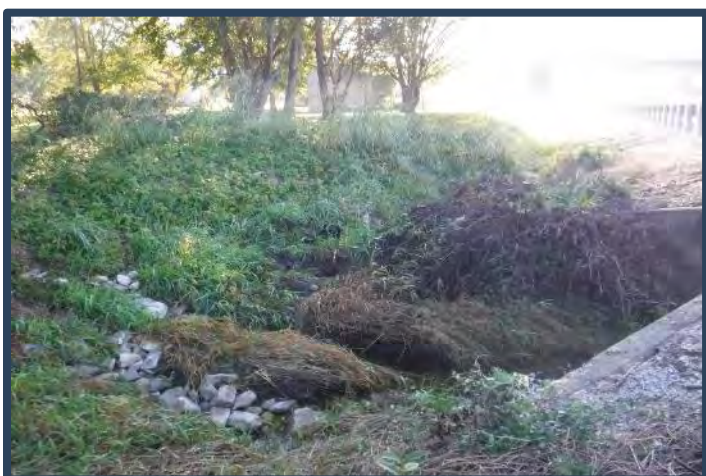


Photo 276: View of Wetland 12 and UNT-33 to North Fork Canoe Creek (arrow) facing south (10/02/18).



Photo 277: View of Wetland 12 (DP-12-IN) facing south (10/02/18). This location met all three wetland criteria.



Photo 278: View of UNT-33 to North Fork Canoe Creek facing south (10/02/18).



Photo 279: View of soil profile at Wetland 12 (DP-12-IN). This location met the depleted below dark surface (A11) indicator (10/02/18).



Photo 280: View of Wetland 12 and UNT-32 to North Fork Canoe Creek (arrow) facing north (10/02/18).



Photo 281: View of well-drained interchange infield area of US 41 facing south (04/24/19).



Photo 282: View of well-drained interchange infield area of US 41 facing east (04/24/19).



Photo 283: View of UNT-34 to North Fork Canoe Creek, facing southwest (04/24/19).



Photo 284: View of Wetland 13 (10/02/18) and surrounding upland facing south.



Photo 285: View of Wetland 13 (DP-13-IN) and UNT-34 to North Fork Canoe Creek facing west (10/02/18). This data point met all three wetland criteria.



Photo 286: View of Wetland 13 and UNT-34 to North Fork Canoe Creek facing south (10/02/18).



Photo 287: View of soil profile at DP-13-IN. This location met the depleted matrix (F3) and the depleted below dark surface (A11) indicators (10/02/18).



Photo 288: View of UNT-34 to North Fork Canoe Creek facing northwest near Wetland 13 (10/02/18).



Photo 289: View of US 41 interchange infield area facing northeast (04/24/19).



Photo 290: View of well-drained US 41 interchange infield area facing north (04/24/19).



Photo 291: View of US 41 interchange infield area facing southwest (04/24/19).



Photo 292: View of US 41 interchange infield area facing north (04/24/19).



Photo 293: View of UNT-37 to North Fork Canoe Creek facing south (04/23/19).



Photo 294: View of well-drained US 41 median facing south (04/23/19).



Photo 295: View of UNT-37 to North Fork Canoe Creek facing north (04/23/19)



Photo 296: View of UNT-36 to North Fork Canoe Creek, downstream, facing southwest (04/24/19).



Photo 297: View of UNT-37 to North Fork Canoe Creek at the confluence with UNT-36 to North Fork Canoe Creek (04/23/19).



Photo 298: View of UNT-38 to North Fork Canoe Creek, facing south (04/23/19).



Photo 299: View of UNT-36 to North Fork Canoe Creek upstream facing northeast (04/23/19).



Photo 300: View of UNT-38 to North Fork Canoe Creek, facing north (04/23/19).



Photo 301: View of UNT-39 to North Fork Canoe Creek facing southeast (04/23/19).



Photo 302: View of UNT-39 to North Fork Canoe Creek facing west (04/23/19).



Photo 303: View of well-drained upland forest facing west (04/23/19).



Photo 304: View of UNT-39 to North Fork Canoe Creek facing south (04/23/19).

APPENDIX D

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 4, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): Concave
 Slope (%): 4 Lat: 37.93872 Long: -87.53858 Datum: NAD-1983
 Soil Map Unit Name: Weinbach silt loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil , or hydrology significantly disturbed? Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a palustrine emergent wetland located between I-69 and an exit ramp from I-69. This area appears to have been disturbed during construction of a ramp to I-69. During rain events, the wetland likely receives runoff from I-69. **WOTUS 2018 ID: NA**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>95</u> x 1 = <u>95</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>95</u> (A) <u>95</u> (B) Prevalence Index = B/A = <u>1.00</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Leersia oryzoides</u>	<u>90</u>	<u>Y</u>	<u>OBL</u>	
2	<u>Scirpus cyperinus</u>	<u>5</u>	<u>N</u>	<u>OBL</u>	
3					
4					
5					
6					
7					
8					
9					
10					
		<u>95</u>	= Total Cover		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

In very dry conditions, this area is probably mowed, and it is likely that it is treated with herbicides to control woody vegetation.

SOIL

Sampling Point:

DP-1-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-12	10YR 5/2	95	10YR 7/6	5	C	M	Silt loam	
12-20	2.5Y 6/1	80	2.5Y 7/4	20	C	M	Silt clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: None
 Depth (inches): N/A
Hydric soil present? Y

Remarks:

This location met the depleted matrix (F3) indicator. Clay content increases at a depth below 12 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|---|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present? (includes capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water-stained leaves demarcate low-lying areas where water is retained during storm events.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 4, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex
 Slope (%): 2 Lat: 37.93879 Long: -87.53852 Datum: NAD-1983
 Soil Map Unit Name: Weinbach silt loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil X, or hydrology significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation , soil , or hydrology naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>N</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland area located between I-69 and an exit ramp from I-69. This area appears to have been disturbed during construction of a ramp to I-69. **WOTUS 2018 ID: NA**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B)
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>105</u> x 4 = <u>420</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>105</u> (A) <u>420</u> (B) Prevalence Index = B/A = <u>4.00</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u> </u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Cynodon dactylon</u>	<u>90</u>	<u>Y</u>	<u>FACU</u>	
2	<u>Schedonorus arundinaceus</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
3	<u>Sorghum halepense</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
4					
5					
6					
7					
8					
9					
10					
		<u>105</u>	= Total Cover		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>N</u>
1					
2					
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

The upland area is infrequently maintained. Chicory (*Cichorium intybus*) and bull thistle (*Cirsium vulgare*) are present in the upland outside of this datapoint.

SOIL

Sampling Point:

DP-1-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-12	10YR 6/3	100					Silt loam	
12-20	10YR 5/3	80	10YR 6/2	20	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None
Depth (inches): N/A

Hydric soil present? N

Remarks:

Soils are well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| <input type="checkbox"/> Surface Water (A1) |
| <input type="checkbox"/> High Water Table (A2) |
| <input type="checkbox"/> Saturation (A3) |
| <input type="checkbox"/> Water Marks (B1) |
| <input type="checkbox"/> Sediment Deposits (B2) |
| <input type="checkbox"/> Drift Deposits (B3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) |
| <input type="checkbox"/> Iron Deposits (B5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Water-Stained Leaves (B9) |

- | |
|---|
| <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Other (Explain in Remarks) |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

(includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The upland datapoint is well drained.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 1

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	2	During rain events, the wetland likely receives runoff from I-69. Small wetland size limits this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	The location of this wetland between I-69 and an entrance ramp to I-69 limits use by terrestrial wildlife. The wetland does not exhibit a high degree of plant diversity to support a variety of species.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	1	There is little pooled/ponded water in this wetland, therefore, this wetland has low potential to support aquatic wildlife populations.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	0	The visual quality/aesthetics of this wetland is low as it is located in an I-69 interchange. Highway noise and traffic diminish the aesthetics of the wetland.

Total Score 6

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-2-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): Concave
 Slope (%): 2 Lat: 37.93596 Long: -87.52557 Datum: NAD-1983
 Soil Map Unit Name: Borrow pits NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? No Are "normal circumstances" present? Yes
 Are vegetation , soil , or hydrology naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a bottomland hardwood forest swale located south of I-69 and north of Eagle Creek. During rain events, the wetland likely receives runoff from I-69 and overflow flooding from Eagle Creek. This wetland has likely been affected by filling and was probably part of a larger wetland in the past. **WOTUS 2018 ID: WTL-04**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across all Strata: <u>5</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Salix interior</u>	<u>75</u>	<u>Y</u>	<u>FACW</u>	
2					
3					
4					
5					
		<u>75</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>30</u> x 1 = <u>30</u> FACW species <u>80</u> x 2 = <u>160</u> FAC species <u>25</u> x 3 = <u>75</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>135</u> (A) <u>265</u> (B) Prevalence Index = B/A = <u>1.96</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1	<u>Cephalanthus occidentalis</u>	<u>30</u>	<u>Y</u>	<u>OBL</u>	
2	<u>Acer rubrum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
3					
4					
5					
		<u>50</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Laportea canadensis</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Acer rubrum</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
3					
4					
5					
6					
7					
8					
9					
10					
		<u>10</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The forest floor is covered with leaf litter and tree debris.

SOIL

Sampling Point:

DP-2-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	2.5Y 3/1	100					Silt loam	
4-10	10YR 5/2	80	2.5Y 6/1	20	C	M	Silt loam	
10-20	10YR 5/4	80	2.5Y 4/1	20	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: None
 Depth (inches): N/A
Hydric soil present? Y

Remarks:

There is a thin layer of leaf litter on top of the soil's surface. Soils are saturated at this point. This location met the depleted matrix (F3) and the depleted below dark surface (A11) indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| <input type="checkbox"/> Surface Water (A1) |
| <input checked="" type="checkbox"/> High Water Table (A2) |
| <input checked="" type="checkbox"/> Saturation (A3) |
| <input type="checkbox"/> Water Marks (B1) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) |
| <input type="checkbox"/> Iron Deposits (B5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9) |

- | |
|---|
| <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Other (Explain in Remarks) |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>6"</u>
Water table present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>0"</u>
Saturation present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>0"</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ponded/pooled water is present within the wetland, outside of this data point. Water-stained leaves demarcate low-lying areas where water is retained during rain/flood events. Crayfish burrows are present throughout the wetland. Sediment deposits (thin coatings of silt) are visible on tree trunk bases. A culvert connecting to an ephemeral channel is located on the southern edge of the wetland.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-2-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex
 Slope (%): 2 Lat: 37.93590 Long: -87.52558 Datum: NAD-1983
 Soil Map Unit Name: Borrow pits NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This datapoint is located between I-69 and Eagle Creek. **WOTUS 2018 ID: WTL-04**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>5</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>60.00%</u> (A/B)
1	<u>Acer rubrum</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
4	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
5	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>10</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>55</u> x 3 = <u>165</u> FACU species <u>40</u> x 4 = <u>160</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>95</u> (A) <u>325</u> (B) Prevalence Index = B/A = <u>3.42</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1	<u>Acer rubrum</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
4	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
5	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>10</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Toxicodendron radicans</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Sorghum halepense</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	
3	<u>Schedonorus arundinacea</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	
4	<u>Plantago major</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
5	<u>Convolvulus arvensis</u>	<u>5</u>	<u>N</u>	<u>NI</u>	
6	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
7	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
8	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
9	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
10	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>80</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point:

DP-2-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	10YR 5/3	98	10YR 6/6	2	C	M	Silt loam	
4-20	7.5YR 5/6	100					Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: None
 Depth (inches): N/A
Hydric soil present? N**Remarks:**

Soils are well drained. Inclusions of tree roots were present throughout the soil core.

HYDROLOGY**Wetland Hydrology Indicators:**Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| <input type="checkbox"/> Surface Water (A1) |
| <input type="checkbox"/> High Water Table (A2) |
| <input type="checkbox"/> Saturation (A3) |
| <input type="checkbox"/> Water Marks (B1) |
| <input type="checkbox"/> Sediment Deposits (B2) |
| <input type="checkbox"/> Drift Deposits (B3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) |
| <input type="checkbox"/> Iron Deposits (B5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Water-Stained Leaves (B9) |

- | |
|---|
| <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Other (Explain in Remarks) |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 2

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	2	Ponded/pooled water is present within the wetland. During rain events, the wetland likely receives runoff from I-69.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	Animal signs were observed within the wetland (tracks, scat, burrows). Raccoon tracks were visible along the edge of ponded water. The narrow size of the wetland may result in minimized habitat potential for large mammals.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	2	Ponded/pooled water is present within the wetland. Tadpoles were observed within ponded areas.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	2	The visual quality/aesthetics of this wetland is low as it is located south of I-69. Trash is strewn throughout the wetland. Highway noise is audible from the wetland.

Total Score 9

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-3-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93583 Long: -87.52266 Datum: NAD-1983
 Soil Map Unit Name: Newark silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a bottomland hardwood forest located south of I-69 and north of Eagle Creek. During rain events, the wetland likely receives runoff from I-69 and overflow flooding from Eagle Creek. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>75.00%</u> (A/B)
1	<u>Acer rubrum</u>	<u>85</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
4					
5					
		<u>85</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>7</u> x 2 = <u>14</u> FAC species <u>85</u> x 3 = <u>255</u> FACU species <u>2</u> x 4 = <u>8</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>94</u> (A) <u>277</u> (B) Prevalence Index = B/A = <u>2.95</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Campsis radicans</u>	<u>2</u>	<u>Y</u>	<u>FACU</u>	
3	<u>Laportea canadensis</u>	<u>2</u>	<u>Y</u>	<u>FACW</u>	
4					
5					
6					
7					
8					
9					
10					
		<u>9</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The forest floor is covered with leaf litter and tree debris.

SOIL

Sampling Point: DP-3-1-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	2.5Y 3/1	100					Silt loam	
4-10	10YR 5/2	80	2.5Y 6/1	20	C	M	Silt loam	
10-20	10YR 5/4	80	2.5Y 4/1	20	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None
Depth (inches): N/A

Hydric soil present? Y

Remarks:

There is a thin layer of leaf litter on top of the soil's surface. Soils are saturated at this point. This location met the depleted matrix (F3) and depleted below dark surface (A11) indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| <input type="checkbox"/> Surface Water (A1) |
| <input checked="" type="checkbox"/> High Water Table (A2) |
| <input checked="" type="checkbox"/> Saturation (A3) |
| <input type="checkbox"/> Water Marks (B1) |
| <input type="checkbox"/> Sediment Deposits (B2) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) |
| <input type="checkbox"/> Iron Deposits (B5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9) |

- | |
|---|
| <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Other (Explain in Remarks) |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <u> </u>	No <u>X</u>	Depth (inches): <u> </u>
Water table present?	Yes <u>X</u>	No <u> </u>	Depth (inches): <u>6"</u>
Saturation present?	Yes <u>X</u>	No <u> </u>	Depth (inches): <u>0"</u>

(includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ponded/pooled water is present within the wetland, outside of this data point. Water-stained leaves demarcate low-lying areas where water is retained during rain/flood events.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-3-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93578 Long: -87.522514 Datum: NAD-1983
 Soil Map Unit Name: Newark silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland area located south of I-69 and north of Eagle Creek. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across all Strata: <u>3</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>66.67%</u> (A/B)
1	<u>Acer saccharinum</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
2					
3					
4					
5					
		<u>30</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>32</u> x 2 = <u>64</u> FAC species <u>62</u> x 3 = <u>186</u> FACU species <u>2</u> x 4 = <u>8</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>96</u> (A) <u>258</u> (B) Prevalence Index = B/A = <u>2.69</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Toxicodendron radicans</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Convolvulus arvensis</u>	<u>30</u>	<u>Y</u>	<u>NI</u>	
3	<u>Laportea canadensis</u>	<u>2</u>	<u>N</u>	<u>FACW</u>	
4	<u>Campsis radicans</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	
5	<u>Ampelopsis cordata</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	
6					
7					
8					
9					
10					
		<u>96</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The silver maples (*Acer saccharinum*) are rooted in the wetland. This data point is proximal to a buttonbush (*Cephalanthus occidentalis*) fringe along Eagle Creek.

SOIL

Sampling Point: DP-3-1-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	2.5Y 5/2	100					Silt loam	
4-16	10YR 5/3	95	2.5Y 6/1	5	C	M	Silt loam	
16-20	2.5Y 6/1	80	2.5 6/1	20	C	M	Silt clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: None
 Depth (inches): N/A
Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This area does not appear to remain saturated for long durations. The area receives infrequent overflow flooding from Eagle Creek.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-3-2-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93726 Long: -87.52086 Datum: NAD-1983
 Soil Map Unit Name: Newark silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a bottomland hardwood forest swale located south of I-69 and north of Eagle Creek. During rain events, the wetland likely receives runoff from I-69 and overflow flooding from Eagle Creek. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Acer negundo</u>	<u>70</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Acer rubrum</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
3					
4					
5					
		<u>80</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>80</u> x 3 = <u>240</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>80</u> (A) <u>240</u> (B) Prevalence Index = B/A = <u>3.00</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
		<u>0</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The forest floor is covered with leaf litter and tree debris. The herb stratum is sparsely vegetated.

SOIL

Sampling Point: DP-3-2-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	10YR 4/1	95	10YR 5/6	5	C	M	Silt clay loam	
4-12	10YR 5/3	50	10YR 6/1	50	C	M	Silt clay loam	
12-20	7.5YR 5/4	60	7.5YR 4/2	40	C	M	Silt clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
☐ Dark Surface (S7) (LRR K, L)
☐ Iron-Manganese Masses (F12) (LRR K, L, R)
☐ Very Shallow Dark Surface (TF12)
☐ Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Y**Remarks:**

There is a thin layer of leaf litter on top of the soil's surface. This location met the depleted matrix (F3) indicator.

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☒ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☒ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres on Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☒ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? Yes ☐ No ☒ Depth (inches):
 Water table present? Yes ☐ No ☒ Depth (inches): >20
 Saturation present? Yes ☐ No ☒ Depth (inches): >20
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface soil cracks are present throughout the wetland. Tree debris and trash are present in the wetland, likely from overflow flooding from Eagle Creek and the Ohio River.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-3-2-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 2 Lat: 37.93745 Long: -87.52059 Datum: NAD-1983
 Soil Map Unit Name: Borrow pits NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? No Are "normal circumstances" present? Yes
 Are vegetation , soil , or hydrology naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>N</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland area located south of I-69 and north of Eagle Creek. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B)
1	<u>Populus deltoides</u>	<u>70</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
4					
5					
		<u>70</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>75</u> x 3 = <u>225</u> FACU species <u>70</u> x 4 = <u>280</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>145</u> (A) <u>505</u> (B) Prevalence Index = B/A = <u>3.48</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1	<u>Robinia pseudoacacia</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>	
2	<u>Maclura pomifera</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	
3					
4					
5					
		<u>70</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u> </u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Toxicodendron radicans</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
4					
5					
6					
7					
8					
9					
10					
		<u>5</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>N</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The herb stratum is minimally vegetated due to shading from the overstory. The vegetation at this location is primarily >6ft tall.

SOIL

Sampling Point: DP-3-2-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	10YR 5/2	98	10YR 6/6	2	C	M	Silt loam	
4-20	7.5YR 5/6	100					Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: None
 Depth (inches): N/A
Hydric soil present? Y

Remarks:

Soils are well drained at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present? (includes capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This data point is moderately well drained.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-3-3-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93726 Long: -87.52086 Datum: NAD-1983
 Soil Map Unit Name: Newark silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a bottomland hardwood forest swale located south of I-69 and north of Eagle Creek. During rain events, the wetland likely receives runoff from I-69 and overflow flooding from Eagle Creek. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across all Strata: <u>8</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>87.50%</u> (A/B)
1	<u>Acer rubrum</u>	<u>70</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Salix nigra</u>	<u>30</u>	<u>Y</u>	<u>OBL</u>	
3					
4					
5					
		<u>100</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>30</u> x 1 = <u>30</u> FACW species <u>22</u> x 2 = <u>44</u> FAC species <u>75</u> x 3 = <u>225</u> FACU species <u>10</u> x 4 = <u>40</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>137</u> (A) <u>339</u> (B) Prevalence Index = B/A = <u>2.47</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1	<u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Ulmus americana</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
3					
4					
5					
		<u>10</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Campsis radicans</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	
2	<u>Toxicodendron radicans</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
3	<u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
4	<u>Laportea canadensis</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
5	<u>Carex grayi</u>	<u>2</u>	<u>N</u>	<u>FACW</u>	
6					
7					
8					
9					
10					
		<u>27</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The forest floor is covered with leaf litter and tree debris. The herb stratum is minimally vegetated.

SOIL

Sampling Point: DP-3-3-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-7	10YR 4/1	95	10YR 5/6	5	C	M	Silt loam	
7-16	2.5Y 5/2	80	10YR 6/6	20	C	M	Silt loam	
16-20	2.5Y 4/1	100					Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

DP-3-3-IN

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None
Depth (inches): N/A

Hydric soil present? Y

Remarks:

There is a thin layer of leaf litter on top of the soil's surface. This location met the depleted matrix (F3) indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface soil cracks are present throughout the wetland. Tree debris and trash are present in the wetland, likely from overflow flooding from Eagle Creek and the Ohio River.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/24/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-3-3-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 2 Lat: 37.93830 Long: -87.51860 Datum: NAD-1983
 Soil Map Unit Name: Borrow pits NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? No Are "normal circumstances" present? Yes
 Are vegetation , soil , or hydrology naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland area located south of I-69 and north of Eagle Creek. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across all Strata: <u>2</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Acer rubrum</u>	<u>90</u>	<u>Y</u>	<u>FAC</u>	
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
4	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
5	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>90</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>45</u> x 2 = <u>90</u> FAC species <u>90</u> x 3 = <u>270</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>135</u> (A) <u>360</u> (B) Prevalence Index = B/A = <u>2.67</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
4	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
5	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Laportea canadensis</u>	<u>40</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	
3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
4	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
5	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
6	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
7	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
8	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
9	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
10	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>45</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The green ash (*Fraxinus pennsylvanica*) is only present in unmowed areas. All trees are rooted within the wetland boundary.

SOIL

Sampling Point: DP-3-3-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	10YR 4/1	100					Silt loam	Rock/fill inclusions
4-12	10YR 5/4	80	10YR 5/2	20	C	M	Silt loam	Rock/fill inclusions

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
☐ Dark Surface (S7) (LRR K, L)
☐ Iron-Manganese Masses (F12) (LRR K, L, R)
☐ Very Shallow Dark Surface (TF12)
☐ Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Rock/fill
 Depth (inches): 12"

Hydric soil present? N

Remarks:

Soils are well drained at this location. Soils are mixed. A restrictive layer of rock/fill was present at a depth of twelve inches.

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres on Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☒ FAC-Neutral Test (D5)

Field Observations:

Surface water present? Yes ☐ No ☒ Depth (inches):
 Water table present? Yes ☐ No ☒ Depth (inches): >12
 Saturation present? Yes ☐ No ☒ Depth (inches): >12
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This upland is moderately well drained.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 5/17/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-3-4-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93652 Long: -87.52329 Datum: NAD-1983
 Soil Map Unit Name: Newark silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an early-age successional bottomland hardwood wetland. The area has hydric soils, hydrophytic vegetation, and the requisite hydrology to be considered a wetland. **WOTUS 2018 ID: WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Fraxinus pennsylvanica</u>	<u>80</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Populus deltoides</u>	<u>50</u>	<u>Y</u>	<u>FAC</u>	
3	<u>Acer negundo</u>	<u>20</u>	<u>N</u>		
4					
5					
		<u>150</u>	<u>= Total Cover</u>		
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>85</u> x 2 = <u>170</u> FAC species <u>90</u> x 3 = <u>270</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>175</u> (A) <u>440</u> (B) Prevalence Index = B/A = <u>2.51</u>
1					
2					
3					
4					
5					
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Toxicodendron radicans</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Acer negundo</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
3	<u>Carex intumescens</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	
4					
5					
6					
7					
8					
9					
10					
		<u>45</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The herb stratum is minimally vegetated.

SOIL

Sampling Point: DP-3-4-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-6	10YR 4/1	98	10YR 5/3	2	C	M	Silt loam	
6-20	10YR 5/2	80	2.5YR 6/6	20	C	M	Sandy loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

DP-3-3-IN

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: None
 Depth (inches): N/A
Hydric soil present? Y

Remarks:

Soils were sandy below six inches and there was water present in the soil pit at eight inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input checked="" type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <u> </u>	No <u>X</u>	Depth (inches): <u> </u>
Water table present?	Yes <u>X</u>	No <u>X</u>	Depth (inches): <u>8</u>
Saturation present?	Yes <u>X</u>	No <u>X</u>	Depth (inches): <u>0</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

It is assumed that without the recent Ohio River overflow flooding, there would not have been groundwater in the test pit.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 5/17/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-3-4-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 4 Lat: 37.93668 Long: -87.52327 Datum: NAD-1983
 Soil Map Unit Name: Newark silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This datapoint lacked the requisite soils and hydrology to be considered a wetland.

WOTUS 2018 ID: **WTL-01**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across all Strata: <u>5</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>80.00%</u> (A/B)
1	<u>Maclura pomifera</u>	<u>70</u>	<u>Y</u>	<u>FACU</u>	
2	<u>Populus deltoides</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
3	<u>Robinia pseudoacacia</u>	<u>20</u>	<u>N</u>	<u>FACU</u>	
4					
5					
		<u>120</u>	<u>= Total Cover</u>		
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>4</u> x 2 = <u>8</u> FAC species <u>49</u> x 3 = <u>147</u> FACU species <u>90</u> x 4 = <u>360</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>143</u> (A) <u>515</u> (B) Prevalence Index = B/A = <u>3.60</u>
1	<u>Acer negundo</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
4					
5					
		<u>15</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Acer negundo</u>	<u>4</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Carex intumescens</u>	<u>4</u>	<u>Y</u>	<u>FACW</u>	
3					
4					
5					
6					
7					
8					
9					
10					
		<u>8</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

Upland tree species become more dominant moving up slope from the wetland.

SOIL

Sampling Point: DP-3-4-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-6	10YR 5/3	100					Silt loam	
6-16	10YR 5/4	98	10YR 6/8	2	C	M	Silt loam	
16-20	10YR 5/4	100					Sandy loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: NA
 Depth (inches): NA
Hydric soil present? N**Remarks:**

Soils are moderately well drained at this location.

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The Ohio River flood approached this data point and some flood debris was nearby.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 3

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	3	Ponded/pooled water is present within the wetland. During rain events, the wetland likely receives runoff from I-69.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	3	Evidence of sediment on the vegetation is obvious as Ohio River floodwater receded.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	4	Although Eagle Creek is channelized, the adjacent wetland is stable because of the bottomland hardwoods.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	3	Animal signs were observed within the wetland (tracks, scat, burrows). Raccoon tracks were visible along the edge of ponded water. The noise and vehicle traffic on existing I-69 is the primary limiting factor for this function.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	2	Aquatic resource benefits are generally low except during flood events.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	2	The visual quality/aesthetics of this wetland is low as it is located south of I-69. Trash is strewn throughout the wetland. Highway noise is audible from the wetland.

Total Score 17

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-4A-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93405 Long: -87.52532 Datum: NAD-1983
 Soil Map Unit Name: Water NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a bottomland hardwood forest wetland parallel to Eagle Creek. The area primarily receives overflow flooding from Eagle Creek and the Ohio River. This wetland has been altered by borrow pits and maintenance of the channelized section of Eagle Creek.

WOTUS 2018 ID: WTL-57

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Acer rubrum</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Fraxinus pennsylvanica</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
3	<u>Salix nigra</u>	<u>25</u>	<u>N</u>	<u>OBL</u>	
4					
		<u>135</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>25</u> x 1 = <u>25</u> FACW species <u>30</u> x 2 = <u>60</u> FAC species <u>100</u> x 3 = <u>300</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>155</u> (A) <u>385</u> (B) Prevalence Index = B/A = <u>2.48</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1	<u>Acer rubrum</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
4					
5					
		<u>15</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Acer rubrum</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
4					
5					
6					
7					
8					
9					
10					
		<u>5</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The herb stratum is almost completely absent, primarily due to shade and Ohio River flooding.

SOIL

Sampling Point: DP-4A-1-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-12	10YR 5/1	100					Silt loam	
12-20	10YR 5/2	95	2.5Y 6/1	5	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: None
 Depth (inches): N/A
Hydric soil present? Y**Remarks:**

There is a thin layer of leaf litter on top of the soil's surface. This location met the depleted matrix (F3) indicator.

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input checked="" type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input checked="" type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This sample point is located near the edge of a borrow pit, west of a raised levee that was excluded from wetland.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-4A-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 3, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 1 Lat: 37.93396 Long: -87.52520 Datum: NAD-1983
 Soil Map Unit Name: Water NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland area between a fringe wetland of a borrow pit and a bottomland hardwood to the west. **WOTUS 2018 ID: WTL-57**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>3</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Acer saccharinum</u>	<u>60</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Ulmus americana</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
3	<u>Salix nigra</u>	<u>10</u>	<u>N</u>	<u>OBL</u>	
4					
5					Prevalence Index Worksheet Total % Cover of: OBL species <u>10</u> x 1 = <u>10</u> FACW species <u>95</u> x 2 = <u>190</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>105</u> (A) <u>200</u> (B) Prevalence Index = B/A = <u>1.90</u>
		<u>100</u>	<u>= Total Cover</u>		
Sapling/Shrub stratum (Plot size: <u>15' diameter</u>)					
1					
2					
3					Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4					
5					
6					
7					
8					Hydrophytic vegetation present? <u>Y</u>
9					
10					
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum (Plot size: <u>5' diameter</u>)					
1	<u>Laportea canadensis</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	Hydrophytic vegetation present? <u>Y</u>
2					
3					
4					
5					
6					Hydrophytic vegetation present? <u>Y</u>
7					
8					
9					
10					
		<u>5</u>	<u>= Total Cover</u>		
Woody vine stratum (Plot size: <u>30' diameter</u>)					Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

The trees are rooted in the bottomland hardwood forest to the west.

SOIL

Sampling Point:

DP-4A-1-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-12	10YR 5/3	100					Silt loam	
12-20	10YR 6/4	98	10YR 6/8	2	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: None
 Depth (inches): N/A
Hydric soil present? N**Remarks:**

This sample point was located on a levee road between two borrow pits.

HYDROLOGY**Wetland Hydrology Indicators:**Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This raised area is very infrequently flooded by the Ohio River.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: Indiana Sampling Point: DP-4B-2-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 10, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.93359 Long: -87.52471 Datum: NAD-1983
 Soil Map Unit Name: Water NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is a fringe emergent wetland on the southern border of a borrow pit (OW-1). The area likely has herbaceous vegetation annually depending on the amount of water in the borrow pit. **WOTUS 2018 ID: WTL-57**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>60</u> x 1 = <u>60</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>60</u> (A) <u>60</u> (B) Prevalence Index = B/A = <u>1.00</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Scirpus atrovirens</u>	<u>60</u>	<u>Y</u>	<u>OBL</u>	
2					
3					
4					
5					
6					
7					
8					
9					
10					
		<u>60</u>	= Total Cover		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

Purple loosestrife (*Lythrum salicaria*) is present just beyond the sample point.

SOIL

Sampling Point: DP-4B-2-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-6	10YR 5/2	70	2.5Y 5/1	30	C	M	Silt loam	
6-20	2.5Y 6/1	70	10YR 5/4	30	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: None
 Depth (inches): N/A
Hydric soil present? Y

Remarks:

This location met the depleted matrix (F3) indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input checked="" type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input checked="" type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <u> </u>	No <u>X</u>	Depth (inches): <u> </u>
Water table present?	Yes <u>X</u>	No <u> </u>	Depth (inches): <u>18"</u>
Saturation present?	Yes <u>X</u>	No <u> </u>	Depth (inches): <u>12"</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This sample point is located near the edge of a borrow pit.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-4B-2-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 10, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex
 Slope (%): 5 Lat: 37.93348 Long: -87.52481 Datum: NAD-1983
 Soil Map Unit Name: Water NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>Y</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This sample point was taken at the top of the bank of a borrow pit (OW-1) near the edge of a corn field. **WOTUS 2018 ID: WTL-57**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across all Strata: <u>5</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>80.00%</u> (A/B)
1	<u>Quercus palustris</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Ulmus americana</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	
3					
4					
5					
		<u>45</u>	<u>= Total Cover</u>		
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>90</u> x 2 = <u>180</u> FAC species <u>50</u> x 3 = <u>150</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>140</u> (A) <u>330</u> (B) Prevalence Index = B/A = <u>2.36</u>
1	<u>Ulmus americana</u>	<u>45</u>	<u>Y</u>	<u>FACW</u>	
2					
3					
4					
5					
		<u>45</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Ambrosia trifida</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Secale cereale</u>	<u>30</u>	<u>Y</u>	<u>NI</u>	
3	<u>Toxicodendron radicans</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
4					
5					
6					
7					
8					
9					
10					
		<u>80</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

Pin oak (*Quercus palustris*) was rooted in the bank.

SOIL

Sampling Point:

DP-4B-2-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	2.5Y 5/2	90	2.5Y 6/3	10	C	M	Silt loam	
4-15	2.5Y 6/3	100					Silt loam	
15-20	2.5Y 5/2	100					Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Y

Remarks:

The soils were very well drained and redox features were minimal.

HYDROLOGY**Wetland Hydrology Indicators:**Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present? (includes capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This area is very well drained.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 5/16/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: DP-4B-3-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 10, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex
 Slope (%): 1 Lat: 37.93522 Long: -87.52392 Datum: NAD-1983
 Soil Map Unit Name: Borrow Pits NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? No

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? No

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID <u> </u>
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This sample point is located on an upland terrace between Eagle Creek and OW-1 (borrow pit). The area is well drained. A corresponding wetland point was not taken because Ohio River flooding had filled the borrow pit. There is a wetland fringe around the open water.

WOTUS 2018 ID: WTL-57

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>75.00%</u> (A/B)
1	<u>Acer saccharinum</u>	<u>60</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Acer negundo</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
3					
4					
5					
		<u>80</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>60</u> x 2 = <u>120</u> FAC species <u>60</u> x 3 = <u>180</u> FACU species <u>30</u> x 4 = <u>120</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>150</u> (A) <u>420</u> (B) Prevalence Index = B/A = <u>2.80</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Toxicodendron radicans</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	
2	<u>Campsis radicans</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	
3					
4					
5					
6					
7					
8					
9					
10					
		<u>70</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

Recent flooding limited the herbaceous layer.

SOIL

Sampling Point:

DP-4B-3-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-12	10YR 5/3	100					Silt loam	
12-20	10YR 5/3	95	2.5Y 6/1	5	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? N

Remarks:

The soils were moderately well drained.

HYDROLOGY**Wetland Hydrology Indicators:**Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present? (includes capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The data point was inundated during recent Ohio River backwater flooding. Some silt and flood debris covered the site.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 4

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	3	The area receives frequent overflow flooding from Eagle Creek and the Ohio River.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	3	Sediment removal was evident.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	3	The wetland and bottomland hardwood vegetation help stabilize the soils in the area.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	3	Animal signs were observed within the wetland (tracks, scat, burrows). Raccoon tracks were visible along the edge of the borrow pit. There is quite a bit of beaver activity and the area is less disturbed since it is farther from existing I-69 traffic noise.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	2	The lowest portions of this wetland, especially the wetland fringe of the borrow pits, are frequently flooded, thereby providing cover and spawning habitat for fish, invertebrates, and amphibians.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	3	The visual quality/aesthetics of this wetland is low because of its juxtaposition with I-69 and the obvious man-made affects of the adjacent borrow pit. Trash is strewn throughout the wetland. Highway noise is audible from the wetland.

Total Score 17

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 5/16/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: UPL-01
 Investigator(s): Luke Eggering Section, Township, Range: Section 10, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave
 Slope (%): 1 Lat: 37.92506 Long: -87.52306 Datum: NAD-1983
 Soil Map Unit Name: Huntington silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil _____, or hydrology _____ significantly disturbed? _____ Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>N</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID _____
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland point within an agricultural field. The area was recently flooded by the Ohio River, however, the swale appears to dry rapidly. This area typically does not retain water for long durations during the growing season and is usually farmed. **WOTUS 2018 ID: NA**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>0</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B)
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) _____ *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
		<u>0</u>	= Total Cover		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>N</u>
1					
2					
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

There was no living vegetation in the sample point. Old growth/stubble from corn (*Zea mays*) was observed in the sample point.

SOIL

Sampling Point: UPL-01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-14	10YR 5/4	100					Silt loam	
14-20	10YR 6/3	98	2.5Y 6/1	2	C	M	Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: None
 Depth (inches): N/A
Hydric soil present? N

Remarks:

The top twelve inches of soil are within the plow zone.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Even though the swale had been flooded recently by the Ohio River, it was drying out rapidly. Surface water is removed efficiently from the swale. Without recent infrequent Ohio River flooding, there would not be sufficient hydrology and, in a normal year, hydrology would be lacking.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: UPL-02
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: Section 10, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None
 Slope (%): 0 Lat: 37.92307 Long: -87.52214 Datum: NAD-1983
 Soil Map Unit Name: Huntington silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil _____, or hydrology _____ significantly disturbed? _____ Are "normal circumstances" present? Yes

Are vegetation _____, soil _____, or hydrology _____ naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID _____
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland point within an agricultural field currently farmed with soybeans. It appears that the Ohio River flood kept this area wet for a long duration in 2018; however, this area typically does not retain water for long durations during the growing season and is usually farmed.

WOTUS 2018 ID: NA

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>2</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B)
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>30</u> x 2 = <u>60</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>10</u> x 4 = <u>40</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>40</u> (A) <u>100</u> (B) Prevalence Index = B/A = <u>2.50</u>
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) _____ *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Echinochloa crus-galli</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Amaranthus spinosus</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	
3					
4					
5					
6					
7					
8					
9					
10					
		<u>40</u>	= Total Cover		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

The majority of the barnyard grass (*Echinochloa crus-galli*) is dead due to herbicide treatment.

SOIL

Sampling Point: UPL-02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-12	10YR 4/3	100					Silt loam	
12-16	10YR 5/3	98	2.5Y 6/1	2	C	M	Silt loam	
16-20	10YR 4/3	100					Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: None
 Depth (inches): N/A
Hydric soil present? N**Remarks:**

Soils are well drained. The top twelve inches of soil are within the plow zone.

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This area was sampled because the 2018 Ohio River flooding showed visual evidence of a possible wetland. The area was dry and farmed in 2017 and dry during this survey.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 5/16/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: Indiana Sampling Point: UPL-03
 Investigator(s): Luke Eggering Section, Township, Range: Section 10, Township 7S, Range 10W
 Landform (hillslope, terrace, etc.): Floodplain swale Local relief (concave, convex, none): Concave
 Slope (%): 1% Lat: 37.92179 Long: -87.52215 Datum: NAD-1983
 Soil Map Unit Name: Huntington silty clay loam NWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil _____, or hydrology _____ significantly disturbed? _____ Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>N</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID _____
Hydric soil present?	<u>N</u>	
Indicators of wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

This is an upland point within an agricultural field. The area appears to be moderately well-drained, however the area was recently flooded by the Ohio River. **WOTUS 2018 ID: NA**

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>0</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B)
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
Sapling/Shrub stratum	(Plot size: <u>15' diameter</u>)				
1					
2					
3					
4					
5					
		<u>0</u>	= Total Cover		
Herb stratum	(Plot size: <u>5' diameter</u>)				Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) _____ *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
		<u>0</u>	= Total Cover		
Woody vine stratum	(Plot size: <u>30' diameter</u>)				Hydrophytic vegetation present? <u>N</u>
1					
2					
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

There was no living vegetation in the sample point. Old growth/stubble from corn (*Zea mays*) and soybean (*Glycine max*) was observed in the sample point.

SOIL

Sampling Point: UPL-03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-8	10YR 4/3	98	2.5Y 5/1	2	C	M	Silt loam	
8-20	10YR 5/4	100					Silt loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 2 cm Muck (A10) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|--|
| <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
 Type: None
 Depth (inches): N/A
Hydric soil present? N**Remarks:**

The soil appears to dry out rapidly. The top twelve inches of soil are within the plow zone.

HYDROLOGY**Wetland Hydrology Indicators:**Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> True Aquatic Plants (B14) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Gauge or Well Data (D9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u> </u>
Water table present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>
Saturation present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <u>>20</u>

 (includes capillary fringe)
Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The surface cracks and crayfish burrows were a direct result of the recent Ohio River flooding. The area appears to drain and dry rapidly.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 7/25/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: IN Sampling Point: UPL-04
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: _____ N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.91278 Long: -87.52105 Datum: NAD-1983
 Soil Map Unit Name: Huntington silt loam, 0 to 4 percent slopes, occasionally flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No _____ (If no, explain in Remarks.)
 Are vegetation X, Soil _____, or Hydrology _____ significantly disturbed? _____ Are "normal circumstances" present? Yes X No _____
 Are vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	
Remarks: This is a swale located in the middle of an agricultural field farmed with soybeans (<i>Glycine max</i>) at the time of survey. This point is located north of Waterworks Road. The 2018 Ohio River flood covered this moderately well-drained swale. WOTUS 2018 ID: NA.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes _____ No <u>X</u> Depth (inches): _____ Water table present? Yes _____ No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes _____ No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: This area does not appear to remain saturated for long durations during the growing season; however, soybeans (<i>Glycine max</i>) are stunted or absent at the bottom of the swale.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: UPL-04

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Glycine max</u>	<u>95</u>	<u>Y</u>	<u>NI</u>
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>95</u> = Total Cover		
50% of total cover: <u>47.5</u>		20% of total cover: <u>19</u>		
Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:			
OBL species	<u>0</u>	x 1 =	<u>0</u>	
FACW species	<u>0</u>	x 2 =	<u>0</u>	
FAC species	<u>0</u>	x 3 =	<u>0</u>	
FACU species	<u>0</u>	x 4 =	<u>0</u>	
UPL species	<u>0</u>	x 5 =	<u>0</u>	
Column totals	<u>0</u>	(A)	<u>0</u>	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

This data point is located in the middle of an agricultural field farmed with soybeans (*Glycine max*) at the time of survey. The soybeans are likely Roundup Ready®, as all other vegetation is absent. Vegetation is disturbed due to farming operations.

Sampling Point: UPL-04

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WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-5A-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: _____ N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89997 Long: -87.52027 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No _____ (If no, explain in Remarks.)
 Are vegetation X, Soil _____, or Hydrology _____ significantly disturbed? _____ Are "normal circumstances" present? Yes X No _____
 Are vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: This wetland system is located south of the Ohio River and Green River #2 Road. This wetland system has PFO and PEM components. Portions of the wetland are farmed. This datasheet represents a PEM portion of the wetland. WOTUS 2018 ID: WTL-58.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<u>X</u> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<input type="checkbox"/> Aquatic Fauna (B13)		
Field Observations:		
Surface water present? Yes _____ No <u>X</u>	Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____
Water table present? Yes _____ No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes _____ No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Although it was not saturated at the time of the field survey, this area appears to remain saturated for long durations during the growing season. It receives infrequent overflow flooding from the Ohio River.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5A-1-IN

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

 Sapling/Shrub Stratum (Plot Size: 15' radius)

1				
2				
3				
4				
5				
6				
7				
8				
9				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

 Herb Stratum (Plot Size: 5' radius)

1	<i>Fraxinus pennsylvanica</i>	40	Y	FACW
2	<i>Impatiens capensis</i>	10	N	FACW
3	<i>Cephalanthus occidentalis</i>	5	N	OBL
4	<i>Lobelia cardinalis</i>	2	N	FACW
5				
6				
7				
8				
9				
10				
11				

57 = Total Cover

 50% of total cover: 28.5

 20% of total cover: 11.4

 Woody Vine Stratum (Plot Size: 30' radius)

1				
2				
3				
4				
5				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0
Dominance Test worksheet:

 Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

 Total Number of Dominant Species Across all Strata: 1 (B)

 Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species	<u>5</u> x 1 = <u>5</u>
FACW species	<u>52</u> x 2 = <u>104</u>
FAC species	<u>0</u> x 3 = <u>0</u>
FACU species	<u>0</u> x 4 = <u>0</u>
UPL species	<u>0</u> x 5 = <u>0</u>
Column totals	<u>57</u> (A) <u>109</u> (B)

 Prevalence Index = B/A = 1.91
Hydrophytic Vegetation Indicators:
☒ 1 -Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is >50%

☒ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

**Hydrophytic
Vegetation
Present?**

 Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

The vegetation is mowed in this area. In dry years, this area is probably farmed.

SOIL

Sampling Point: DP-5A-1-IN

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

Indicators for Problematic Hydric Soils³:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Mucky Mineral (A10) (**LRR N**)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
 - Sandy Mucky Mineral (S1) (**LRR N**, **MLRA 147, 148**)
 - Sandy Gleyed Matrix (S4)
 - Sandy Redox (S5)
 - Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) (**MLRA 147, 148**)
- Thin Dark Surface (S9) (**MLRA 147, 148**)
- Loamy Gleyed Matrix (F2)
- X** — Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
- Umbric Surface (F13) (**MLRA 136,122**)
- Piedmont Floodplain Soils (F19) (**MLRA 148**)
- Red Parent Material (**F21**) (**MLRA 127, 147**)

- 2 cm Muck (A10) **(MLRA 147)**
 — Coast Prairie Redox (A16)
(MLRA 147,148)
 — Piedmont Floodplain Soils (F19)
(MLRA 136, 147)
 — Very Shallow Dark Surface (TF12)
 — Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric soil present? Yes **X** No

Remarks:

This location met the depleted matrix (F3) indicator. Soils were mixed in the plow zone (upper 12 inches).

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/27/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: KY Sampling Point: DP-5A-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.90022 Long: -87.52084 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is an upland adjacent to a wetland system located south of the Ohio River and Green River #2 Road. This upland point is adjacent to an agricultural field and a utility right-of-way. WOTUS 2018 ID: WTL-58.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u> </u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Some surface soil cracks resulting from infrequent Ohio River flooding were observed.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5A-1-OUT

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)			
1				
2				
3				
4				
5				
6				
7				
8				
9				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

Herb Stratum	(Plot Size: <u>5' radius</u>)			
1	<u>Sorghum halepense</u>	<u>2</u>	<u>Y</u>	<u>FACU</u>
2	<u>Amaranthus retroflexus</u>	<u>2</u>	<u>Y</u>	<u>FACU</u>
3	<u>Chamaecrista fasciculata</u>	<u>2</u>	<u>Y</u>	<u>FACU</u>
4				
5				
6				
7				
8				
9				
10				
11				

6 = Total Cover

 50% of total cover: 3

 20% of total cover: 1.2

Woody Vine Stratum	(Plot Size: <u>30' radius</u>)			
1				
2				
3				
4				
5				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0
Dominance Test worksheet:

 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

 Total Number of Dominant Species Across all Strata: 3 (B)

 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species	<u>0</u> x 1 = <u>0</u>
FACW species	<u>0</u> x 2 = <u>0</u>
FAC species	<u>0</u> x 3 = <u>0</u>
FACU species	<u>6</u> x 4 = <u>24</u>
UPL species	<u>0</u> x 5 = <u>0</u>
Column totals	<u>6</u> (A) <u>24</u> (B)

 Prevalence Index = B/A = 4.00
Hydrophytic Vegetation Indicators:

- ☐ 1 -Rapid Test for Hydrophytic Vegetation
☐ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤ 3.0 ¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic
Vegetation
Present?

 Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

Minimal vegetation is present in the herb stratum. The area has recently been tilled so natural vegetation is absent.

SOIL

Sampling Point: DP-5A-1-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc2			
0-11	10YR	5 / 3	100					Silt loam	
11-20	10YR	5 / 2	95	10YR	5 / 4	5	C	M	Silt loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric soil present?

Yes _____ No **X**

Remarks:

The top twelve inches of soil is within the plow zone. The soils appear to be mixed.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 5/17/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-5A-2-IN
 Investigator(s): Luke Eggering Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89722 Long: -87.51989 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This wetland system is located south of the Ohio River and Green River #2 Road. This wetland system has PFO and PEM components. This datasheet represents a PEM portion of the wetland in a pipeline right-of-way. WOTUS 2018 ID: WTL-58.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u>X</u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u>X</u> Drainage Patterns (B10)
<u>X</u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u>X</u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>4</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>0</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Sediment deposits were from recent flooding of the Ohio River. Water in the soil pit was observed at four inches.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5A-2-IN

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)			
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Herb Stratum	(Plot Size: <u>5' radius</u>)			
1	<i>Carex scoparia</i>	40	Y	FACW
2	<i>Polygonum hydropiperoides</i>	30	Y	OBL
3	<i>Cephalanthus occidentalis</i>	15	N	OBL
4	<i>Fraxinus pennsylvanica</i>	10	N	FACW
5				
6				
7				
8				
9				
10				
11				
		95 = Total Cover		
50% of total cover: <u>47.5</u>		20% of total cover: <u>19</u>		
Woody Vine Stratum	(Plot Size: <u>30' radius</u>)			
1				
2				
3				
4				
5				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across all Strata: 2 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:		
OBL species	45	x 1 =	45	
FACW species	50	x 2 =	100	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	95	(A)	145	(B)

Prevalence Index = B/A = 1.91

Hydrophytic Vegetation Indicators:
☒ 1 -Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☒ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

 Green ash (*Fraxinus pennsylvanica*) and shrubs were rooted just outside of the plot in the wooded portion of the slough.

SOIL

Sampling Point: DP-5A-2-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks
	Color (moist)		%	Color (moist)	%	Type ¹	Loc2		
0-4	10YR	4 / 1	90	10YR	5 / 4	10	C	M	Silt loam
4-16	10YR	5 / 2	90	2.5Y	3 / 1	10	C	M	Silty clay loam
16-20	2.5Y	3 / 1	100						Silty clay loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) indicator. Clay content increases with depth.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/27/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-5B-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89918 Long: -87.52014 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	

Remarks: This wetland system is located south of the Ohio River and Green River #2 Road. This wetland system has PFO and PEM components. Portions of the wetland are farmed. This datasheet represents a PFO portion of the wetland, in a low forested swale.
WOTUS 2018 ID: WTL-58.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u>X</u> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 Water moves through this swale during stormwater events and during Ohio River floods.

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5B-1-IN

Tree Stratum (Plot Size: <u>30' radius</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1	<u><i>Acer rubrum</i></u>	<u>75</u>	<u>Y</u>	<u>FAC</u>
2	<u><i>Ulmus americana</i></u>	<u>10</u>	<u>N</u>	<u>FACW</u>
3				
4				
5				
6				
7				
		<u>85</u>	= Total Cover	
50% of total cover: <u>42.5</u>		<u>20</u>	20% of total cover: <u>17</u>	

Sapling/Shrub Stratum (Plot Size: <u>15' radius</u>)				
1	<u><i>Cephalanthus occidentalis</i></u>	<u>40</u>	<u>Y</u>	<u>OBL</u>
2				
3				
4				
5				
6				
7				
8				
9				
		<u>40</u>	= Total Cover	
50% of total cover: <u>20</u>		<u>20</u>	20% of total cover: <u>8</u>	

Herb Stratum (Plot Size: <u>5' radius</u>)				
1	<u><i>Impatiens capensis</i></u>	<u>15</u>	<u>Y</u>	<u>FACW</u>
2	<u><i>Fraxinus pennsylvanica</i></u>	<u>10</u>	<u>Y</u>	<u>FACW</u>
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>25</u>	= Total Cover	
50% of total cover: <u>12.5</u>		<u>5</u>	20% of total cover: <u>5</u>	

Woody Vine Stratum (Plot Size: <u>30' radius</u>)				
1				
2				
3				
4				
5				
		<u>0</u>	= Total Cover	
50% of total cover: <u>0</u>		<u>0</u>	20% of total cover: <u>0</u>	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>40</u>	x 1 = <u>40</u>
FACW species <u>35</u>	x 2 = <u>70</u>
FAC species <u>75</u>	x 3 = <u>225</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>150</u>	(A) <u>335</u> (B)

 Prevalence Index = B/A = 2.23
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤ 3.0 ¹
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes ☒ No

Remarks: (Include photo numbers here or on a separate sheet.)

Some oaks are present on the higher sides of the wetland, but none were present near this data point.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-2	10YR	3 / 1	100						Silty clay loam	A lot of organic matter is present.
2-14	2.5YR	6 / 1	80	10YR	6 / 6	20	C	M	Silty clay loam	
14-20	2.5YR	6 / 1	60	10YR	6 / 6	40	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) and depleted below dark surface (A11) indicators.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: KY Sampling Point: DP-5B-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Convex Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89906 Long: -87.51998 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: This is an upland area adjacent to a wetland system located south of the Ohio River and Green River #2 Road. WOTUS 2018 ID: WTL-58.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: This data point is on a higher terrace and was moderately well drained.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5B-1-OUT

Tree Stratum (Plot Size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status															
1 <u>Acer rubrum</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>75.00%</u> (A/B)														
2																		
3																		
4																		
5																		
6																		
7																		
	<u>80</u>	<u>= Total Cover</u>		Prevalence Index worksheet <table style="width: 100%;"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>30</u></td> <td>x 2 = <u>60</u></td> </tr> <tr> <td>FAC species <u>165</u></td> <td>x 3 = <u>495</u></td> </tr> <tr> <td>FACU species <u>25</u></td> <td>x 4 = <u>100</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column totals <u>220</u></td> <td>(A) <u>655</u> (B)</td> </tr> </tbody> </table> Prevalence Index = B/A = <u>2.98</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>30</u>	x 2 = <u>60</u>	FAC species <u>165</u>	x 3 = <u>495</u>	FACU species <u>25</u>	x 4 = <u>100</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column totals <u>220</u>	(A) <u>655</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>30</u>	x 2 = <u>60</u>																	
FAC species <u>165</u>	x 3 = <u>495</u>																	
FACU species <u>25</u>	x 4 = <u>100</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column totals <u>220</u>	(A) <u>655</u> (B)																	
50% of total cover: <u>40</u>	20% of total cover: <u>16</u>																	
Sapling/Shrub Stratum (Plot Size: <u>15'</u> radius)																		
1 <u>Ulmus americana</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <u>1</u> -Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> <u>2</u> - Dominance Test is >50% <input checked="" type="checkbox"/> <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation¹ (Explain)</u> ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic														
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
	<u>30</u>	<u>= Total Cover</u>																
50% of total cover: <u>15</u>	20% of total cover: <u>6</u>																	
Herb Stratum (Plot Size: <u>5'</u> radius)																		
1 <u>Toxicodendron radicans</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>	Definitions of Four Vegetation Strata: Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall. Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines - All woody vines greater than 3.28 ft in height.														
2 <u>Chasmanthium latifolium</u>	<u>20</u>	<u>N</u>	<u>FACU</u>															
3 <u>Campsis radicans</u>	<u>5</u>	<u>N</u>	<u>FAC</u>															
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
	<u>105</u>	<u>= Total Cover</u>																
50% of total cover: <u>52.5</u>	20% of total cover: <u>21</u>																	
Woody Vine Stratum (Plot Size: <u>30'</u> radius)																		
1 <u>Smilax glauca</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>														
2																		
3																		
4																		
5																		
	<u>5</u>	<u>= Total Cover</u>																
50% of total cover: <u>2.5</u>	20% of total cover: <u>1</u>																	

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP-5B-1-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-6	2.5Y 5 / 3	100						Silt loam	
6-12	2.5Y 6 / 3	98	10YR 5 / 4	2	C	M		Silt loam	
12-20	10YR 5 / 4	100						Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:			Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histisol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)			
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147,148)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)			
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)			
<input type="checkbox"/> 2 cm Mucky Mineral (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)			
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)				
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136,122)				
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)				
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)				

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):		
Type: <u>None</u>		
Depth (inches): <u>N/A</u>	Hydric soil present?	Yes <u> </u> No <u>X</u>

Remarks:
Soils at this point are within the plow zone. Soils are moderately well drained and do not appear to retain water for long durations.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 5/17/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-5C-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Floodplain slough Local relief (concave, convex, none): Concave Slope (%): 1%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89969 Long: -87.51981 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This wetland system is located south of the Ohio River and Green River #2 Road. This wetland system has PFO and PEM components. This datasheet represents a PFO portion of the wetland, east of a pipeline right-of-way. WOTUS 2018 ID: WTL-58.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u>X</u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u>X</u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u>X</u> Drainage Patterns (B10)
<u>X</u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present? Yes <u>X</u> No <u> </u>	Depth (inches): <u>4</u>	
Saturation present? Yes <u>X</u> No <u> </u> (includes capillary fringe)	Depth (inches): <u>0</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Small pools of inundation are near this sample point. Water was present at four inches in the soil pit.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5C-1-IN

Tree Stratum (Plot Size: <u>30'</u> radius)		Absolute % Cover	Dominant Species?	Indicator Status
1	<u><i>Acer rubrum</i></u>	<u>60</u>	<u>Y</u>	<u>FAC</u>
2	<u><i>Quercus palustris</i></u>	<u>40</u>	<u>Y</u>	<u>FACW</u>
3	<u><i>Celtis laevigata</i></u>	<u>25</u>	<u>Y</u>	<u>FACW</u>
4				
5				
6				
7				
		<u>125</u>	= Total Cover	
50% of total cover: <u>62.5</u>		20% of total cover: <u>25</u>		

Sapling/Shrub Stratum (Plot Size: <u>15'</u> radius)				
1	<u><i>Fraxinus pennsylvanica</i></u>	<u>60</u>	<u>Y</u>	<u>FACW</u>
2				
3				
4				
5				
6				
7				
8				
9				
		<u>60</u>	= Total Cover	
50% of total cover: <u>30</u>		20% of total cover: <u>12</u>		

Herb Stratum (Plot Size: <u>5'</u> radius)				
1	<u><i>Fraxinus pennsylvanica</i></u>	<u>20</u>	<u>Y</u>	<u>FACW</u>
2	<u><i>Parthenocissus quinquefolia</i></u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>25</u>	= Total Cover	
50% of total cover: <u>12.5</u>		20% of total cover: <u>5</u>		

Woody Vine Stratum (Plot Size: <u>30'</u> radius)				
1				
2				
3				
4				
5				
		<u>0</u>	= Total Cover	
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 83.33% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>145</u>	x 2 = <u>290</u>
FAC species <u>60</u>	x 3 = <u>180</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>210</u>	(A) <u>490</u> (B)

 Prevalence Index = B/A = 2.33
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤ 3.0 ¹
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes ☒ No

Remarks: (Include photo numbers here or on a separate sheet.)

Due to recent Ohio River flooding and to a lesser extent, shade, the herbaceous layer was very thin.

SOIL

Sampling Point: DP-5C-1-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-3	10YR	3 / 1	90	2.5Y	6 / 1	10	C	M	Silt loam	Organic matter present.
3-12	2.5Y	5 / 1	98	10YR	5 / 6	2	C	M	Silt loam	
12-20	10YR	5 / 2	80	2.5Y	5 / 1	20	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) indicator. A lot of organic matter was present in the top three inches.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/28/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-5D-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89798 Long: -87.51971 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This wetland system is located south of the Ohio River and Green River #2 Road. This wetland system has PFO and PEM components. Portions of the wetland are farmed. This datasheet represents a PEM portion of the wetland. WOTUS 2018 ID: WTL-58.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u>X</u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u>X</u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: This area remained wet for a very long time in 2018 following the Ohio River flood.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5D-1-IN

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

 Sapling/Shrub Stratum (Plot Size: 15' radius)

1				
2				
3				
4				
5				
6				
7				
8				
9				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

 Herb Stratum (Plot Size: 5' radius)

1	<i>Eleocharis obtusa</i>	80	Y	OBL
2	<i>Echinochloa muricata</i>	30	Y	FACW
3	<i>Fraxinus pennsylvanica</i>	5	N	FACW
4				
5				
6				
7				
8				
9				
10				
11				

115 = Total Cover

 50% of total cover: 57.5

 20% of total cover: 23

 Woody Vine Stratum (Plot Size: 30' radius)

1				
2				
3				
4				
5				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

Remarks: (Include photo numbers here or on a separate sheet.)

Dominance Test worksheet:

 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

 Total Number of Dominant Species Across all Strata: 2 (B)

 Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:	
OBL species <u>80</u>	x 1 =	<u>80</u>
FACW species <u>35</u>	x 2 =	<u>70</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column totals <u>115</u>	(A)	<u>150</u> (B)

 Prevalence Index = B/A = 1.30
Hydrophytic Vegetation Indicators:
☒ 1 -Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is >50%

☒ 3 - Prevalence Index is ≤ 3.0 ¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

 Yes ☒ No ☐

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-12	2.5YR	6 / 1	80	10YR	5 / 4	20	C	M	Silty clay loam	
12-20	2.5YR	6 / 1	60	10YR	5 / 4	40	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present?

Yes X No **Remarks:**

This location met the depleted matrix (F3) indicator. Soils were mixed in the plow zone.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/28/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: KY Sampling Point: DP-5D-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89821 Long: -87.51988 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This is an upland area adjacent to a wetland system located south of the Ohio River and Green River #2 Road. It is on a higher stream terrace that is moderately well drained. WOTUS 2018 ID: WTL-58.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Area is infrequently flooded by the Ohio River.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5D-1-OUT

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Zea mays</u>	<u>80</u>	<u>Y</u>	<u>NI</u>
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>80</u> = Total Cover		
50% of total cover: <u>40</u>		20% of total cover: <u>16</u>		
Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>0</u>	(A) <u>0</u> (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

 This upland point was taken in an agricultural field that was planted with corn (*Zea mays*) at the time of the survey. Herbicides likely killed the natural vegetation.

SOIL

Sampling Point: DP-5D-1-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	2.5YR 6 / 2	100					Silt loam	
5-18	10YR 5 / 3	90	10YR 6 / 6	10	C	M	Silt loam	
18-20	10YR 5 / 2	60	10YR 5 / 4	40	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- | | |
|---|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Dark Surface (S7) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> 2 cm Mucky Mineral (A10) (LRR N) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Umbric Surface (F13) (MLRA 136,122) |
| <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) |
| <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147) |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147,148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric soil present? Yes No **X**

Remarks:

The soils in this location are within the plow zone.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/28/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-5D-2-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: _____ N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89723 Long: -87.51927 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No _____ (If no, explain in Remarks.)
 Are vegetation X, Soil _____, or Hydrology _____ significantly disturbed? _____ Are "normal circumstances" present? Yes X No _____
 Are vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: This wetland system is located south of the Ohio River and Green River #2 Road. This wetland system has PFO and PEM components. Portions of the wetland are farmed. This datasheet represents a PEM portion of the wetland in a swale. WOTUS 2018 ID: WTL-58.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u>X</u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u>X</u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present? Yes _____ No <u>X</u>	Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____
Water table present? Yes _____ No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes _____ No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: The swale remained very wet following the 2018 Ohio River flood.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5D-2-IN

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Echinochloa muricata</u>	80	Y	FACW
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		80 = Total Cover		
50% of total cover: <u>40</u>		20% of total cover: <u>16</u>		
Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>80</u>	(A) <u>160</u> (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:
☒ 1 -Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☒ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

The vegetation in this area is dead due to herbicide use.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc2			
0-3	10YR	5 / 2	100					Silt loam	
3-12	2.5Y	6 / 1	95	10YR	6 / 6	5	C	M	Silt loam
12-20	2.5Y	5 / 1	60	10YR	6 / 6	40	C	M	Silty clay loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present?

Yes X No **Remarks:**

This location met the depleted matrix (F3) indicator.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 5/15/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: KY Sampling Point: DP-5D-2-OUT
 Investigator(s): Luke Eggering Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Ridge Local relief (concave, convex, none): Convex Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89749 Long: -87.51947 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is data point is on a ridge that is moderately well drained between two swales that are part of Wetland 5. WOTUS 2018 ID: WTL-58.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u> </u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: This low ridge is moderately well drained. The area was flooded by the Ohio River overflow flooding, which is somewhat irregular and infrequent in this area. The ridge is approximately 18 inches higher than the wetland swales.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5D-2-OUT

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

 Sapling/Shrub Stratum (Plot Size: 15' radius)

1				
2				
3				
4				
5				
6				
7				
8				
9				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

 Herb Stratum (Plot Size: 5' radius)

1	<u>Brassica rapa</u>	<u>1</u>	<u>No</u>	<u>NI</u>
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

1 = Total Cover

 50% of total cover: 0.5

 20% of total cover: 0.2

 Woody Vine Stratum (Plot Size: 30' radius)

1				
2				
3				
4				
5				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0
Dominance Test worksheet:

 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

 Total Number of Dominant Species Across all Strata: 0 (B)

 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>0</u>	(A) <u>0</u> (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
 1 -Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is >50%

 3 - Prevalence Index is $\leq 3.0^1$
 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

**Hydrophytic
Vegetation
Present?**

 Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

 There was almost no living vegetation due to the recent flood. There was dead soybean (*Glycine max*) stubble.

SOIL

Sampling Point: DP-5D-2-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-12	10YR	5 / 3	100						Silt loam	Within the plow zone.
12-20	10YR	5 / 3	80	2.5YR	4 / 1	20	C	M	Silty clay loam	Below the plow zone.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes No X

Remarks:

Even though the area was flooded the soils dried quickly. There was no evidence of frequent saturation.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/28/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: KY Sampling Point: DP-5D-3-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Convex Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89723 Long: -87.51926 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is an upland area adjacent to a wetland system located south of the Ohio River and Green River #2 Road. It is positioned on a moderately well drained terrace. WOTUS 2018 ID: WTL-58.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u> </u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Some surface soil cracks resulting from infrequent Ohio River flooding were observed.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-5D-3-OUT

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Zea mays</u>	100	Y	NI
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		100 = Total Cover		
50% of total cover: <u>50</u>		20% of total cover: <u>20</u>		
Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0 = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:			
OBL species	<u>0</u>	x 1 =	<u>0</u>	
FACW species	<u>0</u>	x 2 =	<u>0</u>	
FAC species	<u>0</u>	x 3 =	<u>0</u>	
FACU species	<u>0</u>	x 4 =	<u>0</u>	
UPL species	<u>0</u>	x 5 =	<u>0</u>	
Column totals	<u>0</u>	(A)	<u>0</u>	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

 This upland point was taken in an agricultural field planted with corn (*Zea mays*). Herbicides likely killed the natural vegetation.

SOIL

Sampling Point: DP-5D-3-OUT

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-11	10YR	5 / 3	98	10YR	6 / 6	2	C	M	Silt loam	
11-20	2.5Y	6 / 2	90	10YR	6 / 8	10	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes No X

Remarks:

The soils at this location are within the plow zone.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 5

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	3	This wetland complex transports Ohio River flood waters and stores flood waters from stormwater and backwater flood events.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	3	Sediment and drift deposits occur throughout this wetland.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	3	The bottomland hardwood portion of this wetland provides quality erosion control. The farmed portions provide less function and value.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	4	There appears to be quality wildlife habitat. If seasonally flooded, this area could provide important benefits for shorebirds and waterfowl.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	1	Aquatic species may benefit during seasonal flooding, but the area remains dry during most of the year.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	4	The only limiting factor for this area's aesthetics would be from on-going farming practices. The area provides quality views of PFO and PEM habitats.

Total Score 18

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-6-1-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89519 Long: -87.51862 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This is a large high-quality predominately bottomland hardwood forest located in the Ohio River floodplain that is bisected by and parallel to a pipeline right-of-way, south of Green River #2 Road. The land directly north of the wetland is farmed. WOTUS 2018 ID: WTL-59.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u>X</u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u>X</u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u>X</u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Crayfish burrows are present throughout the wetland. The area is seasonally flooded by stormwater events and during Ohio River floods.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-6-1-IN

Tree Stratum	(Plot Size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Ulmus americana</i>	35	Y	FACW
2	<i>Acer rubrum</i>	30	Y	FAC
3	<i>Quercus michauxii</i>	10	N	FACW
4	<i>Celtis occidentalis</i>	10	N	FACU
5				
6				
7				
		85	= Total Cover	
50% of total cover:		42.5	20% of total cover: 17	

Sapling/Shrub Stratum	(Plot Size: 15' radius)			
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover:		0	20% of total cover: 0	

Herb Stratum	(Plot Size: 5' radius)			
1	<i>Laportea canadensis</i>	5	Y	FAC
2	<i>Carex grayi</i>	2	Y	FACW
3	<i>Toxicodendron radicans</i>	2	Y	FAC
4				
5				
6				
7				
8				
9				
10				
11				
		9	= Total Cover	
50% of total cover:		4.5	20% of total cover: 1.8	

Woody Vine Stratum		(Plot Size: <u>30' radius</u>)				
1						
2						
3						
4						
5						
			<u>0</u>	= Total Cover		
50% of total cover:		<u>0</u>	20% of total cover:		<u>0</u>	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>47</u>	x 2 = <u>94</u>
FAC species <u>37</u>	x 3 = <u>111</u>
FACU species <u>10</u>	x 4 = <u>40</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>94</u>	(A) <u>245</u> (B)

 Prevalence Index = B/A = 2.61
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is $\leq 3.0^1$
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic
Vegetation
Present?

 Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

The herb stratum is primarily unvegetated. Hackberry (*Celtis occidentalis*) may have been sugarberry (*Celtis laevigata*) but the obvious identifying characteristics lean toward *Celtis occidentalis*. The position in the landscape and the wet conditions point to *Celtis laevigata*.

SOIL

Sampling Point: DP-6-1-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)		%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR	5 / 1	100					Silt loam	Organic matter throughout core.
2-6	10YR	5 / 2	90	10YR 6 / 6	10	C	M	Silt loam	
6-20	10YR	6 / 1	60	10YR 6 / 6	40	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136,122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (**F21**) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147,148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) indicator. Some concretions were observed in the soil at a depth of 18 inches.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-6-1-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None Slope (%): 0%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89539 Long: -87.51844 Datum: NAD-1983
 Soil Map Unit Name: Ashton silt loam, 0 to 4 percent slopes, occasionally flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: This is an upland area adjacent to a wetland system located south of the Ohio River and Green River #2 Road. This upland point is adjacent to an agricultural field and a utility right-of-way. WOTUS 2018 ID: WTL-59.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u> </u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Some surface soil cracks resulting from infrequent Ohio River flooding were observed. The area, which is on a higher stream terrace, does not appear to remain saturated for long durations during the growing season. The terrace is moderately well drained.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-6-1-OUT

Tree Stratum (Plot Size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status															
1 <u>Acer rubrum</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>75.00%</u> (A/B)														
2 <u>Ulmus americana</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>															
3																		
4																		
5																		
6																		
7																		
		<u>70</u> = Total Cover		Prevalence Index worksheet <table style="width: 100%;"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>30</u></td> <td>x 2 = <u>60</u></td> </tr> <tr> <td>FAC species <u>65</u></td> <td>x 3 = <u>195</u></td> </tr> <tr> <td>FACU species <u>55</u></td> <td>x 4 = <u>220</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column totals <u>150</u></td> <td>(A) <u>475</u> (B)</td> </tr> </tbody> </table> Prevalence Index = B/A = <u>3.17</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>30</u>	x 2 = <u>60</u>	FAC species <u>65</u>	x 3 = <u>195</u>	FACU species <u>55</u>	x 4 = <u>220</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column totals <u>150</u>	(A) <u>475</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>30</u>	x 2 = <u>60</u>																	
FAC species <u>65</u>	x 3 = <u>195</u>																	
FACU species <u>55</u>	x 4 = <u>220</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column totals <u>150</u>	(A) <u>475</u> (B)																	
50% of total cover: <u>35</u>		20% of total cover: <u>14</u>																
Sapling/Shrub Stratum (Plot Size: <u>15'</u> radius)																		
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
		<u>0</u> = Total Cover																
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>																
Herb Stratum (Plot Size: <u>5'</u> radius)																		
1 <u>Chasmanthium latifolium</u>	<u>50</u>	<u>Y</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: <u>1</u> -Rapid Test for Hydrophytic Vegetation <u>X</u> <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation¹ (Explain)</u> ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic														
2 <u>Campsis radicans</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>															
3 <u>Toxicodendron radicans</u>	<u>5</u>	<u>N</u>	<u>FAC</u>															
4 <u>Parthenocissus quinquefolia</u>	<u>5</u>	<u>N</u>	<u>FACU</u>															
5																		
6																		
7																		
8																		
9																		
10																		
11																		
		<u>80</u> = Total Cover																
50% of total cover: <u>40</u>		20% of total cover: <u>16</u>																
Woody Vine Stratum (Plot Size: <u>30'</u> radius)																		
1																		
2																		
3																		
4																		
5																		
		<u>0</u> = Total Cover																
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>																
Remarks: (Include photo numbers here or on a separate sheet.) The area has recently been tilled so natural vegetation is absent. Trees are rooted in the wetland, and the canopy extends over the soil core location.																		

SOIL

Sampling Point: DP-6-1-OUT**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix			Redox Features				Texture	Remarks
	Color (moist)		%	Color (moist)		%	Type ¹		
0-2	10YR	5 / 2	100						Silt loam
2-8	10YR	5 / 3	95	10YR	6 / 6	5	C	M	Silt loam
8-20	10YR	5 / 4	95	2.5Y	6 / 1	5	C	M	Silt loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- | | |
|---|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Dark Surface (S7) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> 2 cm Mucky Mineral (A10) (LRR N) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Umbric Surface (F13) (MLRA 136,122) |
| <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) |
| <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147) |

Indicators for Problematic Hydric Soils³:

- | |
|--|
| <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) |
| <input type="checkbox"/> Coast Prairie Redox (A16) |
| <input type="checkbox"/> (MLRA 147,148) |
| <input type="checkbox"/> Piedmont Floodplain Soils (F19) |
| <input type="checkbox"/> (MLRA 136, 147) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if observed):**
 Type: None
 Depth (inches): N/A
Hydric soil present? Yes No **X****Remarks:**

There is a lot of organic matter within the soil core. The top twelve inches are within the plow zone.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-6-2-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89392 Long: -87.51812 Datum: NAD-1983
 Soil Map Unit Name: Melvin silty clay loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This is a large predominately bottomland hardwood forest located in the Ohio River floodplain that is bisected by and parallel to a pipeline right-of-way, south of Green River #2 Road. The land directly north of the wetland is farmed. WOTUS 2018 ID: WTL-59.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u>X</u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Crayfish burrows are present throughout the wetland. The area is inundated during seasonal stormwater and Ohio River flooding events.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-6-2-IN

Tree Stratum	(Plot Size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Ulmus americana</i>	55	Y	FACW
2	<i>Quercus texana</i>	40	Y	OBL
3	<i>Acer rubrum</i>	10	N	FAC
4	<i>Quercus palustris</i>	5	N	FACW
5				
6				
7				
		110	= Total Cover	
50% of total cover:		55	20% of total cover:	22

Sapling/Shrub Stratum	(Plot Size: 15' radius)			
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u>	= Total Cover	
50% of total cover:		0	20% of total cover: 0	

Herb Stratum	(Plot Size: 5' radius)			
1	<i>Saururus cernuus</i>	60	Y	OBL
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		60	= Total Cover	
50% of total cover:		30	20% of total cover: 12	

Woody Vine Stratum		(Plot Size: 30' radius)				
1						
2						
3						
4						
5						
				0	= Total Cover	
50% of total cover:		0		20% of total cover:		0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:	
OBL species <u>100</u>	x 1 =	<u>100</u>
FACW species <u>60</u>	x 2 =	<u>120</u>
FAC species <u>10</u>	x 3 =	<u>30</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column totals <u>170</u>	(A)	<u>250</u> (B)

 Prevalence Index = B/A = 1.47
Hydrophytic Vegetation Indicators:

- ☒ 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤ 3.0 ¹
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes **X** No

Remarks: (Include photo numbers here or on a separate sheet.)

Nuttall oak (*Quercus texana*) trees were quite large.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹	Loc2				
0-2	10YR	3 / 1	100					Silt loam	Organic matter present.	
2-15	2.5YR	6 / 2	80	10YR	5 / 4	20	C	M		Silt loam
15-20	2.5YR	6 / 1	90	10YR	6 / 6	10	C	M		Silt loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) and depleted below dark surface (A11) indicators. Organic matter was present in the top 6 inches of the soil core.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-6-3-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89203 Long: -87.51787 Datum: NAD-1983
 Soil Map Unit Name: Belknap silt loam, 0 to 2 percent slopes, occasionally flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	

Remarks: This is a large predominately bottomland hardwood forest located in the Ohio River floodplain that is bisected by and parallel to a pipeline right-of-way, south of Green River #2 Road. The land south of the wetland transitions into an upland forest. This wetland point is not near the wetland boundary, therefore there is no accompanying upland datasheet.
WOTUS 2018 ID: WTL-59.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u>X</u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u>X</u> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Crayfish burrows are present throughout the wetland.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-6-3-IN

Tree Stratum (Plot Size: <u>30' radius</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1	<u><i>Ulmus americana</i></u>	<u>50</u>	<u>Y</u>	<u>FACW</u>
2	<u><i>Acer rubrum</i></u>	<u>40</u>	<u>Y</u>	<u>FAC</u>
3				
4				
5				
6				
7				
		<u>90</u>	= Total Cover	
50% of total cover: <u>45</u>		20% of total cover: <u>18</u>		

Sapling/Shrub Stratum (Plot Size: <u>15' radius</u>)				
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u>	= Total Cover	
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Herb Stratum (Plot Size: <u>5' radius</u>)				
1	<u><i>Lindera benzoin</i></u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
2	<u><i>Laportea canadensis</i></u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>20</u>	= Total Cover	
50% of total cover: <u>10</u>		20% of total cover: <u>4</u>		

Woody Vine Stratum (Plot Size: <u>30' radius</u>)				
1				
2				
3				
4				
5				
		<u>0</u>	= Total Cover	
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>50</u>	x 2 =	<u>100</u>
FAC species <u>60</u>	x 3 =	<u>180</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column totals <u>110</u>	(A)	<u>280</u> (B)

 Prevalence Index = B/A = 2.55
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤3.0¹
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

**Hydrophytic
Vegetation
Present?**

Yes ☒ No

Remarks: (Include photo numbers here or on a separate sheet.)

Spicebush (*Lindera benzoin*) in this area is approximately two feet tall, which explains why it is listed in the herb stratum.

Sampling Point: DP-6-3-IN

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WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-6-4-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89092 Long: -87.51703 Datum: NAD-1983
 Soil Map Unit Name: Belknap silt loam, 0 to 2 percent slopes, occasionally flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	

Remarks: This is a large predominately bottomland hardwood forest located in the Ohio River floodplain that is bisected by and parallel to a pipeline right-of-way, south of Green River #2 Road. The land to the south of the wetland transitions into upland forest. This point is near the southern boundary of the wetland before the wetland transitions into an upland.

WOTUS 2018 ID: WTL-59.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u>X</u> Oxidized Rhizospheres on Living Roots (C3)	<u>X</u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u>X</u> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Crayfish burrows are present throughout the wetland. Oxidized rhizospheres were present.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-6-4-IN

Tree Stratum	(Plot Size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u><i>Acer rubrum</i></u>	<u>70</u>	<u>Y</u>	<u>FAC</u>
2	<u><i>Ulmus americana</i></u>	<u>15</u>	<u>N</u>	<u>FACW</u>
3	<u><i>Liquidambar styraciflua</i></u>	<u>5</u>	<u>N</u>	<u>FAC</u>
4				
5				
6				
7				
		<u>90</u>	= Total Cover	
50% of total cover: <u>45</u>		20% of total cover: <u>18</u>		

Sapling/Shrub Stratum	(Plot Size: 15' radius)			
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u>	= Total Cover	
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Herb Stratum	(Plot Size: 5' radius)			
1	<u><i>Onoclea sensibilis</i></u>	<u>10</u>	<u>Y</u>	<u>FACW</u>
2	<u><i>Ulmus americana</i></u>	<u>5</u>	<u>Y</u>	<u>FACW</u>
3	<u><i>Toxicodendron radicans</i></u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
4	<u><i>Impatiens capensis</i></u>	<u>5</u>	<u>Y</u>	<u>FACW</u>
5				
6				
7				
8				
9				
10				
11				
		<u>25</u>	= Total Cover	
50% of total cover: <u>12.5</u>		20% of total cover: <u>5</u>		

Woody Vine Stratum	(Plot Size: 30' radius)			
1				
2				
3				
4				
5				
		<u>0</u>	= Total Cover	
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>35</u>	x 2 =	<u>70</u>
FAC species <u>80</u>	x 3 =	<u>240</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column totals <u>115</u>	(A)	<u>310</u> (B)

 Prevalence Index = B/A = 2.70
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤3.0¹
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

This is a typical bottomland hardwood forest for the Ohio River floodplain. The timber is smaller along the south boundary of this wetland, likely due to past logging.

SOIL

Sampling Point: DP-6-4-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)		%	Color (moist)		%	Type ¹		
0-8	2.5Y	5 / 2	95	10YR	6 / 1	5	C	M	Silt loam
8-15	2.5YR	6 / 2	90	7.5YR	6 / 6	10	C	M	Silt loam
15-20	2.5YR	7 / 2	80	10YR	6 / 6	20	C	M	Silt loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- | | |
|---|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Dark Surface (S7) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Stratified Layers (A5) | <input checked="" type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> 2 cm Mucky Mineral (A10) (LRR N) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Umbric Surface (F13) (MLRA 136,122) |
| <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) |
| <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147) |

Indicators for Problematic Hydric Soils³:

- | |
|--|
| <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) |
| <input type="checkbox"/> Coast Prairie Redox (A16) |
| <input type="checkbox"/> (MLRA 147,148) |
| <input type="checkbox"/> Piedmont Floodplain Soils (F19) |
| <input type="checkbox"/> (MLRA 136, 147) |
| <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if observed):**

Type: None

Depth (inches): N/A

Hydric soil present?

Yes X No **Remarks:**

This location met the depleted matrix (F3) indicator.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-6-4-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Convex Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.89076 Long: -87.51698 Datum: NAD-1983
 Soil Map Unit Name: Belknap silt loam, 0 to 2 percent slopes, occasionally flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This is an upland area adjacent to a wetland system located south of the Ohio River and Green River #2 Road. It is upslope from the wetland and is moderately well drained. The soils do not appear to remain saturated for long durations. WOTUS 2018 ID: WTL-59.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-6-4-OUT

Tree Stratum	(Plot Size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Acer saccharum</u>	<u>80</u>	<u>Y</u>	<u>FACU</u>
2	<u>Salix nigra</u>	<u>30</u>	<u>Y</u>	<u>OBL</u>
3				
4				
5				
6				
7				

110 = Total Cover

 50% of total cover: 55

 20% of total cover: 22

Sapling/Shrub Stratum	(Plot Size: <u>15'</u> radius)			
1				
2				
3				
4				
5				
6				
7				
8				
9				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

Herb Stratum	(Plot Size: <u>5'</u> radius)			
1	<u>Urtica dioica</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

20 = Total Cover

 50% of total cover: 10

 20% of total cover: 4

Woody Vine Stratum	(Plot Size: <u>30'</u> radius)			
1	<u>Smilax glauca</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
2				
3				
4				
5				

5 = Total Cover

 50% of total cover: 2.5

 20% of total cover: 1
Dominance Test worksheet:

 Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

 Total Number of Dominant Species Across all Strata: 4 (B)

 Percent of Dominant Species that are OBL, FACW, or FAC: 25.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>30</u>	x 1 = <u>30</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>105</u>	x 4 = <u>420</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>135</u>	(A) <u>450</u> (B)

 Prevalence Index = B/A = 3.33
Hydrophytic Vegetation Indicators:

- ☐ 1 -Rapid Test for Hydrophytic Vegetation
☐ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is $\leq 3.0^1$
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

**Hydrophytic
Vegetation
Present?**

 Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

Forest community is transitioning from a bottomland hardwood to mesic upland community in this area.

SOIL

Sampling Point: DP-6-4-OUT**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-2	2.5Y	6 / 1	100						Silt loam	Duff layer present on surface.
2-12	2.5Y	4 / 2	100						Silt loam	
12-20	2.5Y	7 / 4	90	10YR	6 / 8	10	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136,122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (**F21**) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147,148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

Logging activities and equipment rutting in 2017 somewhat disturbed the top six inches of soil near this datapoint.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 6

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	4	This large wetland complex conveys and stores a substantial amount of floodwater. These waters are slowly released and dissipated through evapotranspiration.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	4	Water marks, sediment, and drift deposits were evident throughout the wetland. The size and vegetation present provide quality water quality enhancement.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	4	The area is flooded by stormwater and Ohio River flood events. The forest and woody understory provide quality stabilized habitat with virtually no erosion noticeable.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	4	Animal signs were observed within the wetland (tracks, scat, burrows). The size of the wetland could support large terrestrial species.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	1	Habitat could support ephemeral species such as frogs, salamanders, and aquatic macrophytes, however the area does dry out completely in most years.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	4	

Total Score 21

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-7-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.88546 Long: -87.51521 Datum: NAD-1983
 Soil Map Unit Name: Alford silt loam, 20 to 30 percent slopes NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This appears to be an old pond that was constructed many years ago. The dam was broken and several tributaries empty into and flow through the area. It is primarily an emergent herbaceous wetland surrounded by trees. WOTUS 2018 ID: WTL-60.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u>X</u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Although the dam is broken, this area appears to temporarily pond water and remains saturated for long durations during the growing season.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-7-IN

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Leersia oryzoides</u>	<u>90</u>	<u>Y</u>	<u>OBL</u>
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>90</u> = Total Cover		
50% of total cover: <u>45</u>		20% of total cover: <u>18</u>		

Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>90</u>	x 1 = <u>90</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>90</u>	(A) <u>90</u> (B)

 Prevalence Index = B/A = 1.00
Hydrophytic Vegetation Indicators:

- ☒ 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is $\leq 3.0^1$
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

Soil is bare in areas not covered in rice cutgrass (*Leersia oryzoides*).

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹	Loc2				
0-6	10YR	4 / 3	80	10YR	5 / 8	20	C	M	Clay loam	Organic matter mixed throughout.
6-20	10YR	4 / 2	95	2.5YR	4 / 6	5	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) indicator. Organic matter is mixed throughout the soil core.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-7-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Hillside Local relief (concave, convex, none): Convex Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.88521 Long: -87.51503 Datum: NAD-1983
 Soil Map Unit Name: Alford silt loam, 20 to 30 percent slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: This upland datapoint was taken on a hillside. WOTUS 2018 ID: WTL-60.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: This data point is very well drained.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-7-OUT

Tree Stratum (Plot Size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status															
1 <u>Acer rubrum</u>	<u>98</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across all Strata: <u>2</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)														
2																		
3																		
4																		
5																		
6																		
7																		
	<u>98</u>	<u>= Total Cover</u>		Prevalence Index worksheet <table style="width: 100%;"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>103</u></td> <td>x 3 = <u>309</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column totals <u>103</u></td> <td>(A) <u>309</u> (B)</td> </tr> </tbody> </table> Prevalence Index = B/A = <u>3.00</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>103</u>	x 3 = <u>309</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column totals <u>103</u>	(A) <u>309</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>103</u>	x 3 = <u>309</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column totals <u>103</u>	(A) <u>309</u> (B)																	
50% of total cover: <u>49</u>	20% of total cover: <u>19.6</u>																	
Sapling/Shrub Stratum (Plot Size: <u>15'</u> radius)																		
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
	<u>0</u>	<u>= Total Cover</u>																
50% of total cover: <u>0</u>	20% of total cover: <u>0</u>																	
Herb Stratum (Plot Size: <u>5'</u> radius)																		
1 <u>Toxicodendron radicans</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <u>1</u> -Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> <u>2</u> - Dominance Test is >50% <input checked="" type="checkbox"/> <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation</u> ¹ (Explain)														
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
	<u>5</u>	<u>= Total Cover</u>																
50% of total cover: <u>2.5</u>	20% of total cover: <u>1</u>																	
Woody Vine Stratum (Plot Size: <u>30'</u> radius)																		
1																		
2																		
3																		
4																		
5																		
	<u>0</u>	<u>= Total Cover</u>																
50% of total cover: <u>0</u>	20% of total cover: <u>0</u>																	

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

The herb stratum is minimally vegetated.

SOIL

Sampling Point: DP-7-OUT**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc2
0-10	10YR	5 / 3	80	7.5YR	5 / 4	20	C	M	Silt loam	
10-20	7.5YR	6 / 6	95	7.5YR	4 / 2	5	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136,122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (**F21**) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147,148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes No **X**

Remarks:

The soils are well drained at this location.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 7

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	3	This old farm pond does slow water passing through the system, however the small size limits the benefits of this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	3	It is apparent that some sediment has dropped out in this small pond.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	2	Since the dam of this old pond has washed out, the area has continued to provide minimum erosion control benefits.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	3	There are some benefits to wildlife in this area, especially during wet periods. Otherwise, the area is primarily used by upland species such as white-tailed deer (<i>Odocoileus virginianus</i>).
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	1	The old pond may provide seasonal benefits to aquatic invertebrates and amphibians.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	4	The old pond surrounded by forest is an aesthetic habitat.

Total Score 16

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-8-IN
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.88162 Long: -87.51594 Datum: NAD-1983
 Soil Map Unit Name: Wakeland silt loam, 0 to 2 percent slopes, occasionally flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is a narrow emergent wetland located in an agricultural field (farmed with soybeans at the time of survey). The wetland likely receives runoff from the adjacent agricultural fields. WOTUS 2018 ID: WTL-62.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u>X</u> Drainage Patterns (B10)
<u> </u> Saturation (A3)	<u>X</u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Moss Trim Lines (B16)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u>X</u> Geomorphic Position (D2)
<u> </u> Iron Deposits (B5)		<u> </u> Shallow Aquitard (D3)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Microtopographic Relief (D4)
<u> </u> Water-Stained Leaves (B9)		<u>X</u> FAC-Neutral Test (D5)
<u> </u> Aquatic Fauna (B13)		
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks Oxidized root channels are present within the soil. The area appears to remain saturated for long durations during the growing season. Deep tractor ruts show how wet the area can be.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-8-IN

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Ammannia coccinea</i>	60	Y	OBL
2	<i>Leersia oryzoides</i>	25	Y	OBL
3	<i>Amaranthus spinosus</i>	20	N	FACU
4	<i>Xanthium strumarium</i>	10	N	FAC
5				
6				
7				
8				
9				
10				
11				
		<u>115</u> = Total Cover		
50% of total cover: <u>57.5</u>		20% of total cover: <u>23</u>		

Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>85</u>	x 1 = <u>85</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>115</u>	(A) <u>195</u> (B)

 Prevalence Index = B/A = 1.70
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤ 3.0 ¹
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

The wetland is bordered by sawtooth blackberry (*Rubus argutus*). The land directly adjacent to the wetland is farmed with soybeans (*Glycine max*).

SOIL

Sampling Point: DP-8-IN**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix			Redox Features				Texture	Remarks
	Color (moist)		%	Color (moist)		%	Type ¹		
0-6	10YR	4 / 2	95	7.5YR	5 / 8	5	C	PL	Silt loam
6-20	2.5Y	6 / 2	85	10YR	6 / 6	15	C	M	Silt loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136,122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (**F21**) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147,148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

This location met the depleted matrix (F3) indicator. The sample point is located in a swale in a valley. Oxidized root channels are present within the soil. The soils in the farmed edges are all within the plow zone and are mixed.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: 7/26/2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-8-OUT
 Investigator(s): Luke Eggering; Lindsey Postaski Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 10%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.88165 Long: -87.51608 Datum: NAD-1983
 Soil Map Unit Name: Alford silt loam, 12 to 20 percent slopes, severely eroded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This upland datapoint was taken on a farmed field. WOTUS 2018 ID: WTL-62.		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Water table present?	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-8-OUT

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		
Herb Stratum	(Plot Size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<u>Glycine max</u>	<u>90</u>	<u>Y</u>	<u>NI</u>
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		<u>90</u> = Total Cover		
50% of total cover: <u>45</u>		20% of total cover: <u>18</u>		
Woody Vine Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		
50% of total cover: <u>0</u>		20% of total cover: <u>0</u>		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>0</u>	(A) <u>0</u> (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

 This data point was taken in a field farmed with soybeans (*Glycine max*).

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc2			
0-12	7.5YR 5 / 4	95	10YR 5 / 2	5	C	M	Silt loam		
12-20	10YR 5 / 2	98	10YR 5 / 6	2	C	M	Silt loam		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):Type: NoneDepth (inches): None

Hydric soil present?

Yes No X **Remarks:**

The soils are well drained at this location. The top twelve inches of soil are within the plow zone.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 8

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	1	A channel forms at the southern edge of the wetland that dries that area, thereby eliminating wetland hydrology to the southeast.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	2	The small size of this wetland limits this function. The herbaceous vegetation does filter stormwater runoff.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	The wetland helps stabilize soils in this small valley, but an eroded channel starts on the downstream end of the wetland.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	This very small area has minimal wildlife benefits, but does provide some habitat for upland species including white-tailed deer (<i>Odocoileus virginianus</i>) and small mammals.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	0	This wetland does not provide this function.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	1	The small size limits the aesthetics and benefits of the area.

Total Score 6

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-9-IN
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Roadside ditch Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82992 Long: -87.56735 Datum: NAD-1983
 Soil Map Unit Name: Dekoven silt loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is a small roadside ditch wetland at a culvert west of US 41 and south of Zion Road. WOTUS 2018 ID: WTL-43		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u>X</u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u>X</u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u>X</u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u>X</u> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Crayfish burrows and sediment deposits were observed in this small primarily emergent wetland. This wetland receives runoff from US 41.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-9-IN

Tree Stratum (Plot Size: 30' diameter)		Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Catalpa speciosa</i>	10	Y	FAC
2	<i>Fraxinus pennsylvanica</i>	10	Y	FACW
3				
4				
5				
6				
7				
		20	= Total Cover	
50% of total cover: 10		20% of total cover: 4		

Sapling/Shrub Stratum (Plot Size: 15' diameter)		Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Rhus glabra</i>	10	Y	NI
2				
3				
4				
5				
6				
7				
8				
9				
		10	= Total Cover	
50% of total cover: 5		20% of total cover: 2		

Herb Stratum (Plot Size: 5' diameter)		Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Echinochloa crus-galli</i>	45	Y	FAC
2	<i>Persicaria pensylvanica</i>	15	Y	FACW
3	<i>Schedonorus arundinaceus</i>	10	N	FACU
4	<i>Lonicera japonica</i>	10	N	FACU
5	<i>Dipsacus fullonum</i>	5	N	FACU
6	<i>Glechoma hederacea</i>	5	N	FACU
7	<i>Sorghum halepense</i>	5	N	FACU
8	<i>Carex grayi</i>	5	N	FACW
9				
10				
11				
		100	= Total Cover	
50% of total cover: 50		20% of total cover: 20		

Woody Vine Stratum (Plot Size: 30' diameter)		Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 80.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>30</u>	x 2 = <u>60</u>
FAC species <u>55</u>	x 3 = <u>165</u>
FACU species <u>35</u>	x 4 = <u>140</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>120</u>	(A) <u>365</u> (B)

 Prevalence Index = B/A = 3.04
Hydrophytic Vegetation Indicators:

- 1 -Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is $\leq 3.0^1$
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: DP-9-IN

US Army Corps of Engineers

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-9-OUT
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82993 Long: -87.56735 Datum: NAD-1983
 Soil Map Unit Name: Dekoven silt loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil X, or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This upland is west of US 41 and south of Zion Road. Historically, the area appears to have been disturbed by construction of a ramp to US 41. WOTUS 2018 ID: WTL-43		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Geomorphic Position (D2)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Shallow Aquitard (D3)
<u> </u> Aquatic Fauna (B13)		<u> </u> Microtopographic Relief (D4)
		<u> </u> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u> </u> No <u> </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: The upland area is frequently maintained.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-9-OUT

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		
Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)			
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		
Herb Stratum	(Plot Size: <u>5' diameter</u>)			
1	<i>Cynodon dactylon</i>	85	Y	FACU
2	<i>Schedonorus arundinacea</i>	10	N	FACU
3	<i>Sorghum halepense</i>	5	N	FACU
4				
5				
6				
7				
8				
9				
10				
11				
		100	= Total Cover	
50% of total cover: 50		20% of total cover: 20		
Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)			
1				
2				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	100	x 4 =	400	
UPL species	0	x 5 =	0	
Column totals	100	(A)	400	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation in this area appears to be frequently maintained.

Sampling Point: DP-9-OUT

US Army Corps of Engineers

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WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 9

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	1	Small wetland size limits this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	Small wetland size limits this function.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	0	This wetland does not provide this function.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	1	The proximity to US 41 limits this function.

Total Score 5

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point DP-10-IN
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Roadside ditch Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82807 Long: -87.56665 Datum: NAD-1983
 Soil Map Unit Name: Uniontown silt loam, 2 to 6 percent slopes NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is a small roadside ditch emergent wetland east of US 41 south of Zion Road. The area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-44		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u>X</u> Oxidized Rhizospheres on Living Roots (C3)	<u>X</u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u>X</u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u>X</u> Geomorphic Position (D2)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Shallow Aquitard (D3)
<u> </u> Aquatic Fauna (B13)		<u> </u> Microtopographic Relief (D4)
		<u> </u> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u>X</u> No <u> </u> Depth (inches): <u>19"</u> Saturation present? Yes <u>X</u> No <u> </u> Depth (inches): <u>15"</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: There is one inch of water within the soil pit. Soils are saturated at this location.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-10-IN

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Echinochloa crus-galli</i>	80	Y	FAC
2	<i>Setaria pumila</i>	10	N	FAC
3	<i>Poa pratensis</i>	5	N	FACU
4	<i>Schedonorus arundinaceus</i>	5	N	FACU
5				
6				
7				
8				
9				
10				
11				
		100	= Total Cover	
50% of total cover: 50		20% of total cover: 20		

Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>90</u>	x 3 = <u>270</u>
FACU species <u>10</u>	x 4 = <u>40</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>100</u>	(A) <u>310</u> (B)

 Prevalence Index = B/A = 3.10
Hydrophytic Vegetation Indicators:

 1 -Rapid Test for Hydrophytic Vegetation

 X 2 - Dominance Test is >50%

 3 - Prevalence Index is ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: DP-10-IN

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WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-10-OUT
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82809 Long: -87.56662 Datum: NAD-1983
 Soil Map Unit Name: Uniontown silt loam, 2 to 6 percent slopes, rarely flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This upland area is east of US 41 and south of Zion Road. Historically, the area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-44		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Geomorphic Position (D2)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Shallow Aquitard (D3)
<u> </u> Aquatic Fauna (B13)		<u> </u> Microtopographic Relief (D4)
		<u> </u> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u> </u> No <u> </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: The upland area is frequently maintained.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-10-OUT

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Cynodon dactylon</i>	90	Y	FACU
2	<i>Schedonorus arundinacea</i>	10	N	FACU
3	<i>Sorghum halepense</i>	5	N	FACU
4				
5				
6				
7				
8				
9				
10				
11				
		105	= Total Cover	
50% of total cover: 52.5		20% of total cover: 21		

Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>105</u>	x 4 = <u>420</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>105</u>	(A) <u>420</u> (B)

 Prevalence Index = B/A = 4.00
Hydrophytic Vegetation Indicators:

 1 -Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is >50%

 3 - Prevalence Index is ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation in this area appears to be frequently maintained.

Sampling Point: DP-10-OUT

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WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 10

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	1	Small wetland size limits this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	Small wetland size limits this function.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	0	This wetland does not support this function.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	1	Small wetland size limits this function.

Total Score 5

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-11-IN
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Roadside ditch Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82723 Long: -87.56650 Datum: NAD-1983
 Soil Map Unit Name: Hosmer silt loam, 2 to 6 percent slopes NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil , or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Remarks: This is a small roadside ditch emergent wetland south of Zion Road, east of US-41. Historically, the area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-45	

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply) <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) </div> <div style="width: 48%;"> <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks) </div> </div>	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)	Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: Drainage patterns were observed within the wetlands. This wetland receives runoff from US 41.	

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-11-IN

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Typha angustifolia</i>	60	Y	OBL
2	<i>Echinochloa crus-galli</i>	15	N	FAC
3	<i>Dipsacus fullonum</i>	10	N	FACU
4	<i>Poa pratensis</i>	5	N	FACU
5				
6				
7				
8				
9				
10				
11				
		90	= Total Cover	
50% of total cover: 45		20% of total cover: 18		

Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>60</u>	x 1 = <u>60</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>15</u>	x 4 = <u>60</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>90</u>	(A) <u>165</u> (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

☒ 1 -Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is >50%

☒ 3 - Prevalence Index is ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: DP-11-IN

US Army Corps of Engineers

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-11-OUT
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82723 Long: -87.566503 Datum: NAD-1983
 Soil Map Unit Name: Hosmer silt loam, 2 to 6 percent slopes NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil X, or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: This upland area is east of US 41 and south of Zion Road. Historically, the area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-45	

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u> </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: The upland area is frequently maintained.	

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-11-OUT

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		
Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		
Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Cynodon dactylon</i>	95	Y	FACU
2	<i>Schedonorus arundinacea</i>	5	N	FACU
3	<i>Sorghum halepense</i>	5	N	FACU
4				
5				
6				
7				
8				
9				
10				
11				
		105	= Total Cover	
50% of total cover: 52.5		20% of total cover: 21		
Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Remarks: (Include photo numbers here or on a separate sheet.)
 Vegetation in this area appears to be frequently maintained.

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>105</u>	x 4 = <u>420</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>105</u>	(A) <u>420</u> (B)

 Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

SOIL

Sampling Point: DP-11-OUT

[illegible]

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 11

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	1	Small wetland size limits this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	Small wetland size limits this function.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	0	This wetland does not support this function.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	1	Small wetland size limits this function.

Total Score 5

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-12-IN
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Roadside ditch Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82597 Long: -87.56587 Datum: NAD-1983
 Soil Map Unit Name: Dekoven silt loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil X, or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: This is a small roadside ditch emergent wetland south of Zion Road, east of US-41. Historically, the area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-46	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u>X</u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Iron Deposits (B5)		<u>X</u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u>X</u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present? Yes <u> </u> No <u>X</u>	Depth (inches): <u> </u>	Yes <u>X</u> No <u> </u>
Water table present? Yes <u> </u> No <u>X</u>	Depth (inches): <u>>20"</u>	
Saturation present? Yes <u> </u> No <u>X</u> (includes capillary fringe)	Depth (inches): <u>>18"</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: This area receives runoff from US 41. Crayfish burrows were observed within the wetland. Water-stained leaves were present in low-lying areas. Two ephemeral tributaries to North Fork Canoe drain into this wetland.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-12-IN

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Phalaris arundinacea</i>	80	Y	FACW
2	<i>Toxicodendron radicans</i>	10	N	FAC
3	<i>Persicaria pensylvanica</i>	10	N	FACW
4	<i>Echinochloa crus-galli</i>	5	N	FAC
5				
6				
7				
8				
9				
10				
11				
		105	= Total Cover	
50% of total cover: 52.5		20% of total cover: 21		

Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>90</u>	x 2 = <u>180</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>105</u>	(A) <u>225</u> (B)

 Prevalence Index = B/A = 2.14
Hydrophytic Vegetation Indicators:

☒ 1 -Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is >50%

☒ 3 - Prevalence Index is ≤3.0¹

 4- Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Type ¹	Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%						
0-14	2.5Y 3 / 1	95	7.5YR 4 / 6	5			C	M	Silty clay loam	
14-20	2.5Y 4 / 2	90	7.5YR 4 / 6	10			C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☒ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present? Yes X No

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point: DP-12-OUT
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82723 Long: -87.566503 Datum: NAD-1983
 Soil Map Unit Name: Hosmer silt loam, 2 to 6 percent slopes NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil X, or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This upland area is east of US 41 and south of Zion Road. Historically, the area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-46		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Geomorphic Position (D2)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Shallow Aquitard (D3)
<u> </u> Aquatic Fauna (B13)		<u> </u> Microtopographic Relief (D4)
		<u> </u> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u> </u> No <u> </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-12-OUT

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		
Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)			
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		
Herb Stratum	(Plot Size: <u>5' diameter</u>)			
1	<i>Cynodon dactylon</i>	85	Y	FACU
2	<i>Schedonorus arundinacea</i>	15	N	FACU
3	<i>Sorghum halepense</i>	5	N	FACU
4				
5				
6				
7				
8				
9				
10				
11				
		105	= Total Cover	
50% of total cover: 52.5		20% of total cover: 21		
Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)			
1				
2				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>0</u>	x 2 =	<u>0</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>105</u>	x 4 =	<u>420</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column totals <u>105</u>	(A)	<u>420</u> (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation in this area appears to be frequently maintained.

SOIL

Sampling Point: DP-12-OUT

[illegible]¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

Indicators for Problematic Hydric Soils³:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Mucky Mineral (A10) (**LRR N**)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) (**LRR N**,
MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) (**MLRA 147, 148**)
- Thin Dark Surface (S9) (**MLRA 147, 148**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
- Umbric Surface (F13) (**MLRA 136,122**)
- Piedmont Floodplain Soils (F19) (**MLRA 148**)
- Red Parent Material (**F21**) (**MLRA 127, 147**)

- ☐ 2 cm Muck (A10) **(MLRA 147)**
☐ Coast Prairie Redox (A16)
(MLRA 147,148)
☐ Piedmont Floodplain Soils (F19)
(MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric soil present? Yes No **X**

Remarks:

The soils are well drained at this location.

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 12

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	1	Small wetland size limits this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	Small wetland size limits this function.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	0	This wetland does not provide this function.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	1	Small wetland size limits this function.

Total Score 5

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#:1601700); KYTC (KYTC#:2-1088) State: KY Sampling Point: DP-13-IN
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Roadside ditch Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82465 Long: -87.56789 Datum: NAD-1983
 Soil Map Unit Name: Dekoven silt loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil X, or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: This is a small roadside ditch emergent wetland west of US 41. Historically, area appears to have been disturbed by construction of US 41. WOTUS 2018 ID: WTL-47		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u>X</u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u>X</u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u>X</u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u>X</u> Geomorphic Position (D2)
<u>X</u> Water-Stained Leaves (B9)		<u> </u> Shallow Aquitard (D3)
<u> </u> Aquatic Fauna (B13)		<u> </u> Microtopographic Relief (D4)
		<u>X</u> FAC-Neutral Test (D5)
Field Observations:		
Surface water present?	Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Water table present?	Yes <u>X</u> No <u> </u> Depth (inches): <u>8"</u>	
Saturation present? (includes capillary fringe)	Yes <u>X</u> No <u> </u> Depth (inches): <u>5"</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: A tributary to North Fork Canoe Creek drains into this wetland. A 3' x 5' box inlet is present on the western boundary of this wetland.		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-13-IN

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Fraxinus pennsylvanica</i>	5	Y	FACW
2	<i>Salix interior</i>	2	Y	FACW
3	<i>Acer saccharinum</i>	2	Y	FACW
4				
5				
6				
7				
8				
9				
		9	= Total Cover	
50% of total cover: 4.5		20% of total cover: 1.8		

Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Typha angustifolia</i>	80	Y	OBL
2	<i>Phalaris arundinacea</i>	15	N	FACW
3				
4				
5				
6				
7				
8				
9				
10				
11				
		95	= Total Cover	
50% of total cover: 47.5		20% of total cover: 19		

Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>80</u>	x 1 = <u>80</u>
FACW species <u>30</u>	x 2 = <u>60</u>
FAC species <u>0</u>	x 3 = <u>6</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>110</u>	(A) <u>146</u> (B)

 Prevalence Index = B/A = 1.33
Hydrophytic Vegetation Indicators:

☒ 1 -Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is >50%

☒ 3 - Prevalence Index is ≤ 3.0 ¹

 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

The area is predominantly emergent with minimal sapling growth.

SOIL

Sampling Point: DP-13-IN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks
	Color (moist)		%	Color (moist)	%	Type ¹	Loc2		
0-5	10YR	3 / 2	85	10YR	4 / 4	15	C	M	Silty clay loam
5-20	10YR	4 / 1	70	10YR	4 / 6	30	C	M	Silty clay loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

☐ Histisol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Mucky Mineral (A10) (LRR N)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136,122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)
☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147,148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None
 Depth (inches): N/A

Hydric soil present?

Yes X No **Remarks:**

The soils at this location met the depleted matrix (F3) and depleted below dark surface (A11) indicators.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Henderson/Henderson Sampling Date: October 2, 2018
 Applicant/Owner: INDOT (Des#: 1601700); KYTC (#2-1088) State: KY Sampling Point DP-13-OUT
 Investigator(s): L. Postaski Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.82467 Long: -87.56791 Datum: NAD-1983
 Soil Map Unit Name: Dekoven silt loam NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation X, Soil X, or Hydrology significantly disturbed? Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: This upland is west of US 41 and south of Zion Road. Historically, the area appears to have been disturbed by construction of a ramp to US 41. WOTUS 2018 ID: WTL-47		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u> </u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u> </u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u> </u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Stunted or Stressed Plants (D1)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Geomorphic Position (D2)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Shallow Aquitard (D3)
<u> </u> Aquatic Fauna (B13)		<u> </u> Microtopographic Relief (D4)
		<u> </u> FAC-Neutral Test (D5)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> Saturation present? Yes <u> </u> No <u>X</u> Depth (inches): <u>>20</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u> </u> No <u> </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: DP-13-OUT

Tree Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Sapling/Shrub Stratum	(Plot Size: <u>15' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Herb Stratum	(Plot Size: <u>5' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1	<i>Cynodon dactylon</i>	80	Y	FACU
2	<i>Schedonorus arundinacea</i>	15	N	FACU
3	<i>Sorghum halepense</i>	10	N	FACU
4				
5				
6				
7				
8				
9				
10				
11				
		105	= Total Cover	
50% of total cover: 52.5		20% of total cover: 21		

Woody Vine Stratum	(Plot Size: <u>30' diameter</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
		0	= Total Cover	
50% of total cover: 0		20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>105</u>	x 4 = <u>420</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column totals <u>105</u>	(A) <u>420</u> (B)

 Prevalence Index = B/A = 4.00
Hydrophytic Vegetation Indicators:

 1 -Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is >50%

 3 - Prevalence Index is ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation in this area appears to be frequently maintained.

Sampling Point: DP-13-OUT

US Army Corps of Engineers

WETLAND FUNCTIONS & VALUES FORM

Wetland I.D.: Wetland 13

Project/Site: I-69 Ohio River Crossing

Function/Value	Score	Comments
Floodwater Alteration/Retention - Considers the effectiveness (wetland size, water capacity in wetland, location in watershed, wetland juxtaposition, etc.) of the wetland in reducing flood damage and the flow of floodwaters by attenuation of floodwaters for prolonged periods following precipitation events.	1	Small wetland size limits this function.
Sediment, Nutrient, & Toxicant Removal - Considers the effectiveness (wetland configuration, vegetative cover, wetland size, etc.) of the wetland in reducing or preventing degradation of water quality by trapping sediments, excess nutrients, and toxicants.	1	Small wetland size limits this function.
Erosion Control and Stabilization - Considers the effectiveness (vegetative cover, size, substrate, etc.) of the wetland in reducing erosion of stream channels or stream banks down gradient of the wetland, along shorelines if associated with a lake or tidally influenced water body, or within the wetland itself.	1	Small wetland size limits this function.
Wildlife Habitat (Terrestrial) - Considers the effectiveness (wetland's size, connectivity with other habitats, wetland juxtaposition, human-caused disturbance, etc.) of the wetland to provide habitat for various types and populations of terrestrial animals.	1	Small wetland size limits this function.
Wildlife Habitat (Aquatic) - Considers the effectiveness (wetland's size, substrate, water quality, wetland juxtaposition, human-caused disturbance, pollution, etc.) of the wetland to provide habitat for various types and populations of aquatic animals.	0	This wetland does not provide this function.
Visual Quality/Aesthetics - Considers the visual and aesthetic qualities of the wetland.	1	Small wetland size limits this function.

Total Score 5

Score	Potential to Provide Desirable Wetland Functions and Values
0	None
1	Poor
2	Low
3	Moderate
4	High
5	Very High

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: I-69 Ohio River Crossing City/County: Evansville/Vanderburgh Sampling Date: 4/23/2019
 Applicant/Owner: INDOT (Des#:1601700); KYTC (#2-1088) State: IN Sampling Point: UPL-05
 Investigator(s): Luke Eggering Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Road ditch/swale Local relief (concave, convex, none): Convex Slope (%): 1%
 Subregion (LRR or MLRA): MLRA 120A Lat: 37.81527 Long: -87.5628 Datum: NAD-1983
 Soil Map Unit Name: Uniontown silt loam, 0 to 2 percent slopes, rarely flooded NWI classification: NA
 Are climatic / hydrologic conditions on the site typical for this time of the year? Yes X No (If no, explain in Remarks.)
 Are vegetation , Soil , or Hydrology significantly disturbed? No Are "normal circumstances" present? Yes X No
 Are vegetation , Soil , or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	

Remarks: This datapoint is located at the downstream end of a roadside swale located east of the Edward T. Breathitt Pennyrite Parkway. This area is silted in, causing the swale to pond water after stormwater events. The swale turns into an eroded ditch entering UNT-36 to North Fork Canoe Creek.

WOTUS 2018 ID: NA.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u>X</u> Surface Water (A1)	<u> </u> True Aquatic Plants (B14)	<u> </u> Surface Soil Cracks (B6)
<u> </u> High Water Table (A2)	<u> </u> Hydrogen Sulfide Odor (C1)	<u> </u> Sparsely Vegetated Concave Surface (B8)
<u>X</u> Saturation (A3)	<u> </u> Oxidized Rhizospheres on Living Roots (C3)	<u> </u> Drainage Patterns (B10)
<u> </u> Water Marks (B1)	<u> </u> Presence of Reduced Iron (C4)	<u> </u> Moss Trim Lines (B16)
<u> </u> Sediment Deposits (B2)	<u> </u> Recent Iron Reduction in Tilled Soils (C6)	<u> </u> Dry-Season Water Table (C2)
<u> </u> Drift Deposits (B3)	<u> </u> Thin Muck Surface (C7)	<u>X</u> Crayfish Burrows (C8)
<u> </u> Algal Mat or Crust (B4)	<u> </u> Other (Explain in Remarks)	<u> </u> Saturation Visible on Aerial Imagery (C9)
<u> </u> Iron Deposits (B5)		<u> </u> Geomorphic Position (D2)
<u> </u> Inundation Visible on Aerial Imagery (B7)		<u> </u> Shallow Aquitard (D3)
<u> </u> Water-Stained Leaves (B9)		<u> </u> Microtopographic Relief (D4)
<u> </u> Aquatic Fauna (B13)		<u> </u> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Surface water present?	Yes <u>X</u> No <u> </u>	Depth (inches):	<u>6</u>	
Water table present?	Yes <u> </u> No <u>X</u>	Depth (inches):	<u>>20</u>	
Saturation present? (includes capillary fringe)	Yes <u>X</u> No <u> </u>	Depth (inches):	<u>0</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: The hydrology of this swale would be lost with routine maintenance of the roadside swale. The swale had water from recent stormwater events.

VEGETATION (Four Strata) - Use scientific names of plants

 Sampling Point: UPL-05

Tree Stratum	(Plot Size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1				
2				
3				
4				
5				
6				
7				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

Sapling/Shrub Stratum	(Plot Size: <u>15' radius</u>)			
1				
2				
3				
4				
5				
6				
7				
8				
9				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0

Herb Stratum	(Plot Size: <u>5' radius</u>)			
1	<u>Ludwigia alternifolia</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>
2	<u>Schedonorus arundinacea</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>
3	<u>Daucus carota</u>	<u>5</u>		<u>UPL</u>
4				
5				
6				
7				
8				
9				
10				
11				

55 = Total Cover

 50% of total cover: 27.5

 20% of total cover: 11

Woody Vine Stratum	(Plot Size: <u>30' radius</u>)			
1				
2				
3				
4				
5				

0 = Total Cover

 50% of total cover: 0

 20% of total cover: 0
Dominance Test worksheet:

 Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

 Total Number of Dominant Species Across all Strata: 2 (B)

 Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species	<u>0</u> x 1 = <u>0</u>
FACW species	<u>30</u> x 2 = <u>60</u>
FAC species	<u>0</u> x 3 = <u>0</u>
FACU species	<u>20</u> x 4 = <u>80</u>
UPL species	<u>5</u> x 5 = <u>25</u>
Column totals	<u>55</u> (A) <u>165</u> (B)

 Prevalence Index = B/A = 3.00
Hydrophytic Vegetation Indicators:
1 -Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

☒ 3 - Prevalence Index is $\leq 3.0^1$
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:
Tree - Woody plants, excluding vines 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic
Vegetation
Present?

 Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation at this data point is routinely mowed and approximately 40% of the area is unvegetated. *Carex spp.* was present at this data point (10%), however, it was mowed and not possible to identify to the species level. Seedbox (*Ludwigia alternifolia*) was dominant in the wettest portion of the swale. The tall fescue (*Schedonorus arundinacea*) became dominant near the drier edges of the swale.

Sampling Point: UPL-05

US Army Corps of Engineers

APPENDIX E

Stream Data Forms



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

27

SITE NAME/LOCATION UNT-1 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.93854

LONG. -87.53897

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Concrete-lined ephemeral channel in interchange

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	0
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input checked="" type="checkbox"/> ARTIFICIAL [3 pts]	100

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 6

(B) 1

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS The concrete channel is wet from recent rainfall.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The concrete is beginning to deteriorate.

AVERAGE BANKFULL WIDTH (meters)

2.0

HHEI Metric Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is an infrequently maintained interchange area.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS The concrete is wet from previous night's rain.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Roadside debris is present in the area.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

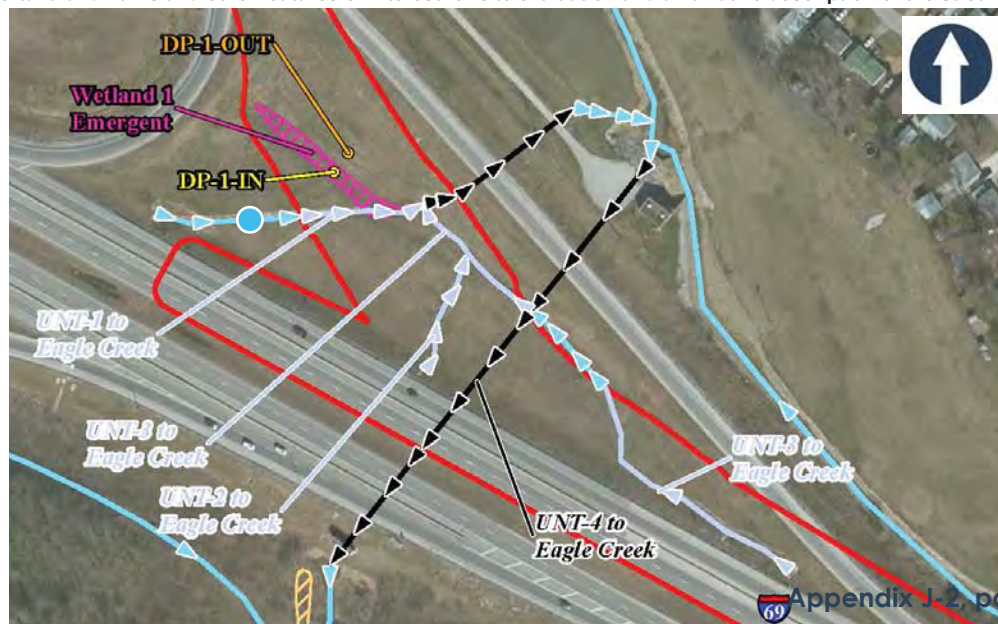
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a low-quality concrete lined ephemeral channel in the I-69/US-41 interchange. The concrete has some mosses growing on it. Overall, there is limited habitat for aquatic life. It is anticipated that approximately 134 feet of this stream will be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

27

SITE NAME/LOCATION UNT-2 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 167

LAT. 37.93811

LONG. -87.53802

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel in interchange

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	15
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	70
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.0

HHEI Metric Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is an infrequently maintained interchange area.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Stormwater from previous night's rain is present in a few low-lying areas.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This is a fairly straight eroded stream/ditch in the US-41/I-69 interchange. Roadside debris is present in the area. Herbicide appears to have been used on young dead trees.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

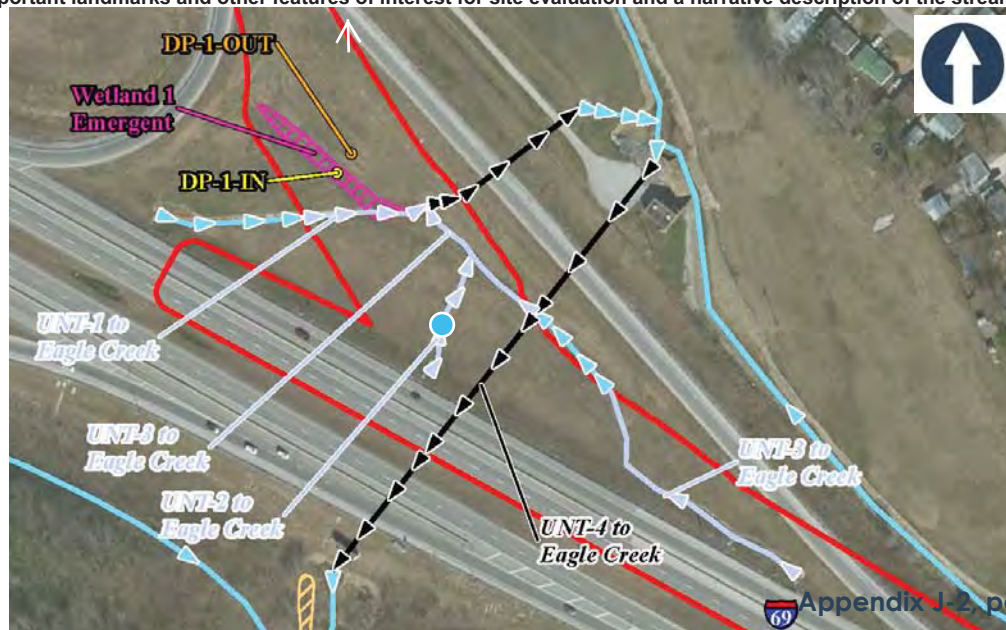
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This deeply incised, eroded, ephemeral channel is generally low quality. The upstream end is near a culvert that has riprap protection. The erosion starts where the riprap ends. A few scattered crayfish burrows were observed. In this area, there is marginal habitat for upland species, but traffic disturbance minimizes benefits to wildlife. The entire channel, approximately 156 feet, will be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

11

SITE NAME/LOCATION UNT-3 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.93771

LONG. -87.53727

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel in interchange

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	30
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	10
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	60
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an eroded ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is an infrequently maintained interchange area.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Stormwater from previous night's rain is present in a few scour holes.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input checked="" type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: A lot of roadway debris (aluminum cans, glass bottles, fast food containers, etc.)
is present. Runoff is from US-41 and the interchange.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

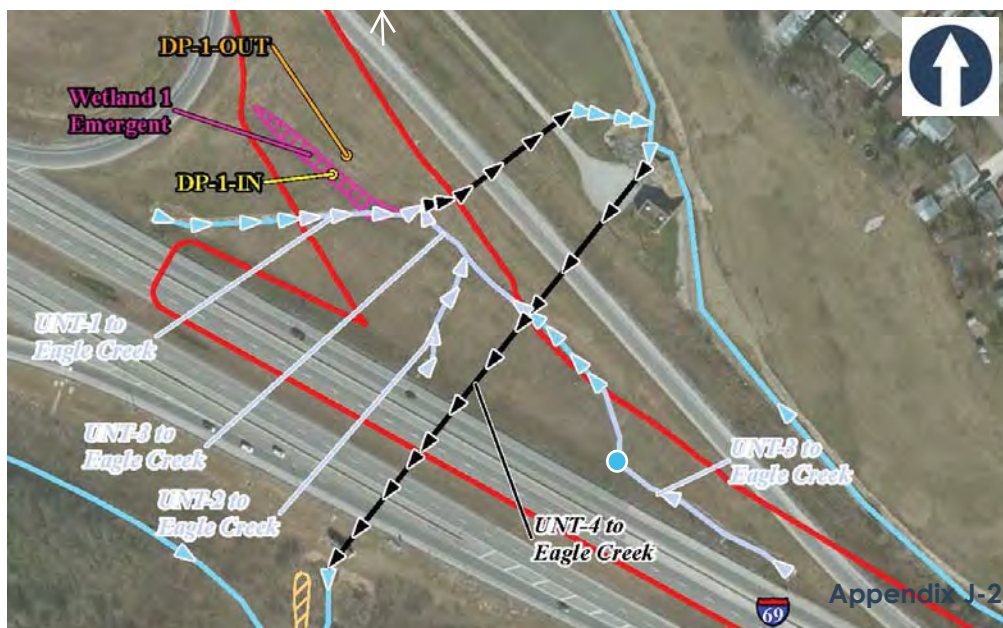
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This ephemeral channel is an erosional feature that has developed an ordinary high water mark and stabilized a channel over time. The area is infrequently maintained through mowing or use of herbicides. A few crayfish burrows are present. Traffic minimizes benefits to wildlife. Overall, this channel is low quality. Approximately 130 feet of the stream will be enclosed in a culvert and 316 feet of the stream will be filled. A potential shift in the alignment to the existing US 41 ramp to the northeast could avoid these impacts.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

26

SITE NAME/LOCATION UNT-5 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 10

LAT. 37.93642

LONG. -87.53343

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Shallow ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	35
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	10
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	55
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Dry ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

2.0

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS Proximal to I-69.

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Mostly dry channel with more water west of this stream reach.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This ephemeral channel likely receives runoff from I-69 during heavy rain events.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel north of I-69. Overall, this channel is low quality. This channel would fall outside of the construction limits.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

21

SITE NAME/LOCATION UNT-6 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 3

LAT. 37.93664

LONG. -87.52701

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Shallow ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	35
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	60
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is a dry ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is a shallow channel through a forest.

FLOW REGIME (At Time of Evaluation)

(Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel)

(Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.0 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel north of I-69. Overall, this channel is low quality. This ephemeral channel flows under I-69 via a culvert during heavy rain events.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

21

SITE NAME/LOCATION UNT-7 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.93657

LONG. -87.52691

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Shallow ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	35
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	60
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is a dry ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is a shallow channel through a forest parallel to I-69.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel north of I-69. Overall, this channel is low quality.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

22

SITE NAME/LOCATION UNT-8 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 56

LAT. 37.93525

LONG. -87.52670

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	15
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	70
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Stormwater from previous night's rain is present in the normally dry channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.9 mile

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
 Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

This is an ephemeral channel that drains into Eagle Creek. Approximately 25 feet of channel lies between the right of way and preliminary construction limits. This sample point is below a culvert under a private access road. This stream receives fairly frequent backwater flooding from Eagle Creek.

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

22

SITE NAME/LOCATION UNT-9 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.25

LENGTH OF STREAM REACH (ft) 95

LAT. 37.93609

LONG. -87.52514

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	15
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	70
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Stormwater from previous night's rain is present in a few normally dry scour holes.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.9 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel that drains into Eagle Creek. This channel likely receives runoff from I-69. This tributary braids into Wetland 3 with no defined channels. It is unclear whether this 96 feet of channel will be filled or spanned by structure.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

22

SITE NAME/LOCATION UNT-10 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 144

LAT. 37.93675

LONG. -87.52317

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	20
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	70
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI
Metric
Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.9 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

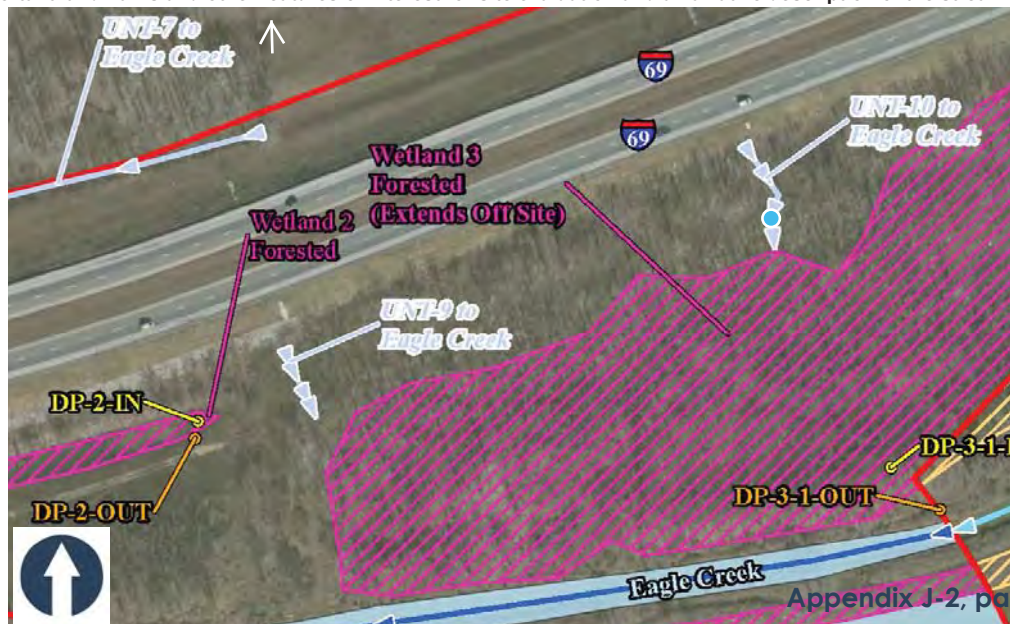
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel that drains into Eagle Creek. This channel likely receives runoff from I-69. This tributary braids into Wetland 3 with no defined channels. It is unclear whether this 143 feet of channel will be filled or spanned by structure.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: Eagle Creek

RM: N/A

Date: 08/01/18

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.93533, -87.52389

Office verified location ☐1] SUBSTRATE Check ONLY Two substrate TYPE BOXES;
estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE	
<input type="checkbox"/> BLDR /SLABS [10]	0	0	<input type="checkbox"/> HARDPAN [4]	0	0		
<input type="checkbox"/> BOULDER [9]	0	0	<input type="checkbox"/> DETRITUS [3]	0	0		
<input type="checkbox"/> COBBLE [8]	0	0	<input type="checkbox"/> MUCK [2]	0	0		
<input type="checkbox"/> GRAVEL [7]	0	0	<input checked="" type="checkbox"/> SILT [2]	100	0		
<input type="checkbox"/> SAND [6]	0	0	<input type="checkbox"/> ARTIFICIAL [0]	0	0		
<input type="checkbox"/> BEDROCK [5]	0	0	(Score natural substrates; ignore sludge from point-sources)				

ORIGIN	
<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT
<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> EMBEDDEDNESS
<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> SANDSTONE [0]
<input checked="" type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> RIP/RAP [0]
<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> LACUSTURINE [0]
<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> SHALE [-1]
<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> COAL FINES [-2]
<input type="checkbox"/> SHALE [-1]	
<input type="checkbox"/> COAL FINES [-2]	

QUALITY	
<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> FREE [1]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]
<input type="checkbox"/> NONE [1]	

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

Substrate
1
Maximum
20

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

UNDERCUT BANKS [1]		POOLS > 70cm [2]		OXBOWS, BACKWATERS [1]	
1	0	0	0	0	0
2	0	1	0	1	0
0	0	0	1	0	0
0	0	0	0	1	0

<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> MODERATE 25-75% [7]
<input checked="" type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments

Cover
Maximum
20
8

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel
Maximum
20
13

The entire stretch in the project area is channelized but stable.

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input checked="" type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]				
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]				
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]				
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]					
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]					

Indicate predominant land use(s)
past 100m riparian.

Comments

Riparian
Maximum
10
9

The left descending bank was recently sprayed with herbicide to kill woody vegetation.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

<input type="checkbox"/> > 1m [6]
<input type="checkbox"/> 0.7-<1m [4]
<input type="checkbox"/> 0.4-<0.7m [2]
<input checked="" type="checkbox"/> 0.2-<0.4m [1]
<input type="checkbox"/> < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]
<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]
<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

<input type="checkbox"/> TORRENTIAL [-1]	<input checked="" type="checkbox"/> SLOW [1]
<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool /
Current
Maximum
12
4

When the Ohio River rises, backwater reverses the flow of Eagle Creek.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

No riffles were present in the reach.

Riffle /
Run
Maximum
8
0

6] GRADIENT (1.0 ft/mi)	
<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]	
<input type="checkbox"/> MODERATE [6-10]	
<input type="checkbox"/> HIGH - VERY HIGH [10-6]	

%POOL: 100	%GLIDE: 0
%RUN: 0	%RIFFLE: 0

Gradient
Maximum
10
2

AJ SAMPLED REACH

Check ALL that apply

☐ BOAT

☐ WADE

☐ L. LINE

☐ OTHER

☐ 0.5 Km

☐ 0.2 Km

☐ 0.15 Km

☐ 0.12 Km

☐ OTHER

1st

--sample pass--

2nd

☐ < 20 cm

☐ 20-40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

1st

_____ cm

2nd

_____ cm

☐ HIGH

☐ UP

☐ NORMAL

☐ LOW

☐ DRY

☐ NUISANCE ALGAE

☐ INVASIVE MACROPHYTES

☐ EXCESS TURBIDITY

☐ DISCOLORATION

☐ FOAM / SCUM

☐ OIL SHEEN

☐ TRASH / LITTER

☐ NUISANCE ODOR

☐ SLUDGE DEPOSITS

☐ CSOs/SSOs/OUTFALLS

☐ CANOPY

☐ > 85%- OPEN

☐ 55%-<85%

☐ 30%-<55%

☐ 10%-<30%

☐ <10%- CLOSED

CJ RECREATION

AREA

DEPTH

POOL:

☐ >100ft²

☐ >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

This channelized reach of Eagle Creek is typical. The left descending bank was recently sprayed with herbicide to kill woody vegetation. It appears that channel maintenance only occurs from the south side of the creek. A levee located north of I-69 may impact hydrology during high water events. This reach of Eagle Creek is frequently affected by backwater flooding from the Ohio River. There is considerable amount of beaver activity and beaver dams in this reach. Eagle Creek is considered a legal drain in Indiana. Eagle Creek will be spanned by bridges and impacts to the stream will be short term during construction.

DJ MAINTENANCE

Circle some & COMMENT

☐ PUBLIC/ PRIVATE / BOTH / NA

☐ ACTIVE / HISTORIC / BOTH / NA

☐ YOUNG-SUCCESSION-OLD

☐ SPRAY/ SNAG / REMOVED

☐ MODIFIED / DIPPED OUT / NA

☐ LEVEED / ONE SIDED

☐ RELOCATED / CUTOFFS

☐ MOVING-BEDLOAD

☐ STABLE

☐ ARMoured / SLUMPS

☐ ISLANDS / SCoured

☐ IMPOUNDED / DESICCATED

☐ FLOOD CONTROL / DRAINAGE

EJ ISSUES

☐ WWTP / CSO / NPDES / INDUSTRY

☐ HARDENED / URBAN / DIRT&GRIME

☐ CONTAMINATED / LANDFILL

☐ BMPs-CONSTRUCTION-SEDIMENT

☐ LOGGING / IRRIGATION / COOLING

☐ BANK / EROSION / SURFACE

☐ FALSE BANK / MANURE / LAGOON

☐ WASH H₂O / TILE / H₂O TABLE

☐ ACID / MINE / QUARRY / FLOW

☐ NATURAL/ WETLAND/ STAGNANT

☐ PARK / GOLF / LAWN / HOME

☐ ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

☐ width

☐ depth

☐ max. depth

☐ bankfull width

☐ bankfull x depth

☐ W/D ratio

☐ bankfull max. depth

☐ floodprone x² width

☐ entrench. ratio

Legacy Tree:

Stream Drawing:



HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME Eagle Creek		LOCATION Evansville, Indiana	
STATION # NA RIVERMILE NA		STREAM CLASS Perennial	
LAT 37.93501 LONG -87.52485		RIVER BASIN Ohio River	
STORET # N/A		AGENCY N/A	
INVESTIGATORS L. Eggering			
FORM COMPLETED BY L. Eggering		DATE 05/16/19 TIME 12:30 AM <input checked="" type="radio"/> PM	REASON FOR SURVEY I-69 ORX Project

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 14	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
	SCORE 9	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 9	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
SCORE 12	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
SCORE <u>7</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>8</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
SCORE <u>7</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>7</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone) Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.	
SCORE <u>9</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>6</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 113

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Eagle Creek		LOCATION Evansville, Indiana	
STATION # <u>N/A</u> RIVERMILE <u>N/A</u>		STREAM CLASS Perennial	
LAT <u>37.93521</u> LONG <u>-87.52485</u>		RIVER BASIN Ohio River	
STORET # <u>N/A</u>		AGENCY <u>N/A</u>	
INVESTIGATORS L. Eggering			
FORM COMPLETED BY L. Eggering		DATE <u>05/16/19</u> TIME <u>12:30 PM</u> AM PM	REASON FOR SURVEY I-69 ORX Project

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Now</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> %cloud cover <input type="checkbox"/> clear/sunny </p> </div> <div style="width: 45%;"> <p>Past 24 hours</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> %cloud cover <input type="checkbox"/> clear/sunny </p> </div> </div> <p>Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </p> <p>Air Temperature <u>26</u> °C</p> <p>Other <u>Clear and calm</u></p>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p> <p>See attached Qualitative Habitat Evaluation Index (QHEI) Form.</p>
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Stream Subsystem</p> <p> <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal </p> <p>Stream Origin</p> <p> <input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____ </p> </div> <div style="width: 45%;"> <p>Stream Type</p> <p> <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater </p> <p>Catchment Area <u>16</u> km²</p> </div> </div>

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input type="checkbox"/> Forest ' Commercial ' Field/Pasture ' Industrial ' Agricultural ' Other _____ ' Residential		Local Watershed NPS Pollution ' No evidence <input type="checkbox"/> Some potential sources ' Obvious sources Local Watershed Erosion <input type="checkbox"/> None ' Moderate ' Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Trees ' Shrubs ' Grasses ' Herbaceous dominant species present _____		
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div> Estimated Reach Length 100 _____ m Estimated Stream Width 10 _____ m Sampling Reach Area 1000 _____ m² Area in km² (m²x1000) 0.001 _____ km² Estimated Stream Depth 1.5 _____ m Surface Velocity (at thalweg) 0.7 _____ m/sec </div> <div> Canopy Cover ' Partly open <input type="checkbox"/> Partly shaded ' Shaded High Water Mark 2.8 _____ m Proportion of Reach Represented by Stream Morphology Types ' Riffle 2 _____ % ' Run 18 _____ % ' Pool 80 _____ % Channelized <input type="checkbox"/> Yes ' No Dam Present ' Yes <input type="checkbox"/> No </div> </div>		
LARGE WOODY DEBRIS	LWD N/A _____ m ² Density of LWD N/A _____ m ² /km ² (LWD/ reach area)		
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent ' Rooted submergent ' Rooted floating ' Free floating ' Floating Algae ' Attached Algae ' Common buttonbush dominant species present _____ Portion of the reach with aquatic vegetation 2 _____ %		
WATER QUALITY	<div style="display: flex; justify-content: space-between;"> <div> Temperature 21.5 _____ ° C Specific Conductance 464.0 SPC Dissolved Oxygen 95.5% _____ pH 7.66 _____ Turbidity 72.15 NTU WQ Instrument Used YSI ProDSS </div> <div> Water Odors <input type="checkbox"/> Normal/None ' Sewage ' Petroleum ' Chemical ' Fishy ' Other _____ Water Surface Oils ' Slick ' Sheen ' Globs ' Flecks <input type="checkbox"/> None ' Other _____ Turbidity (if not measured) ' Clear ' Slightly turbid <input type="checkbox"/> Turbid ' Opaque ' Stained ' Other _____ </div> </div>		
SEDIMENT/SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div> Odors ' Normal ' Sewage ' Petroleum ' Chemical ' Anaerobic <input type="checkbox"/> None ' Other _____ Oils <input type="checkbox"/> Absent ' Slight ' Moderate ' Profuse </div> <div> Deposits ' Sludge ' Sawdust ' Paper fiber ' Sand ' Relict shells <input type="checkbox"/> Other No deposits. Looking at stones which are not deeply embedded, are the undersides black in color? ' Yes ' No No stones present. </div> </div>		

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	10
Boulder	> 256 mm (10")	0			
Cobble	64-256 mm (2.5"-10")	0	Muck-Mud	black, very fine organic (FPOM)	2
Gravel	2-64 mm (0.1"-2.5")	0			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	35			
Clay	< 0.004 mm (slick)	60			

5% is comprised of artificial material.



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

12

SITE NAME/LOCATION UNT-11 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 80

LAT. 37.93345

LONG. -87.52263

RIVER CODE N/A

RIVER MILE N/A

DATE 08/17/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	30
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	60
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.5

HHEI
Metric
Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 08/17/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

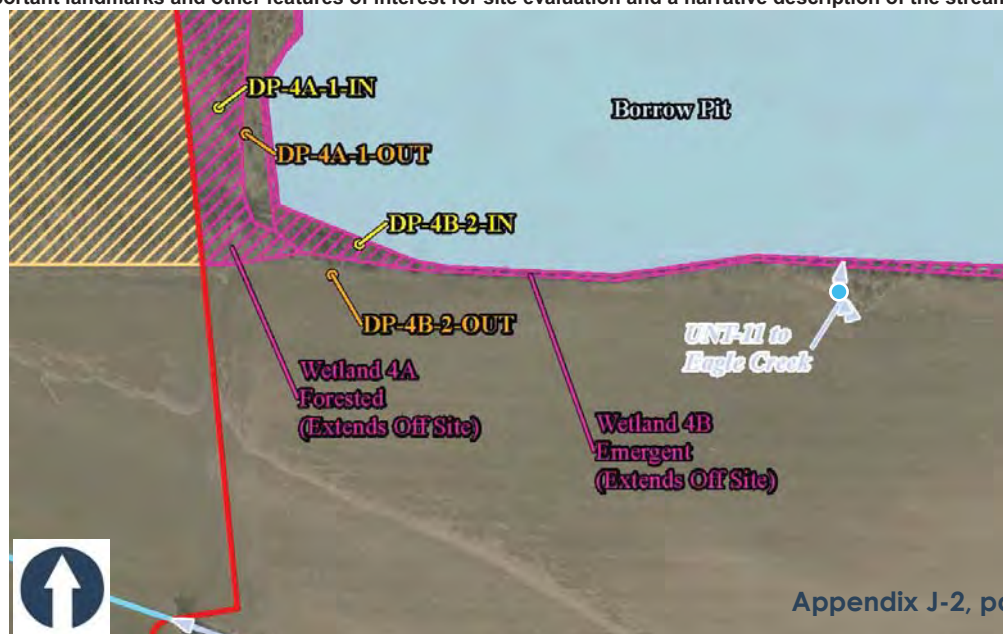
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel that drains from an agricultural field into a borrow pit (OW-1). It is unlikely that this channel will be filled, because I-69 will likely be on structure.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION UNT-12 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.04

LENGTH OF STREAM REACH (ft) 200

LAT. 37.93215

LONG. -87.52483

RIVER CODE N/A

RIVER MILE N/A

DATE 08/01/18

SCORER Luke F. Eggering

COMMENTS Main agricultural stream/ditch to Eagle Creek

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check **ONLY** two predominant substrate **TYPE** boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check **ONLY** one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Bottom of stream/ditch is moist from overnight rainfall

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check **ONLY** one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The stream/ditch is fairly uniform.

AVERAGE BANKFULL WIDTH (meters)

3.5

HHEI Metric Points

Substrate
Max = 40

5

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

25

This information **must** also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Corn to the north, soybeans to the south

FLOW REGIME (At Time of Evaluation) (Check **ONLY** one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This stream/ditch likely only has water during stormwater events and Ohio River/Eagle Creek floods.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check **ONLY** one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.9 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: The area is routinely mowed and sprayed with herbicide.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is the main agricultural stream/ditch that drains this area. It flows into Eagle Creek to the northwest. Many crayfish burrows were observed. The I-69 corridor crosses 1,049 feet of this tributary. It is unclear whether or not the I-69 roadway and interchange ramps will be on structure.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

25

SITE NAME/LOCATION UNT-13 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.93190

LONG. -87.52579

RIVER CODE N/A

RIVER MILE N/A

DATE 08/01/18

SCORER Luke F. Eggering

COMMENTS Agricultural stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input checked="" type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Bottom of stream/ditch is moist from overnight rainfall

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS Stream/ditch is fairly uniform.

AVERAGE BANKFULL WIDTH (meters)

2.5

HHEI Metric Points

Substrate
Max = 40

5

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Corn to the north, soybeans to the south.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This stream/ditch likely only has water during stormwater events and Ohio River/Eagle Creek floods.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.6 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: The area is routinely mowed and sprayed with herbicide.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This agricultural stream/ditch flows into a larger agricultural stream/ditch, which flows into Eagle Creek. The stream/ditch likely only has water in significant stormwater events and during severe Ohio River/Eagle Creek flood events. Many crayfish burrows and dead crayfish were observed. Approximately 430 feet of channelization may be necessary during construction. However, this agricultural stream/ditch may be avoided if I-69 is on structure or with a slight shift in the alignment to the east.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

20

SITE NAME/LOCATION UNT-14 to Eagle Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.93053

LONG. -87.52486

RIVER CODE N/A

RIVER MILE N/A

DATE 08/01/18

SCORER Luke F. Eggering

COMMENTS Lateral agricultural stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input checked="" type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Agricultural stream/ditch is moist from recent rainfall

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS Stream/ditch is routinely cleaned and herbicides are used

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

5

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Corn to the south, soybeans to the north

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.6 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Evansville South, IN-KY NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Vanderburgh County Township / City: Evansville

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: The area is routinely mowed and sprayed with herbicide.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This agricultural stream/ditch flows into a larger agricultural stream/ditch, which flows into Eagle Creek. Water is likely only present during stormwater events and during Ohio River/Eagle Creek flood events. Many crayfish burrows and dead crayfish were observed. A severe Ohio River flood event occurred in February 2018. I-69 crosses approximately 772 feet of this agricultural ditch. It is unclear whether I-69 will be on structure or fill in this area.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

40

SITE NAME/LOCATION UNT-1 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88948

LONG. -87.51613

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS This is the main channel in this valley.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	0
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	40	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input checked="" type="checkbox"/> ARTIFICIAL [3 pts]	40

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

15

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

0

Pool Depth
Max = 30

0

COMMENTS The channel is dry.

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

3.5

Bankfull
Width
Max=30

25

COMMENTS The banks have been armored with riprap.

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is a shallow ephemeral channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 0.8 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 5
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: There are no obvious pollution sources. There are agricultural fields in the upper reaches of this stream.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

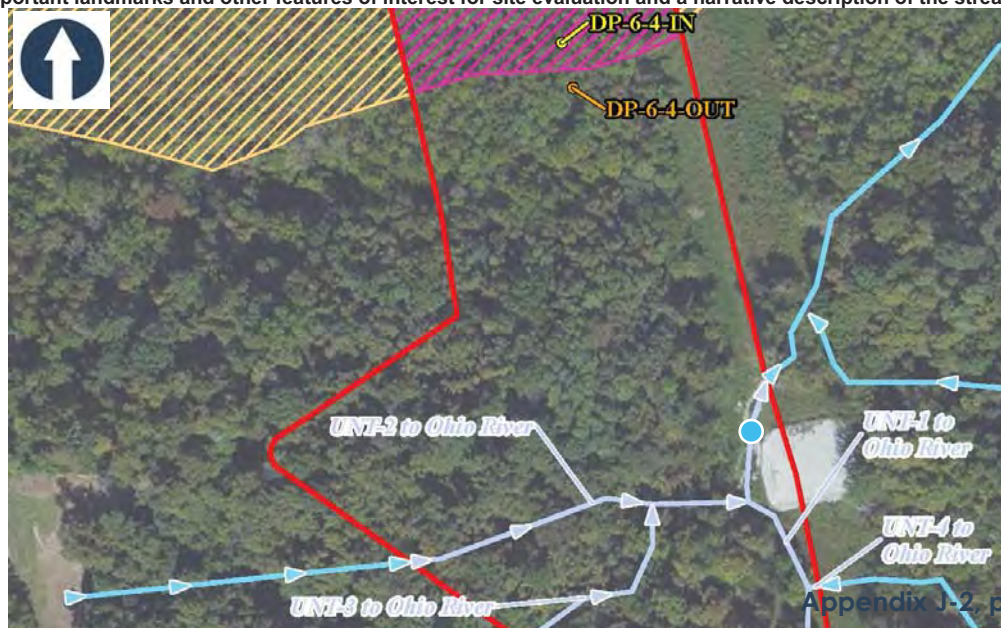
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel. No aquatic life was observed; however, crayfish burrows were present in the channel. This sampling point is channelized and armored with riprap located near a pipeline facility. Approximately 32 feet of this 240-foot reach of stream UNT-1 to Ohio River would be channelized.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

19

SITE NAME/LOCATION UNT-2 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88931

LONG. -87.51670

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Wooded ephemeral draw/channel.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	10
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	40
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	20	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS The channel is dry.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is shallow.

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

14

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is a shallow ephemeral channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 0.8 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 20
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Silt/sediment in the channel is likely from logging activities.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

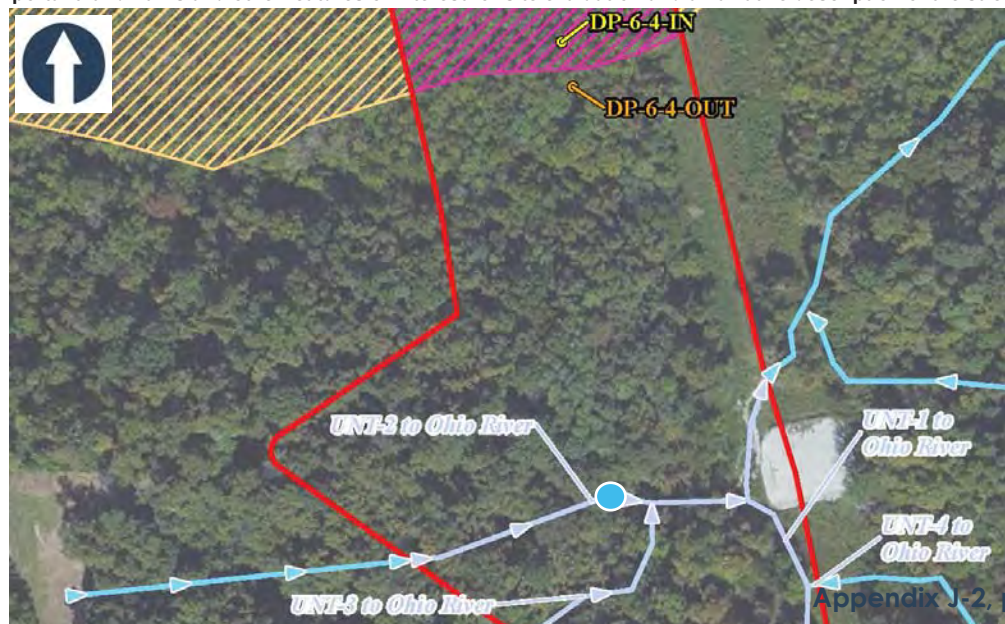
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a shallow ephemeral channel that extends west to a recently logged area. Approximately 226 feet of the 412-foot stream would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

27

SITE NAME/LOCATION UNT-3 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88891

LONG. -87.51687

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Wooded ephemeral draw/channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	40
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	15
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	25	<input type="checkbox"/> MUCK [0 pts]	15
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Plunge pools had a little water

MAXIMUM POOL DEPTH (centimeters):

5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS This is an ephemeral channel.

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

17

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS The area was selectively logged last year.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS The channel is usually dry. Water in pools is from recent rainfall.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 0.9 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 85
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Silt and muck in the channel is likely from logging activities.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

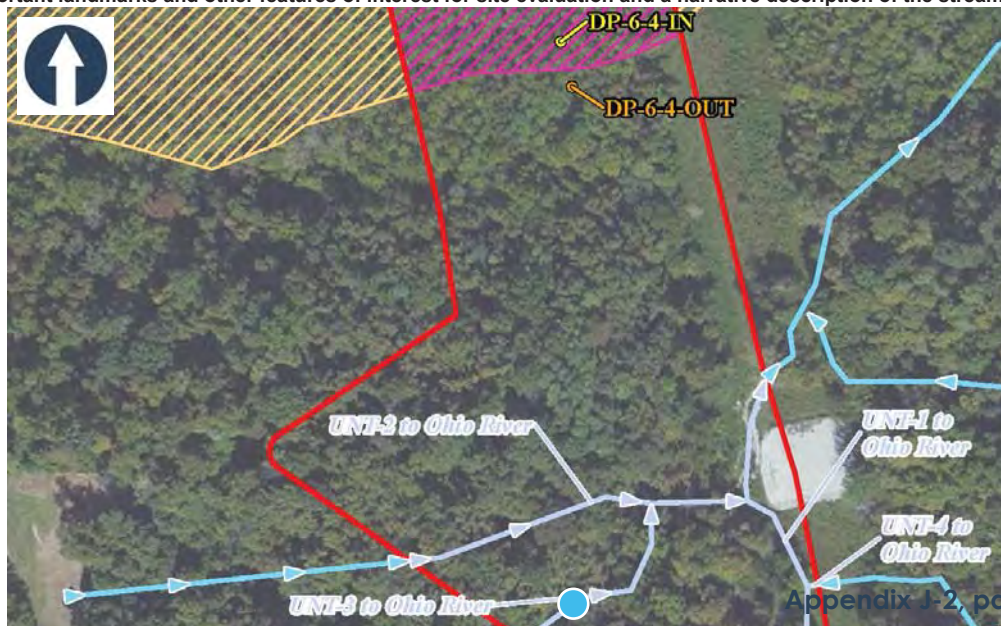
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel in a forest. Recent logging activity likely contributed to the presence of silt and muck in the channel. The surrounding area is good wildlife habitat. Approximately 181 feet of the 252-foot channel would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

38

SITE NAME/LOCATION UNT-4 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 14

LAT. 37.88900

LONG. -87.51586

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Sample point is in a pipeline right-of-way

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check **ONLY** two predominant substrate **TYPE** boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	80
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	15	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 15

(A) 15

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check **ONLY** one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Intermittent pools of waters in a normally dry channel.

MAXIMUM POOL DEPTH (centimeters):

2.5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check **ONLY** one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is eroded through the pipeline right-of-way.

AVERAGE BANKFULL WIDTH (meters)

1.5

HHEI Metric Points

Substrate
Max = 40

18

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

15

This information **must** also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Pipeline right-of-way is currently an old field.

FLOW REGIME (At Time of Evaluation) (Check **ONLY** one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is normally a dry channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check **ONLY** one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 0.9 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 60
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Some agriculture is present in the upper reaches of the watershed.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

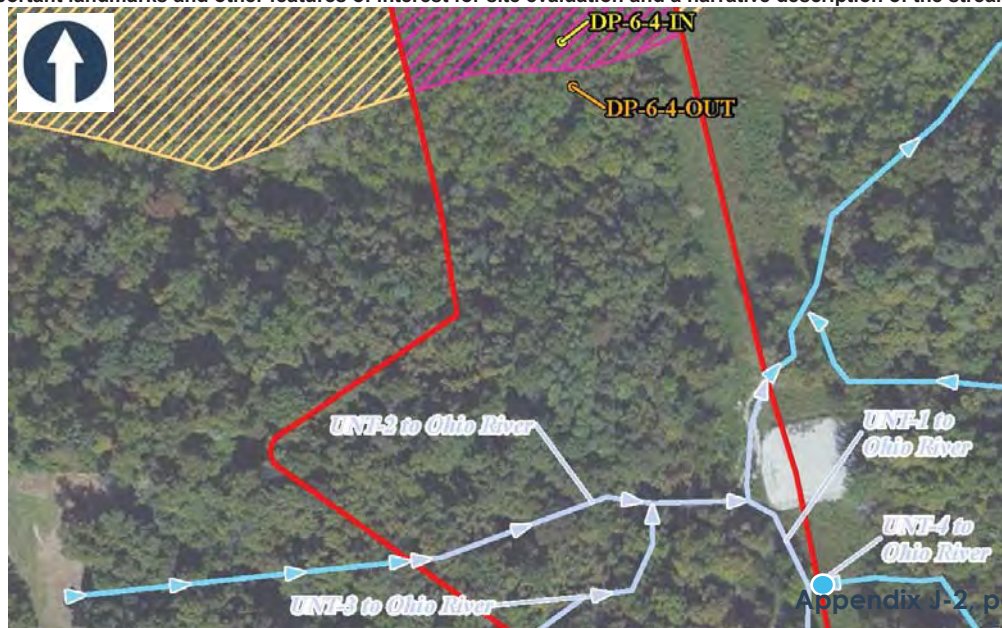
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-4 to Ohio River is a deeply incised channel located west of a utility right-of-way. The sample point is located within a pipeline right-of-way; however, the majority of the overall system is forested. The area is primarily used by upland species. An occasional crayfish burrow was observed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

33

SITE NAME/LOCATION UNT-5 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88769

LONG. -87.51580

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Wooded ephemeral draw/channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	10
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	30
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	40	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Water is from recent rainfall.

MAXIMUM POOL DEPTH (centimeters):

2.5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is eroded.

AVERAGE BANKFULL WIDTH (meters)

1.5

HHEI Metric Points

Substrate
Max = 40

13

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is normally a dry channel. Pools of water during survey are likely from recent rains.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a deeply incised wooded channel/ephemeral stream. Pools of water during survey are likely from recent rains. No aquatic species were observed. Some crayfish burrows were observed. The surrounding area is good quality habitat for upland species. Approximately 263 feet of the 403-foot channel would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

28

SITE NAME/LOCATION UNT-6 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 42

LAT. 37.88709

LONG. -87.51534

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Sample point is in a pipeline right-of-way

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	80
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	15	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 15

(A) 15

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Intermittent pools of water in a normally dry channel.

MAXIMUM POOL DEPTH (centimeters):

2.5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is eroded through the pipeline right-of-way.

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

18

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Pipeline right-of-way is currently an old field.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is normally a dry channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.0 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 60

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Some agriculture is present in the upper reaches of the watershed.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

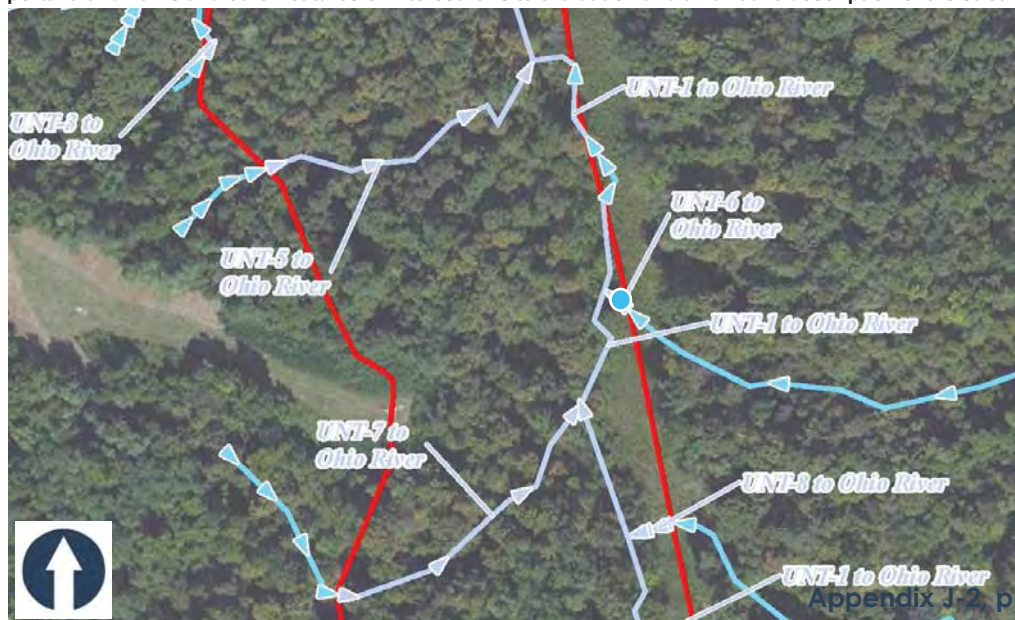
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-6 to Ohio River is a deeply incised channel located west of a utility right-of-way. The sample point is located within a pipeline right-of-way; however, the majority of the overall system is forested. The area is primarily used by upland species. An occasional crayfish burrow was observed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

46

SITE NAME/LOCATION UNT-7 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88631

LONG. -87.51586

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Wooded steep sided ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLD R SLABS [16 pts]	10	<input type="checkbox"/> SILT [3 pt]	0
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	10	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	30	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	30	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 50

(A) 21

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

26

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

7.5

Pool Depth
Max = 30

15

COMMENTS Water in the plunge pools are from recent rains.

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

1.0

Bankfull
Width
Max=30

5

COMMENTS The channel is very steep sided.

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is a deeply incised channel in a wooded draw.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is normally a dry channel. Pools of water during survey are likely from recent rains.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input checked="" type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.1 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This is a uniform deeply incised channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel in a wooded draw. The water that is currently in the channel is likely due to recent rainfall. No aquatic species were observed. No crayfish burrows were observed. Approximately 224 feet of the 392-foot channel would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

41

SITE NAME/LOCATION UNT-8 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 60

LAT. 37.88630

LONG. -87.51508

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Sample point is in a pipeline right-of-way

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check **ONLY** two predominant substrate **TYPE** boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	0
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input checked="" type="checkbox"/> BEDROCK [16 pt]	70	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	25	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 95

(A) 28

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check **ONLY** one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Intermittent pools of water in a normally dry channel.

MAXIMUM POOL DEPTH (centimeters):

2.5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check **ONLY** one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is eroded through the pipeline right-of-way.

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

31

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

5

This information **must** also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Pipeline right-of-way is currently an old field.

FLOW REGIME (At Time of Evaluation) (Check **ONLY** one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is normally a dry channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check **ONLY** one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.1 mile
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 40

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Some agriculture is present in the upper reaches of the watershed.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

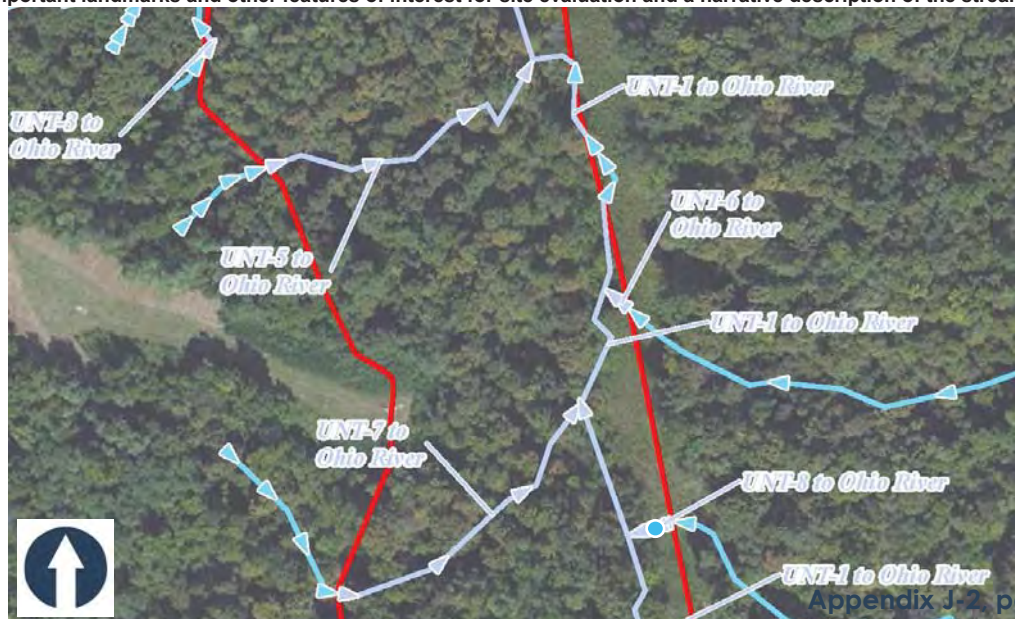
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Generally, this is a dry ephemeral channel. The sample point is located within a pipeline right-of-way; however, the majority of the overall system is forested. The area is primarily used by upland species. An occasional crayfish burrow was observed. Lichens were present on the bedrock and channel. Approximately 34 feet of UNT-8 to Ohio River will be filled. UNT-8 to Ohio River will be connected to the channelized portion of UNT-1 to Ohio River.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

11

SITE NAME/LOCATION UNT-9 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88462

LONG. -87.51585

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel in a wooded draw

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input checked="" type="checkbox"/> SILT [3 pt]	15
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	75
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is incised at the bottom of this wooded draw.

AVERAGE BANKFULL WIDTH (meters)

1

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.2 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5"

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 95

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This is a dry ephemeral channel. There is the potential for soil erosion and herbicides entering from agricultural fields to the south.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

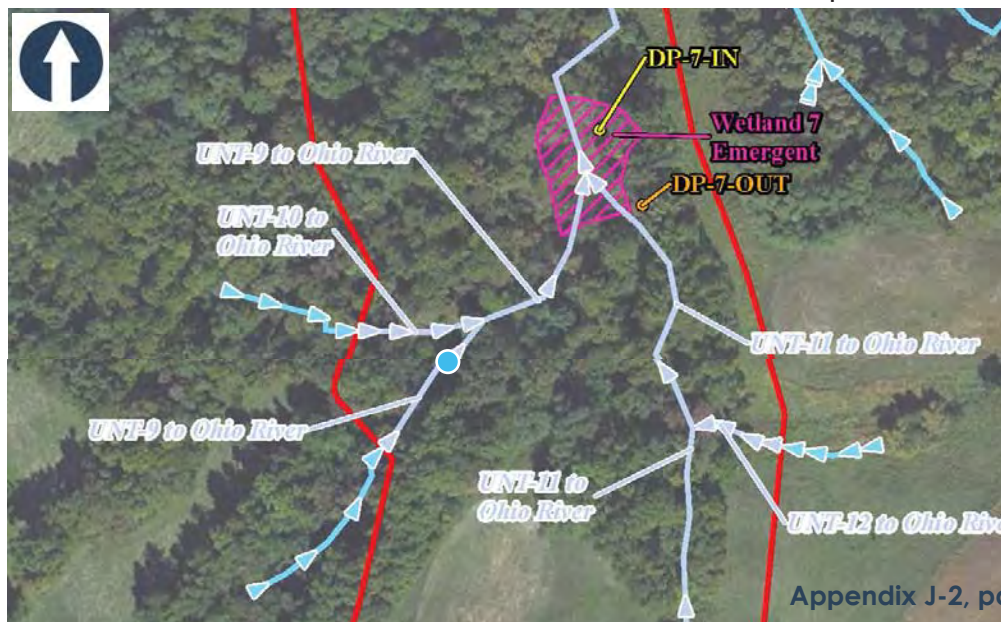
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel in a wooded draw that likely only has flow during stormwater events. It is fairly undisturbed and the surrounding area is high quality habitat for terrestrial wildlife. Crayfish burrows are present in the channel. Approximately 22 feet of UNT-9 to Ohio River would be enclosed in a culvert. Approximately 144 feet of channel lies within the ROW, however it would not be impacted.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

12

SITE NAME/LOCATION UNT-10 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 155

LAT. 37.88478

LONG. -87.51592

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Ephemeral channel in a wooded draw.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check **ONLY** two predominant substrate **TYPE** boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	5
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	20
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	70
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check **ONLY** one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check **ONLY** one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS The channel is narrow and incised.

AVERAGE BANKFULL WIDTH (meters)

1

HHEI Metric Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information **must** also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is a wooded draw.

FLOW REGIME (At Time of Evaluation) (Check **ONLY** one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This ephemeral channel only has flow during stormwater events.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check **ONLY** one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.2 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 85
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This is an ephemeral channel in a wooded draw. The area is fairly undisturbed.
It is likely dry except during stormwater events.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Crayfish burrows were observed in the channel. There are 362 feet of UNT-10 to Ohio River in the ROW. Approximately 254 feet of UNT-10 to Ohio River would be filled and replaced with 284 feet (78 feet of existing channel in culvert +206 feet of new culvert) of culvert that will extend from the western construction limits to UNT-1 to Ohio River. Approximately 61 feet of braided channel is within Wetland 7.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

26

SITE NAME/LOCATION UNT-11 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88347

LONG. -87.51491

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Wooded draw with agriculture surrounding

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	15
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	80
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Water is present only during stormwater events.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS This is a small eroded channel.

AVERAGE BANKFULL WIDTH (meters)

1.6

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS Agriculture is present on both sides of the wooded draw.

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Ephemeral flow only.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.3 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inch

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion from agricultural field is probable but not severe.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral channel in a wooded draw that is surrounded by agricultural fields. This is habitat for deer and upland species. Occasional crayfish burrows are in the channel. Approximately 878 feet of UNT-11 to Ohio River will be relocated to east of the ROW. Approximately 64 feet of UNT-11 to Ohio River is braided through Wetland 7.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION UNT-12 to Ohio River

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 113

LAT. 37.88447

LONG. -87.51457

RIVER CODE N/A

RIVER MILE N/A

DATE 08/02/18

SCORER Luke F. Eggering

COMMENTS Wooded draw from the east

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	15
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	5	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	80
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 5

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS After rain, there are a few holes of water in plunge pool.

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS This is an eroded channel with several plunge pools.

AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS 75 feet east of the channel is an agricultural field.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS At the sample point, the channel is dry.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.15 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5"

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion from agricultural field is probable but not severe.

This sample point is a wooded draw.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

There are some head-cuts and plunge pools developed along the eroding channel. Crayfish burrows are present in the channel. Many opossum and raccoon tracks were observed. Approximately 88 feet of UNT-12 to Ohio River are within the ROW. Approximately 80 feet of UNT-12 to Ohio River would be filled and UNT-12 to Ohio River will connect to channelized section of UNT-11 to Ohio River.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: Ohio River

RM: N/A

Date: 08/01/18

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.90136, -87.51918

Office verified location ☐1] SUBSTRATE Check ONLY Two substrate TYPE BOXES;
estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE	
<input type="checkbox"/>	BLDR /SLABS [10]	0	0	<input type="checkbox"/>	HARDPAN [4]	0	0
<input type="checkbox"/>	BOULDER [9]	5	0	<input type="checkbox"/>	DETRITUS [3]	0	0
<input type="checkbox"/>	COBBLE [8]	0	0	<input type="checkbox"/>	MUCK [2]	0	0
<input type="checkbox"/>	GRAVEL [7]	0	0	<input checked="" type="checkbox"/>	SILT [2]	75	0
<input checked="" type="checkbox"/>	SAND [6]	15	0	<input type="checkbox"/>	ARTIFICIAL [0]	5	0
<input type="checkbox"/>	BEDROCK [5]	0	0	(Score natural substrates; ignore sludge from point-sources)			

ORIGIN

<input type="checkbox"/>	LIMESTONE [1]
<input type="checkbox"/>	TILLS [1]
<input checked="" type="checkbox"/>	WETLANDS [0]
<input type="checkbox"/>	HARDPAN [0]
<input type="checkbox"/>	SANDSTONE [0]
<input type="checkbox"/>	RIP/RAP [0]
<input type="checkbox"/>	LACUSTURINE [0]
<input type="checkbox"/>	SHALE [-1]
<input type="checkbox"/>	COAL FINES [-2]

QUALITY

<input type="checkbox"/>	HEAVY [-2]
<input checked="" type="checkbox"/>	MODERATE [-1]
<input type="checkbox"/>	NORMAL [0]
<input type="checkbox"/>	FREE [1]
<input type="checkbox"/>	EXTENSIVE [-2]
<input type="checkbox"/>	MODERATE [-1]
<input checked="" type="checkbox"/>	NORMAL [0]
<input type="checkbox"/>	NONE [1]

Substrate

7

Maximum 20

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

0	UNDERCUT BANKS [1]	3	POOLS > 70cm [2]	0	OXBOWS, BACKWATERS [1]
2	OVERHANGING VEGETATION [1]	0	ROOTWADS [1]	0	AQUATIC MACROPHYTES [1]
0	SHALLOWS (IN SLOW WATER) [1]	1	BOULDERS [1]	3	LOGS OR WOODY DEBRIS [1]
0	ROOTMATS [1]				

<input type="checkbox"/>	EXTENSIVE >75% [11]
<input checked="" type="checkbox"/>	MODERATE 25-75% [7]
<input type="checkbox"/>	SPARSE 5-<25% [3]
<input type="checkbox"/>	NEARLY ABSENT <5% [1]

Comments

Cover
Maximum 20

12

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel
Maximum 20

15

The entire stretch in the project area is channelized but stable.

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input checked="" type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	
		<input type="checkbox"/> NONE [0]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]			

Indicate predominant land use(s)
past 100m riparian.

Comments

Riparian
Maximum 10

7

The left descending bank was recently sprayed with herbicide to kill woody vegetation.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

<input checked="" type="checkbox"/>	> 1m [6]
<input type="checkbox"/>	0.7-<1m [4]
<input type="checkbox"/>	0.4-<0.7m [2]
<input type="checkbox"/>	0.2-<0.4m [1]
<input type="checkbox"/>	< 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/>	POOL WIDTH > RIFFLE WIDTH [2]
<input type="checkbox"/>	POOL WIDTH = RIFFLE WIDTH [1]
<input type="checkbox"/>	POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

<input type="checkbox"/>	TORRENTIAL [-1]	<input type="checkbox"/>	SLOW [1]
<input type="checkbox"/>	VERY FAST [1]	<input type="checkbox"/>	INTERSTITIAL [-1]
<input type="checkbox"/>	FAST [1]	<input type="checkbox"/>	INTERMITTENT [-2]
<input checked="" type="checkbox"/>	MODERATE [1]	<input type="checkbox"/>	EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool /
Current
Maximum 12

9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

No riffles were present in the reach.

Riffle /
Run
Maximum 8

5

6] GRADIENT (2 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]
DRAINAGE AREA (>100 mi ²)	<input type="checkbox"/> MODERATE [6-10]
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]

%POOL: 0	%GLIDE: 0
%RUN: 100	%RIFFLE: 0

Gradient
Maximum 10

3

AJ SAMPLED REACH

Check ALL that apply

METHOD

☐ BOAT
☐ WADE
☐ L. LINE
☐ OTHER

STAGE

1st -sample pass-- 2nd

☐ HIGH
☐ UP
☐ NORMAL
☐ LOW
☐ DRY

DISTANCE

☐ 0.5 Km
☐ 0.2 Km
☐ 0.15 Km
☐ 0.12 Km
☐ OTHER

CLARITY

1st --sample pass-- 2nd

☐ < 20 cm
☐ 20-<40 cm
☐ 40-70 cm
☐ > 70 cm/ CTB

SECCHI DEPTH

1st _____ cm
2nd _____ cm

CANOPY

☐ > 85%- OPEN
☐ 55%-<85%
☐ 30%-<55%
☒ 10%-<30%
☐ <10%- CLOSED

CJ RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

BJ AESTHETICS

☐ NUISANCE ALGAE
☐ INVASIVE MACROPHYTES
☐ EXCESS TURBIDITY
☐ DISCOLORATION
☐ FOAM / SCUM
☐ OIL SHEEN
☒ TRASH / LITTER
☐ NUISANCE ODOR
☐ SLUDGE DEPOSITS
☐ CSOs/SSOs/OUTFALLS

DJ MAINTENANCE

☐ PUBLIC / PRIVATE / BOTH / NA
☐ ACTIVE / HISTORIC / BOTH / NA
☐ YOUNG-SUCCESSION-OLD
☐ SPRAY / SNAG / REMOVED
☐ MODIFIED / DIPPED OUT / NA
☐ LEVEEED / ONE SIDED
☐ RELOCATED / CUTOFFS
☐ MOVING-BEDLOAD-STABLE
☐ ARMoured / SLUMPS
☐ ISLANDS / SCoured
☐ IMPOUNDED / DESICCATED
☐ FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

EJ ISSUES

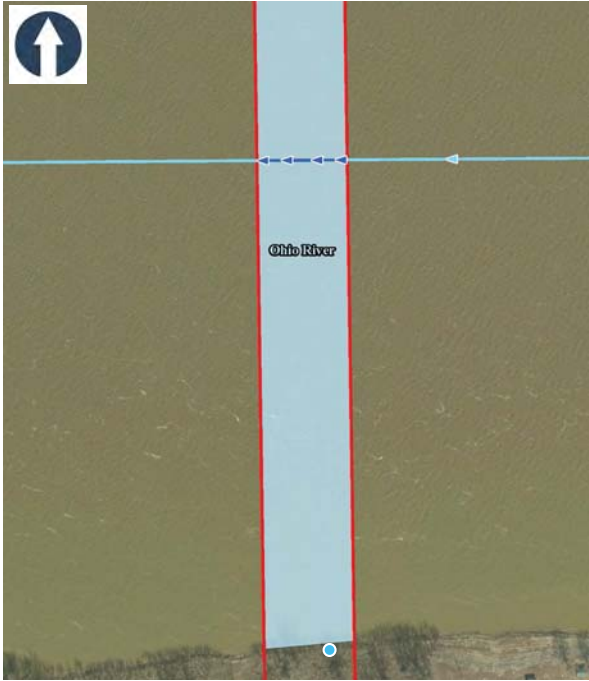
☐ WWTP / CSO / NPDES / INDUSTRY
☐ HARDENED / URBAN / DIRT&GRIME
☐ CONTAMINATED / LANDFILL
☐ BMPs-CONSTRUCTION-SEDIMENT
☐ LOGGING / IRRIGATION / COOLING
☐ BANK / EROSION / SURFACE
☐ FALSE BANK / MANURE / LAGOON
☐ WASH H₂O / TILE / H₂O TABLE
☐ ACID / MINE / QUARRY / FLOW
☐ NATURAL / WETLAND / STAGNANT
☐ PARK / GOLF / LAWN / HOME
☐ ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

☐ \bar{x} width
☐ \bar{x} depth
☐ max. depth
☐ \bar{x} bankfull width
☐ bankfull \bar{x} depth
☐ W/D ratio
☐ bankfull max. depth
☐ floodprone x^2 width
☐ entrench. ratio

Legacy Tree:

Stream Drawing:



HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME <u>Ohio River</u>		LOCATION <u>Henderson, Kentucky</u>	
STATION # <u>NA</u> RIVERMILE <u>NA</u>		STREAM CLASS <u>Perennial</u>	
LAT <u>37.90136</u> LONG <u>-87.51918</u>		RIVER BASIN <u>Ohio River</u>	
STORET # <u>N/A</u>		AGENCY <u>N/A</u>	
INVESTIGATORS <u>L. Eggering</u>			
FORM COMPLETED BY <u>L. Eggering</u>		DATE <u>08/01/18</u> TIME <u>3:00</u> AM <input checked="" type="radio"/> PM	REASON FOR SURVEY <u>I-69 ORX Project</u>

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
	SCORE 9	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
	SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 18	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 20	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
SCORE 9 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
SCORE 8 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone) Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.	
SCORE 6 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 144

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Ohio River		LOCATION Henderson, Kentucky	
STATION # <u>N/A</u> RIVERMILE <u>N/A</u>		STREAM CLASS Perennial	
LAT <u>37.90136</u> LONG <u>-87.51918</u>		RIVER BASIN Ohio River	
STORET # <u>N/A</u>		AGENCY <u>N/A</u>	
INVESTIGATORS L. Eggering			
FORM COMPLETED BY L. Eggering		DATE <u>08/01/18</u> TIME <u>3:00 PM</u> AM PM	REASON FOR SURVEY I-69 ORX Project

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Now</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input checked="" type="checkbox"/> 40 %cloud cover <input type="checkbox"/> clear/sunny </p> </div> <div style="width: 45%;"> <p>Past 24 hours</p> <p> <input checked="" type="checkbox"/> 50 % <input type="checkbox"/> </p> </div> </div> <div style="margin-top: 10px;"> <p>Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </p> <p>Air Temperature <u>28</u> °C</p> <p>Other <u>Light rain over the previous 3 days</u></p> </div>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p> <p>See attached Qualitative Habitat Evaluation Index (QHEI) Form.</p> <div style="height: 300px; border: 1px solid black; margin-top: 10px;"></div>
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Stream Subsystem</p> <p> <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal </p> <p>Stream Origin</p> <p> <input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____ </p> </div> <div style="width: 45%;"> <p>Stream Type</p> <p> <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater </p> <p>Catchment Area <u>>250</u> km²</p> </div> </div>

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input type="checkbox"/> Forest <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources Local Watershed Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous dominant species present _____	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>200</u> m Estimated Stream Width <u>618</u> m Sampling Reach Area <u>123,600</u> m² Area in km² (m²x1000) <u>1.24</u> km² Estimated Stream Depth <u>9</u> m Surface Velocity (at thalweg) <u><1</u> m/sec </div> <div style="width: 45%;"> Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark <u>618</u> m Proportion of Reach Represented by Stream Morphology Types <input type="checkbox"/> Riffle <u>0</u> % <input type="checkbox"/> Run <u>0</u> % <input type="checkbox"/> Pool <u>100</u> % Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	
LARGE WOODY DEBRIS	LWD <u>N/A</u> m ² Density of LWD <u>N/A</u> m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae Aquatic vegetation absent. dominant species present _____ Portion of the reach with aquatic vegetation <u>0</u> %	
WATER QUALITY	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature <u>18.6</u> °C Specific Conductance <u>317.8</u> SPC Dissolved Oxygen <u>96</u> % pH <u>7.68</u> Turbidity <u>35.96</u> NTU WQ Instrument Used <u>YSI ProDSS</u> </div> <div style="width: 45%;"> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____ </div> </div>	
SEDIMENT/SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Odors <input type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="width: 45%;"> Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input checked="" type="checkbox"/> Other <u>No deposits.</u> Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input type="checkbox"/> No No stones present. </div> </div>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	15
Boulder	> 256 mm (10")	5			
Cobble	64-256 mm (2.5"-10")	0	Muck-Mud	black, very fine organic (FPOM)	10
Gravel	2-64 mm (0.1"-2.5")	0			
Sand	0.06-2mm (gritty)	15	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	75			
Clay	< 0.004 mm (slick)	0			

5% is comprised of artificial material.



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

25

SITE NAME/LOCATION UNT-1 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.88112

LONG. -87.51607

RIVER CODE N/A

RIVER MILE N/A

DATE 08/03/18

SCORER Luke F. Eggering

COMMENTS This is an eroded ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	20
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	80
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS The channel is dry.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS Channel is incised from erosion.

AVERAGE BANKFULL WIDTH (meters)

2.0

HHEI Metric Points

Substrate
Max = 40

5

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS RDB: Soybeans, LDB: Narrow strip of herbaceous plants, mainly blackberry.

FLOW REGIME (At Time of Evaluation)

(Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel)

(Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5 inches
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 0
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: The channel likely receives eroded soils from the adjacent agricultural field.
The channel is incised.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel downstream from a wetland. It is eroded and likely only carries water in stormwater events. The channel is incised from stormwater, but also likely receives eroded soils from the adjacent agricultural field. The area provides habitat for deer. Crayfish burrows were observed along the bottom of the channel. Approximately 454 feet of UNT-1 to North Fork Canoe Creek would lie within the ROW and 416 feet would be filled.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

25

SITE NAME/LOCATION UNT-2 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.03

LENGTH OF STREAM REACH (ft) 200

LAT. 37.87914

LONG. -87.51703

RIVER CODE N/A

RIVER MILE N/A

DATE 08/03/18

SCORER Luke F. Eggering

COMMENTS This is an eroded ephemeral channel

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	20
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	80
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS The channel is dry.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS Channel is incised from erosion.

AVERAGE BANKFULL WIDTH (meters)

2.5

HHEI Metric Points

Substrate
Max = 40

5

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS RDB: Soybeans, LDB: Narrow strip of herbaceous plants, mainly blackberry.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5"

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: The channel likely receives eroded soils from the adjacent agricultural field.

The channel is incised.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No

Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel downstream from a wetland. It is eroded and likely only carries water in stormwater events. The channel is incised from stormwater, but also likely receives eroded soils from the adjacent agricultural field. The area provides habitat for deer. Crayfish burrows were observed along the bottom of the channel. Approximately 246 feet of UNT-2 to North Fork Canoe Creek would lie within the ROW.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

14

SITE NAME/LOCATION UNT-3 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.04

LENGTH OF STREAM REACH (ft) 200

LAT. 37.87794

LONG. -87.51793

RIVER CODE N/A

RIVER MILE N/A

DATE 08/03/18

SCORER Luke F. Eggering

COMMENTS Dry ephemeral channel wooded draw with mowed areas on both sides

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLD R SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	25
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	60
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	15
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A)

6

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS The channel is dry.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.5

HHEI Metric Points

Substrate
Max = 40

9

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS This is a wooded draw with mowed fields on both sides.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS Braided ephemeral channels.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.6 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5"

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: There are possible impacts from erosion from agricultural fields in the small watershed.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

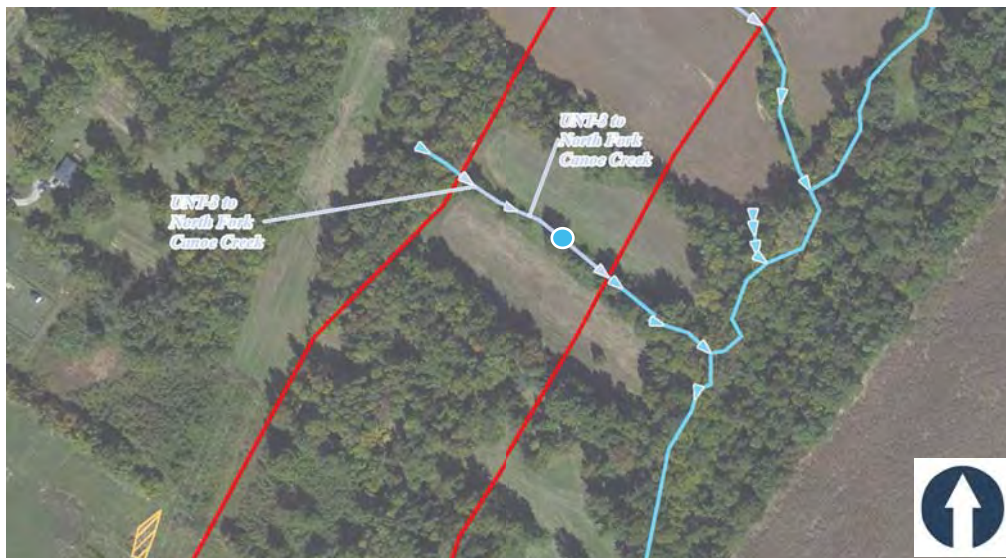
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry ephemeral channel in a wooded draw. There are mowed fields/food plots on both sides of this channel. Some portions of the channel are braided. No aquatic life was observed. Approximately 236 feet of channel will be enclosed in a culvert, and there are approximately 269 feet in the ROW.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

41

SITE NAME/LOCATION UNT-4 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.03

LENGTH OF STREAM REACH (ft) 200

LAT. 37.87351

LONG. -87.52187

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some pools.

MAXIMUM POOL DEPTH (centimeters):

4

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.5

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.9 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This channel is in a utility right-of-way. Crayfish burrows were observed at the lowest portions of the channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 267 feet of stream will be in the right-of-way and approximately 236 feet will be in a culvert. This ephemeral channel has already been channelized.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

43

SITE NAME/LOCATION UNT-5 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.06

LENGTH OF STREAM REACH (ft) 200

LAT. 37.87109

LONG. -87.52359

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check **ONLY** two predominant substrate **TYPE** boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 15

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check **ONLY** one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some pools.

MAXIMUM POOL DEPTH (centimeters):

2

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check **ONLY** one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

2.0

HHEI Metric Points

Substrate
Max = 40

18

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

20

This information **must** also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check **ONLY** one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check **ONLY** one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.1 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 85

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent utility ROW area likely affect this channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 277 feet of channel are within the right-of-way and approximately 236 feet of channel would be within a culvert. The culvert would need to extend beyond the existing channel, approximately 30 feet.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

50

SITE NAME/LOCATION UNT-6 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.67

LENGTH OF STREAM REACH (ft) 200

LAT. 37.85822

LONG. -87.53216

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐ BLDR SLABS [16 pts]
☐ BOULDER (>256 mm) [16 pts]
☐ BEDROCK [16 pt]
☐ COBBLE (65-256 mm) [12 pts]
☒ GRAVEL (2-64 mm) [9 pts]
☐ SAND (<2 mm) [6 pts]

PERCENT

0
0
0
0
10
10

TYPE

☒ SILT [3 pt]
☐ LEAF PACK/WOODY DEBRIS [3 pts]
☐ FINE DETRITUS [3 pts]
☐ CLAY or HARDPAN [0 pt]
☐ MUCK [0 pts]
☐ ARTIFICIAL [3 pts]

PERCENT

80
0
0
0
0
0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐
☐
☐

> 30 centimeters [20 pts]
> 22.5 - 30 cm [30 pts]
> 10 - 22.5 cm [25 pts]

☐
☒
☐

> 5 cm - 10 cm [15 pts]
< 5 cm [5 pts]
NO WATER OR MOIST CHANNEL [0 pts]

2

COMMENTS This is an ephemeral channel with some pools.

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

☒
☐
☐

> 4.0 meters (> 13') [30 pts]
> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

☐
☐
☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
≤ 1.0 m (≤ 3' 3") [5 pts]

4.5

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L R
☒ ☒

(Per Bank)
Wide >10m

☐ ☐

Moderate 5-10m

☐ ☐

Narrow <5m

☐ ☐

None

COMMENTS

FLOODPLAIN QUALITY

L R
☐ ☐

(Most Predominant per Bank)
Mature Forest, Wetland

☐ ☐

Immature Forest, Shrub or Old Field

☐ ☐

Residential, Park, New Field

☐ ☐

Fenced Pasture

L R
☐ ☐

Conservation Tillage

☐ ☐

Urban or Industrial

☒ ☒

Open Pasture, Row Crop

☐ ☐

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☐
☐

Stream Flowing
Subsurface flow with isolated pools (Interstitial)

☐
☒

Moist Channel, isolated pools, no flow (Intermittent)
Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☒
☐

None
0.5

☐
☐

1.0
1.5

☐
☐

2.0
2.5

☐
☐

3.0
>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.9 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent agricultural area likely affect this stream/ditch. The stream banks are incised. Crayfish burrows were observed in the channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 629 feet of this channel are within the right-of-way and approximately 425 feet of channel would be in a culvert. Note: This tributary crosses US 60 upstream however, it will not be within the construction limits.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

40

SITE NAME/LOCATION UNT-7 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.04

LENGTH OF STREAM REACH (ft) 183

LAT. 37.86429

LONG. -87.53661

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	20
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	75	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some pools.

MAXIMUM POOL DEPTH (centimeters):

2

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

2.0

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.3 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Crayfish burrows were observed within the channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

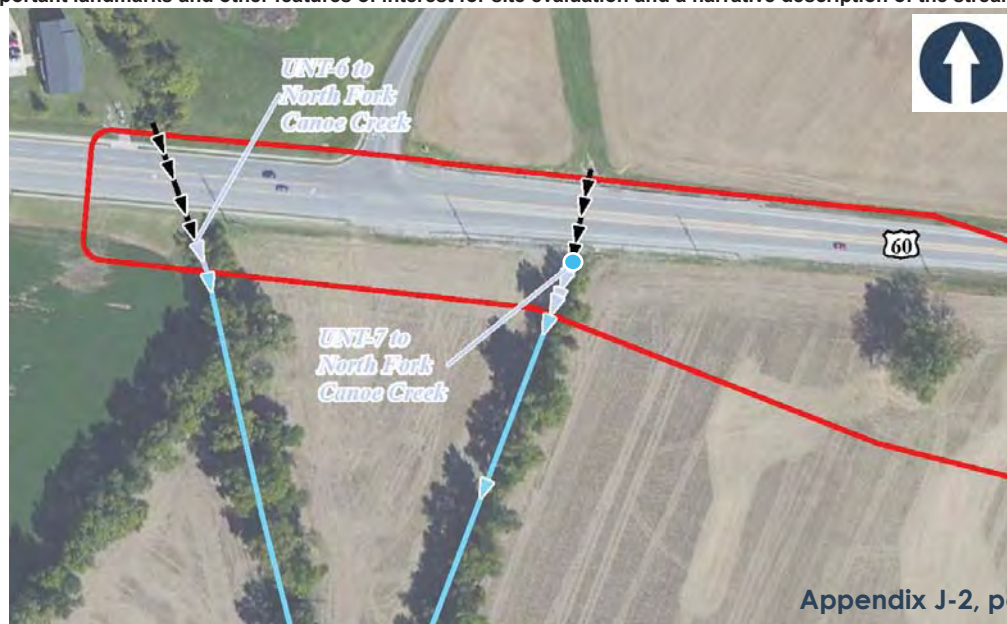
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 46 feet of this channel are within the right-of-way and the existing US 60 culvert would be extended approximately 12 feet downstream.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION UNT-8 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 160

LAT. 37.86399

LONG. -87.53151

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with a scour hole.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.5

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.6 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

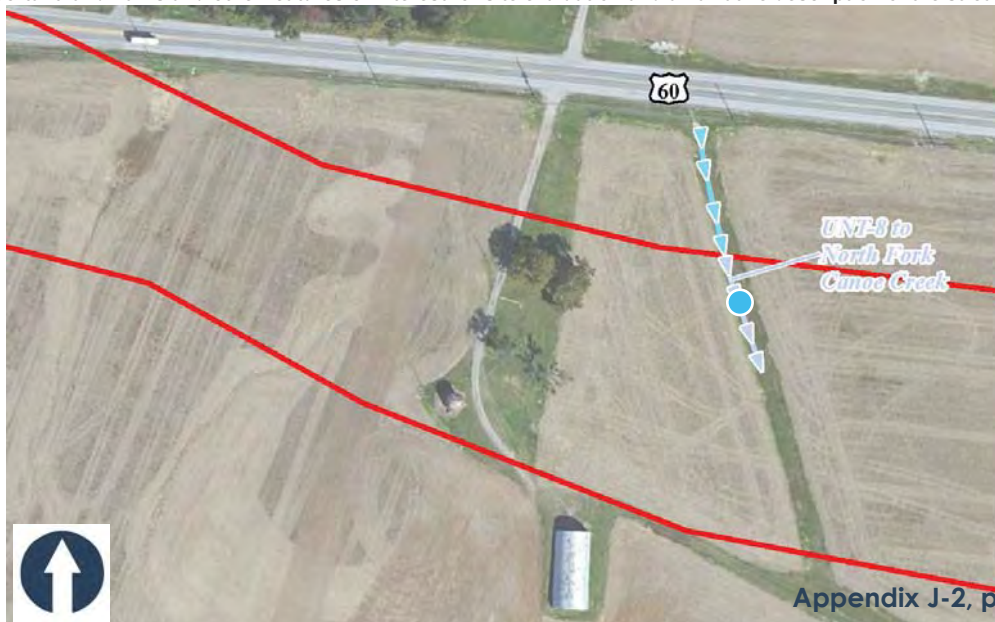
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 134 feet of this channel are within the right-of-way and approximately 104 feet of this channel will be in a culvert. The culvert will be extended approximately 196 feet to the south through the construction limits. Note: The eroded ephemeral channel transitions into a broad drainage swale and eventually extends 1,176 feet to UNT-9 to North Fork Canoe Creek. The drainage swale is a grass waterway that does not have a discernible bed and bank. UNT-8 to North Fork Canoe Creek is an isolated eroded ephemeral channel.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

41

SITE NAME/LOCATION UNT-9 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.87

LENGTH OF STREAM REACH (ft) 200

LAT. 37.86229

LONG. -87.52767

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	80
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.9 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: At this location, the channel is damp but there is no standing water.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 743 feet of this channel are within the right-of-way and 540 feet of channel will be within a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: UNT-10 to North Fork Canoe Creek

RM: N/A

Date: 08/03/18

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.86149, -87.52346

Office verified location ☐1] SUBSTRATE Check ONLY Two substrate TYPE BOXES;
estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE	
<input type="checkbox"/> BLDR /SLABS [10]	0	0	<input type="checkbox"/> HARDPAN [4]	0	0		
<input type="checkbox"/> BOULDER [9]	0	0	<input type="checkbox"/> DETRITUS [3]	0	0		
<input type="checkbox"/> COBBLE [8]	0	0	<input type="checkbox"/> MUCK [2]	0	0		
<input type="checkbox"/> GRAVEL [7]	0	0	<input checked="" type="checkbox"/> SILT [2]	90	0		
<input checked="" type="checkbox"/> SAND [6]	10	0	<input type="checkbox"/> ARTIFICIAL [0]	0	0		
<input type="checkbox"/> BEDROCK [5]	0	0	(Score natural substrates; ignore sludge from point-sources)				

ORIGIN	
<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> TILLS [1]
<input checked="" type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> HARDPAN [0]
<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RIP/RAP [0]
<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]
<input type="checkbox"/> COAL FINES [-2]	

QUALITY	
<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

Substrate
8
Maximum
20

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

UNDERCUT BANKS [1]		POOLS > 70cm [2]		OXBOWS, BACKWATERS [1]	
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> MODERATE 25-75% [7]
<input checked="" type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments

Cover
Maximum
20
4

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input checked="" type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel
Maximum
20
11

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE [1]	
<input type="checkbox"/> NONE / LITTLE [3]	<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]		
		<input type="checkbox"/> NONE [0]		<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]			

Indicate predominant land use(s)
past 100m riparian.

Comments

Riparian
Maximum
10
5.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

<input type="checkbox"/> > 1m [6]
<input type="checkbox"/> 0.7-<1m [4]
<input type="checkbox"/> 0.4-<0.7m [2]
<input type="checkbox"/> 0.2-<0.4m [1]
<input checked="" type="checkbox"/> < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]
<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]
<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

<input type="checkbox"/> TORRENTIAL [-1]	<input checked="" type="checkbox"/> SLOW [1]
<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]

Indicate for reach - pools and riffles.

Comments

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)Pool /
Current
Maximum
12
3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

No riffles were present in the reach.

Riffle /
Run
Maximum
8
0

6] GRADIENT (1.0 ft/mi)	
<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]	
<input type="checkbox"/> MODERATE [6-10]	
<input type="checkbox"/> HIGH - VERY HIGH [10-6]	

%POOL: 5	%GLIDE: 0
%RUN: 95	%RIFFLE: 0

Gradient
Maximum
10
3

Check ALL that apply

METHOD

METHOD

- ☐ BOAT
☐ WADE
☐ L. LINE
☐ OTHER

STAGE

1st -sample pass- 2nd

- | | | |
|--------------------------|--------|--------------------------|
| <input type="checkbox"/> | HIGH | <input type="checkbox"/> |
| <input type="checkbox"/> | UP | <input type="checkbox"/> |
| <input type="checkbox"/> | NORMAL | <input type="checkbox"/> |
| <input type="checkbox"/> | LOW | <input type="checkbox"/> |
| <input type="checkbox"/> | DRY | <input type="checkbox"/> |

DISTANCE

- ☐ 0.5 Km
☐ 0.2 Km
☐ 0.15 Km
☐ 0.12 Km
☐ OTHER

meters

CANOPY

- ☒ > 85%- OPEN
☐ 55%-<85%
☐ 30%-<55%
☐ 10%-<30%
☐ <10%- CLOSE

CLARITY

1st --sample pass-- 2nd

- | | | |
|--------------------------|--------------|--------------------------|
| <input type="checkbox"/> | < 20 cm | <input type="checkbox"/> |
| <input type="checkbox"/> | 20-<40 cm | <input type="checkbox"/> |
| <input type="checkbox"/> | 40-70 cm | <input type="checkbox"/> |
| <input type="checkbox"/> | > 70 cm/ CTB | <input type="checkbox"/> |
| <input type="checkbox"/> | SECCHI DEPTH | <input type="checkbox"/> |

1st 6m

cm

B1 AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

D1 MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURD / SLUMPS
ISLANDS / SCOURD
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

E1 ISSUES

- WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT & GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H₂O / TILE / H₂O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F1 MEASUREMENTS

- \bar{x} width
 \bar{x} depth
 max. depth
 \bar{x} bankfull width
 bankfull \bar{x} depth
 W/D ratio
 bankfull max. depth
 floodprone x^2 width
 entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

This channel is an erosional feature within an agricultural field. The banks of this channel are unvegetated. Approximately 15 feet of this eroded ephemeral channel are within the right-of-way.

Stream Drawing:





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

31

SITE NAME/LOCATION UNT-11 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.86199

LONG. -87.52138

RIVER CODE N/A

RIVER MILE N/A

DATE 08/03/18

SCORER Luke F. Eggering

COMMENTS Ephemeral railroad stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	40
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	50
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS This is a stable well-maintained channel.

AVERAGE BANKFULL WIDTH (meters)

3.5

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS RDB is soybeans, LDB is a levee with Johnson grass.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS This is a dry channel.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 3.1 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5"
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from railroad maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a well-maintained ephemeral railroad stream/ditch. There are many wetland plants in the stream/ditch, but the area was recently sprayed with herbicide, killing the Johnsongrass and some vegetation. Crayfish burrows were observed in the bottom of the stream/ditch. Approximately 640 feet of this channel is within the right-of-way however, it will be spanned by the US 60 railroad bridge.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

37

SITE NAME/LOCATION UNT-12 to North Fork Canoe Creek

SITE NUMBER N/A RIVER BASIN N/A DRAINAGE AREA (mi²) 0.64

LENGTH OF STREAM REACH (ft) 200 LAT. 37.86127 LONG. -87.51739 RIVER CODE N/A RIVER MILE N/A

DATE 09/20/18 SCORER Luke F. Eggering COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.5

HHEI Metric Points

Substrate
Max = 40

12

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 3.3 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: 07/30/18 Quantity: 0.5"

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Crayfish burrows were observed. Trash/debris was present within the channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 111 feet of this channel are within the right-of-way and approximately 69 feet of channel will be in a culvert. The existing US 60 culvert will be extended to the southeast.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: UNT-13 to North Fork Canoe Creek

RM: N/A

Date: 09/20/18

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.86156, -87.51632

Office verified location ☐1] SUBSTRATE Check ONLY Two substrate TYPE BOXES;
estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE	
<input type="checkbox"/> BLDR /SLABS [10]	0	0	<input type="checkbox"/> HARDPAN [4]	0	0		
<input type="checkbox"/> BOULDER [9]	0	0	<input type="checkbox"/> DETRITUS [3]	0	0		
<input type="checkbox"/> COBBLE [8]	0	0	<input type="checkbox"/> MUCK [2]	0	0		
<input type="checkbox"/> GRAVEL [7]	5	0	<input checked="" type="checkbox"/> SILT [2]	85	0		
<input checked="" type="checkbox"/> SAND [6]	10	0	<input type="checkbox"/> ARTIFICIAL [0]	0	0		
<input type="checkbox"/> BEDROCK [5]	0	0	(Score natural substrates; ignore sludge from point-sources)				

ORIGIN	
<input type="checkbox"/> LIMESTONE [1]	SILT EMBEDDEDNESS
<input type="checkbox"/> TILLS [1]	
<input checked="" type="checkbox"/> WETLANDS [0]	
<input type="checkbox"/> HARDPAN [0]	
<input type="checkbox"/> SANDSTONE [0]	
<input type="checkbox"/> RIP/RAP [0]	
<input type="checkbox"/> LACUSTURINE [0]	
<input type="checkbox"/> SHALE [-1]	
<input type="checkbox"/> COAL FINES [-2]	

QUALITY	
<input type="checkbox"/> HEAVY [-2]	Substrate 8 Maximum 20
<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> NONE [1]	

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

0 UNDERCUT BANKS [1]	0 POOLS > 70cm [2]	0 OXBOWS, BACKWATERS [1]
0 OVERHANGING VEGETATION [1]	0 ROOTWADS [1]	0 AQUATIC MACROPHYTES [1]
0 SHALLOWS (IN SLOW WATER) [1]	0 BOULDERS [1]	2 LOGS OR WOODY DEBRIS [1]
0 ROOTMATS [1]		

<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> MODERATE 25-75% [7]
<input checked="" type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments

Cover
Maximum
20
4

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel
Maximum
20
12

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input checked="" type="checkbox"/> NONE / LITTLE [3]	L R	<input type="checkbox"/> WIDE > 50m [4]	L R	<input type="checkbox"/> FOREST, SWAMP [3]	L R	<input type="checkbox"/> CONSERVATION TILLAGE [1]	
<input type="checkbox"/> MODERATE [2]		<input checked="" type="checkbox"/> MODERATE 10-50m [3]		<input type="checkbox"/> SHRUB OR OLD FIELD [2]		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	
<input type="checkbox"/> HEAVY / SEVERE [1]		<input type="checkbox"/> NARROW 5-10m [2]		<input checked="" type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]		<input type="checkbox"/> MINING / CONSTRUCTION [0]	
		<input type="checkbox"/> VERY NARROW < 5m [1]		<input type="checkbox"/> FENCED PASTURE [1]			
		<input type="checkbox"/> NONE [0]		<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]			

Indicate predominant land use(s)
past 100m riparian.

Comments

Riparian
Maximum
10
5.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

<input type="checkbox"/> > 1m [6]
<input type="checkbox"/> 0.7-<1m [4]
<input type="checkbox"/> 0.4-<0.7m [2]
<input checked="" type="checkbox"/> 0.2-<0.4m [1]
<input type="checkbox"/> < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]
<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]
<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

<input type="checkbox"/> TORRENTIAL [-1]	<input type="checkbox"/> SLOW [1]
<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> FAST [1]	<input checked="" type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool /
Current
Maximum
12
1

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

No riffles were present in the reach.

Riffle /
Run
Maximum
8
0

6] GRADIENT (1.0 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]
DRAINAGE AREA (1.77 mi ²)	<input type="checkbox"/> MODERATE [6-10]
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]

%POOL: 5	%GLIDE: 0
%RUN: 95	%RIFFLE: 0

Gradient
Maximum
10
3

AJ SAMPLED REACH

Check ALL that apply

☐ BOAT

☐ WADE

☐ L. LINE

☐ OTHER

1st

--sample pass--

2nd

☐ HIGH

☐ UP

☐ NORMAL

☐ LOW

☐ DRY

☐ 0.5 Km

☐ 0.2 Km

☐ 0.15 Km

☐ 0.12 Km

☐ OTHER

1st

--sample pass--

2nd

☐ < 20 cm

☐ 20-40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

1st

cm

2nd

cm

☐ CANOPY

☐ > 85%- OPEN

☐ 55%-<85%

☐ 30%-<55%

☐ 10%-<30%

☐ <10%- CLOSED

CJ RECREATION

AREA

DEPTH

POOL:

☐ >100ft²

☐ >3ft

BJ AESTHETICS

☐ NUISANCE ALGAE

☐ INVASIVE MACROPHYTES

☐ EXCESS TURBIDITY

☐ DISCOLORATION

☐ FOAM / SCUM

☐ OIL SHEEN

☐ TRASH / LITTER

☐ NUISANCE ODOR

☐ SLUDGE DEPOSITS

☐ CSOs/SSOs/OUTFALLS

DJ MAINTENANCE

☐ PUBLIC / PRIVATE / BOTH / NA

☐ ACTIVE / HISTORIC / BOTH / NA

☐ YOUNG-SUCCESSION-OLD

☐ SPRAY / SNAG / REMOVED

☐ MODIFIED / DIPPED OUT / NA

☐ LEVEED / ONE SIDED

☐ RELOCATED / CUTOFFS

☐ MOVING-BEDLOAD-STABLE

☐ ARMoured / SLUMPS

☐ ISLANDS / SCoured

☐ IMPOUNDED / DESICCATED

☐ FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

EJ ISSUES

☐ WWTP / CSO / NPDES / INDUSTRY

☐ HARDENED / URBAN / DIRT&GRIME

☐ CONTAMINATED / LANDFILL

☐ BMPs-CONSTRUCTION-SEDIMENT

☐ LOGGING / IRRIGATION / COOLING

☐ BANK / EROSION / SURFACE

☐ FALSE BANK / MANURE / LAGOON

☐ WASH H₂O / TILE / H₂O TABLE

☐ ACID / MINE / QUARRY / FLOW

☐ NATURAL / WETLAND / STAGNANT

☐ PARK / GOLF / LAWN / HOME

☐ ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

☐ \bar{x} width

☐ \bar{x} depth

☐ max. depth

☐ \bar{x} bankfull width

☐ bankfull \bar{x} depth

☐ W/D ratio

☐ bankfull max. depth

☐ floodprone x^2 width

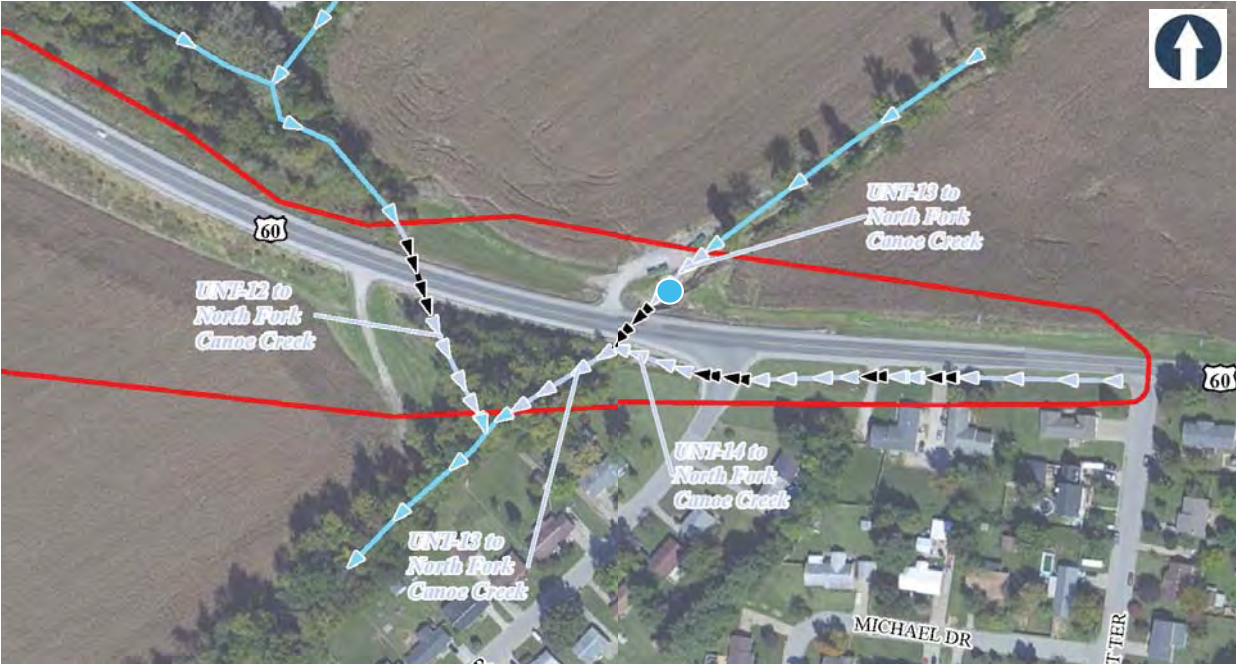
☐ entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

There are some shallow pools throughout the channel. Crayfish burrows and frogs were observed. Trash/debris was present within the channel. Approximately 114 feet of this channel are within the right-of-way and 61 feet of channel will be within a culvert. The Hwy 60 culvert would be extended to the southwest.

Stream Drawing:





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

27

SITE NAME/LOCATION UNT-14 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.86135

LONG. -87.51653

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

12

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 3.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a roadside channel that parallels US 60. Approximately 123 feet of this channel are within the right-of-way and 109 feet are within the construction limits.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

26

SITE NAME/LOCATION UNT-15 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 59

LAT. 37.85914

LONG. -87.52828

RIVER CODE N/A

RIVER MILE N/A

DATE 08/03/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with dry scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 3.0 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This channel is an erosional feature within an agricultural field.

The banks of this channel are unvegetated.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 15 feet of this eroded ephemeral channel are within the right-of-way.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

26

SITE NAME/LOCATION UNT-16 to North Fork Canoe Creek

SITE NUMBER N/A RIVER BASIN N/A DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200 LAT. 37.85811 LONG. -87.53069 RIVER CODE N/A RIVER MILE N/A

DATE 09/20/18 SCORER Luke F. Eggering COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some dry scour holes. MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.8 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This channel is an erosional feature within an agricultural field.

The banks of this channel are unvegetated.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 218 feet of this eroded ephemeral channel are within the right-of-way and approximately 127 feet would be in a culvert, Approximately 223 feet of culvert would be required to connect UNT-16 to North Fork Canoe Creek to the upstream watershed. In lieu of the culvert, the upstream watershed could be drained in a road ditch to UNT-14 to North Fork Canoe Creek.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

36

SITE NAME/LOCATION UNT-17 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.5

LENGTH OF STREAM REACH (ft) 200

LAT. 37.85428

LONG. -87.54710

RIVER CODE N/A

RIVER MILE N/A

DATE 09/20/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some dry scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

4.5

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.0 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: There is a scour hole near a culvert. The channel has steep banks.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 660 feet of this channel are within the right-of-way. Approximately 423 feet of channel would be enclosed within an approximately 416-foot culvert. Note: Straight-line culvert reduces the channel length by 7 feet.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

21

SITE NAME/LOCATION UNT-18 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.85460

LONG. -87.54706

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.0 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Crayfish burrows were observed in the channel. Approximately 213 feet of this channel are within the right-of-way and 156 feet of channel would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

26

SITE NAME/LOCATION UNT-19 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.85418

LONG. -87.54681

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.0

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.0 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent agricultural area likely affect this stream/ditch. The stream has steep banks, approximately 5-6 feet high.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Crayfish burrows were observed in the channel. Approximately 199 feet of channel are within the right-of-way and 99 feet of channel would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

45

SITE NAME/LOCATION UNT-20 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.85358

LONG. -87.55093

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	75
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	20	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some dry scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

4.5

HHEI
Metric
Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.9 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 428 feet of this channel are in the right-of-way and approximately 273 feet would be enclosed in a culvert.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

35

SITE NAME/LOCATION UNT-21 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) 0.73

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84837

LONG. -87.56449

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Intermittent stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check **ONLY** two predominant substrate **TYPE** boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	75
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	20	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A)

12

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check **ONLY** one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check **ONLY** one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information **must** also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check **ONLY** one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check **ONLY** one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.4 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

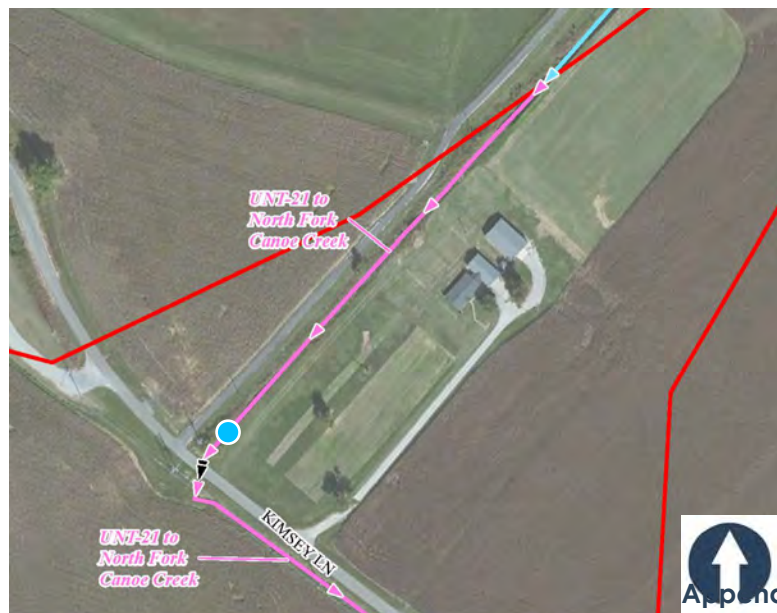
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 628 feet of this channel are in the right-of-way and approximately 484 feet are within the construction limits.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME UNT-21 North Fork Canoe Creek		LOCATION Henderson, Kentucky	
STATION # <u>NA</u> RIVERMILE <u>NA</u>		STREAM CLASS Intermittent	
LAT <u>37.84837</u> LONG <u>-87.56449</u>		RIVER BASIN Ohio River	
STORET # N/A		AGENCY N/A	
INVESTIGATORS L. Eggering			
FORM COMPLETED BY L. Eggering		DATE <u>09/21/18</u> TIME <u>12:00</u> AM <input checked="" type="radio"/> PM	REASON FOR SURVEY I-69 ORX Project WOTUS Report

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
	SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
	SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
SCORE <u>7</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>8</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
SCORE <u>7</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>8</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone) Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.	
SCORE <u>2</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>2</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 75

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME <u>UNT-21 to North Fork Canoe Creek</u>		LOCATION <u>Henderson, Kentucky</u>
STATION # <u>N/A</u> RIVERMILE <u>N/A</u>		STREAM CLASS <u>Intermittent</u>
LAT <u>37.84837</u> LONG <u>-87.56449</u>		RIVER BASIN <u>Ohio River</u>
STORET # <u>N/A</u>		AGENCY <u>N/A</u>
INVESTIGATORS <u>L. Eggering</u>		
FORM COMPLETED BY <u>L. Eggering</u>		DATE <u>09/21/18</u> TIME <u>12:30 PM</u> AM PM REASON FOR SURVEY <u>I-69 ORX Project</u>

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div> Now storm (heavy rain) rain (steady rain) showers (intermittent) 25 % <input type="checkbox"/> % cloud cover clear/sunny </div> <div> Past 24 hours 30 % <input type="checkbox"/> </div> <div> Has there been a heavy rain in the last 7 days? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Air Temperature <u>27</u> °C Other _____ </div> </div>
SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph) See attached Primary Headwater Habitat Evaluation Index (HHEI) Form.
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div> Stream Subsystem Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Tidal <input type="checkbox"/> Stream Origin Glacial <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Swamp and bog <input type="checkbox"/> Spring-fed <input type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____ </div> <div> Stream Type <input checked="" type="checkbox"/> Coldwater <input type="checkbox"/> Warmwater Catchment Area <u>1.9</u> km² </div> </div>

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input type="checkbox"/> Forest <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural Other _____ <input type="checkbox"/> Residential	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources Local Watershed Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present Trees _____ Shrubs _____ Grasses _____ <input checked="" type="checkbox"/> Herbaceous dominant species present Johnsongrass is the dominant species in the immediate area. _____	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length 200 _____ m Estimated Stream Width 3 _____ m Sampling Reach Area 600 _____ m² Area in km² (m²x1000) 0.0006 _____ km² Estimated Stream Depth 1.8 _____ m Surface Velocity (at thalweg) <1 _____ m/sec </div> <div style="width: 45%;"> Canopy Cover Partly open <input checked="" type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark 2.7 _____ m Proportion of Reach Represented by Stream Morphology Types Riffle 0 _____ % Run 95 _____ % Pool 5 _____ % Channelized <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Dam Present Yes <input checked="" type="checkbox"/> No </div> </div>	
LARGE WOODY DEBRIS	LWD N/A _____ m ² Density of LWD N/A _____ m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present Rooted emergent _____ Rooted submergent _____ Rooted floating _____ Free floating _____ Floating Algae _____ Attached Algae _____ dominant species present Aquatic vegetation absent. _____ Portion of the reach with aquatic vegetation 0 _____ %	
WATER QUALITY	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature N/A _____ °C Specific Conductance N/A _____ Dissolved Oxygen N/A _____ pH N/A _____ Turbidity N/A _____ WQ Instrument Used N/A _____ </div> <div style="width: 45%;"> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy Other _____ Water Surface Oils <input checked="" type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None Other _____ Turbidity (if not measured) Clear <input checked="" type="checkbox"/> Slightly turbid Turbid _____ Opaque Stained Other _____ </div> </div>	
SEDIMENT/SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Odors Normal _____ Sewage _____ <input checked="" type="checkbox"/> Petroleum Chemical _____ Anaerobic _____ <input type="checkbox"/> None Other _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="width: 45%;"> Deposits Sludge _____ Sawdust _____ Paper fiber _____ <input checked="" type="checkbox"/> Sand Relict shells _____ Other _____ Looking at stones which are not deeply embedded, are the undersides black in color? Yes <input checked="" type="checkbox"/> No </div> </div>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	5
Boulder	> 256 mm (10")	0			
Cobble	64-256 mm (2.5"-10")	0	Muck-Mud	black, very fine organic (FPOM)	5
Gravel	2-64 mm (0.1"-2.5")	20			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	75			
Clay	< 0.004 mm (slick)	0			



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

26

SITE NAME/LOCATION UNT-22 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84708

LONG. -87.56247

RIVER CODE N/A

RIVER MILE N/A

DATE 08/03/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: This channel is an erosional feature within an agricultural field. The banks of this channel are unvegetated.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

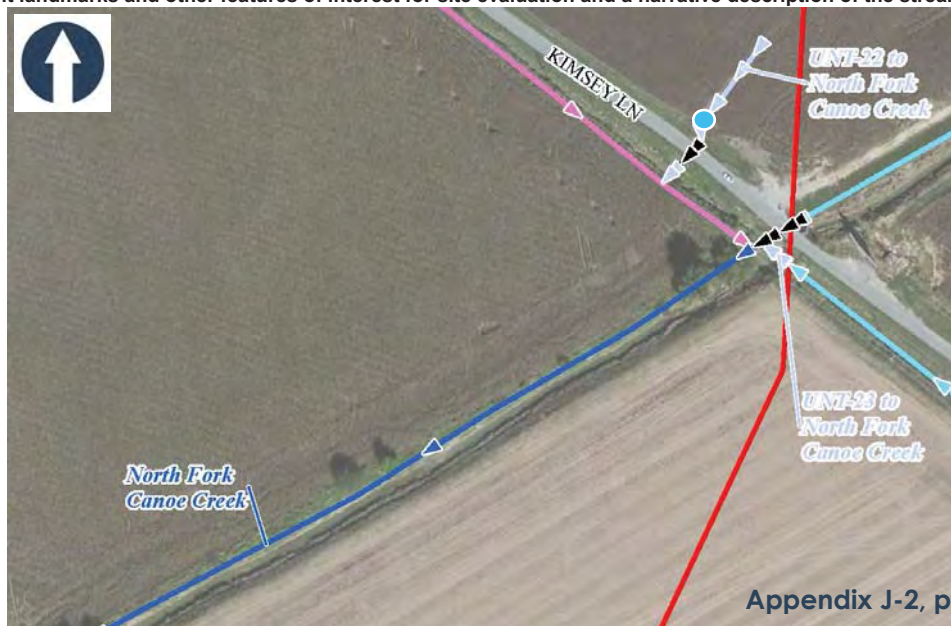
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

Approximately 150 feet of this eroded ephemeral channel are within the right-of-way.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: UNT-23 to North Fork Canoe Creek

RM: N/A

Date: 09/21/18

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.84653, -87.56203

Office verified location ☐

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE	
<input type="checkbox"/>	BLDR /SLABS [10]	0	0	<input checked="" type="checkbox"/>	HARDPAN [4]	15	0
<input type="checkbox"/>	BOULDER [9]	0	0	<input type="checkbox"/>	DETRITUS [3]	0	0
<input type="checkbox"/>	COBBLE [8]	0	0	<input type="checkbox"/>	MUCK [2]	0	0
<input type="checkbox"/>	GRAVEL [7]	10	0	<input checked="" type="checkbox"/>	SILT [2]	75	0
<input type="checkbox"/>	SAND [6]	0	0	<input type="checkbox"/>	ARTIFICIAL [0]	0	0
<input type="checkbox"/>	BEDROCK [5]	0	0	(Score natural substrates; ignore sludge from point-sources)			

ORIGIN	
<input type="checkbox"/>	LIMESTONE [1]
<input type="checkbox"/>	TILLS [1]
<input checked="" type="checkbox"/>	WETLANDS [0]
<input type="checkbox"/>	HARDPAN [0]
<input type="checkbox"/>	SANDSTONE [0]
<input type="checkbox"/>	RIP/RAP [0]
<input type="checkbox"/>	LACUSTURINE [0]
<input type="checkbox"/>	SHALE [-1]
<input type="checkbox"/>	COAL FINES [-2]

QUALITY	
<input type="checkbox"/>	HEAVY [-2]
<input type="checkbox"/>	MODERATE [-1]
<input checked="" type="checkbox"/>	NORMAL [0]
<input type="checkbox"/>	FREE [1]
<input type="checkbox"/>	EXTENSIVE [-2]
<input type="checkbox"/>	MODERATE [-1]
<input checked="" type="checkbox"/>	NORMAL [0]
<input type="checkbox"/>	NONE [1]

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

Substrate
Maximum
20
6

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

1	UNDERCUT BANKS [1]	0	POOLS > 70cm [2]	0	OXBOWS, BACKWATERS [1]
0	OVERHANGING VEGETATION [1]	0	ROOTWADS [1]	0	AQUATIC MACROPHYTES [1]
0	SHALLOWS (IN SLOW WATER) [1]	0	BOULDERS [1]	2	LOGS OR WOODY DEBRIS [1]
0	ROOTMATS [1]				

<input type="checkbox"/>	EXTENSIVE >75% [11]
<input type="checkbox"/>	MODERATE 25-75% [7]
<input checked="" type="checkbox"/>	SPARSE 5-<25% [3]
<input type="checkbox"/>	NEARLY ABSENT <5% [1]

Comments

Cover
Maximum
20
5

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel
Maximum
20
12

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY			
<input checked="" type="checkbox"/>	NONE / LITTLE [3]	<input type="checkbox"/>	WIDE > 50m [4]	<input type="checkbox"/>	FOREST, SWAMP [3]	<input type="checkbox"/>	CONSERVATION TILLAGE [1]
<input type="checkbox"/>	MODERATE [2]	<input checked="" type="checkbox"/>	MODERATE 10-50m [3]	<input type="checkbox"/>	SHRUB OR OLD FIELD [2]	<input checked="" type="checkbox"/>	URBAN OR INDUSTRIAL [0]
<input type="checkbox"/>	HEAVY / SEVERE [1]	<input checked="" type="checkbox"/>	NARROW 5-10m [2]	<input type="checkbox"/>	RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/>	MINING / CONSTRUCTION [0]
		<input type="checkbox"/>	VERY NARROW < 5m [1]	<input type="checkbox"/>	FENCED PASTURE [1]		
		<input type="checkbox"/>	NONE [0]	<input checked="" type="checkbox"/>	OPEN PASTURE, ROWCROP [0]		

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian
Maximum
10
5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

<input type="checkbox"/>	> 1m [6]
<input type="checkbox"/>	0.7-<1m [4]
<input type="checkbox"/>	0.4-<0.7m [2]
<input checked="" type="checkbox"/>	0.2-<0.4m [1]
<input type="checkbox"/>	< 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/>	POOL WIDTH > RIFFLE WIDTH [2]
<input type="checkbox"/>	POOL WIDTH = RIFFLE WIDTH [1]
<input type="checkbox"/>	POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

<input type="checkbox"/>	TORRENTIAL [-1]	<input type="checkbox"/>	SLOW [1]
<input type="checkbox"/>	VERY FAST [1]	<input type="checkbox"/>	INTERSTITIAL [-1]
<input type="checkbox"/>	FAST [1]	<input checked="" type="checkbox"/>	INTERMITTENT [-2]
<input type="checkbox"/>	MODERATE [1]	<input type="checkbox"/>	EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool /
Current
Maximum
12
1

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS		
<input type="checkbox"/>	BEST AREAS > 10cm [2]	<input type="checkbox"/>	STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/>	NONE [2]
<input type="checkbox"/>	BEST AREAS 5-10cm [1]	<input type="checkbox"/>	MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/>	LOW [1]
<input type="checkbox"/>	BEST AREAS < 5cm [metric=0]	<input type="checkbox"/>	UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/>	MODERATE [0]
				<input type="checkbox"/>	EXTENSIVE [-1]

Comments

No riffles were present in the reach.

Riffle /
Run
Maximum
8
0

6] GRADIENT (1.0 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]
DRAINAGE AREA (1.54 mi ²)	<input type="checkbox"/> MODERATE [6-10]
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]

%POOL: 5	%GLIDE: 0
%RUN: 95	%RIFFLE: 0

Gradient
Maximum
10
3

AJ SAMPLED REACH

Check ALL that apply

☐ BOAT

☐ WADE

☐ L. LINE

☐ OTHER

1st

--sample pass--

2nd

☐ HIGH

☐ UP

☐ NORMAL

☐ LOW

☐ DRY

☐ 0.5 Km

☐ 0.2 Km

☐ 0.15 Km

☐ 0.12 Km

☐ OTHER

1st

--sample pass--

2nd

☐ < 20 cm

☐ 20-40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

1st

--sample pass--

2nd

☐ < 20 cm

☐ 20-40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ > 85%- OPEN

☐ 55%-<85%

☐ 30%-<55%

☐ 10%-<30%

☐ <10%- CLOSED

1st

--sample pass--

2nd

☐ < 20 cm

☐ 20-40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

CJ RECREATION

POOL: ☐ >100ft² ☐ >3ft

AREA DEPTH

AREA DEPTH

AREA DEPTH

AREA DEPTH

AREA DEPTH

AREA DEPTH

AREA DEPTH

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Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

There are some shallow pools throughout the mostly dry channel. Crayfish burrows and frogs were observed. Trash/debris was present within the channel. Approximately 16 feet of this channel are within the right-of-way.

BJ AESTHETICS

☐ NUISANCE ALGAE

☐ INVASIVE MACROPHYTES

☐ EXCESS TURBIDITY

☐ DISCOLORATION

☐ FOAM / SCUM

☐ OIL SHEEN

☐ TRASH / LITTER

☐ NUISANCE ODOR

☐ SLUDGE DEPOSITS

☐ CSOs/SSOs/OUTFALLS

DJ MAINTENANCE

PUBLIC / PRIVATE / BOTH / NA

ACTIVE / HISTORIC / BOTH / NA

YOUNG-SUCCESSION-OLD

SPRAY / SNAG / REMOVED

MODIFIED / DIPPED OUT / NA

LEVEED / ONE SIDED

RELOCATED / CUTOFFS

MOVING-BEDLOAD-STABLE

ARMOURED / SLUMPS

ISLANDS / SCoured

IMPOUNDED / DESICCATED

FLOOD CONTROL / DRAINAGE

FLOOD CONTROL / DRAINAGE

FLOOD CONTROL / DRAINAGE

FLOOD CONTROL / DRAINAGE

FLOOD CONTROL / DRAINAGE

FLOOD CONTROL / DRAINAGE

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FLOOD CONTROL / DRAINAGE

EJ ISSUES

☐ WWTP / CSO / NPDES / INDUSTRY

☐ HARDENED / URBAN / DIRT&GRIME

☐ CONTAMINATED / LANDFILL

☐ BMPs-CONSTRUCTION-SEDIMENT

☐ LOGGING / IRRIGATION / COOLING

☐ BANK / EROSION / SURFACE

☐ FALSE BANK / MANURE / LAGOON

☐ WASH H₂O / TILE / H₂O TABLE

☐ ACID / MINE / QUARRY / FLOW

☐ NATURAL / WETLAND / STAGNANT

☐ PARK / GOLF / LAWN / HOME

☐ ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

☐ width

☐ depth

☐ max. depth

☐ bankfull width

☐ bankfull x depth

☐ W/D ratio

☐ bankfull max. depth

☐ floodprone x² width

☐ entrench. ratio

Stream Drawing:





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

11

SITE NAME/LOCATION UNT-24 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 81

LAT. 37.84950

LONG. -87.56781

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	80
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	15
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.9

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.2 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral agricultural stream/ditch. Approximately 30 feet of this channel are within the right-of-way. UNT-24 to North Fork Canoe Creek enters UNT-25 to North Fork Canoe Creek.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

11

SITE NAME/LOCATION UNT-25 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84594

LONG. -87.56666

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.5

HHEI Metric Points

Substrate
Max = 40

6

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.4 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a well-maintained ephemeral roadside stream/ditch. Approximately 1,648 feet of this channel are within the right-of-way and approximately 1,369 feet of channel are within the construction limits: Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed. UNT-25 to North Fork Canoe Creek enters UNT-27 to North Fork Canoe Creek approximately 257 feet from North Fork Canoe Creek.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

32

SITE NAME/LOCATION UNT-26 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84578

LONG. -87.56601

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

2.0

HHEI Metric Points

Substrate
Max = 40

12

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area ;likely affect this stream/ditch. Crayfish burrows were observed. Some vegetation was rooted in the channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a well-maintained ephemeral roadside stream/ditch. The channel is dry with cracked soils. Approximately 1,600 feet of this channel is within the right-of-way and approximately 1,581 feet of channel are within the construction limits. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: North Fork Canoe Creek

RM: N/A

Date: 08/01/18

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.84439, -87.56658

Office verified location ☐

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE		ORIGIN		QUALITY		Substrate 10 Maximum 20
<input type="checkbox"/>	BLDR /SLABS [10]	0	0	<input type="checkbox"/>	HARDPAN [4]	0	0	<input type="checkbox"/>	LIMESTONE [1]	<input type="checkbox"/>	HEAVY [-2]	
<input type="checkbox"/>	BOULDER [9]	0	0	<input type="checkbox"/>	DETRITUS [3]	0	0	<input type="checkbox"/>	TILLS [1]	<input type="checkbox"/>	MODERATE [-1]	
<input type="checkbox"/>	COBBLE [8]	15	0	<input type="checkbox"/>	MUCK [2]	0	0	<input type="checkbox"/>	WETLANDS [0]	<input type="checkbox"/>	NORMAL [0]	
<input type="checkbox"/>	GRAVEL [7]	10	0	<input type="checkbox"/>	SILT [2]	65	0	<input type="checkbox"/>	HARDPAN [0]	<input type="checkbox"/>	FREE [1]	
<input type="checkbox"/>	SAND [6]	10	0	<input type="checkbox"/>	ARTIFICIAL [0]	0	0	<input type="checkbox"/>	SANDSTONE [0]	<input type="checkbox"/>	EXTENSIVE [-2]	
<input type="checkbox"/>	BEDROCK [5]	0	0					<input type="checkbox"/>	RIP/RAP [0]	<input type="checkbox"/>	MODERATE [-1]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]								(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]		

Comments

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

0	UNDERCUT BANKS [1]	0	POOLS > 70cm [2]	0	OXBOWS, BACKWATERS [1]	<input type="checkbox"/>	EXTENSIVE >75% [11]
0	OVERHANGING VEGETATION [1]	0	ROOTWADS [1]	0	AQUATIC MACROPHYTES [1]	<input type="checkbox"/>	MODERATE 25-75% [7]
0	SHALLOWS (IN SLOW WATER) [1]	0	BOULDERS [1]	2	LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/>	SPARSE 5-<25% [3]
0	ROOTMATS [1]					<input type="checkbox"/>	NEARLY ABSENT <5% [1]

Comments

Cover
Maximum 20
4

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel
Maximum 20
12

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input checked="" type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	
		<input type="checkbox"/> NONE [0]		<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]			

Comments

Indicate predominant land use(s) past 100m riparian.

Riparian
Maximum 10
5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

- ☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☒ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

- ☒ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

- ☐ TORRENTIAL [-1] ☒ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Comments

 Recreation Potential
 Primary Contact
 Secondary Contact
 (circle one and comment on back)
Pool /
Current
Maximum 12
4

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

No riffles were present in the reach.

Riffle /
Run
Maximum 8
0

6] GRADIENT (1.0 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]	%POOL: 5	%GLIDE: 0	Gradient Maximum 10 3
DRAINAGE AREA (13.3 mi ²)	<input type="checkbox"/> MODERATE [6-10]	%RUN: 95	%RIFFLE: 0	
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

AJ SAMPLED REACH

Check ALL that apply

METHOD

☐ BOAT

☐ WADE

☐ L. LINE

☐ OTHER

STAGE

1st -sample pass-- 2nd

☐ HIGH

☐ UP

☐ NORMAL

☐ LOW

☐ DRY

DISTANCE

☐ 0.5 Km

☐ 0.2 Km

☐ 0.15 Km

☐ 0.12 Km

☐ OTHER

CLARITY

1st --sample pass-- 2nd

☐ < 20 cm

☐ 20-40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

CANOPY

1st pass

2nd pass

☐ > 85%- OPEN

☐ 55%-<85%

☐ 30%-<55%

☐ 10%-<30%

☐ <10%- CLOSED

BJ AESTHETICS

☐ NUISANCE ALGAE

☐ INVASIVE MACROPHYTES

☐ EXCESS TURBIDITY

☐ DISCOLORATION

☐ FOAM / SCUM

☐ OIL SHEEN

☐ TRASH / LITTER

☐ NUISANCE ODOR

☐ SLUDGE DEPOSITS

☐ CSOs/SSOs/OUTFALLS

DJ MAINTENANCE

☐ PUBLIC / PRIVATE / BOTH / NA

☐ ACTIVE / HISTORIC / BOTH / NA

☐ YOUNG-SUCCESSION-OLD

☐ SPRAY / SNAG / REMOVED

☐ MODIFIED / DIPPED OUT / NA

☐ LEVEED / ONE SIDED

☐ RELOCATED / CUTOFFS

☐ MOVING-BEDLOAD-STABLE

☐ ARMoured / SLUMPS

☐ ISLANDS / SCoured

☐ IMPOUNDED / DESICCATED

☐ FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

EJ ISSUES

☐ WWTP / CSO / NPDES / INDUSTRY

☐ HARDENED / URBAN / DIRT&GRIME

☐ CONTAMINATED / LANDFILL

☐ BMPs-CONSTRUCTION-SEDIMENT

☐ LOGGING / IRRIGATION / COOLING

☐ BANK / EROSION / SURFACE

☐ FALSE BANK / MANURE / LAGOON

☐ WASH H₂O / TILE / H₂O TABLE

☐ ACID / MINE / QUARRY / FLOW

☐ NATURAL / WETLAND / STAGNANT

☐ PARK / GOLF / LAWN / HOME

☐ ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

☐ \bar{x} width

☐ \bar{x} depth

☐ max. depth

☐ \bar{x} bankfull width

☐ bankfull \bar{x} depth

☐ W/D ratio

☐ bankfull max. depth

☐ floodprone x^2 width

☐ entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Approximately 1,526 feet of North Fork Canoe Creek are within the right-of-way and 570 feet are within the construction limits. North Fork Canoe Creek will be spanned by a bridge. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed. This reach of creek is highly channelized but stable.

Stream Drawing:



HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME <u>North Fork Canoe Creek</u>		LOCATION <u>Henderson, Kentucky</u>	
STATION # <u>NA</u> RIVERMILE <u>NA</u>		STREAM CLASS <u>Perennial</u>	
LAT <u>37.84431</u> LONG <u>-87.56637</u>		RIVER BASIN <u>Ohio River</u>	
STORET # <u>N/A</u>		AGENCY <u>N/A</u>	
INVESTIGATORS <u>L. Eggering</u>			
FORM COMPLETED BY <u>L. Eggering</u>		DATE <u>05/16/19</u> TIME <u>09:30</u> <input checked="" type="radio"/> AM <input type="radio"/> PM	REASON FOR SURVEY <u>I-69 ORX Project</u>

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
	SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
	SCORE 9	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
SCORE 11	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
SCORE <u>5</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>5</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
SCORE <u>7</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>7</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone) Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.	
SCORE <u>4</u> (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE <u>6</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 98

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME <u>North Fork Canoe Creek</u>		LOCATION <u>Evansville, Indiana</u>
STATION # <u>N/A</u>	RIVERMILE <u>N/A</u>	STREAM CLASS <u>Perennial</u>
LAT <u>37.84431</u> LONG <u>-87.56637</u>		RIVER BASIN <u>Ohio River</u>
STORET # <u>N/A</u>		AGENCY <u>N/A</u>
INVESTIGATORS <u>L. Eggering</u>		
FORM COMPLETED BY <u>L. Eggering</u>		DATE <u>05/16/19</u> TIME <u>09:30 AM</u> AM PM REASON FOR SURVEY <u>I-69 ORX Project</u>

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Now</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input checked="" type="checkbox"/> 20 % cloud cover <input type="checkbox"/> clear/sunny </p> </div> <div style="width: 45%;"> <p>Past 24 hours</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input checked="" type="checkbox"/> 20 % cloud cover <input type="checkbox"/> clear/sunny </p> </div> </div> <p>Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Air Temperature <u>20</u> °C</p> <p>Other _____</p>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p> <p>See attached Qualitative Habitat Evaluation Index (QHEI) Form.</p>
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Stream Subsystem</p> <p> <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal </p> <p>Stream Origin</p> <p> <input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____ </p> </div> <div style="width: 45%;"> <p>Stream Type</p> <p> <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater </p> <p>Catchment Area <u>34.5</u> km²</p> </div> </div>

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse ' Forest ' Commercial ' Field/Pasture ' Industrial <input checked="" type="checkbox"/> Agricultural ' Other _____ ' Residential		Local Watershed NPS Pollution ' No evidence ' Some potential sources <input checked="" type="checkbox"/> Obvious sources Local Watershed Erosion <input checked="" type="checkbox"/> None ' Moderate ' Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present Trees _____ Shrubs _____ Grasses _____ <input checked="" type="checkbox"/> Herbaceous dominant species present Johnsongrass and scattered black locust.		
INSTREAM FEATURES	Estimated Reach Length 60 m Estimated Stream Width 4.1 m Sampling Reach Area 246 m ² Area in km² (m²x1000) 0.000246 km ² Estimated Stream Depth 1.0 m Surface Velocity (at thalweg) 0.5 m/sec		Canopy Cover ' Partly open <input checked="" type="checkbox"/> Partly shaded ' Shaded High Water Mark 3.4 m Proportion of Reach Represented by Stream Morphology Types ' Riffle 10 % ' Run 90 % ' Pool 0 % Channelized <input checked="" type="checkbox"/> Yes ' No Dam Present ' Yes <input checked="" type="checkbox"/> No
LARGE WOODY DEBRIS	LWD N/A m ² Density of LWD N/A m ² /km ² (LWD/ reach area)		
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Rooted emergent ' Rooted submergent ' Rooted floating ' Free floating ' Floating Algae ' Attached Algae dominant species present Johnsongrass sloughing banks Portion of the reach with aquatic vegetation 2 %		
WATER QUALITY	Temperature 15.9 °C Specific Conductance 513.0 SPC Dissolved Oxygen 129.5% pH 8.09 Turbidity 9.98 NTU WQ Instrument Used YSI ProDSS		Water Odors <input checked="" type="checkbox"/> Normal/None ' Sewage ' Petroleum ' Chemical ' Fishy ' Other _____ Water Surface Oils ' Slick ' Sheen ' Globs ' Flecks <input checked="" type="checkbox"/> None ' Other _____ Turbidity (if not measured) ' Clear <input checked="" type="checkbox"/> Slightly turbid ' Turbid ' Opaque ' Stained ' Other _____
SEDIMENT/SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal ' Sewage ' Petroleum ' Chemical ' Anaerobic ' None ' Other _____ Oils <input checked="" type="checkbox"/> Absent ' Slight ' Moderate ' Profuse Deposits ' Sludge ' Sawdust ' Paper fiber ' Sand ' Relict shells <input checked="" type="checkbox"/> Other No deposits. Looking at stones which are not deeply embedded, are the undersides black in color? ' Yes ' No No stones present.		

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	2
Boulder	> 256 mm (10")	0			
Cobble	64-256 mm (2.5"-10")	0	Muck-Mud	black, very fine organic (FPOM)	1
Gravel	2-64 mm (0.1"-2.5")	10			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	40			
Clay	< 0.004 mm (slick)	40			

5% is comprised of artificial material.



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

41

SITE NAME/LOCATION UNT-27 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84535

LONG. -87.56700

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Agricultural stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

5.0

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.4 miles

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch. Some vegetation was rooted in the channel.

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
 Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

This is an agricultural stream/ditch west of US 41. The channel is dry with cracked soils. The direct channel impacts will be calculated when the I-69 south interchange design is completed.

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION UNT-28 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84233

LONG. -87.56585

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	80
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a well-maintained agricultural stream/ditch. The channel is dry with cracked soils. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION UNT-29 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84309

LONG. -87.56512

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

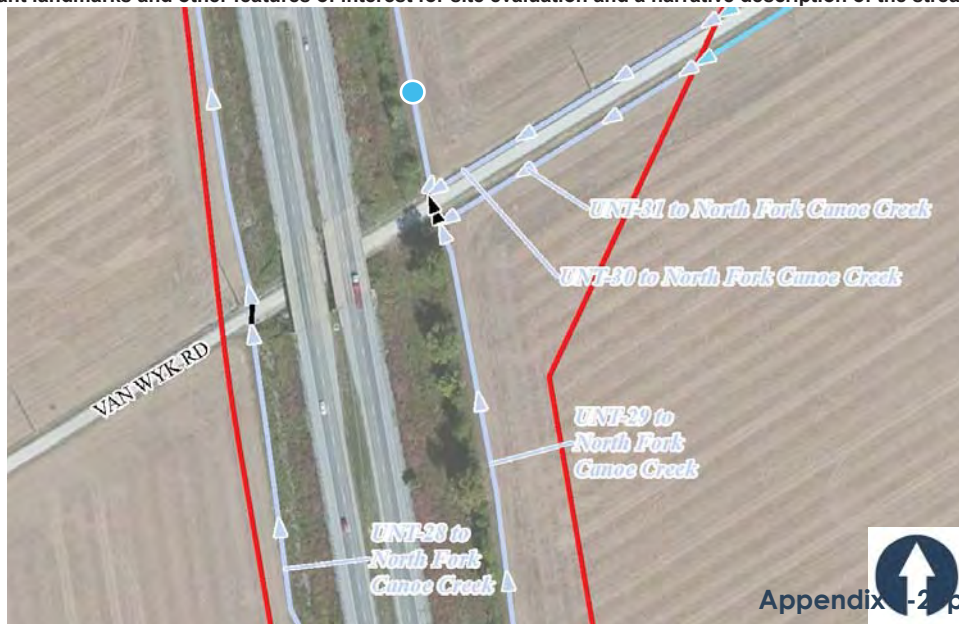
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a dry agricultural stream/ditch. The channel is dry with cracked soils. Approximately 1,634 feet of this channel are within the right-of-way and approximately 1,059 feet of channel are within the construction limit. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION UNT-30 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84270

LONG. -87.56488

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

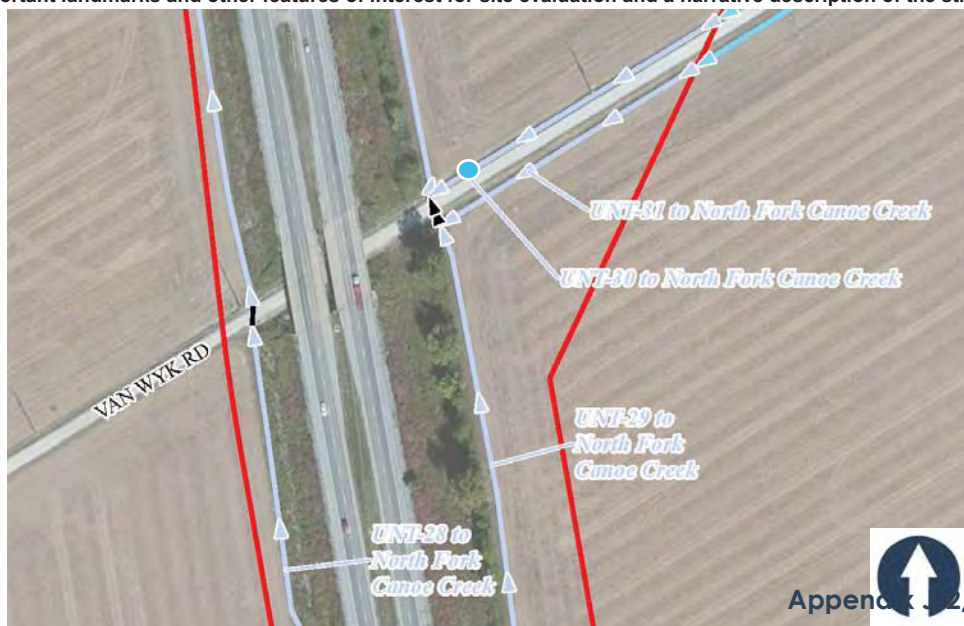
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-30 to North Fork Canoe Creek is a dry, well-maintained roadside channel north of Van Wyk Road. The channel is dry with cracked soils.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION UNT-31 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.84267

LONG. -87.56476

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Ephemeral ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	85
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 12

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.2

HHEI Metric Points

Substrate
Max = 40

15

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance and the adjacent agricultural area likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

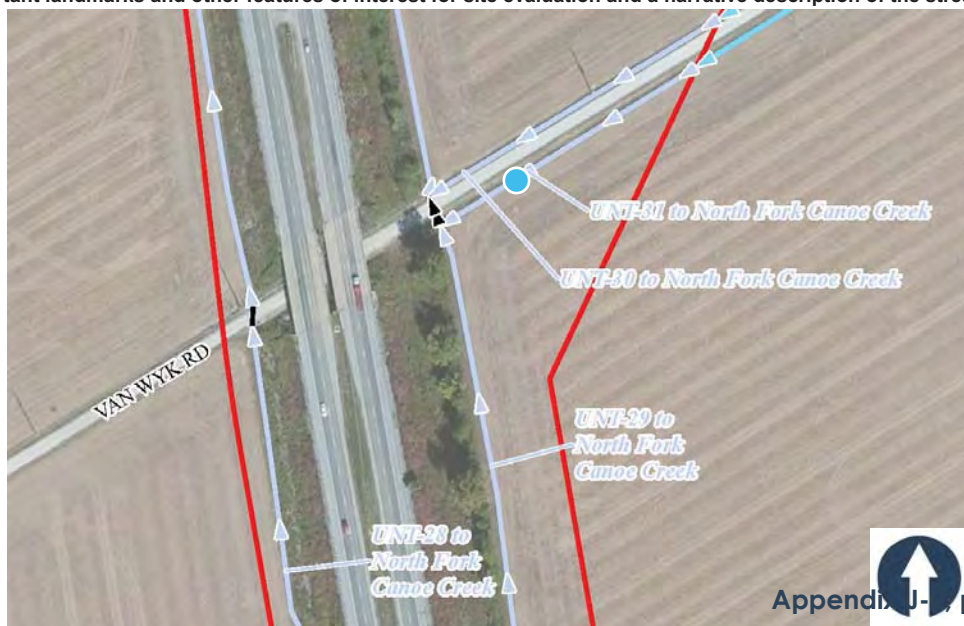
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is a well-maintained ephemeral roadside stream/ditch. The channel is dry with cracked soils. Approximately 360 feet of this channel is within the right-of-way and approximately 108 feet of channel are within the construction limits. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION UNT-32 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.82629

LONG. -87.56612

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Roadside ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.8

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.4 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

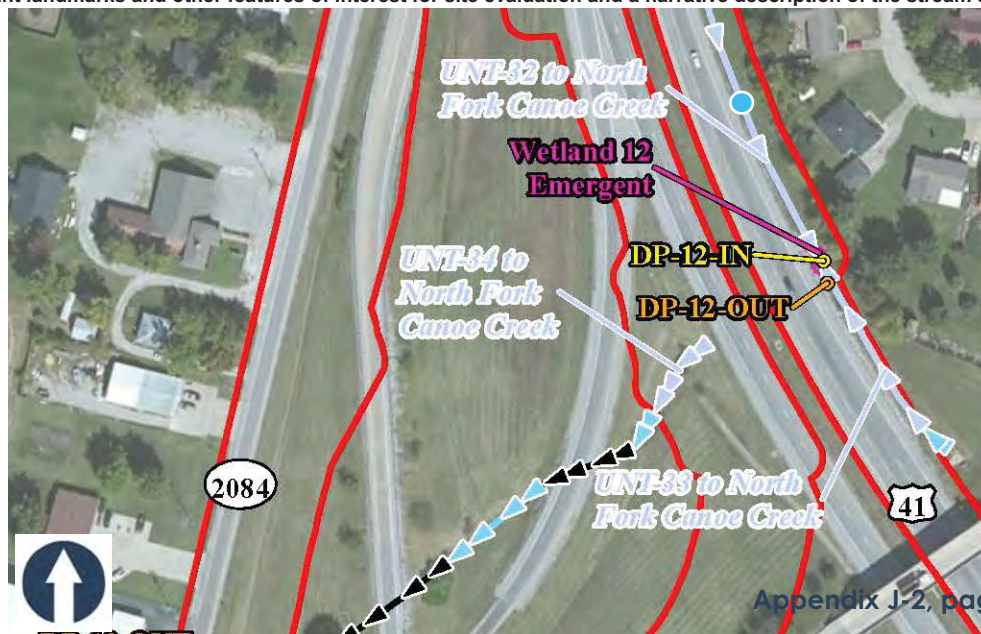
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral stream within a roadside ditch. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION UNT-33 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200

LAT. 37.82579

LONG. -87.56576

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Roadside stream/ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS This is an ephemeral channel with some scour holes.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.8

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.4 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

This is an ephemeral roadside stream/ditch. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION UNT-34 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 182

LAT. 37.82556

LONG. -87.56645

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Roadside ditch.

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

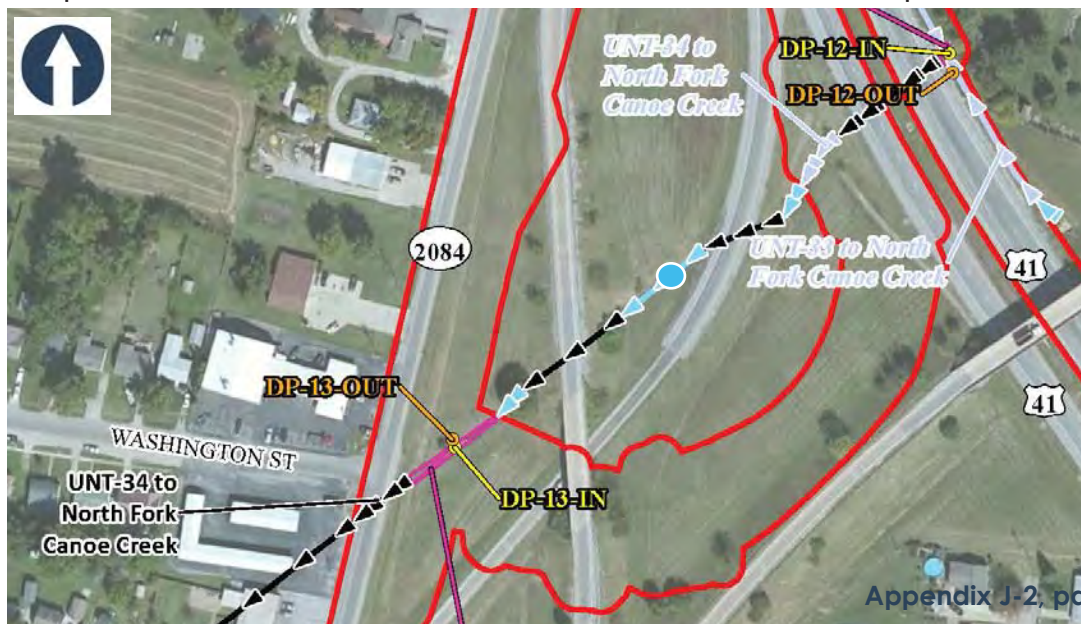
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-34 to North Fork Canoe Creek is dry, well-maintained roadside channel between the ramps to Highway 41. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION UNT-35 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 181

LAT. 37.82194

LONG. -87.56839

RIVER CODE N/A

RIVER MILE N/A

DATE 09/21/18

SCORER Luke F. Eggering

COMMENTS Roadside stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.0

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 1.5 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

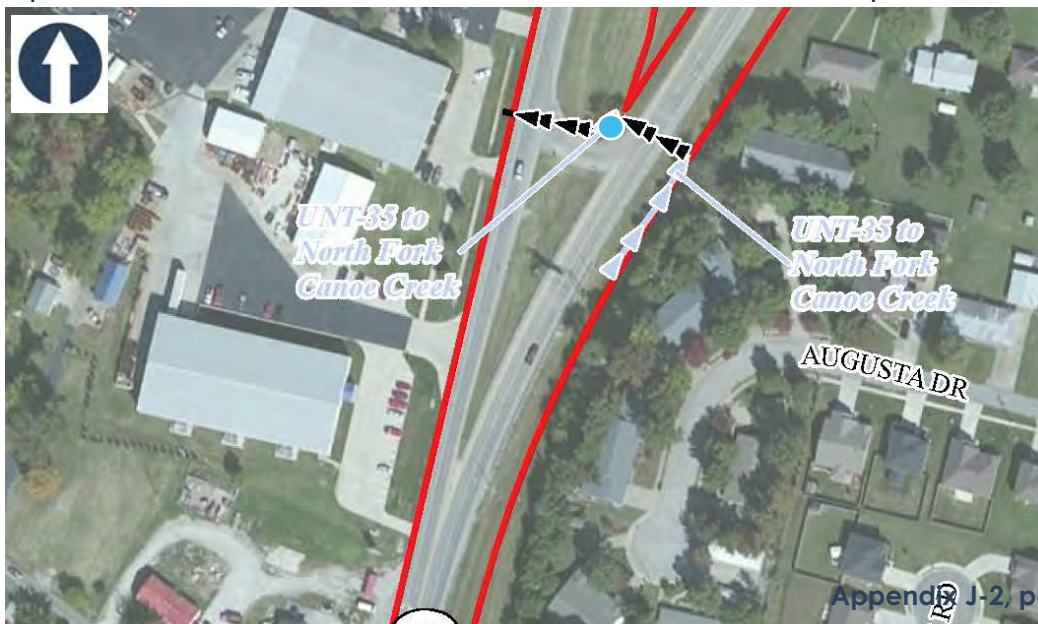
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-35 to North Fork Canoe Creek is dry, well-maintained roadside channel parallel to Highway 41. Note: The direct channel impacts will be calculated when the I-69 south interchange design is completed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Stream & Location: UNT-36 North Fork Canoe Creek

RM: N/A

Date: 04/23/19

Scorers Full Name & Affiliation: Luke F. Eggering, PWS

River Code: N/A

STORET #: N/A

Lat./ Long.: (NAD 83 - decimal) 37.814631, -87.563035

Office verified location ☐

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE	
<input type="checkbox"/>	BLDR /SLABS [10]	0	0	<input type="checkbox"/>	HARDPAN [4]	0	0
<input type="checkbox"/>	BOULDER [9]	0	0	<input type="checkbox"/>	DETRITUS [3]	0	0
<input type="checkbox"/>	COBBLE [8]	0	0	<input type="checkbox"/>	MUCK [2]	0	0
<input type="checkbox"/>	GRAVEL [7]	20	0	<input type="checkbox"/>	SILT [2]	80	0
<input type="checkbox"/>	SAND [6]	0	0	<input type="checkbox"/>	ARTIFICIAL [0]	0	0
<input type="checkbox"/>	BEDROCK [5]	0	0	(Score natural substrates; ignore sludge from point-sources)			

ORIGIN	
<input type="checkbox"/>	LIMESTONE [1]
<input type="checkbox"/>	TILLS [1]
<input type="checkbox"/>	WETLANDS [0]
<input type="checkbox"/>	HARDPAN [0]
<input type="checkbox"/>	SANDSTONE [0]
<input type="checkbox"/>	RIP/RAP [0]
<input type="checkbox"/>	LACUSTURINE [0]
<input type="checkbox"/>	SHALE [-1]
<input type="checkbox"/>	COAL FINES [-2]

QUALITY	
<input type="checkbox"/>	HEAVY [-2]
<input type="checkbox"/>	MODERATE [-1]
<input type="checkbox"/>	NORMAL [0]
<input type="checkbox"/>	FREE [1]
<input type="checkbox"/>	EXTENSIVE [-2]
<input type="checkbox"/>	MODERATE [-1]
<input type="checkbox"/>	NORMAL [0]
<input type="checkbox"/>	NONE [1]

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

The sample point is at a scour hole just upstream from the US 41 double culvert.

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

UNDERCUT BANKS [1]		POOLS > 70cm [2]		OXBOWS, BACKWATERS [1]	
0		1		0	
1	OVERHANGING VEGETATION [1]	0	ROOTWADS [1]	0	AQUATIC MACROPHYTES [1]
0	SHALLOWS (IN SLOW WATER) [1]	0	BOULDERS [1]	1	LOGS OR WOODY DEBRIS [1]
0	ROOTMATS [1]				

Comments

The park has dumped concrete and asphalt in places along the channel.

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Concrete has helped stabilize the bank.

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE [1]	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]		
		<input checked="" type="checkbox"/> NONE [0]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]			

Comments

The sample point is in Donald "Hugh" McCormick Henderson County Fairground and Freedom Park.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> FAST [1]
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> MODERATE [1]
		<input type="checkbox"/> INTERSTITIAL [-1]
		<input type="checkbox"/> INTERMITTENT [-2]
		<input type="checkbox"/> EDDIES [1]

Comments

No riffles were observed at the sample location.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

No riffles were present in the reach.

6] GRADIENT (0.5 ft/mi)	DRAINAGE AREA (2.43 mi ²)
<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]	<input type="checkbox"/> MODERATE [6-10]
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]

%POOL: 100	%GLIDE: 0
%RUN: 0	%RIFFLE: 0

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current
Maximum 12

Riffle / Run
Maximum 8

Gradient
Maximum 10

AJ SAMPLED REACH

Check ALL that apply

☐ BOAT

☐ WADE

☐ L. LINE

☐ OTHER

☐ 0.5 Km

☐ 0.2 Km

☐ 0.15 Km

☐ 0.12 Km

☐ OTHER

1st

--sample pass--

2nd

☐ < 20 cm

☐ 20-<40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

1st

_____ cm

2nd

_____ cm

☐ HIGH

☐ UP

☐ NORMAL

☐ LOW

☐ DRY

☐ NUISANCE ALGAE

☐ INVASIVE MACROPHYTES

☐ EXCESS TURBIDITY

☐ DISCOLORATION

☐ FOAM / SCUM

☐ OIL SHEEN

☐ TRASH / LITTER

☐ NUISANCE ODOR

☐ SLUDGE DEPOSITS

☐ CSOs/SSOs/OUTFALLS

☐ > 85%- OPEN

☐ 55%-<85%

☐ 30%-<55%

☐ 10%-<30%

☐ <10%- CLOSED

☐ CANOPY

1st

_____ cm

2nd

_____ cm

CJ RECREATION

POOL: ☐ >100ft² ☐ >3ft

Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

UNT-36 to North Fork Canoe Creek is a tributary that flows under the Edward T. Breathitt Pennyrile Parkway via two 14-foot box culverts. UNT-36 to North Fork Canoe Creek appears to be a perennial stream. At the time of the survey, the area may have been affected by Ohio River and North Fork Canoe Creek backwater.

CLARITY

☐ < 20 cm

☐ 20-<40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

1st

_____ cm

2nd

_____ cm

☐ CANOPY

1st

_____ cm

2nd

_____ cm

CJ RECREATION

POOL: ☐ >100ft² ☐ >3ft

Stream Drawing:

CLARITY

☐ < 20 cm

☐ 20-<40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

1st

_____ cm

2nd

_____ cm

☐ CANOPY

1st

_____ cm

2nd

_____ cm

CJ RECREATION

POOL: ☐ >100ft² ☐ >3ft

Stream Drawing:

Appendix J-2, page 697

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME _____	LOCATION _____	
STATION # _____ RIVERMILE _____	STREAM CLASS _____	
LAT _____ LONG _____	RIVER BASIN _____	
STORET # _____	AGENCY _____	
INVESTIGATORS _____		
FORM COMPLETED BY _____	DATE _____ TIME _____ AM PM	REASON FOR SURVEY _____

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)					The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.					The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE ____ (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 0					
SCORE ____ (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 0					
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE ____ (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 0					
SCORE ____ (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 0					
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE ____ (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 0					
SCORE ____ (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 0					

Total Score _____

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME UNT-36 to North Fork Canoe Creek		LOCATION Evansville, Indiana
STATION # <u>N/A</u> RIVERMILE <u>N/A</u>		STREAM CLASS Perennial
LAT <u>37.81475</u> LONG <u>-87.56277</u>		RIVER BASIN Ohio River
STORET # <u>N/A</u>		AGENCY <u>N/A</u>
INVESTIGATORS L. Eggering		
FORM COMPLETED BY L. Eggering		DATE <u>05/16/19</u> TIME <u>08:30 AM</u> AM PM REASON FOR SURVEY I-69 ORX Project

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Now</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input checked="" type="checkbox"/> 20 % cloud cover <input type="checkbox"/> clear/sunny </p> </div> <div style="width: 45%;"> <p>Past 24 hours</p> <p> <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input checked="" type="checkbox"/> 20 % cloud cover <input type="checkbox"/> clear/sunny </p> </div> </div> <p>Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Air Temperature <u>18</u> °C</p> <p>Other _____</p>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p> <p>See attached Qualitative Habitat Evaluation Index (QHEI) Form.</p>
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Stream Subsystem</p> <p> <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal </p> <p>Stream Origin</p> <p> <input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____ </p> </div> <div style="width: 45%;"> <p>Stream Type</p> <p> <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater </p> <p>Catchment Area <u>6.3</u> km²</p> </div> </div>

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous dominant species present Cottonwood _____	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length 40 _____ m Estimated Stream Width 3 _____ m Sampling Reach Area 120 _____ m² Area in km² (m²x1000) 0.00012 _____ km² Estimated Stream Depth 0.3 _____ m Surface Velocity (at thalweg) <1.0 _____ m/sec </div> <div style="width: 45%;"> Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark 0.7 _____ m Proportion of Reach Represented by Stream Morphology Types <input type="checkbox"/> Riffle 0 _____ % <input type="checkbox"/> Run 100 _____ % <input type="checkbox"/> Pool 0 _____ % Channelized <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	
LARGE WOODY DEBRIS	LWD N/A _____ m ² Density of LWD N/A _____ m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae dominant species present Green bullrush _____ Portion of the reach with aquatic vegetation 1 _____ %	
WATER QUALITY	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature 16.2 _____ °C Specific Conductance 724.0 SPC Dissolved Oxygen 95.5% _____ pH 7.75 _____ Turbidity 8.91 NTU WQ Instrument Used YSI ProDSS </div> <div style="width: 45%;"> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____ </div> </div>	
SEDIMENT/SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="width: 45%;"> Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input checked="" type="checkbox"/> Other No deposits. Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input type="checkbox"/> No No stones present. </div> </div>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	10
Boulder	> 256 mm (10")	0			
Cobble	64-256 mm (2.5"-10")	0	Muck-Mud	black, very fine organic (FPOM)	10
Gravel	2-64 mm (0.1"-2.5")	30			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	10			
Clay	< 0.004 mm (slick)	50			

5% is comprised of artificial material.



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

21

SITE NAME/LOCATION UNT-37 to North Fork Canoe Creek

SITE NUMBER N/A

RIVER BASIN N/A

DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 100

LAT. 37.81480

LONG. -87.56294

RIVER CODE N/A

RIVER MILE N/A

DATE 05/16/19

SCORER Luke F. Eggering

COMMENTS Roadside stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

11

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

0

Pool Depth
Max = 30

5

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

1.0

Bankfull
Width
Max=30

5

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME** (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

- SINUOSITY** (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.8 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-37 to North Fork Canoe Creek is dry, well-maintained roadside channel parallel to Highway 41.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

21

SITE NAME/LOCATION UNT-38 to North Fork Canoe Creek

SITE NUMBER N/A RIVER BASIN N/A DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200 LAT. 37.81400 LONG. -87.56299 RIVER CODE N/A RIVER MILE N/A

DATE 05/16/19 SCORER Luke F. Eggering COMMENTS Roadside stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	80
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Road ditch appears to be dry most of the year.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS Road ditch appears to be maintained.

AVERAGE BANKFULL WIDTH (meters)

0.5

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS The ditch is at the top of the slope for US 41.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS The area appears to be ephemeral in normal conditions.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.9 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA

Photograph Information: Photos attached.

Elevated Turbidity? (Y/N): No Canopy (% open): 100

Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

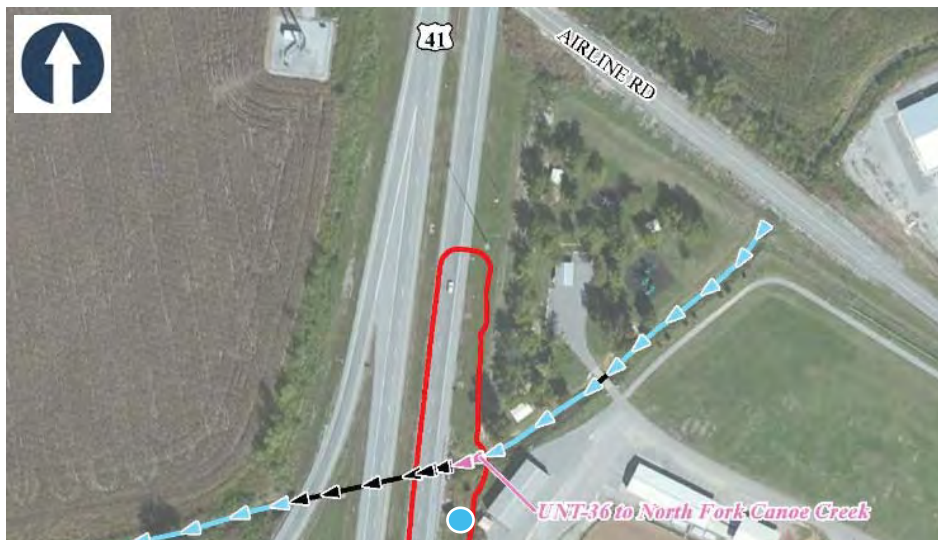
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-38 to North Fork Canoe Creek is dry, well-maintained roadside channel parallel to Highway 41.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

21

SITE NAME/LOCATION UNT-39 to North Fork Canoe Creek

SITE NUMBER N/A RIVER BASIN N/A DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200 LAT. 37.80921 LONG. -87.56422 RIVER CODE N/A RIVER MILE N/A

DATE 05/16/19 SCORER Luke F. Eggering COMMENTS Roadside stream/ditch

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	90
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0
<input type="checkbox"/> BEDROCK [16 pt]	0	<input type="checkbox"/> FINE DETRITUS [3 pts]	0
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	0	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 9

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Channel is dry except in the northwest corner.

MAXIMUM POOL DEPTH (centimeters):

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS Road ditch is more eroded upslope.

AVERAGE BANKFULL WIDTH (meters)

0.5

HHEI Metric Points

Substrate
Max = 40

11

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS The right descending bank is the slope of US 41 fill material.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS The area appears to be ephemeral in normal conditions.

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☒ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☒ WWH Name: Ohio River Distance from Evaluated Stream 2.8 miles
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Henderson, KY-IN NRCS Soil Map Page: N/A NRCS Soil Map Stream Order 1
County: Henderson County Township / City: Henderson

MISCELLANEOUS

Base Flow Conditions? (Y/N): No Date of last precipitation: Unknown Quantity: NA
Photograph Information: Photos attached.
Elevated Turbidity? (Y/N): No Canopy (% open): 100
Were samples collected for water chemistry? (Y/N): N/A (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) N/A If not, please explain: N/A

Additional comments/description of pollution impacts: Soil erosion and herbicides from road maintenance likely affect this stream/ditch.
Some crayfish burrows were observed near the northwest corner of the channel.

BIOTIC EVALUATION

Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrates Observed? (Y/N) No Voucher? (Y/N) No

Comments Regarding Biology:

UNT-39 to North Fork Canoe Creek is usually dry, well-maintained roadside channel parallel to the Edward T. Breathitt Pennyrile Parkway.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



APPENDIX F

Approved JD Forms

Intentionally blank.
To be completed
following agency
field-checks.

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: _____ County/parish/borough: _____ City: _____
Center coordinates of site (lat/long in degree decimal format): Lat. ° **Pick List**, Long. ° **Pick List**.
Universal Transverse Mercator: _____

Name of nearest waterbody: _____

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: _____

Name of watershed or Hydrologic Unit Code (HUC): _____

☐ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date: _____

☐ Field Determination. Date(s): _____

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Pick List** “navigable waters of the U.S.” within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: _____

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Pick List** “waters of the U.S.” within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

- ☐ TNWs, including territorial seas
- ☐ Wetlands adjacent to TNWs
- ☐ Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
- ☐ Non-RPWs that flow directly or indirectly into TNWs
- ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
- ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
- ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- ☐ Impoundments of jurisdictional waters
- ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: _____ linear feet: _____ width (ft) and/or _____ acres.
Wetlands: _____ acres.

c. Limits (boundaries) of jurisdiction based on: **Pick List**

Elevation of established OHWM (if known): _____

2. Non-regulated waters/wetlands (check if applicable):³

☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: _____

¹ Boxes checked below shall be supported by completing the appropriate sections in Section III below.

² For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least “seasonally” (e.g., typically 3 months).

³ Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW: _____.

Summarize rationale supporting determination: _____.

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is “adjacent”: _____.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are “relatively permanent waters” (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: _____ inches

Average annual snowfall: _____ inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

☐ Tributary flows directly into TNW.

☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain: _____.

Identify flow route to TNW⁵: _____.

Tributary stream order, if known: _____.

⁴ Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

⁵ Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):

Average width: feet
Average depth: feet
Average side slopes: **Pick List**.

Primary tributary substrate composition (check all that apply):

<input type="checkbox"/> Silts	<input type="checkbox"/> Sands	<input type="checkbox"/> Concrete
<input type="checkbox"/> Cobbles	<input type="checkbox"/> Gravel	<input type="checkbox"/> Muck
<input type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetation. Type/% cover:	
<input type="checkbox"/> Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .

Presence of run/riffle/pool complexes. Explain: .

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime: .

Other information on duration and volume: .

Surface flow is: **Pick List**. Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

Tributary has (check all that apply):

<input type="checkbox"/> Bed and banks	
<input type="checkbox"/> OHWM ⁶ (check all indicators that apply):	
<input type="checkbox"/> clear, natural line impressed on the bank	<input type="checkbox"/> the presence of litter and debris
<input type="checkbox"/> changes in the character of soil	<input type="checkbox"/> destruction of terrestrial vegetation
<input type="checkbox"/> shelving	<input type="checkbox"/> the presence of wrack line
<input type="checkbox"/> vegetation matted down, bent, or absent	<input type="checkbox"/> sediment sorting
<input type="checkbox"/> leaf litter disturbed or washed away	<input type="checkbox"/> scour
<input type="checkbox"/> sediment deposition	<input type="checkbox"/> multiple observed or predicted flow events
<input type="checkbox"/> water staining	<input type="checkbox"/> abrupt change in plant community
<input type="checkbox"/> other (list):	
<input type="checkbox"/> Discontinuous OHWM. ⁷ Explain: .	

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

<input checked="" type="checkbox"/> High Tide Line indicated by:	<input checked="" type="checkbox"/> Mean High Water Mark indicated by:
<input type="checkbox"/> oil or scum line along shore objects	<input type="checkbox"/> survey to available datum;
<input type="checkbox"/> fine shell or debris deposits (foreshore)	<input type="checkbox"/> physical markings;
<input type="checkbox"/> physical markings/characteristics	<input type="checkbox"/> vegetation lines/changes in vegetation types.
<input type="checkbox"/> tidal gauges	
<input type="checkbox"/> other (list):	

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: .

Identify specific pollutants, if known: .

⁶A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
 - ☐ Federally Listed species. Explain findings: .
 - ☐ Fish/spawn areas. Explain findings: .
 - ☐ Other environmentally-sensitive species. Explain findings: .
 - ☐ Aquatic/wildlife diversity. Explain findings: .

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: . acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain: .

☐ Ecological connection. Explain: .

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
 - ☐ Federally Listed species. Explain findings: .
 - ☐ Fish/spawn areas. Explain findings: .
 - ☐ Other environmentally-sensitive species. Explain findings: .
 - ☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately () acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)

Size (in acres)

Directly abuts? (Y/N)

Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:

- ☐ TNWs: linear feet width (ft), Or, acres.
- ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

- ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
- ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs⁸ that flow directly or indirectly into TNWs.

- ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

- ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
☐ Wetlands directly abutting an RPW where tributaries typically flow “seasonally.” Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

- ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

- ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.⁹

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- ☐ Demonstrate that impoundment was created from “waters of the U.S.,” or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):¹⁰

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

⁸See Footnote # 3.

⁹ To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰ Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
 - ☐ Prior to the Jan 2001 Supreme Court decision in “SWANCC,” the review area would have been regulated based solely on the “Migratory Bird Rule” (MBR).
- ☐ Waters do not meet the “Significant Nexus” standard, where such a finding is required for jurisdiction. Explain: .
- ☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the “Significant Nexus” standard, where such a finding is required for jurisdiction (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☐ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
- ☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - ☐ Office concurs with data sheets/delineation report.
 - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters’ study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
 - ☐ USGS NHD data.
 - ☐ USGS 8 and 12 digit HUC maps.
- ☐ U.S. Geological Survey map(s). Cite scale & quad name: .
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ☐ National wetlands inventory map(s). Cite name: .
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- ☐ Photographs: ☐ Aerial (Name & Date): .
or ☐ Other (Name & Date): .
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .