

Cairo Bridge Project Aquatic Resources Investigation Ritchie County, West Virginia

State Project: S343-31-9.82
Federal Project: STP-0031(037)D



U.S. Department of Transportation
Federal Highway Administration



West Virginia Department of Transportation
Division of Highways



March 1, 2017

INTRODUCTION

Skelly and Loy, Inc. conducted aquatic resources investigations for the replacement of the existing structure carrying West Virginia Route 31 (WV 31) over North Fork Hughes River in the town of Cairo located in Ritchie County, on December 8, 2016. This memo documents the methodology utilized for field investigations and the findings. No wetland resources were identified within the project study area. One perennial stream, North Fork Hughes River was identified. A Physical Characterization/Water Quality Field Data Sheet and a Habitat Assessment Field Data Sheet – Low Gradient Streams was completed for this stream. These data sheets are from the United States Environmental Protection Agency (EPA) Rapid Bioassessment Protocol, Attachment 2.

A Project Location Map (Attachment 1), field data forms (Attachment 2), and a Field Findings figure and Photograph Log (Attachment 3) are attached to this memo. The wetland and stream resource findings from the field investigations are presented below.

The study area is centered on Main Street (WV 31). It begins 200 feet from the northern edge of the existing bridge and extends 200 feet from the southern edge of the bridge. Despite being located with the Town boundary, the project area is more rural than urban in character. Figure 1 shows the project's location.

METHODOLOGY

Field investigations were conducted in accordance with the United States Army Corps of Engineers' (USACE's) *Wetlands Delineation Manual* (Technical Report Y-87-1, 1987) and the *Regional Supplements to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Version 2.0) (2012) (Regional Supplement); and Section 404 of the Federal Clean Water Act. Within the site boundaries, cursory visual inspection of vegetation, hydrology, and soils was conducted. This inspection was used to determine the presence or absence of wetland habitats.

Surface water resources were identified and classified in accordance with West Virginia and USACE regulatory guidance, including West Virginia Title 46 Legislative Rules Environmental Quality Board Series 1 Requirements Governing Water Quality Standards; USACE Nationwide

Permits, Conditions, District Engineer's Decision, Further Information and Definitions (2012); USACE Exemptions for Construction or Maintenance of Irrigation Ditches and Maintenance of Drainage Ditches Under Section 404 of the Clean Water Act (2007); and USACE Ordinary High Water Mark Identification (2005) elements. Water chemistry, physical instream and adjacent riparian habitat assessments were conducted in accordance with the EPA low gradient streams visual-based habitat assessment found within the *Rapid Bioassessment Protocols (RBP) for Use in Streams and Wadeable Rivers* (Barbour 1999). In addition, reviews of published secondary sources were reviewed for regulatory protection status and West Virginia Stream Use and Protection status. These sources include:

- *West Virginia Title 47 Legislative Rule, Department of Environmental Protection, Water Resources, Series 2, Requirements Governing Water Quality Standards (47 Code of State Regulations [CSR] 2) (July 8, 2016);*
- *West Virginia Division of Natural Resources (WVDNR) West Virginia Hunting, Trapping and Fishing Map (WVDNR 2015);*
- *West Virginia Title 60 (effective date May 1, 2012) Legislative Rule, Department of Environmental Protection, Secretary's Office, Series 5, Antidegradation Implementation Procedures; and*

West Virginia Department of Environmental Protection Shapefiles for Tier 3 Streams and Tier 3 – Listing for Tier 3 streams and reasons for inclusion in Excel (WVDEP 2015).

FINDINGS

A review of the project study area utilizing the U.S. Fish and Wildlife Service (USFWS) online Wetland Mapper determined that only the riverine (R5UBH) National Wetland Inventory (NWI) wetlands associated with North Fork Hughes River and Big Run occur within or near the project study area. A Federal Emergency Management Act (FEMA) 100-year floodplain is located throughout the project study area.

On December 8, 2016, Skelly and Loy, Inc. conducted a thorough investigation of the project study area for potential "Waters of the United States" including wetlands and streams. No wetlands were identified within the project study area; however, an upland area was investigated for wetland criteria in the northwest quadrant of the bridge. Data from this location was recorded on a Modified Wetland Determination Data Form – Eastern Mountains and

Piedmont, which was modified from the USACE Regional Supplement (2012). This data form can be found within Attachment 2 and photographs of this location are included in Attachment 3.

The ordinary high water mark (OHWM) of one perennial stream, North Fork Hughes River, was identified within the project study area. The designated use for North Fork Hughes River is Category A, Use Subcategory Public water according to 47CSR 2A, July 8, 2016. The North Fork Hughes River is used for potable water by three municipal water supplies including Cairo Water. The stream is known to contain a historical population of the federally endangered mussel species, clubshell (*Pleurobema clava*) as identified in the *Clubshell (Pleurobema clava) and Northern Riffleshell (Epioblasma torulosa rangiana) Recovery Plan* prepared by G. Thomas Watters of the Ohio Department of Natural Resources, 1994. North Fork Hughes River is a “*Water of the United States.*”

North Fork Hughes River flows generally from northeast to southwest under WV 31 then it bends nearly 90 degrees toward the south near the study area limits. Approximately 175 feet upstream of the existing bridge is the confluence of Big Run, which is outside the project study area, with North Fork Hughes River. A large gravel bar is located near the confluence and extends over half of the streambed of North Fork Hughes River. Additional gravel has been transported downstream and deposited below the bridge as another gravel bar island. Land use within the project study area includes open space, residential, and commercial uses. North Fork Hughes River has been historically channelized within the project study area. Evidence of channelization includes placement of boulders along portions of the stream banks. Within the project study area, the riparian zone is relatively small and dominated by herbaceous vegetation with limited woody cover by trees or shrubs. The dominant species is Japanese knotweed (*Fallopia japonica*) and American sycamore (*Platanus occidentalis*). In the northwest quadrant of the existing bridge is an existing gas or water line and the remnants of older abandoned and broken pipes that extend into the stream. Within this quadrant, a number of topographic features identified as “slumps” are located and appear to possibly be associated with the abandoned utility (water, gas, etc.) lines. An overhead electric line and a buried gas line is located west of the project study area limits along a narrow bench above the stream.

The physical characteristics of North Fork Hughes River can be reviewed on the attached *Physical Characterization/Water Quality Field Data Sheet* (Attachment 2). North Fork Hughes River within the project study area consists of approximately 60 percent riffle, 30 percent run,

and 10 percent pool morphology types. The estimated flow width at the time of observation was approximately 30 to 40 feet with an estimated average flow depth ranging from 2 to 24 inches. The estimated OHWM is approximately 50 to 60 feet in width and 18 to 40 inches in depth. The stream has a partly open canopy and steep sloping banks. The stream substrates consist primarily of cobble with gravel, sand, and silt deposits and relatively low organic substrate components consisting of detritus. The stream appears well flushed and substrates are moderately embedded. Stream banks display moderate to severe erosion with active erosion affecting nearly 100 percent of the stream reach. There are some potential sources of non-point source pollution within or near the project study area, including road influences (salts and oils), parking lot runoff, and nearby commercial operations.

Habitat for fish and other aquatic organisms was observed to supply cover including vegetated banks, undercut banks, and gravel/cobble substrates. There is approximately 35 percent mix of stable habitat, which is considered by the RBP to be at the high end of 'marginal'. The stream contains all four velocity / depth regimes (slow-deep, slow-shallow, fast-deep, and fast shallow) however, the slow regimes are limited, which is considered by the RBP to be at the low end of 'optimal'. Overall, North Fork Hughes River scored 101 out of a total score of 200 on the EPA Rapid Bio-Assessment Habitat Assessment Field Data Sheet – Low Gradient Streams (Attachment 2). The score of 101 puts the stream in the low 'suboptimal' condition category of the RBP. Representative photographs of the stream can be found in Attachment 3. Other photographs are stored electronically in the project technical file.

CONCLUSIONS

Based upon the background investigation and the December 8, 2016 field reconnaissance, it was determined that no wetlands exist within the project study area. Regulated "*Waters of the United States*" present within the project study area are limited to the ordinary high water mark of North Fork Hughes River.

Given the absence of regulated wetland resources within the project study area, additional agency field views or a subsequent jurisdictional determination meeting with representatives from the USACE do not appear to be warranted at this time. If deemed necessary, any potential field views could be held as part of and during the permit review process for this project.

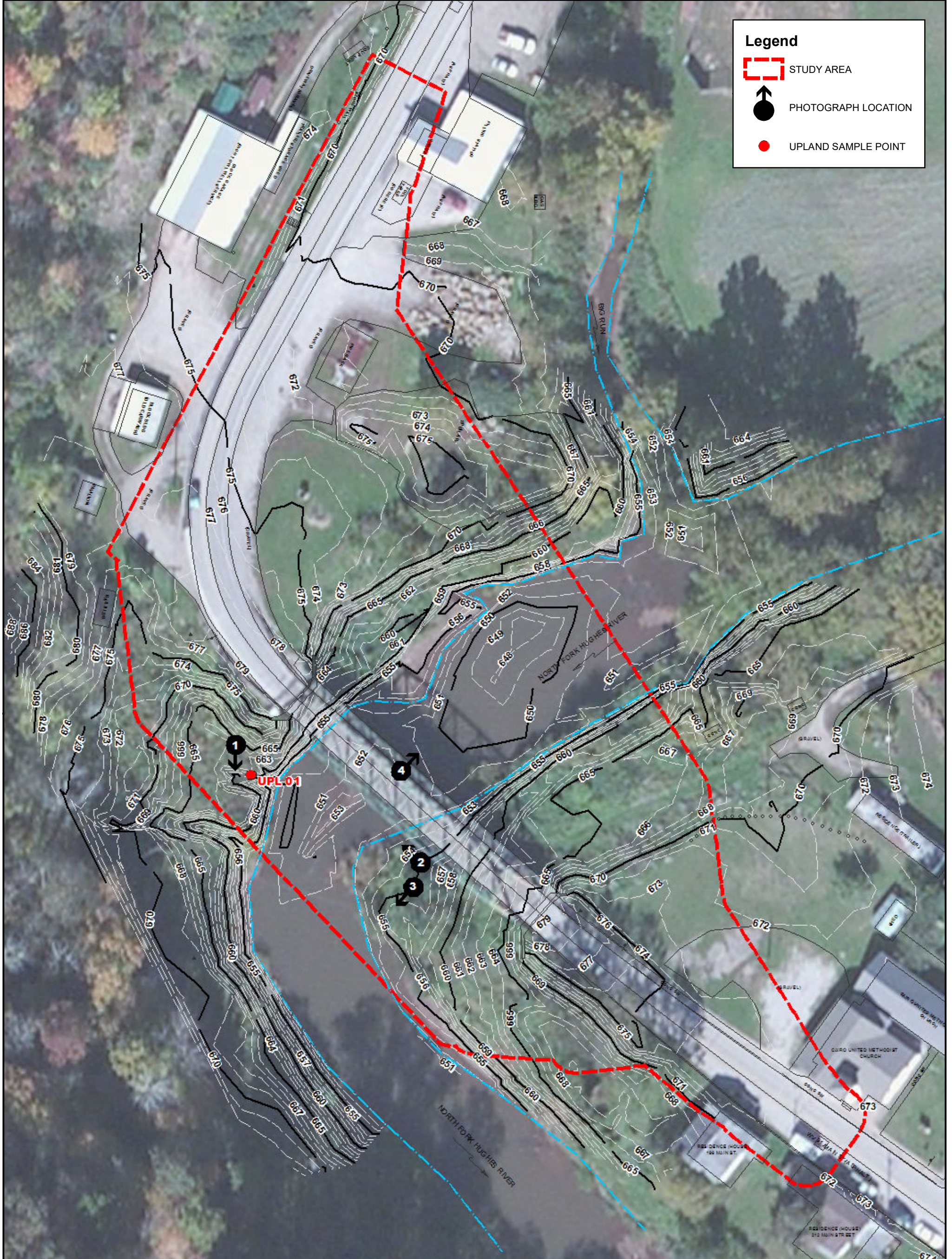
ATTACHMENTS

Attachment 1: Project Location Map

Attachment 2: Field Data Forms

Attachment 3: Field Findings and Photograph Log

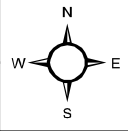
ATTACHMENTS



Legend

- STUDY AREA
- ↑ PHOTOGRAPH LOCATION
- UPLAND SAMPLE POINT

WEST VIRGINIA DIVISION OF HIGHWAYS
 CAIRO BRIDGE
 WV 31 OVER NORTH FORK HUGHES RIVER
 TOWN OF CAIRO
 RITCHIE COUNTY



PROJECT LOCATION

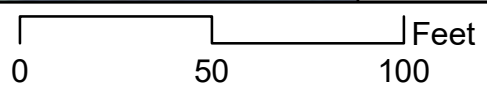


FIGURE - 1

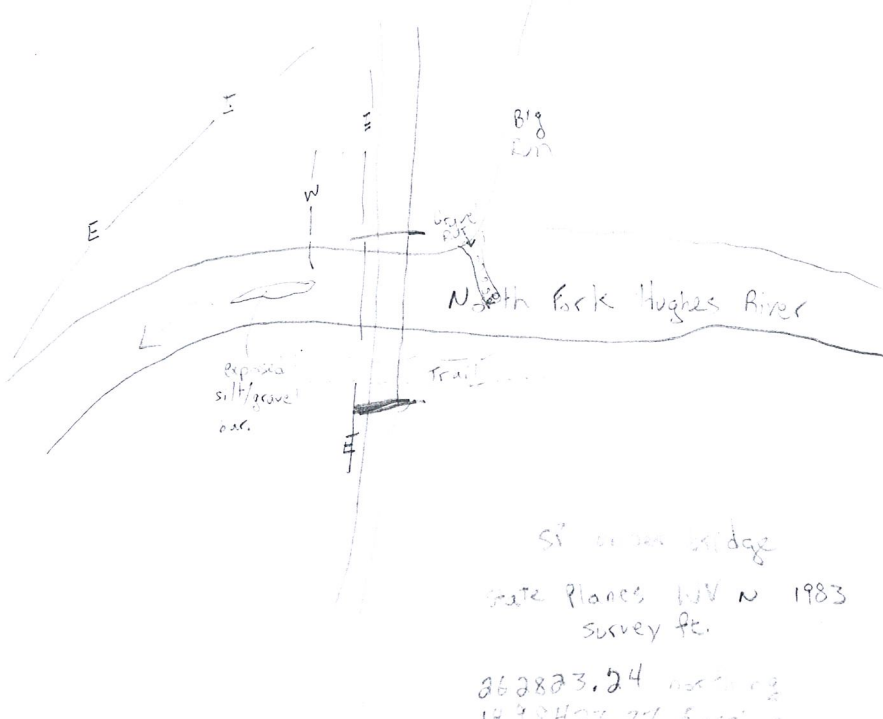
SKELLY and LOY Inc.
 CONSULTANTS IN
 ENVIRONMENT - ENERGY
 ENGINEERING - PLANNING



PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

| | | |
|--|--|---|
| STREAM NAME <u>STR</u> | LOCATION | |
| STATION # <u> </u> RIVERMILE | STREAM CLASS (circle) Per. Int. Eph. | |
| UTM <u> </u> UTM <u> </u> | RIVER BASIN (USGS watershed abbr.) | |
| STORET # | AGENCY <u>WVDOH</u> | |
| INVESTIGATORS (Circle) EWL, SGT, SJP, <u>TAS</u> , FP <u>SRG</u> | | |
| FORM COMPLETED BY <u>TAS</u> | DATE <u>12/8/16</u> TIME <u>1015</u> <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM | REASON FOR SURVEY <u>Baseline Conditions</u> |
| TM (circle) 1 2 3 4 5 6 | | |

| | | | |
|---------------------------|---|---|---|
| WEATHER CONDITIONS | Now <input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input checked="" type="checkbox"/> 30% %cloud cover <input type="checkbox"/> clear/sunny | Past 24 hours <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> % <input checked="" type="checkbox"/> | Has there been a heavy rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Air Temperature <u>35</u> °C or <u>F</u> (circle one) Other _____ |
|---------------------------|---|---|---|

| | |
|--------------------------|--|
| SITE LOCATION/MAP | Draw a map of the site and indicate the areas sampled (or attach a photograph) Refer to field map for stream segment location  |
|--------------------------|--|

| | | |
|--------------------------------|---|--|
| STREAM CHARACTERIZATION | Stream-Subsystem Ded above <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal Stream Origin <input checked="" type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input checked="" type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____ | Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area _____ ac. or sq. miles <div style="border: 1px solid red; padding: 5px; display: inline-block; color: red; font-weight: bold;">circle measure units used</div> |
|--------------------------------|---|--|

Photos 101849 Facing upstream } -AS
 101855 Facing downstream }
 101858 same }
 104343 - 104739 (C)
 Photos SRG
 from page

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 checked="" type="checkbox"/> Residential | | Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input 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 checked="" type="checkbox"/> Herbaceous dominant species present <u>Am. Sycamore, Japanese Knotweed</u> | | |
| INSTREAM FEATURES | Sample Reach <u>330</u> ft. (circle if appl.) or _____ ft. (For all circle measure units used). Wetted width: <u>30-40 in. or ft.</u> Wetted Depth: <u>2-2.5 in. or ft. variable</u> Normal width (est.): <u>50-60 in. or ft.</u> Normal Depth (est.): _____ in. or ft. OHWM width (est.): <u>50-60 in. or ft.</u> OHWM Depth (est.): <u>18-40 in. or ft.</u> Riffle/Pool/Run ratio at time of field investigation within sample reach: <u>60</u> % Riffle, <u>30</u> % Run and <u>10</u> % Pool or flows insufficient to est. ___ Yes Channelized: Yes ___ or No <u>X</u> , Dam present: Yes ___ or No <u>X</u> Canopy Cover Partly open <u>X</u> , Partly shaded ___ or Shaded ___ | | |
| LARGE WOODY DEBRIS | LWD _____ m ² Density of LWD _____ m ² /cm ² (LWD/reach area) LWD assessed w/ HGM | | |
| 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 <input checked="" type="checkbox"/> N/A no Aquatic Vegetation dominant species present _____ Portion of the reach with aquatic vegetation _____ % | | |
| WATER QUALITY <input type="checkbox"/> <div style="border: 1px solid red; padding: 5px; color: red; font-weight: bold;"> Sampling not conducted, insufficient water </div> | Temperature <u>5.5</u> °C 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 _____ Specific Conductance <u>215.3</u> Dissolved Oxygen <u>11.06</u> pH <u>7.3</u> Turbidity <u>n/a</u> WQ Instrument Used <u>YSI 55 & 63</u> Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____ | | |
| SEDIMENT/SUBSTRATE | 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 Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input checked="" type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other <u>silt</u> Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | | |

| 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 | | | Detritus | sticks, wood, coarse plant materials (CPOM) | 5 |
| Boulder | > 256 mm (10") | | | | |
| Cobble | 64-256 mm (2.5"-10") | 40 | Muck-Mud | black, very fine organic (FPOM) | — |
| Gravel | 2-64 mm (0.1"-2.5") | 20 | | | |
| Sand | 0.06-2mm (gritty) | 20 | Marl | grey, shell fragments | — |
| Silt | 0.004-0.06 mm | 20 | | | |
| Clay | < 0.004 mm (slick) | | | | |

Note: Substrate composition also assessed w/HGM

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

| | | |
|--|-----------------|--|
| STREAM NAME <u>STR North Fork Hughes River</u> | | LOCATION |
| STATION # _____ | RIVERMILE _____ | STREAM CLASS <u>Potomac</u> |
| LAT _____ | LONG _____ | RIVER BASIN |
| STORET # _____ | | AGENCY <u>WVDOH</u> |
| INVESTIGATORS <u>TAS, JRG</u> | | |
| FORM COMPLETED BY <u>JRG</u> | | DATE <u>12/8/12</u> TIME <u>10:35</u> <input checked="" type="radio"/> AM <input type="radio"/> PM |
| REASON FOR SURVEY <u>Baseline Conditions</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 <u>11</u> | 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 <u>10</u> | 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 <u>13</u> | 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 <u>9</u> | 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 <u>16</u> | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |

59

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 <u>14</u> | 20 | 19 | 18 | 17 | 16 | 15 | (14) | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 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 <u>8</u> | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | (8) | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 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>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 | | |
| 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>4</u> (LB) | Left Bank | 10 | 9 | | | 8 | 7 | 6 | | | 5 | (4) | 3 | | | 2 | 1 | 0 | | |
| | SCORE <u>4</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>3</u> (LB) | Left Bank | 10 | 9 | | | 8 | 7 | 6 | | | 5 | 4 | (3) | | | 2 | 1 | 0 | | |
| | SCORE <u>3</u> (RB) | Right Bank | 10 | 9 | | | 8 | 7 | 6 | | | 5 | 4 | (3) | | | 2 | 1 | 0 | | |

Parameters to be evaluated broader than sampling reach

Total Score 99

59 + 40

MODIFIED WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont*1

Wetland ID

UPL

Project/Site: Cairo Bridge City/County: Cairo, Ritchie County Sampling Date: 12/8/16

Applicant/Owner: WVDOH State: _____ Sampling Point: WI or UPL

Investigator(s): TAS, SRG Section, Township, Range: _____

Landform: Summit ___ Hillslope ___ Terrace Floodplain ___ Local relief: Concave ___ Convex ___ Linear ___ Level Slope (%): _____

Subregion:(LRR or MLRA): LRR N Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No _____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (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 <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Remarks: | |

HYDROLOGY

| | |
|---|--|
| <p>Wetland Hydrology Indicators:</p> <p><u>Primary Indicators (minimum of one is required; check all that apply)</u></p> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13) | <p><u>Secondary Indicators (minimum of two required)</u></p> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5) |
|---|--|

| | |
|---|---|
| <p>Field Observations:</p> Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe) | Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/> |
|---|---|

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

*1 Form modified from: U. S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, ed. J.S. Wakley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-XX. Vicksburg, MS: U.S. Army Engineer Research and Develo

VEGETATION (Four Strata) – Use scientific names of plants.

| Tree Stratum (Plot size: 30' dia. _____ Other: _____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|------------------|-------------------|------------------|
| 1. <u>Staghorn sumac (Rhus typhina)</u> | <u>20</u> | <u>X</u> | <u>NI</u> |
| 2. <u>Black locust (Robinia pseudoacacia)</u> | <u>5</u> | <u>X</u> | <u>FACU</u> |
| 3. _____ | _____ | _____ | _____ |
| 4. _____ | _____ | _____ | _____ |
| 5. _____ | _____ | _____ | _____ |
| 6. _____ | _____ | _____ | _____ |
| 7. _____ | _____ | _____ | _____ |
| 8. _____ | _____ | _____ | _____ |

50% (TC) = 13 20% (TC) = 5 85 = Total Cover (TC)

| Sapling/Shrub Stratum (Plot size: 15' dia. _____ Other: _____) | Absolute % Cover | Dominant Species? | Indicator Status |
|--|------------------|-------------------|------------------|
| 1. _____ | _____ | _____ | _____ |
| 2. _____ | _____ | _____ | _____ |
| 3. _____ | _____ | _____ | _____ |
| 4. _____ | _____ | _____ | _____ |
| 5. _____ | _____ | _____ | _____ |
| 6. _____ | _____ | _____ | _____ |
| 7. _____ | _____ | _____ | _____ |
| 8. _____ | _____ | _____ | _____ |
| 9. _____ | _____ | _____ | _____ |
| 10. _____ | _____ | _____ | _____ |

50% (TC) = _____ 20% (TC) = _____ 0 = Total Cover (TC)

| Herb Stratum (Plot size: 5' dia. _____ Other: _____) | Absolute % Cover | Dominant Species? | Indicator Status |
|--|------------------|-------------------|------------------|
| 1. <u>Wingstem (Verbesina alternifolia)</u> | <u>20</u> | _____ | <u>FAC</u> |
| 2. <u>grass sp.</u> | <u>60</u> | <u>X</u> | <u>TBD</u> |
| 3. <u>violet sp.</u> | <u>30</u> | <u>X</u> | <u>TBD</u> |
| 4. _____ | _____ | _____ | _____ |
| 5. _____ | _____ | _____ | _____ |
| 6. _____ | _____ | _____ | _____ |
| 7. _____ | _____ | _____ | _____ |
| 8. _____ | _____ | _____ | _____ |
| 9. _____ | _____ | _____ | _____ |
| 10. _____ | _____ | _____ | _____ |
| 11. _____ | _____ | _____ | _____ |
| 12. _____ | _____ | _____ | _____ |

50% (TC) = 55 20% (TC) = 22 110 = Total Cover (TC)

| Woody Vine Stratum (Plot size: 30' dia. _____ Other: _____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|------------------|-------------------|------------------|
| 1. _____ | _____ | _____ | _____ |
| 2. _____ | _____ | _____ | _____ |
| 3. _____ | _____ | _____ | _____ |
| 4. _____ | _____ | _____ | _____ |
| 5. _____ | _____ | _____ | _____ |
| 6. _____ | _____ | _____ | _____ |

50% (TC) = _____ 20% (TC) = _____ _____ = Total Cover (TC)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (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>20</u> | x 3 = <u>60</u> |
| FACU species <u>5</u> | x 4 = <u>20</u> |
| UPL species <u>—</u> | x 5 = <u>—</u> |
| Column Totals: <u>25</u> (A) | <u>80</u> (B) |

Prevalence Index = B/A = 3.20

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 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – 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.)

Sample Point Photograph(s) (ID, Direction): 100447, E & 100457, S; Camera: TAS Power

GPSed Surveyed: Yes X No _____; Unit Pitt 1 or GPS file name _____

SOIL

Sampling Point: WP or UPL

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

| Depth (inches) | Matrix | | Redox Features | | | | Texture ³ | Remarks |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|----------------------|-------------|
| | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 0-16 | 7.5YR 4/4 | 100 | — | — | — | — | Si | damp, moist |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

³s=sand, l=loam, c=clay, si =silt, f=fine, vf=very fine, co= coarse
¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

- | | |
|---|--|
| Hydric Soil Indicators: | Indicators for Problematic Hydric Soils³: |
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Coast Prairie Redox (A16) ^{*2} |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> (MLRA 147, 148) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> (MLRA 136, 147) |
| <input type="checkbox"/> 2 cm Muck (A10) (LRR N) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Thick Dark Surface (A12) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) | ^{*2} Not applicable to LRR N or MLRA 147 |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | ^{*3} Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. |
| <input type="checkbox"/> Sandy Redox (S5) | |
| <input type="checkbox"/> Stripped Matrix (S6) | |
| <input type="checkbox"/> Dark Surface (S7) | |
| <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) | |
| <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) | |
| <input type="checkbox"/> Loamy Gleyed Matrix (F2) | |
| <input type="checkbox"/> Depleted Matrix (F3) | |
| <input type="checkbox"/> Redox Dark Surface (F6) | |
| <input type="checkbox"/> Depleted Dark Surface (F7) | |
| <input type="checkbox"/> Redox Depressions (F8) | |
| <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) | |
| <input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122) ^{*2} | |
| <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) ^{*2} | |
| <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147) | |

Restrictive Layer (if observed):
 Type: n/a
 Depth (inches):

Hydric Soil Present? Yes No

Remarks:

**WV 31 Cairo Bridge over North Fork Hughes River
Cairo, Ritchie County, West Virginia
Photograph Log**



Photograph 1 – Upland Sample Point looking southwest.



Photograph 2 – North Fork Hughes River looking northwest from southern shore beneath the Cairo Bridge.

**WV 31 Cairo Bridge over North Fork Hughes River
Cairo, Ritchie County, West Virginia
Photograph Log**



Photograph 3 – North Fork Hughes River looking downstream from southern shore beneath the Cairo Bridge.



Photograph 4 – North Fork Hughes River looking upstream from the Cairo Bridge. Big Run confluence is directly upstream and to the left of the large gravel bar.