Stream Habitat Assessment and Wetland Delineation Report

Lewis Creek West

Ohio County, Kentucky

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I. INTRODUCTION

This report is a description of streams and wetlands located within a 1194.5-acre study area in Ohio County, Kentucky. Information contained within this document was compiled for the purpose of identifying potential environmental impacts that may be associated with a future coal mining operation. The amount of streams and wetlands located within the study area does not reflect impact amounts associated with future permit applications. The report will focus on the physical assessment of streams and wetlands. The documentation of existing conditions will aid in determination of the amount of mitigation that will be required for potential impacts on jurisdictional waters of the United States.

The data presented in this report is based upon field investigation, general research, and information supplied by Armstrong Coal Company, Inc. The text body is limited to analysis, which may be further summarized, supported or illustrated by tables and exhibits. The exhibits and appendix include the following: project vicinity map, aerial map, National Wetlands Inventory map, soils map, USGS topographic quadrangle, floodplain map, cross sections of larger streams, stream habitat assessment forms, wetland delineation forms, and photographic documentation.

Location

The study area is located approximately 4.1 miles south of Centertown, Kentucky, in Ohio County (Central City East, Paradise, and Equality USGS 7.5 minute topographic quadrangles). The center of the site is located at Latitude: 37° 21' 47.5" N, Longitude: 87° 00' 38.9" W. The site can be accessed from KY 1903, a roadway through the property, which intersects US 62 near the community of Rockport (see Exhibit 1).

Background and Description

The topography generally consists of hilly terrain, with floodplain along the eastern boundary (along Lewis and West Fork Lewis Creeks). To the southwest, the site borders the Green River for approximately 0.9 miles. Kentucky Route 1903, which divides the site, also defines a ridgeline that separates drainage from the area towards either the Green River or to Lewis and West Fork Lewis Creeks. Approximately eighty percent (940 acres) of the study area is forested. Most of the forest is mature, but has some portions characterized by areas of thick undergrowth vegetation and young trees. The remaining land use (255 acres) appears to be predominantly for agricultural purposes, either cropped or in pasture. Land features in the study area include ponds, wetlands, and brushy/grassy fields. In forested sections, the dominant vegetation consists of small to medium size trees. The dominant tree species within the study

boundary include maple species (*Acer* spp.), sycamore (*Platanus occidentalis*), oak species (*Quercus* spp.), hickory species (*Carya* spp.), and sweetgum (*Liquidambar styraciflua*).

Purpose of Project

The purpose of the project is for Armstrong Coal Company to establish a surface coal mine operation.

II. STREAM ASSESSMENT AND WETLAND DELINEATION METHODS

Streams

The Environmental Protection Agency's (EPA*) Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (1999) was used to assess all ephemeral, intermittent and perennial streams in the permit area. High gradient or low gradient field data sheets were completed for each stream. Documentation included photographs, location, and total length. The protocol matrix used to assess habitat quality is based on key physical characteristics of the water-body and surrounding land, particularly the catchment of the site under investigation. Habitat is defined as the quality of in-stream and riparian habitat that influences the structure and function of the aquatic community in a stream. This matrix provides an effective means of evaluating and documenting habitat quality at each site. Habitat parameters evaluated are related to overall aquatic life use and are a potential source of limitation to aquatic biota. Site selection for assessment was based upon a probabilistic approach to provide information about the overall status or condition of each site (Barbour, et al. 1999).

For this report, assessments focus on the matrix in which physical characteristics of each stream are evaluated on 10 parameters with scales from 0 to 20, in which 20 represents a pristine situation. Parameters address characteristics including substrate, flow regime, sediment deposition, and riparian zone quality, among others. The potential score for a pristine evaluation is 200 total, but a high habitat assessment score can still represent a poor stream when taking into account conductivity, which contributes to overall ecological integrity. To describe water quality within the assessed reach, habitat criteria provided by the Newburgh Regulatory Office of the Louisville District Corps of Engineers was used. This habitat criteria provides ranges of habitat scores and corresponding descriptive scores (poor to optimal) for stream quality.

Stream lengths, channel locations and limits were determined in the field utilizing manual measuring techniques including range finding, pacing, global positioning, and verification of mapping. Stream flow was determined in the field based upon stream status at the time of visit. The final determination of stream quantity and jurisdiction will be decided by the USACE.

Updated contour information within the study area was utilized, although older USGS mapping was used to determine drainage areas for many of the streams; making those measurements approximate.

See Sections VII and VIII each for a list of tables, exhibits, and items in the appendix that are included within this report.

Wetlands

Potential wetlands within the study area were evaluated for the presence of wetland characteristics during August and September 2011, January 2012, September 2012, and October 2012. See Table 2 for a summary of identified wetlands and their sizes. On-site wetland determinations were conducted using criteria outlined in the 2010 USACE's *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*. Hydrology, vegetation, and soils were evaluated. Soil characteristics were identified using soil borings, dug pits, and a Munsell soil color chart. Wetland boundaries were defined in the field, surveyed using a hand-held global positioning unit and transferred to project mapping in order to determine approximate wetland areas. Data on soils were taken from the Natural Resources Conservation Service's Web Soil Survey (USDA 2009). The National Wetland Inventory (NWI) map for the Paradise Quadrangle (U.S. Fish and Wildlife Service 1988) was examined for existing Cowardin classifications (Cowardin et al. 1979). The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (1989) was consulted for floodplain boundaries. Refer to Exhibits 3 through 7 for locations of delineated wetlands on project mapping. See the appendix for Wetland Delineation Forms and photographs.

III. EXISTING CONDITIONS: STREAMS

There are 1 perennial, 7 intermittent, and 65 ephemeral streams located within, or immediately adjacent to, the study area boundary. All assessed streams are identified on Exhibits 2 and 3. The intermittent streams along the western side of the study area (west of KY 1903) are tributaries to the Green River; all others are tributaries to Lewis and West Fork Lewis Creeks. A discussion of the data and exhibits are presented in this report.

Stream Assessments

Perennial Stream 1 (PER-1) is West Fork Lewis Creek, located near the east-central study boundary and flows south to a confluence with Lewis Creek. It flows for approximately

161 feet through the study area. PER-1 has a drainage area of approximately 6118 acres at the study location. The stream bottom width was 14.5 feet, with a bankfull width of 24.0 feet. This stream classified, according to the Rosgen methodology, as an “F6” type stream.

The EPA stream habitat assessment (Low Gradient) for the reach indicates epifaunal substrate/available cover scoring in the suboptimal range. Streambed morphology consists of short riffles and runs, and long pools; the majority of which were large and deep. Stream substrate consists of predominantly silt/clay size material, with gravel and cobble sizes also present in the riffle and run sections. There was little evidence of new deposition of fine sediment affecting the channel bottom. There was some evidence of past channelization; with sinuosity in the marginal range. The stream was flowing at the time of assessment, utilizing all of the channel bottom. Banks are moderately stable to unstable, with frequent erosion problem areas (30 to 60 percent of the banks) along the left descending bank. Vegetative cover scored marginal to low suboptimal. The riparian zone width scores ranged from poor along the right descending bank and low suboptimal along the left bank. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species.

PER-1 had a total habitat score of 121, which corresponds to a stream quality rating of suboptimal. Conductivity measured at 3820 μS.

Intermittent Stream 1 (INT-1) runs from the northwest to the east-central section of the study area. It flows southeast for approximately 6710 feet to Wetland I at the study boundary limit. INT-1 has a drainage area of approximately 520.7 acres. Due to its length, the stream was assessed in four reaches. The stream has a bottom width ranging from 1.5 to 6.0 feet, and a bankfull width ranging from 4.0 to 14.0 feet.

The EPA stream habitat assessment (Low Gradient) for the upstream reach, INT-1US, indicates the epifaunal substrate/available cover scored in the marginal range, with 10 to 30 percent of stable habitat favorable for colonization. Streambed morphology consists of short runs and long pools. The majority of pools are deep. Stream substrate consists of only silt/clay size material. There was some deposition of new fine sediment, with 20 to 50 percent of the bottom affected. There was evidence of past channelization, resulting in a low sinuosity score. The stream was flowing at the time of assessment, utilizing greater than 75 percent of the channel bottom. Banks are moderately unstable, with 30 to 60 percent of bank area erosion present. Vegetative cover scored suboptimal, with 70 to 90 percent of the banks vegetated. The riparian zone width scored in the poor range. Dominant riparian vegetation consisted of trees and herbaceous species. This section of stream classified as a Rosgen “F6” stream type.

The stream habitat assessment (Low Gradient) for the upper-mid reach, INT-1UM, indicates the epifaunal substrate/available cover also scored in the marginal range. Streambed

morphology consisted of only runs, and stream substrate again consisted of only silt/clay sizes. There was little deposition of new fine sediment in the channel. There was some evidence of past channelization, with sinuosity scoring marginal. Very little flow was present in the channel. Banks are moderately stable in this reach, with infrequent areas of erosion. Vegetative cover again scored suboptimal. The riparian zone width scored in the poor range. Dominant riparian vegetation consisted of trees, shrubs, and herbaceous species. This section of stream classified as a “C6” type

The stream habitat assessment (Low Gradient) for the middle reach, INT-1MS, indicates the epifaunal substrate/available cover scored in the suboptimal range, with a 30 to 50 percent mix of stable habitat. Streambed morphology consisted of long runs and short, shallow pools. Stream substrate consisted of a better mix of material, from silt/clay to gravel sizes present. There was moderate deposition of new fine sediment in the channel. There was some evidence of past channelization, with sinuosity scoring poor. Stream flow was utilizing 25 to 75 percent of the channel. Banks are moderately unstable in this reach, with areas having erosion. Vegetative cover scored marginal, while the riparian zone width scored poor (left descending bank) to optimal (right descending bank). Dominant riparian vegetation consisted of trees, shrubs, and herbaceous species. This section of stream classified as a Rosgen “F6” type.

The stream habitat assessment (Low Gradient) for the downstream reach, INT-1DS, indicates the epifaunal substrate/available cover scored in the marginal range. Streambed morphology consisted of only runs, and stream substrate consisted of only silt/clay size material. There was little deposition of new fine sediment in the channel. There was little to no evidence of past channelization, with sinuosity scoring marginal. Stream flow was not utilizing much of the channel. Banks are stable in this reach, with little evidence of erosion. Vegetative cover scored marginal, while the riparian zone width scored suboptimal. Dominant riparian vegetation consisted of trees, shrubs, and herbaceous species. This section classified as a “C6” type stream.

INT-1 has an average total habitat score of 89, which corresponds to a stream quality rating of marginal. The conductivity readings (only available at two assessment points) were 267 μS and 334 μS.

Intermittent Stream 2 (INT-2) runs from the central section of the study area to the eastern boundary. It flows southeast for approximately 3360 feet to the boundary. INT-2 has a drainage area of approximately 79.9 acres. The stream bottom width ranges from 2.0 to 3.5 feet, with a bankfull width ranging from 3.0 to 5.5 feet. Due to its length, the stream was assessed at two locations.

The EPA stream habitat assessment (High Gradient) for the upstream reach, INT-2US, indicates the epifaunal substrate/available cover scored in the marginal range. The streambed morphology consists of long runs, and very short shallow pools. The stream substrate consists of a mix of silt/clay and sand size material. Only two of the four velocity/depth regimes are present. There was moderate deposition of new fine sediment. There was evidence of past channelization. The stream was not flowing at the time of assessment. Banks are moderately unstable. Vegetative cover scored suboptimal. Riparian zone width scored from suboptimal (left descending bank) to marginal (right descending bank). The dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section of stream classified as a “G6” stream type.

The stream habitat assessment (Low Gradient) for the downstream reach, INT-2DS, indicates the epifaunal substrate/available cover again scored in the marginal range. The streambed morphology consists of only runs, and tream substrate consists of only silt/clay material. There was little evidence of deposition of new fine sediment. There was evidence of past channelization, with sinuosity scoring low marginal. The stream was not flowing at the time of assessment. Banks are moderately stable in this reach, with vegetative cover scoring marginal. Riparian zone width scored from suboptimal (right descending bank) to poor (left descending bank). Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section of stream was classified as a type “E6” stream.

INT-2 has an average total habitat score of 73, which corresponds to a stream quality rating of marginal. Conductivity readings were unavailable due to dry conditions.

Intermittent Stream 3 (INT-3) runs from the south-central section of the study area westward to the southwestern boundary. It flows west for approximately 2548 feet to the boundary, through Wetland S. INT-3 has a drainage area of approximately 417.1 acres. The stream bottom width ranges from 2.5 to 4.5 feet, with a bankfull width ranging from 6.0 to 15.0 feet. Due to its length, the stream was assessed at three locations.

The EPA stream habitat assessment (High Gradient) for the upstream reach, INT-3US, indicates epifaunal substrate/available cover scored in the marginal range. Streambed morphology consists of equal runs and shallow pools. Stream substrate consists of small amounts of gravel size material on bedrock. Only two of the four velocity/depth regimes were present. There was some deposition of new fine sediment, affecting 5 to 30 percent or more of the channel bottom. There was evidence of past channelization. The flow was utilizing 25 to 75 percent of the channel, with some pooling present. Banks are unstable, with frequent erosion problem areas due to the channel being very incised/entrenched. Vegetative cover scored in the marginal range, while riparian zone width scored optimal. Dominant riparian vegetation

consisted of trees, shrubs and herbaceous species. This section of stream is classified as a "G1" type stream.

The stream habitat assessment (Low Gradient) for the middle stream reach, INT-3MS, indicates epifaunal substrate/available cover scores in the optimal range. Streambed morphology consists of very short runs and very long pools. Pools were a mix of deep and shallow. The stream substrate consists of predominantly sand size material, with silt/clay sizes present. There was moderate deposition of new fine sediment. There was no evidence of past channelization, with sinuosity scoring marginal. Stream flow was utilizing the entire channel bottom. Banks are moderately stable in this reach, with infrequent areas of erosion. Vegetative cover scored suboptimal, while the riparian zone width scored optimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section is classified as a "E5" stream type.

The stream habitat assessment (Low Gradient) for the downstream stream reach, INT-3DS, indicates the epifaunal substrate/available cover scored in the marginal range. Streambed morphology again consisted of short runs and long pools, but pools were shallow. Stream substrate, however, consists of only silt/clay size material. There was evidence of some new deposition of fine sediment. There was evidence of past channelization, with sinuosity again scoring in the marginal range. The stream was minimally flowing at the time of assessment, but pooled. Banks are moderately unstable in this reach (becoming incised/entrenched as it nears the river). Vegetative cover scored marginal, while the riparian zone width scored optimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section is classified as a Rosgen type "F6" stream.

INT-3 has an average total habitat score of 112, which corresponds to a stream quality rating of suboptimal. Conductivity readings averaged 107 μS.

Intermittent Stream 4 (INT-4) runs from the northwest section of the study area southward to a confluence with INT-3 near the west-central boundary. It flows south for approximately 5624 feet to the confluence with INT-3. INT-4 has a drainage area of approximately 306.2 acres. Stream bottom width ranges from 3.0 to 4.3 feet, with a bankfull width ranging from 7.0 to 8.9 feet. Due to its length, the stream was assessed at three locations.

The EPA stream habitat assessment (Low Gradient) for the upstream reach, INT-4US, indicates the epifaunal substrate/available cover scored in the marginal range. Streambed morphology consists of equal riffles, runs, and shallow pools. The stream substrate consists of a mix of silt/clay to gravel size material. There was heavy deposition of new fine sediment, affecting 80 percent or more of the channel bottom. There was some evidence of past

channelization, with sinuosity in the marginal range. The stream was not flowing at the time of assessment, but had some pooling present. Banks are unstable, with frequent erosion problem areas. Vegetative cover and riparian zone width both scored suboptimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section is classified as a "G5" stream type.

The stream habitat assessment (Low Gradient) for the middle stream reach, INT-4MS, indicates the epifaunal substrate/available cover scored in the suboptimal range. Streambed morphology consists of very long runs and very short, shallow pools. Stream substrate consists of only silt/clay and sand size material. There was evidence of some new deposition of fine sediment. Again, there was evidence of past channelization, with sinuosity scoring marginal. The stream was not flowing at the time of assessment, but had standing pools. Banks are moderately unstable in this reach, with vegetative cover scoring marginal. Riparian zone width scored optimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section is also classified as a "G5" type stream.

The stream habitat assessment (Low Gradient) for the downstream reach, INT-4DS, indicates epifaunal substrate/available cover scored in the marginal range. Streambed morphology consists of only runs, and stream substrate consists of only silt/clay size material. There was evidence of some new deposition of fine sediment. There was evidence of past channelization, with sinuosity again scoring in the marginal range. The stream was not flowing at the time of assessment. Banks are moderately stable in this reach. Vegetative cover scored marginal, while the riparian zone width scored suboptimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section is classified as an "F6" stream type.

INT-4 has an average total habitat score of 92, which corresponds to a stream quality rating of marginal. Conductivity readings (only available at two assessment points in pools) were 53 μS and 95 μS.

Intermittent Stream 5 (INT-5) is located in the west-central section of the study area, flowing southwest to a confluence with INT-4. It flows for approximately 2546 feet to INT-4. INT-5 has a drainage area of approximately 117.5 acres. Stream bottom width ranges from 2.5 to 4.0 feet, with a bankfull width ranging from 4.0 to 6.0 feet. Due to its length, the stream was assessed at three locations.

The EPA stream habitat assessment (Low Gradient) for the upstream reach, INT-5US, indicates epifaunal substrate/available cover scored in the marginal range. Streambed morphology consists of long runs and shorter shallow pools. Stream substrate consists of sand size material. There was heavy deposition of new fine sediment, affecting 80 percent or more of

the channel bottom. There was some evidence of past channelization, with sinuosity in the marginal range. The stream was flowing at the time of assessment, utilizing greater than 75 percent of the channel bottom. Banks are moderately unstable, with frequent erosion problem areas (30 to 60 percent of the banks). Vegetative cover scored suboptimal, while riparian zone width scored marginal along the right descending bank and suboptimal along the left bank. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section of stream classified as a “G5” stream type.

The stream habitat assessment (Low Gradient) for the middle stream reach, INT-5MS, indicates the epifaunal substrate/available cover scored in the suboptimal range. Streambed morphology consists of very short runs and very long deep pools. Stream substrate consists of predominantly sand size material, with silt/clay sizes present. There was moderate deposition of new fine sediment. Again, there was evidence of past channelization, with sinuosity scoring marginal. The stream was flowing at the time of assessment, utilizing 25 to 75 percent of the channel. Banks are moderately unstable in this reach, with vegetative cover scoring marginal. Riparian zone width scored optimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section also classified as a type “G5” stream.

The stream habitat assessment (Low Gradient) for the downstream reach, INT-5DS, indicates epifaunal substrate/available cover scored in the suboptimal range. Streambed morphology consists of only runs, and stream substrate consists of equal silt/clay and sand size material. There was evidence of moderate deposition of new fine sediment. There was some evidence of past channelization, with sinuosity again scoring in the marginal range. There was little to no flow at the time of assessment. Banks are moderately stable in this reach. Vegetative cover and riparian zone width scored suboptimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This also classified as a “G5” stream type.

INT-5 has an average total habitat score of 96, which corresponds to a stream quality rating of high marginal. Conductivity readings (only available at the upper two assessment points) were 75 μS and 88 μS.

Intermittent Stream 6 (INT-6) runs southward along the western boundary of the study area. It flows south for approximately 953 feet to the boundary, running through Wetland AA, along Wetland Z, and through Wetland Y. INT-6 has a drainage area of approximately 71.0 acres. The stream bottom width ranges from 1.0 to 5.0 feet, with a bankfull width ranging from 3.0 to 4.5 feet. Due to its length, the stream was assessed at two locations.

The EPA stream habitat assessment (Low Gradient) for the upstream reach, INT-6US, indicates epifaunal substrate/available cover scored in the suboptimal range. Streambed morphology consists of long runs, and short shallow pools. Stream substrate consists of a mix

of predominantly silt/clay, with sand size material. There was moderate deposition of new fine sediment, affecting 50 to 80 percent of the channel bottom. There was some evidence of past channelization, with sinuosity scoring in the marginal range. The stream was utilizing greater than 75 percent of the channel bottom for flow at the time of assessment. Banks are moderately stable. Vegetative cover and riparian zone width both scored in the suboptimal range. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section classified as a type “E6” stream.

The stream habitat assessment (Low Gradient) for the downstream reach, INT-6DS, indicates epifaunal substrate/available cover scored in the marginal range. Streambed morphology consists of only runs, and the substrate consists of only silt/clay material. There was moderate deposition of new fine sediment. There was evidence of past channelization, with sinuosity scoring marginal. The stream was not flowing in this reach at the time of assessment. Banks are moderately stable in this reach, with vegetative cover scoring suboptimal. Riparian zone width scored from suboptimal (right descending bank) to suboptimal (left descending bank). Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This section also classified as a “E6” stream type.

INT-6 has an average total habitat score of 103, which corresponds to a stream quality rating of low suboptimal. One conductivity reading (only available at the upper assessment point) was measured to be 117 μS.

Intermittent Stream 7 (INT-7) is located in the south-central portion of the study area, and is a tributary to INT-3. It flows southwest for approximately 848 feet to its confluence with INT-3. INT-7 has a drainage area of approximately 45 acres. The stream bottom width is 2.5 feet, with a bankfull width of 3.5 feet.

The EPA stream habitat assessment (HIgh Gradient) for INT-7, indicates epifaunal substrate/available cover scored in the low suboptimal range. The streambed morphology consists of only runs. Stream substrate consists of a mix of predominantly silt/clay, with some sand and gravel size material available. There was moderate deposition of new fine sediment, affecting 50 to 80 percent of the channel bottom. There was some evidence of past channelization, and the channel is incised. During the time of assessment, little to no water was present in the channel bottom. Both banks scored as being moderately unstable. Vegetative protection scored in the low marginal range, while the riparian zone width scored optimal. Dominant riparian vegetation consisted of trees, shrubs and herbaceous species. This stream classified as a type “G6” stream.

INT-7 has a total habitat score of 71, which corresponds to a stream quality rating of marginal. A conductivity reading was not available due to dry conditions.

Ephemeral Streams (E-1 to E-64) are located throughout the permit study area, and for discussion purposes have been divided into three groups based on drainage area (which generally reflects the length and character of the associated stream). In reviewing the data, it appears streams with drainage areas up to 5 acres, 5 to 20 acres, and those greater than 20 acres, can be characterized together.

For those streams with **drainage areas of up to 5 acres** (twenty-three streams), the average length of channel is approximately 329 feet within the project limits. They have an average bottom width of 1.3 feet and average bankfull width of 3.7 feet.

The EPA stream habitat assessments indicate epifaunal substrate/available cover is an average value in the marginal range. Generally, substrate consists of a mix of silt/clay and sand sized material, with silt/clay being either predominant or equal in presence with sand-sized material. Lesser amounts of other sizes are occasionally found. Streambed morphology typically consisted of nearly all runs, with a few very long run/short shallow pool situations. There was some deposition of new material. With few exceptions, evidence of past channelization was minimal. As expected, most of the streams were dry at the time of assessment, with an occasional shallow pool present. On average, banks are moderately stable, with vegetative protection ranking in the marginal range. Riparian zone widths were generally suboptimal, though many scored in the optimal range. Dominant riparian vegetation typically consists of trees, herbaceous species, and grasses. The large majority of these ephemerals (fourteen) classified as a “B5 or 6” type of stream. Four classified as “G” stream types and four classified as “A”. Only one “E” stream was determined.

These streams have an average habitat score of 91, which indicates that stream quality is in the high marginal range. No conductivity readings were collected due to dry stream conditions during the assessment period (the pools available were too shallow to take proper readings).

For ephemeral streams with **drainage areas of 5 to 20 acres** (twenty-four streams), the flow length is an average of approximately 790 feet within the project boundary. They also have average bottom widths of 1.6 feet and average bankfull widths of 3.9 feet. It should be noted that two streams in this category (E-26 and E-26A) appear to be isolated.

Generally, the EPA stream habitat assessment for these streams would indicate a marginal score for epifaunal substrate/available cover. With few exceptions, the substrate for these streams consisted of predominantly silt/clay-sized material, with sand and some gravel available. Streambed morphology typically consisted of runs only, with a few instances of shallow pools present. Generally, there was little to some deposition of new material, with only

a few instances of heavy deposition noted. Most of the streams were dry at the time of assessment, with an occasional pool present. Some evidence of past channelization was typically present. Bank stability averaged in the moderately stable range, with a few in the moderately unstable to unstable range. Vegetative protection averaged in the low suboptimal range, as did the riparian zone width (with a few instances where it was poor). Dominant riparian vegetation generally consisted of trees, herbaceous species, and grasses. Again, the majority (sixteen) of the streams classified as a “B” types. Type “G” streams were the next most common (five streams). Three “E” type streams were determined in this group.

These streams have an average habitat score of 86, which also corresponds to a stream quality rating in the marginal range. Only two conductivity readings were obtained, one in a pool and the other after a storm event. The readings averaged 76 μS.

For ephemeral streams with **drainage areas of 20 acres or more** (eighteen streams), the flow length is an average of approximately 1337 feet within the project boundary. They also have average bottom widths of 2.0 feet and average bankfull widths of 4.4 feet.

Generally, the EPA stream habitat assessment for these streams indicate a high marginal epifaunal substrate/available cover. Substrate for these streams typically consisted of predominantly silt/clay-sized materials, and some substrates included sand and gravel sizes. Streambed morphology was predominantly runs only, with several having long runs and short shallow pools. Generally, there was deposition of new material, ranging from moderate to very little noted. Most of the streams were dry, with an occasional pool present. Some evidence of past channelization was typically present, with sinuosity averaging in the marginal range. Bank stability scores averaged in the moderately stable range. Vegetative protection averaged between high marginal to low suboptimal. Riparian zone width was generally in the suboptimal range, with several scores ranging from poor to optimal. Dominant riparian vegetation generally consisted of trees, herbaceous species, and grasses. Several of these streams, being typically longer, had multiple sections assessed; each with a separate Rosgen classification. Therefore, the number of classifications is greater than the number of streams indicated. The classifications of the streams/stream sections indicate that the streams nearly equally classified as “B” (seven streams), “E” (eight streams), or “G” (seven streams).

These streams have an average habitat score of 89, again in the marginal range. Only a few conductivity readings were collected due to dry stream conditions. They averaged 54 μS.

A stream assessment was conducted on each ephemeral stream (at multiple locations if warranted due to stream length), and assessment sheets are included in the appendix.

IV. EXISTING CONDITIONS: WETLANDS

Thirty-three wetland areas with a total wetland area of approximately 28.861 acres were delineated for this project; of this area, 27.901 acres of wetland occur within the study boundaries. Some of these wetlands will be excluded from the permit area or left undisturbed, which will reduce the final wetland impact acreage. Several wetlands are located within the 100-year floodplain of Lewis Creek and West Fork Lewis Creek. Refer to Exhibits 2a, 2b, 3a, and 3b for locations of delineated wetlands, and the appendix for photographs of each wetland. Table 2 is a summary of wetland information. Descriptions of the delineated wetlands follow. It should be noted that although the areas are referred to as wetlands, these determinations are assigned pending final USACE verifications.

Wetland A is a palustrine forested wetland (PFO1A), based on the Cowardin classification (Cowardin, et al., 1979). Total wetland area is 0.046 acres. An outflow from the wetland and pond was not found, and the wetland appears to be isolated. The wetland is sparsely vegetated. Dominant trees consist of silver maple (*Acer saccharinum*) and sycamore (*Platanus occidentalis*). The hydrophytic vegetation criterion is met by the dominance test since both dominants have a facultative wetland (FACW) indicator status. The soil has a depleted matrix with a matrix color of 10YR 4/2 and redox concentrations of 2.5YR 4/4 throughout the upper 12 inches. Soil texture is silty clay loam. Iron deposits and water-stained leaves indicate the presence of wetland hydrology.

Wetland B is a palustrine forested wetland (PFO1A) located on a floodplain. Total wetland area is 0.377 acres; of this area, 0.361 acres of the wetland are situated within the project boundaries. The wetland drains to West Fork Lewis Creek. Silver maple is the dominant tree and sapling; hophornbean (*Ostrya virginiana*) is dominant in the sapling stratum; false nettle (*Boehmeria cylindrica*) is dominant in the herbaceous stratum; and, trumpet vine (*Campsis radicans*) is dominant in the vine stratum. Eighty percent of the dominants have an indicator status of FAC or wetter. From a depth of 4 to 11 inches the soil has a matrix color of 7.5YR 4/2 with redox concentrations of 2.5YR 4/8. Primary indicators of wetland hydrology observed are water marks, drift deposits, and water-stained leaves.

Wetland C is palustrine forested wetland (PFO1A) that drains to West Fork Lewis Creek. Total wetland area is 0.326 acres. Dominant vegetation consists of silver maple and cherrybark oak (*Quercus pagoda*) in the tree stratum; silver maple in the sapling stratum; lizard's tail (*Saururus cernuus*) in the herbaceous stratum; and trumpet vine in the woody vine stratum. The upper 12 inches of soil have a matrix color of 10YR 4/2 with 2.5YR 4/6 redox concentrations. Texture is silty clay loam. Water marks, drift deposits, and water-stained leaves indicate wetland hydrology is present.

Wetland D is a palustrine forested wetland (PFO1A) with a total area of 0.424 acres; of this area, 0.355 acres of the wetland are located within the project boundary. The floodplain wetland is connected to West Fork Lewis Creek. The dominance test for hydrophytic vegetation is passed. The soil matrix has a 10YR 4/2 color with 2.5YR 4/8 redox concentrations from a depth of 3 to 12 inches. This section of the soil profile fits the description of a depleted matrix. Indicators of wetland hydrology include water marks, drift deposits, and water-stained leaves.

Wetland E is palustrine emergent wetland (PEM1A) with a total area of 2.062 acres. The wetland is connected to West Fork Lewis Creek. Barnyard grass (*Echinochloa muricata*) is the sole dominant species. Soil matrix color is 10YR 5/2 from a depth of 4 to 12 inches, and redox concentrations have a color of 5YR 4/6. Texture is silty clay loam. Wetland hydrology indicators observed include algal mat or crust and water-stained leaves.

Wetland F is a palustrine forested wetland (PFO1B) situated on a hillslope. The wetland drains to West Fork Lewis Creek and has a total area of 0.193 acres. Vegetation is dominated by red maple (*Acer rubrum*) in the tree and sapling strata and poison ivy (*Toxicodendron radicans*), sensitive fern (*Onoclea sensibilis*), and false nettle in the herbaceous stratum. The dominance test is passed. The soil matrix color ranges from 2.5Y 5/2 to 10YR 7/2 throughout the upper 11 inches of soil. Redox concentrations of 7.5YR 5/8 are present in the matrix. Soil texture is silty clay loam. The presence of drift deposits and water-stained leaves indicate wetland hydrology.

Wetland G is a palustrine forested wetland (PFO1A) with a total area of 0.316 acres. The wetland drains to West Fork Lewis Creek. Dominant vegetation consists of red maple and sycamore in the tree stratum; red maple in the sapling stratum; and false nettle, *Carex* sp., and sensitive fern in the herbaceous stratum. From 3 to 12 inches the soil has a matrix color of 10YR 5/2 and 2.5YR 4/6 redox concentrations, fitting the description of a depleted matrix. Water marks, drift deposits, and water-stained leaves are present.

Wetland H is a palustrine scrub-shrub wetland (PSS1A) with a total area of 0.315 acres; of this area, 0.114 acres of the wetland are situated within the project boundary. The wetland is located on a floodplain and is connected to West Fork Lewis Creek. Buttonbush (*Cephalanthus occidentalis*) and black willow (*Salix nigra*) are the dominant shrubs, and barnyard grass is the dominant herb. The rapid test for hydrophytic vegetation is passed. The upper 12 inches of soil have a matrix color of 7.5YR 5/2 with 2.5YR 4/6 redox concentrations. Texture is silty clay loam. Indicators of wetland hydrology include water-stained leaves, drainage patterns, and crayfish burrows.

Wetland I is palustrine scrub-shrub wetland (PSS1A) with a total area of 5.825 acres. The wetland drains to West Fork Lewis Creek. Due to the wetland's size, a baseline was

established and 4 transects were conducted. Dense vegetation composed prodominantly of buttonbush is found at 6 stations. Dominant herbaceous species are clearweed (*Pilea pumila*), sedges (*Carex* species), and barnyard grass. At each station, the rapid test for hydrophytic vegetation is passed. Soil profiles fit the description of a depleted matrix with a typical matrix color of 10YR 5/2 and redox concentrations of 2.5YR 4/6. Primary indicators of wetland hydrology observed include water-stained leaves and iron deposits on the soil surface.

Wetland J is a palustrine forested wetland (PFO1A) located in a slight depression. The wetland drains to Wetland I, which is connected to West Fork Lewis Creek. Total wetland area is 0.127 acres. Vegetation is dominated by river birch (*Betula nigra*) and swamp white oak (*Quercus bicolor*) in the tree stratum; sweetgum (*Liquidambar styraciflua*) and cherrybark oak (*Quercus pagoda*) in the sapling stratum; and lizard's tail, poison ivy, false nettle, and *Carex* sp. in the herbaceous stratum. The dominance test for hydrophytic vegetation is passed. From a depth of 1 to 12 inches the soil has a matrix color of 10YR 6/2 and redox concentrations of 2.5YR 4/6. Texture is silty clay loam. Water-stained leaves, an indicator of wetland hydrology, are present.

Wetland K is palustrine forested wetland (PFO1A) with a total area of 0.764 acres. The wetland is fed by a seep at the toe of a hill and drains to stream, INT-1. Dominant species consist of cottonwood (*Populus deltoides*) and red maple in the tree stratum; ironwood (*Carpinus caroliniana*) in the sapling stratum; and lizard's tail and false nettle in the herbaceous stratum. All dominants have an indicator status of FAC or wetter. The soil has a matrix color of 10YR 4/1 and 2.5YR 4/6 redox concentrations from 6 to 12 inches in the soil profile. Texture is silty clay loam. Primary indicators of wetland hydrology include surface water and soil saturation.

Wetland L is palustrine forested wetland (PFO1B) with a total area of 0.360 acres. The wetland is fed by a seep at the toe of a hill and is connected to stream, INT-1. Vegetation is dominated by pin oak (*Quercus palustris*), red maple, and blackgum (*Nyssa sylvatica*) in the tree stratum; ironwood and river birch in the sapling stratum; and lizard's tail in the herbaceous stratum. The dominance test for hydrophytic vegetation is passed. The soil has a matrix color of 10YR 4/1 and 2.5YR 3/6 redox concentratons. Texture is silty clay loam. The presence of surface water and soil saturation indicate wetland hydrology.

Wetland M is palustrine forested wetland (PFO1B) with a total area of 0.355 acres. Hydrology is from a seep at the toe of a slope. The wetland drains to stream, INT-1. Dominant trees are sycamore and red maple; dominant saplings are red maple, hophornbeam, swamp white oak, and green ash; and lizard's tail is the dominant herb. Eighty-six percent of the dominants have an indicator status of FAC or wetter. The soil has a depleted matrix with a

matrix color of 10YR 4/1 and 2.5YR 4/6 redox concentrations. Texture is silty clay loam. Soil saturation and water-stained leaves indicate wetland hydrology.

Wetland N is another seep-fed palustrine forested wetland (PFO1B) draining to INT-1. Total wetland area is 0.001 acres. Dominant trees are blackgum and red maple, and dominant herbs are lizard's tail, false nettle, and touch-me-not species (*Impatiens* sp.). The dominance test for hydrophytic vegetation is passed. The upper 12 inches of soil have a matrix color of 10YR 5/1 and a silty clay loam texture. Wetland hydrology indicators include surface water and soil saturation.

Wetland O is palustrine emergent wetland (PEM1H) within an old farm pond. Cattle have access to the wetland. Total wetland area is 0.061 acres. No outflow from the pond was observed. Dominant herbaceous vegetation consists of barnyard grass, arrowhead (*Sagittaria latifolia*), and cocklebur. All dominants have an indicator status of FAC or wetter. The soil has a depleted matrix with a matrix color of 7.5YR 4/2 with 2.5YR 4/6 redox concentrations. Texture is silty clay loam. Surface water and soil saturation are present.

Wetland P is palustrine emergent wetland (PEM1B) on a hill slope. Total wetland area is 0.237 acres. The wetland drains to intermittent stream, INT-1. Dominant species consist of common rush (*Juncus effusus*) and sapling-sized red maple and sweetgum. The silty clay loam soil has a matrix color of 10YR 4/2 with redox concentrations of 5YR 4/6. Soil saturation indicates the presence of wetland hydrology.

Wetland Q is palustrine forested wetland (PFO1A) located in a bottomland area, draining to West Fork Lewis Creek via INT-2. Total wetland area is 0.396 acres. Dominant vegetation consists of river birch and red maple in both the tree and sapling strata. The dominance test for hydrophytic vegetation is passed. The top 3 inches of soil have a matrix color of 2.5Y 7/1 with 7.5YR 5/8 redox concentrations. Below this is a restrictive layer of hard clay. Indicators of wetland hydrology include water-stained leaves, crayfish burrows, and a sparsely vegetated concave surface.

Wetland R is a spring-fed palustrine emergent wetland (PEM1B) that drains to INT-3. Total wetland area is 0.010 ac. Dominant vegetation consists of lizard's tail, *Carex* sp. and sapling-sized sweetgum. The dominance test for hydrophytic vegetation is passed. The soil has a depleted matrix with a matrix color of 10YR 4/1. Surface water, a high water table, and soil saturation indicate wetland hydrology.

Wetland S is palustrine forested wetland (PFO1B) located in a valley; and, INT-3 drains into and out of the wetland. Total wetland area is 0.619 acres. Vegetation is dominated by sycamore and river birch in the tree stratum; ironwood and American elm (*Ulmus americana*) in the sapling stratum; and false nettle and whitegrass (*Leersia virginica*) in the herbaceous

stratum. All dominants have an indicator status of FAC or wetter. The soil has a matrix color of 7.5YR 4/1 with 2.5YR 3/6 redox concentrations. Below a layer of sand, the soil has a silty clay loam texture. Wetland hydrology indicators include a high water table and water-stained leaves.

Wetland T is a combination of palustrine forested and scrub-shrub wetland (PFO1B / PSS1B). Total wetland area is 0.127 acres. The wetland is fed by a seep and drains to E-49 and then INT-5. Dominant vegetation consists of whitegrass, Frank's sedge (*Carex frankii*), and sapling-sized sweetgum. The dominance test for hydrophytic vegetation is passed. From a depth of 1 to 5 inches, the soil has a matrix color of 10YR 5/1 with 2.5YR 3/6 redox concentrations. Texture is silty clay loam. Indicators of wetland hydrology include surface water and soil saturation.

Wetland U is a palustrine forested wetland (PFO1A) with a total wetland area of 1.506 acres; of this area, 1.265 acres of the wetland are located within the project boundary. The wetland drains to the Green River and likely receives backwater flooding. Two plant communities were evaluated. Community 1 is dominated by overcup oak (*Quercus lyrata*) and green ash (*Fraxinus pennsylvanica*) in the tree stratum and buttonbush (*Cephalanthus occidentalis*) in the shrub stratum. The hydrophytic vegetation criterion is met by the dominance test since 100 percent of the dominants are obligate (OBL), facultative wetland (FACW), or facultative (FAC). The soil has a depleted matrix with a matrix color of 2.5Y 6/2 and redox concentrations of 7.5YR 5/6 from a depth of 1 to 12 inches. Soil texture is clay loam. Water marks and water-stained leaves indicate the presence of wetland hydrology.

Community 2 is composed of river birch, silver maple, and green ash in the tree stratum; slippery elm and green ash in the sapling stratum; and lizard's tail and false nettle in the herbaceous stratum. The soil has a matrix color of 2.5Y 6/2 and redox concentrations of 10YR 5/6 from a depth of 2 to 10 inches. Texture is clay loam. Water marks, sediment deposits, and water-stained leaves are primarily wetland hydrology indicators.

Wetland V is a strip of palustrine emergent wetland (PEM1B) in a horse pasture. An ephemeral stream (E-52) drains into and out of the farmed wetland. Total wetland area is 0.090 acres. Herbaceous vegetation is dominated by mistflower, straw-colored flatsedge (*Cyperus strigosus*), and Oriental lady's thumb (*Polygonum caespitosum*). Sixty-six percent of the dominants have an indicator status of FAC or wetter. The top twelve inches of soil have a matrix color of 2.5Y 6/2 and redox concentrations of 7.5YR 4/6. Soil texture is silty clay loam. Oxidized rhizospheres on living roots are a primary indicator of wetland hydrology.

Wetland W is palustrine scrub-shrub wetland (PSS1B) with a total area of 0.054 acres. Stream, E-51 drains into and out of the wetland. Vegetation is dominated by black willow and sycamore in the tree stratum; black willow in the sapling stratum; and Nepalese eulalia

(*Microstegium vimineum*) in the herbaceous stratum. The dominance test for hydrophytic vegetation is passed. The soil has a matrix color of 2.5Y 7/2 and redox concentrations of 10YR 5/8 from a depth of 2 to 10 inches. Soil texture is silt loam. Observed primary indicators of wetland hydrology are water-stained leaves and oxidized rhizospheres on living roots.

Wetland X is an old pond that has been drained due to a large hole in the dam. The palustrine forested wetland (PFO1C) drains to an ephemeral stream (E-54). Total wetland area is 0.018 acres. Dominant vegetation includes river birch, cottonwood, and red maple in the tree stratum; sweetgum and red maple in the sapling stratum; and *Carex* species in the herbaceous stratum. One hundred percent of the dominants have an indicator status of FAC or wetter. The top 8 inches of soil have a matrix color of 2.5Y 7/2 with 7.5YR 5/8 redox concentrations. Wetland hydrology indicators consist of oxidized rhizospheres on living roots and a sparsely vegetated concave surface.

Wetland Y is a palustrine forested wetland (PFO1A) located in a bottomland area. An intermittent stream (INT-6) braids through the wetland with drainage eventually reaching Green River. Total wetland area is 0.920 acres. Dominant vegetation consists of silver maple in the tree stratum; buttonbush and river birch in the shrub stratum; and false nettle and lizard's tail in the herbaceous stratum. The rapid test for hydrophytic vegetation is passed. Soil matrix color is 2.6Y 7/2 from 6 to 12 inches with 7.5YR 5/8 redox concentrations. Texture is silty clay loam. The presence of oxidized rhizospheres on living roots, drainage patterns, and crayfish burrows indicate wetland hydrology.

Wetland Z is a bottomland palustrine forested wetland (PFO1A) with a total area of 0.169 acres. An intermittent stream (INT-6) runs along the wetland boundary. Dominant trees are silver maple and sweetgum; dominant shrubs are sweetgum, buttonbush, and slippery elm; dominant herbs are false nettle and sensistive fern; and the dominant vine is poison ivy. The vegetation passes the dominance test. The upper 12 inches of soil have a matrix color of 2.5Y 7/2 with redox concentrations of 7.5YR 5/6. Texture is silty clay loam. Indicators of wetland hydrology include oxidized rhizospheres on living roots, sparsely vegetated concave surface, and crayfish burrows.

Wetland AA is a palustrine emergent wetland (PEM1C) that is fed by a spring or old well. Total wetland area is 0.034 acres. The wetland drains to stream, INT-6. Dominant vegetation consists of buttonbush and sweetgum in the shrub stratum; false nettle and dotted smartweed (*Polygonum punctatum*) in the herbaceous stratum; and Japanese honeysuckle (*Lonicera japonica*) in the vine stratum. All dominants are FAC or wetter. The soil matrix color is 2.5Y 5/1 throughout the upper 12 inches; texture is sandy loam. The presence of surface water and soil saturation indicate wetland hydrology.

Wetland BB is a palustrine forested wetland (PFO1C) wetland, consisting of 4 separate wetland areas in close proximity to each other, located in a flat bottomland with braided stream channels. The wetland areas drain to stream, INT-5. Total wetland area is 0.976 acres. Two plant communities were evaluated. Community 1 is dominated by river birch *(Betula nigra)* and sweetgum (*Liquidambar styraciflua*); dominant shrubs are spicebush (*Lindera benzoin*) and American hornbeam *(Carpinus caroliniana)*; and dominant herbs are lizard's tail *(Saururus cernuus)* and river cane. One hundred percent of the dominants have an indicator status of FAC or wetter. From 1 to 4 inches the soil has a matrix color of 2.5YR 6/2 with redox concentrations of 7.5YR 5/8. Texture is silty clay loam. Indicators of wetland hydrology include soil saturation and water-stained leaves. Community 2 has dominant tree species of sycamore (*Platanus occidentalis*), swamp chestnut oak (*Quercus michauxii*), and sweetgum (*Liquidambar styraciflua*). The dominant sapling stratum species are sweetgum (*L. styraciflua*), hornbeam (*Carpinus caroliniana*), and green ash (*Fraxinus pennsylvanica*). The dominant herbs are false nettle (*Boehmeria cylindrica*), giant cane (*Arundinaria gigantia*), smartweed (*Polygonum aviculare*) and poison ivy (*Toxidendron radicans*). The dominant vine species is greenbriar (*Smilax rotundifolia*). Hydrophytic vegetation is established by the rapid test. The soil has a silt-clay texture from 0 to 10 inches, with a gleyed matrix color of 10YR 5/2 and a redox feature of 5YR 4/6. The soil belongs to the Clifty gravely silt loam series, and has a slope of less than 2 percent. Saturation is a primary indicator of wetland hydrology, and the presence of water-stained leaves, sparsely vegetated concave surface, moss trim lines, drainage patterns and crayfish burrows are also indicators of wetland hydrology.

Wetland CC is a palustrine forested wetland (PFO1A) that drains to intermittent stream, INT-2. Total wetland area is 0.084 acres. Dominant vegetation consists of red maple and green ash in the tree and sapling strata, and false nettle in the herbaceous stratum. The vegetation passes the dominance test. The top 3 inches of soil have a matrix color of 2.5Y 7/2 with redox concentrations of 7.5YR 5/8. Water-stained leaves and oxidized rhizospheres on living roots indicate the presence of wetland hydrology.

Wetland DD is a recently logged palustrine forested wetland (PFO1C) located in a bottomland area. The wetland drains to stream, INT-1. Total wetland area is 9.641 acres. Vegetation was assessed in a section of the wetland undisturbed by logging. Dominant trees consist of sweetgum and river birch, and dominant saplings consist of red maple and sweetgum. The upper 6 inches of soil have a matrix color of 2.5Y 7/1 with 10YR 5/8 redox concentrations. Soil texture is silt loam. Indicators of wetland hydrology include the presence of surface water, water marks, and water-stained leaves.

Wetland EE is a mix of palustrine emergent (PEM1A) and palustrine scrub-shrub (PSS1A) located in a floodplain and connected to West Fork Lewis Creek. An old haul road runs through the site, the corridor of which is not wetland. The total wetland area is 0.728 acres, of which 0.295 acres is within the boundary limits. Wetland EE drains to West Fork Lewis Creek. Vegetation is dominated by buttonbush (*Cephalanthus occidentalis*) and American elm in the shrub stratum, and beggerstick (*Bidens aristosa*), cocklebur *(Xanthium strumarium)*, and pigweed *(Amaranthus retroflexus)* in the herbaceous stratum. The rapid test for hydrophytic vegetation is passed. The soil belongs partly to the Bonnie silt loam, occasionally flooded (Bo) soil series and partly to the Fairpoint, Bethesda, and Morristown silt loams, 6 to 20 percent slopes (FbD). From 3 to 6 inches, the soil has a matrix color of 10Y 5/2 with 5YR 4/6 redox concentrations. Soil texture is loam. Surface water and soil saturation are primary wetland hydrology indicators.

Wetland FF is a palustrine forested wetland that is temporarily flooded (PFO1A). This wetland consists of 2 separate wetland areas in close proximity to each other. The wetland has a total area of 0.665 acres, and drains to tributary INT-4. The dominant tree stratum species are river birch (*Betula nigra*) and red maple (*Acer rubrum*). The dominant sapling stratum species are red maple (*A. rubrum*) and sweetgum (*Liquidambar styraciflua*). The dominant herbaceous stratum species are sedge (*Carex sp*.) and poison ivy (*Toxidendron radicans*). Hydrophytic vegetation is established by the rapid test. The soil has a silt-clay texture below 3 inches, with a gleyed matrix color of 10YR 6/2 and a redox feature of 10YR 4/6. The top 3 inches consists of a brownish clay/organic layer. The soil belongs to the Fondorf-Wellston silt loam series, and has a slope of 2 to 4 percent. The presence of water-stained leaves, sparsely vegetated concave surface, moss trim lines and crayfish burrows are indicators of wetland hydrology.

Wetland GG is a palustrine forested wetland that is temporarily flooded (PFO1A). This wetland consists of 2 separate wetland areas in close proximity to each other. The wetland has a total area of 1.035 acres, and drains to tributary INT-4. The dominant tree stratum species are river birch (*Betula nigra*) and red maple (*Acer rubrum*). The dominant sapling stratum species are red maple (*A. rubrum*) and sweetgum (*Liquidambar styraciflua*). The dominant herbaceous stratum species are sedge (*Carex sp*.) and poison ivy (*Toxidendron radicans*). Hydrophytic vegetation is established by the rapid test. The soil has a silt-clay texture below 3 inches, with a gleyed matrix color of 10YR 6/2 and a redox feature of 10YR 4/6. The top 3 inches consists of a brownish clay/organic layer. The soil belongs to the Fondorf-Wellston silt loam series, and has a slope of 2 to 4 percent. The presence of water-stained leaves, sparsely

vegetated concave surface, moss trim lines, drainage patterns and crayfish burrows are indicators of wetland hydrology.

Ponds

Three open-water ponds are located in the study area. See Exhibits 3, 5, 8, and 10, for their locations. Total area of open water is 0.375 acres. See Table 3 for a summary of pond information.

2) REFERENCES

Barbour, M. T.; J. Gerritsen; B. D. Snyder; J. B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water, Washington, D.C.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Fish and Wildlife Service, Washington, D.C.

Environmental Laboratory. 1987. Army Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experimentation Station, Vicksburg, Miss.

Federal Emergency Management Agency. 1989. Flood Insurance Rate Map, Ohio County, KY.

Grace-Jarrett, P, Senior Project Manager, USACE. 2010. Personal Communication.

Jones, R. L. 2005. Plant Life of Kentucky. The University Press of Kentucky, Lexington, KY.

Environmental and Public Protection Cabinet. 2008. Standard Methods for Assessing Biological Integrity of Surface Waters in Kentucky, Revision 3. Division of Water, Frankfort, KY.

Kentucky Water Watch. 2002. Technical Appendix: Explanation of Water Quality Parameters.

U.S. Army Corps of Engineers. 2010. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-XX. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture, Natural Resource Conservation Service. 1987. Soil Survey of Ohio County, Kentucky.

U.S. Department of Agriculture, Natural Resource Conservation Service. 2009. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/. Accessed October 2011.

3) TABLES

Table 1. Summary of Stream Information

Table 2. Summary of Wetland Information

Table 3. Summary of Ponds and Open Water

Table 1: Summary of Stream Study Information

Stream ID, (Classification)*	Latitude	Longitude	Flow Regime	Drainage Areas (ac)	Studied Length (ft)	Cond. µS	Habitat Score	Date Assessed
PER-1, (F6)	37.36350	86.99850	Perennial	6118	161	3820	121	8/23/2011
INT-1, (F6,C6,F6,C6)	37.36694	87.00197	Intermittent	520.7	6710	301 av.	89 av.	8/24/2011
INT-2, (G6, E6)	37.35839	87.00044	Intermittent	79.9	3360	----	73 av.	9/16/2011
INT-3, (G1,E5,F6)	37.35564	87.01578	Intermittent	417.1	2548	107 av.	112 av.	9/14/2011
INT-4, (G5,G5,F6)	37.35711	87.01572	Intermittent	306.2	5624	74 av.	92 av.	9/15/2011
INT-5, (G5,G5,G5)	37.36017	87.01814	Intermittent	117.5	2546	82 av.	96 av.	9/15/2011
INT-6, (E6,E6)	37.36003	87.02192	Intermittent	71.0	953	117	103 av.	9/21/2011
INT-7, (G6)	37.35756	87.01147	Intermittent	44.7	848	----	71	9/14/2011
E-1, (G6)	37.37450	87.01597	Ephemeral	74.1	174	----	77	8/26/2011
E-2, (E6)	37.37200	87.01211	Ephemeral	16.3	528	----	68	8/26/2011
E-3, (E6)	37.37281	87.00917	Ephemeral	32.5	398	----	87	8/26/2011
E-4, (E6)	37.37081	87.00922	Ephemeral	82.7	172	----	103	8/25/2011
E-5, (B6)	37.37247	87.00519	Ephemeral	15.8	1495	----	95	8/25/2011
E-6, (B6)	37.36986	87.00431	Ephemeral	21.8	1877	----	97	8/24/2011
E-7, (B5)	37.37.278	87.00350	Ephemeral	4.4	203	----	98	8/24/2011
E-8, (B5)	37.37300	87.00197	Ephemeral	2.2	245	----	85	8/22/2011
E-9, (B6)	37.37344	87.00014	Ephemeral	11.4	927	----	96	8/22/2011
E-10, (B5)	37.37219	86.99958	Ephemeral	1.8	287	----	86	8/22/2011
E-11, (B6)	37.36972	87.00228	Ephemeral	6.5	1053	----	107	8/25/2011
E-12, (G6)	37.36750	86.99908	Ephemeral	10.7	662	----	82	8/19/2011
E-13, (B6)	37.36519	87.00128	Ephemeral	22.8	1079	----	111	8/24/2011
E-14, (G6)	37.36742	87.00600	Ephemeral	11.2	808	96	81	8/24/2011
E-15, (B6)	37.36944	87.00817	Ephemeral	13.7	1200	----	119	8/25/2011
E-16, (E6)	37.37006	87.00869	Ephemeral	3.9	382	----	107	8/25/2011
E-17 (B6)	37.37061	87.01000	Ephemeral	2.6	190	----	108	8/25/2011
E-18, (B6)	37.37061	87.01000	Ephemeral	14	500	----	108	8/25/2011
E-19, (E6)	37.37108	87.01731	Ephemeral	40.7	1729	----	62	8/26/2011
E-20, (G6,E6)	37.35789	87.00019	Ephemeral	46.7	2803	----	81 av.	8/17/2011
E-21, (B5)	37.35778	87.00625	Ephemeral	19.4	1230	----	70	8/17/2011
E-22, (E6)	37.35633	87.00286	Ephemeral	22.2	1050	----	94	8/16/2011
E-23 (E6)	37.35517	87.00119	Ephemeral	10.8	223	----	84	8/16/2011
E-24, (E6)	37.35211	87.00325	Ephemeral	28.7	1321	----	101	8/15/2011
E-25, (B6)	37.35200	87.00942	Ephemeral	19.1	692	----	90	9/13/2011
E-26**, (B4)	37.35286	87.00736	Ephemeral	9.7	337	----	88	8/15/2011
E-26A**, (B6)	37.35222	87.00700	Ephemeral	16.9	472	----	80	8/15/2011
E-27, (G5)	37.35369	87.00831	Ephemeral	11.9	929	----	87	9/13/2011
E-28, (B5)	37.35061	87.00789	Ephemeral	1.6	348	----	86	9/12/2011
E-29, (B6)	37.35144	87.01089	Ephemeral	33.3	1377	----	91	9/13/2011
E-30, (E6)	37.35272	87.01131	Ephemeral	8.1	658	----	28	9/13/2011
E-31, (G6)	37.35508	87.01397	Ephemeral	9.1	811	----	83	9/14/2011
E-32, (G6)	37.35650	87.00861	Ephemeral	8.7	200	----	102	9/14/2011

E-33, (G6)	37.35622	87.01061	Ephemeral	3.7	416	----	70	9/14/2011
E-34, (B6)	37.35997	87.01011	Ephemeral	24.1	1553	----	104	9/14/2011
E-35, (B6)	37.35778	87.01011	Ephemeral	3.9	618	----	73	9/14/2011
E-36, (G6)	37.35831	87.01011	Ephemeral	2.6	316	----	99	9/14/2011
E-37, (B6)	37.35953	87.00919	Ephemeral	3.9	417	----	97	9/14/2011
E-38, (B6)	37.36017	87.00972	Ephemeral	1.7	254	----	92	9/14/2011
E-39, (B6)	37.36067	87.00994	Ephemeral	1.3	272	----	90	9/14/2011
E-40, (B6)	37.36144	87.00969	Ephemeral	1.2	221	----	82	9/14/2011
E-41, (B6)	37.36072	87.01044	Ephemeral	2.7	381	----	92	9/14/2011
E-42, (B6)	37.35889	87.01181	Ephemeral	7.3	729	----	68	9/14/2011
E-43, (B6)	37.36042	87.01742	Ephemeral	23.1	1963	----	100	9/16/2011
E-44, (G6)	37.36303	87.01444	Ephemeral	21.8	1156	----	80	9/15/2011
E-45, (B6)	37.36536	87.01172	Ephemeral	3.8	574	----	83	9/15/2011
E-46, (B6)	37.36631	87.01150	Ephemeral	6.9	445	----	78	9/15/2011
E-47, (G6)	37.36600	87.01236	Ephemeral	25.6	1476	----	90	9/15/2011
E-48, (B6)	37.36667	87.01333	Ephemeral	14.9	1598	----	76	9/15/2011
E-49, (B6)	37.36575	87.01550	Ephemeral	14.0	985	----	92	9/16/2011
E-50, (B6)	37.36439	87.01900	Ephemeral	3.6	257	----	108	9/15/2011
E-51, (G5,G5,E5)	37.36597	87.01925	Ephemeral	38.3	1805	54 av.	87 av.	9/15/2011
E-52, (B5)	37.36844	87.01686	Ephemeral	8.9	521	----	67	9/14/2011
E-53, (G5)	37.36808	87.02031	Ephemeral	5.0	426	----	78	9/16/2011
E-54, (G4)	37.36903	87.02144	Ephemeral	25.3	834	----	110	9/16/2011
E-55, (B5)	37.37025	87.02072	Ephemeral	8.4	464	----	102	9/15/2011
E-56, (A5)	37.37081	87.02069	Ephemeral	0.9	262	----	85	9/15/2011
E-57, (B6)	37.37069	87.02028	Ephemeral	0.9	218	----	90	9/15/2011
E-58, (G5)	37.36958	87.02169	Ephemeral	4.8	425	----	99	9/16/2011
E-59, (A6)	37.37108	87.02144	Ephemeral	1.8	215	----	92	9/15/2011
E-60, (A5)	37.37122	87.02214	Ephemeral	1.5	155	----	91	9/15/2011
E-61, (E5)	37.36694	87.02342	Ephemeral	43.9	1941	----	96	9/16/2011
E-62, (A5)	37.36753	87.02345	Ephemeral	4.0	491	----	96	9/16/2011
E-63, (B6)	37.35711	87.01422	Ephemeral	15.3	1486	55	110	1/25/2012
E-64, (B6)	37.36539	87.00567	Ephemeral	20.1	957	----	85	8/17/2011
				Total Perennial	**161**			
				Total Intermittent	**22589**			
				Total Ephemeral	**50191**			

***** Multiple Rosgen classifications listed are from upstream to downstream by assessment reach.

****** Appear to be isolated.

NOTES:

1) Streams with multiple assessments have averages shown for habitat score and conductivity readings.
2) Data provided in this table is for baseline purposes only. The amount of stream located within the study area is not intended to reflect future impact lengths.

Table 2: Summary of Wetlands Information

Wetland	Classification	Connectivity (Yes/No)	Total Area (acres)	Area In Boundary (acres)
A	PFO1A	No	0.046	0.046
B	PFO1A	Yes	0.377	0.361
C	PFO1A	Yes	0.326	0.326
D	PFO1A	Yes	0.424	0.355
E	PEM1A	Yes	2.062	2.062
F	PFO1B	Yes	0.193	0.193
G	PFO1A	Yes	0.316	0.316
H	PSS1A	Yes	0.315	0.114
I	PSS1A	Yes	5.825	5.825
J	PFO1A	Yes	0.127	0.127
K	PFO1A	Yes	0.764	0.764
L	PFO1B	Yes	0.360	0.360
M	PFO1B	Yes	0.355	0.355
N	PFO1B	Yes	0.001	0.001
O	PEM1H	No	0.061	0.061
P	PEM1B	Yes	0.237	0.237
Q	PFO1A	Yes	0.396	0.396
R	PEM1B	Yes	0.010	0.010
S	PFO1B	Yes	0.619	0.619
T	PFO1B/PSS1B	Yes	0.127	0.127
U	PFO1A	Yes	1.506	1.265
V	PEM1B	Yes	0.090	0.090
W	PSS1B	Yes	0.054	0.054
X	PFO1C	Yes	0.018	0.018
Y	PFO1A	Yes	0.920	0.920
Z	PFO1A	Yes	0.169	0.169
AA	PEM1C	Yes	0.034	0.034
BB	PFO1C	Yes	0.976	0.976
CC	PFO1A	Yes	0.084	0.084
DD	PFO1C	Yes	9.641	9.641
EE	PEM1B/PSS1B	Yes	0.728	0.295
FF	PFO1A	Yes	0.665	0.665
GG	PFO1A	Yes	1.035	1.035
		Totals	**28.861**	**27.901**

* The amount of wetlands located within the study area does not reflect future impact area.

Table 3. Summary of Ponds and Open Water

	Feature Associated With	Area in Boundary (Acres)
Pond 1	Open Water	0.124
Pond 2	Open Water	0.127
Pond 3	Open Water	0.124
	Total Area	**0.375**

The amount of ponds/open water located within the study area does not reflect future impact area.

VII. EXHIBITS

Exhibit 1: Vicinity Map

Exhibit 2: Sheet Index Map

Exhibits 3 - 7: Topographic Maps

Exhibits 8 - 12: Aerial Maps

Exhibit 13: National Wetlands Inventory (NWI) Map

Exhibit 14: Soil Map

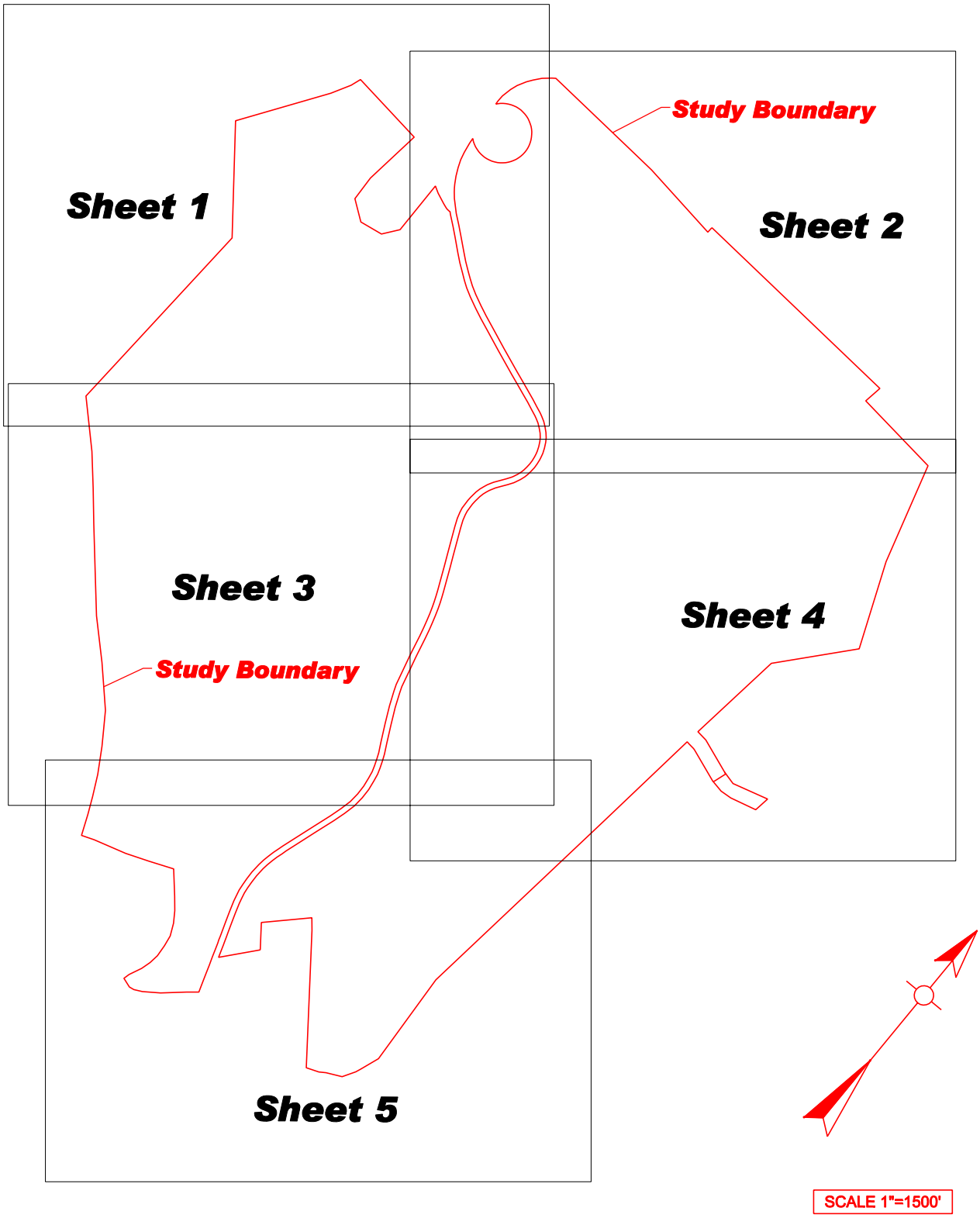
Exhibit 15: FEMA Flood Insurance Rate Map

Exhibits 16 - 19: Cross Sections of Perennial and Intermittent Streams

T.H.E. Engineers, Inc.	PROJECT: Lewis Creek West - Jurisdictional Waters Delineation			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: Ohio	STATE: KY	NEAR: Centertown	ITEM: Vicinity Map	Exhibit 1

DATE:

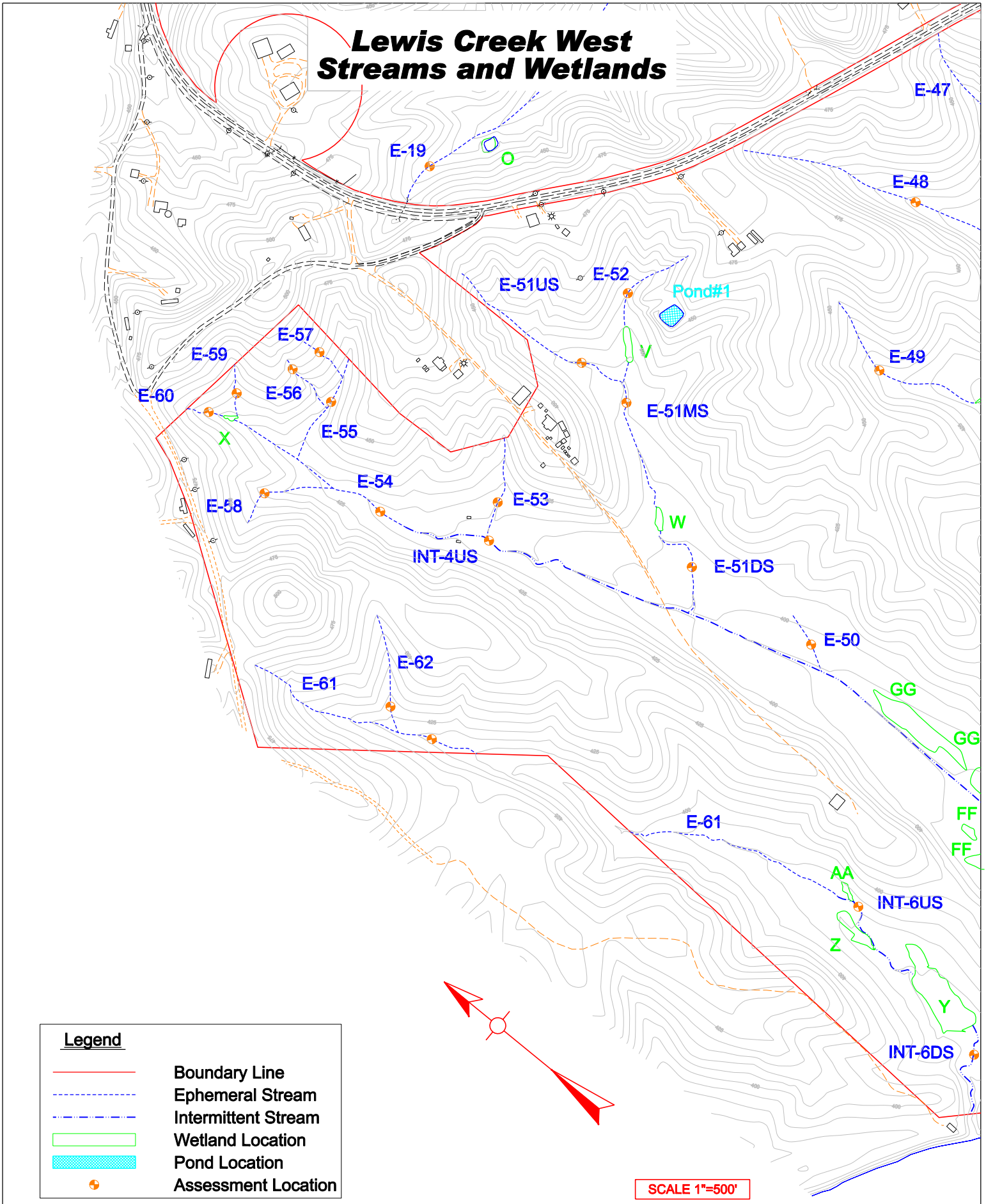
Sheet Index



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION				
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: INDEX MAP	EXHIBIT 2

DATE:

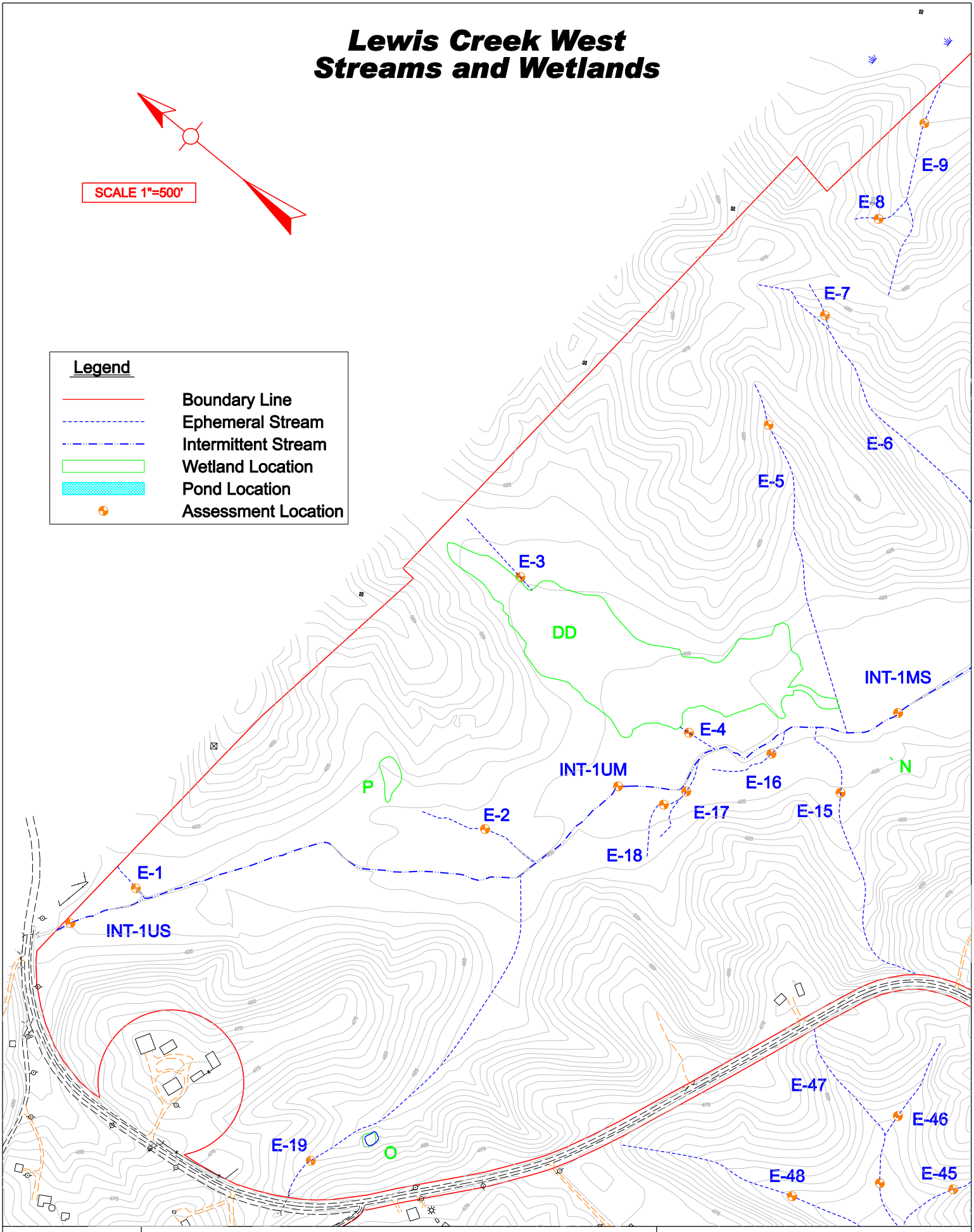
Lewis Creek West Streams and Wetlands



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: TOPO MAP	EXHIBIT 3 (SHEET 1)

DATE:

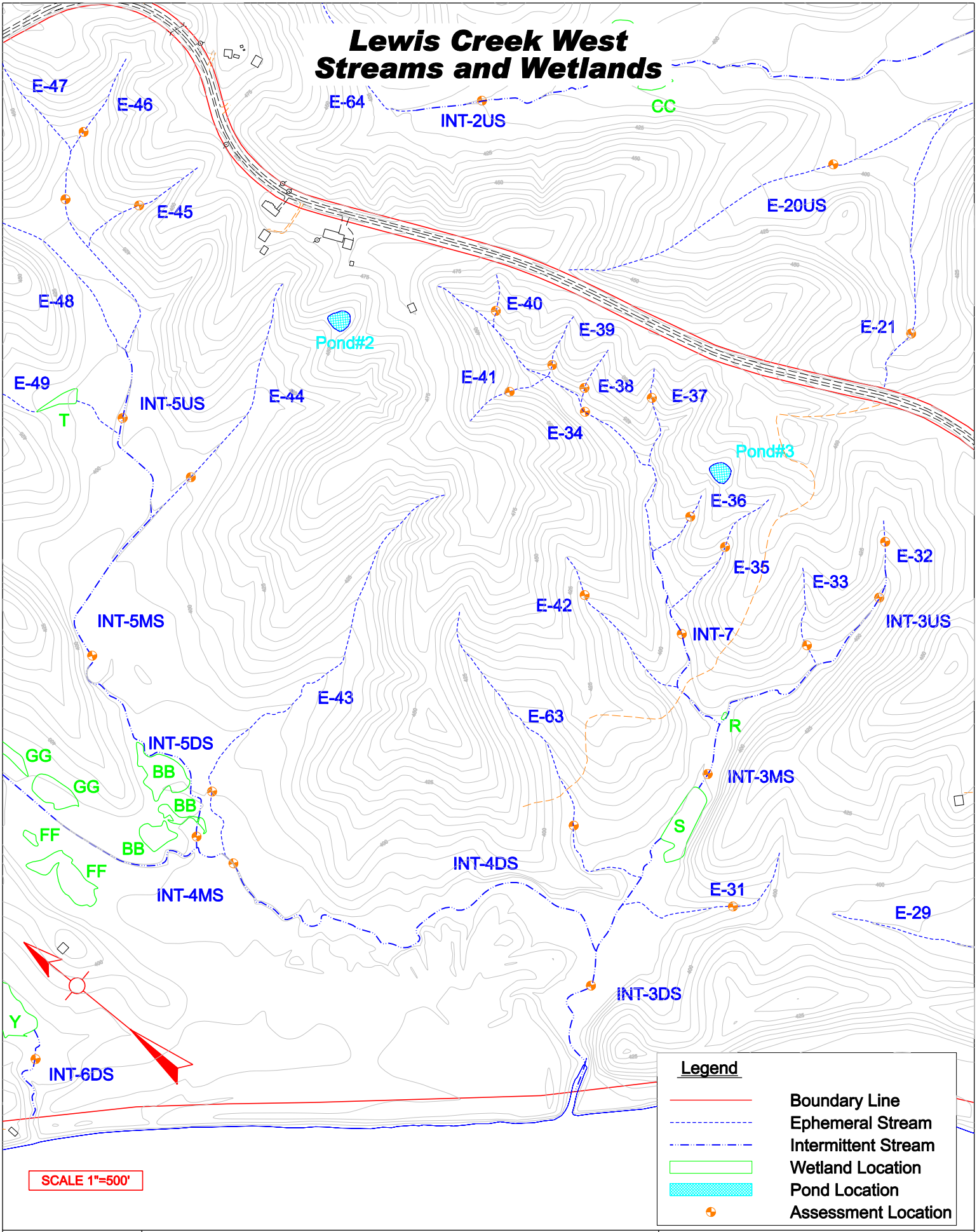
Lewis Creek West
Streams and Wetlands



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: TOPO MAP	EXHIBIT 4 (SHEET 2)

DATE:

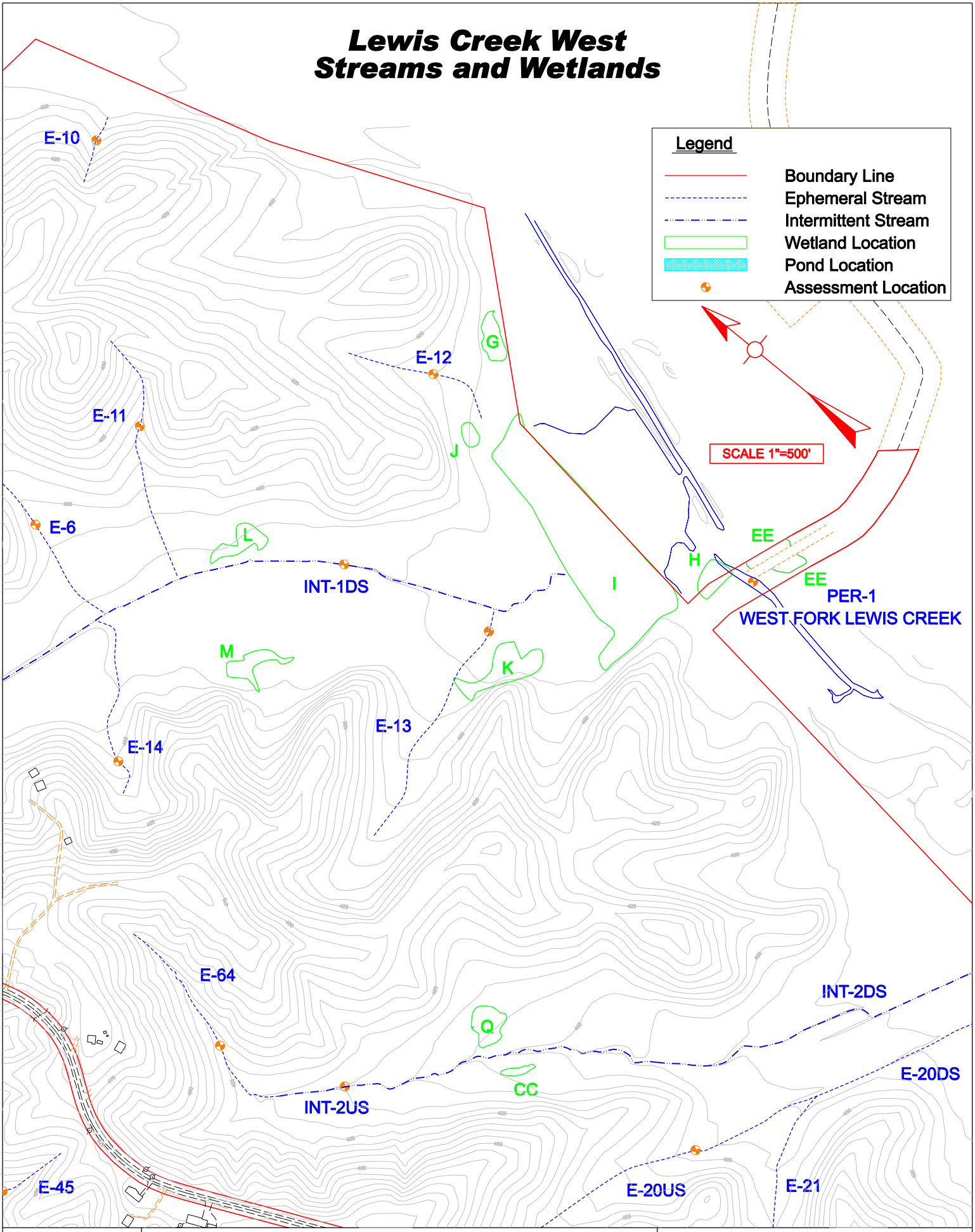
Lewis Creek West Streams and Wetlands



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: TOPO MAP	EXHIBIT 5 (SHEET 3)

DATE:

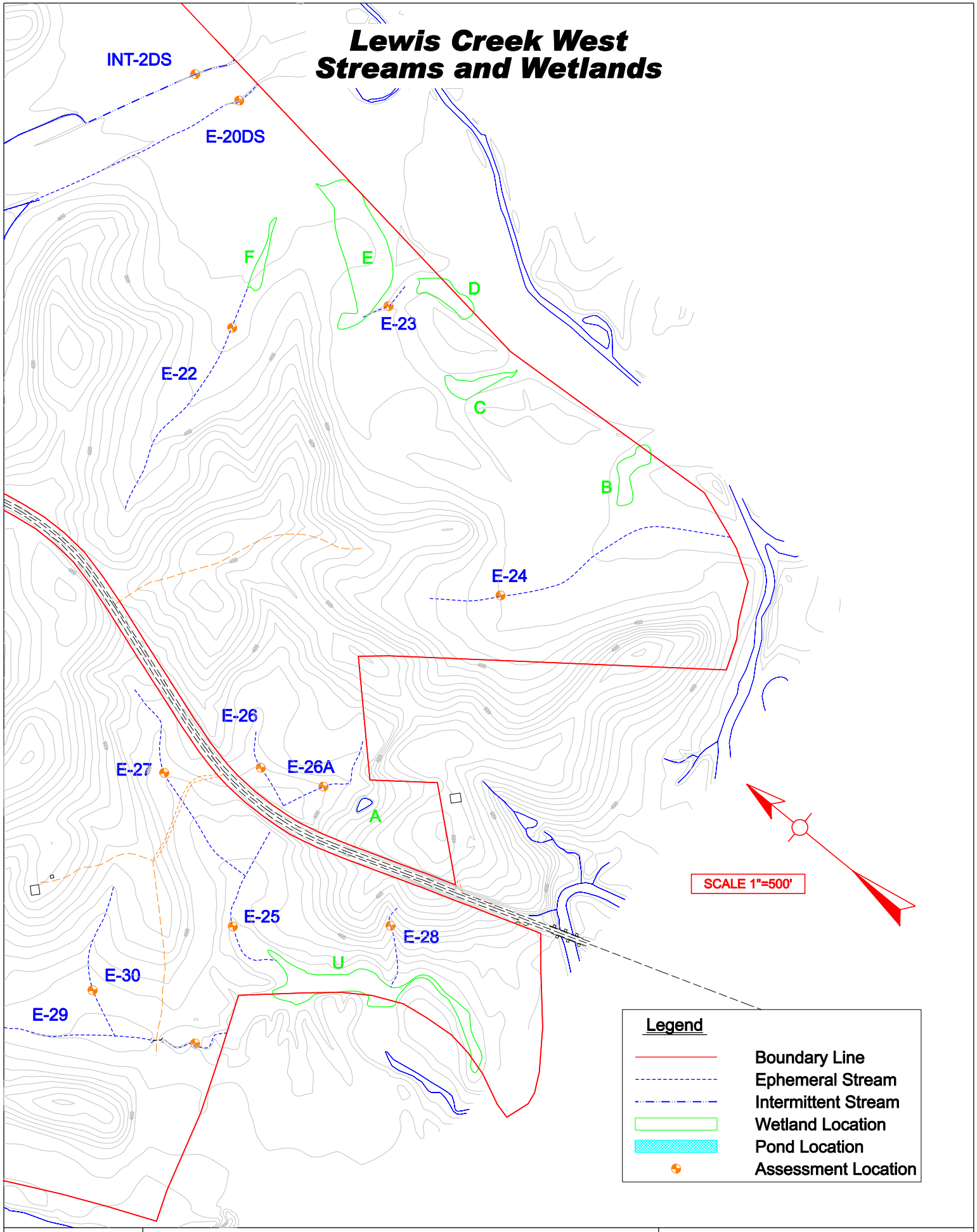
Lewis Creek West
Streams and Wetlands



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: TOPO MAP	EXHIBIT 6 (SHEET 4)

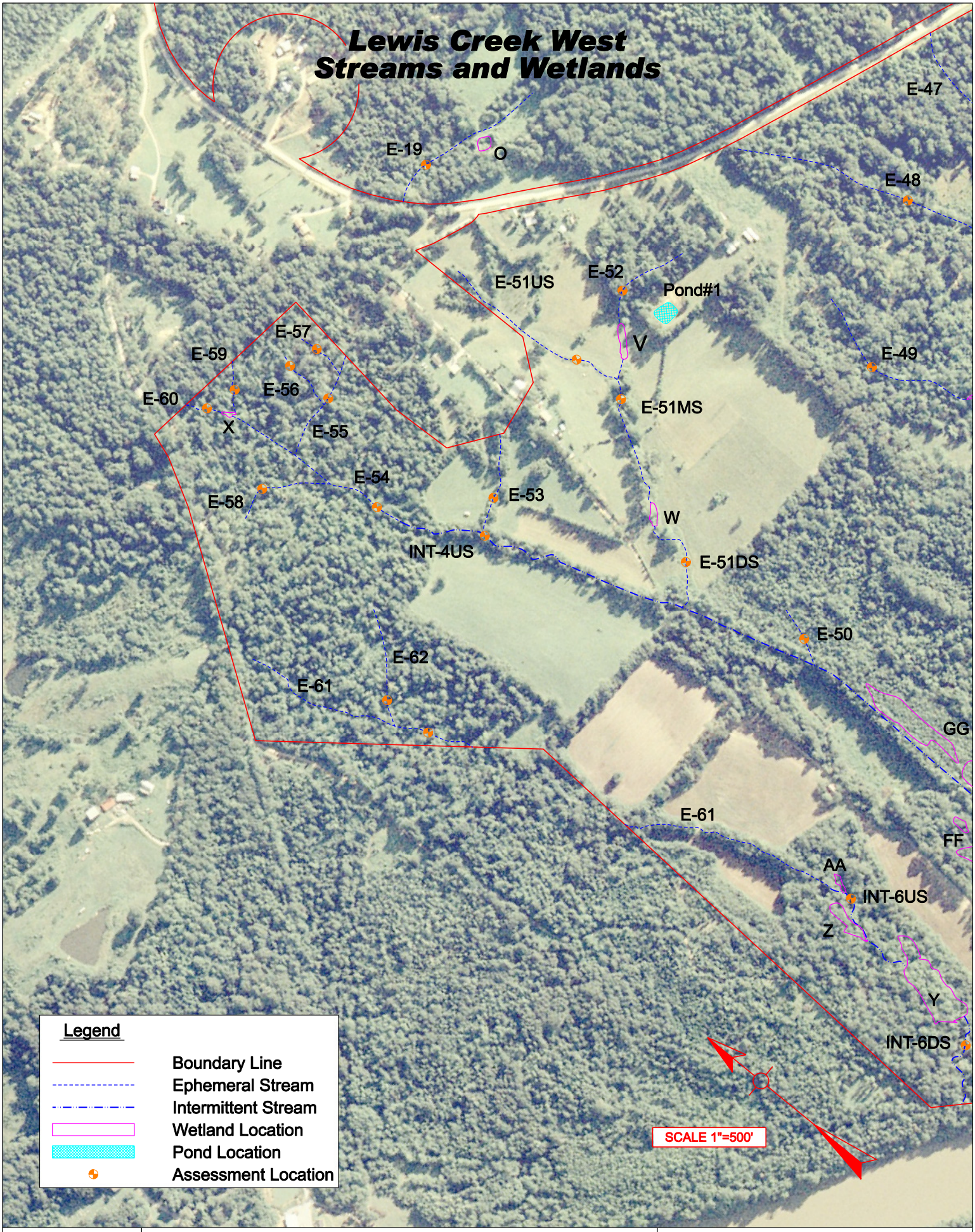
DATE:

Lewis Creek West Streams and Wetlands



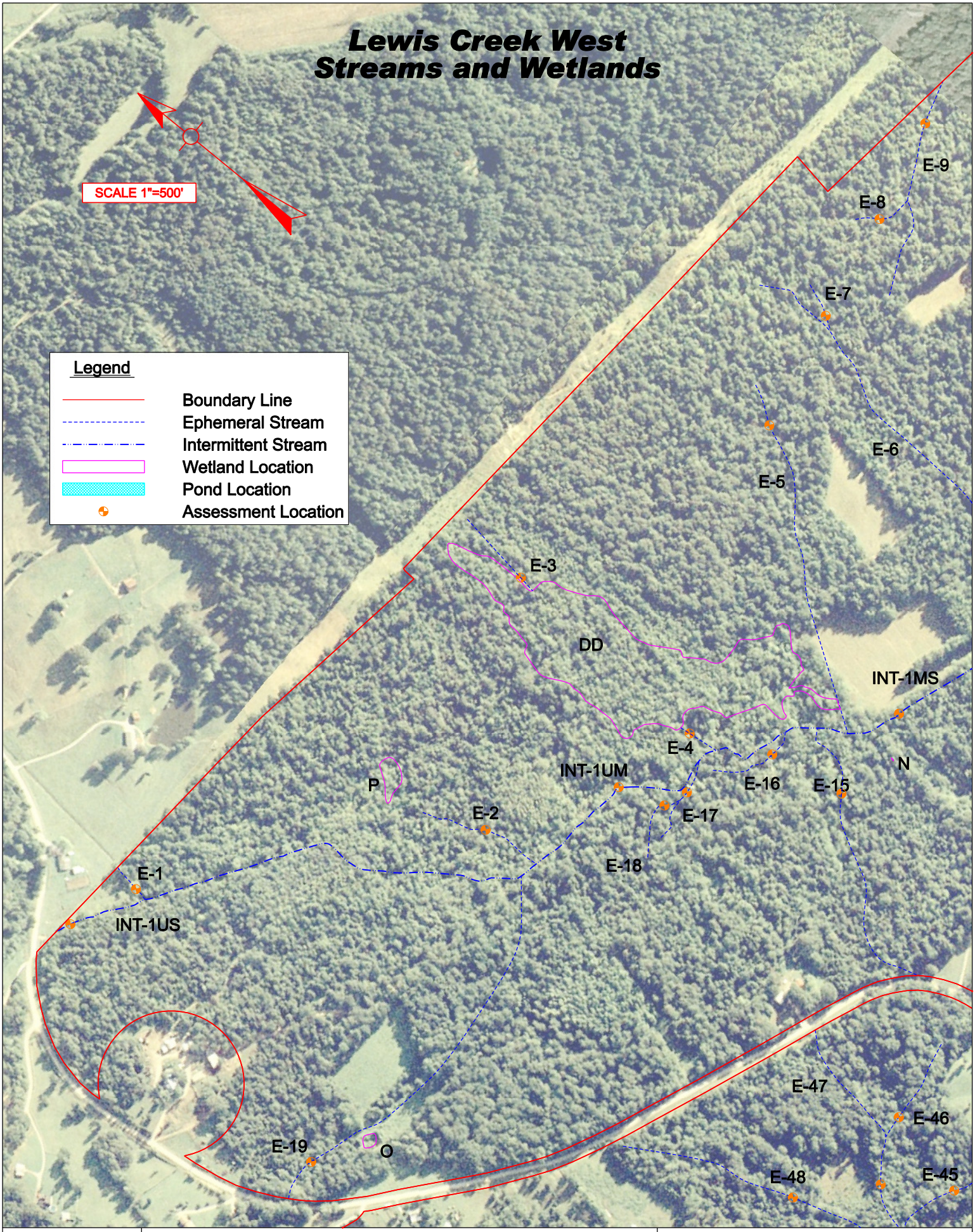
T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: TOPO MAP	EXHIBIT 7 (SHEET 5)

DATE:



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION		UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: AERIAL MAP	EXHIBIT 8 (SHEET 1)

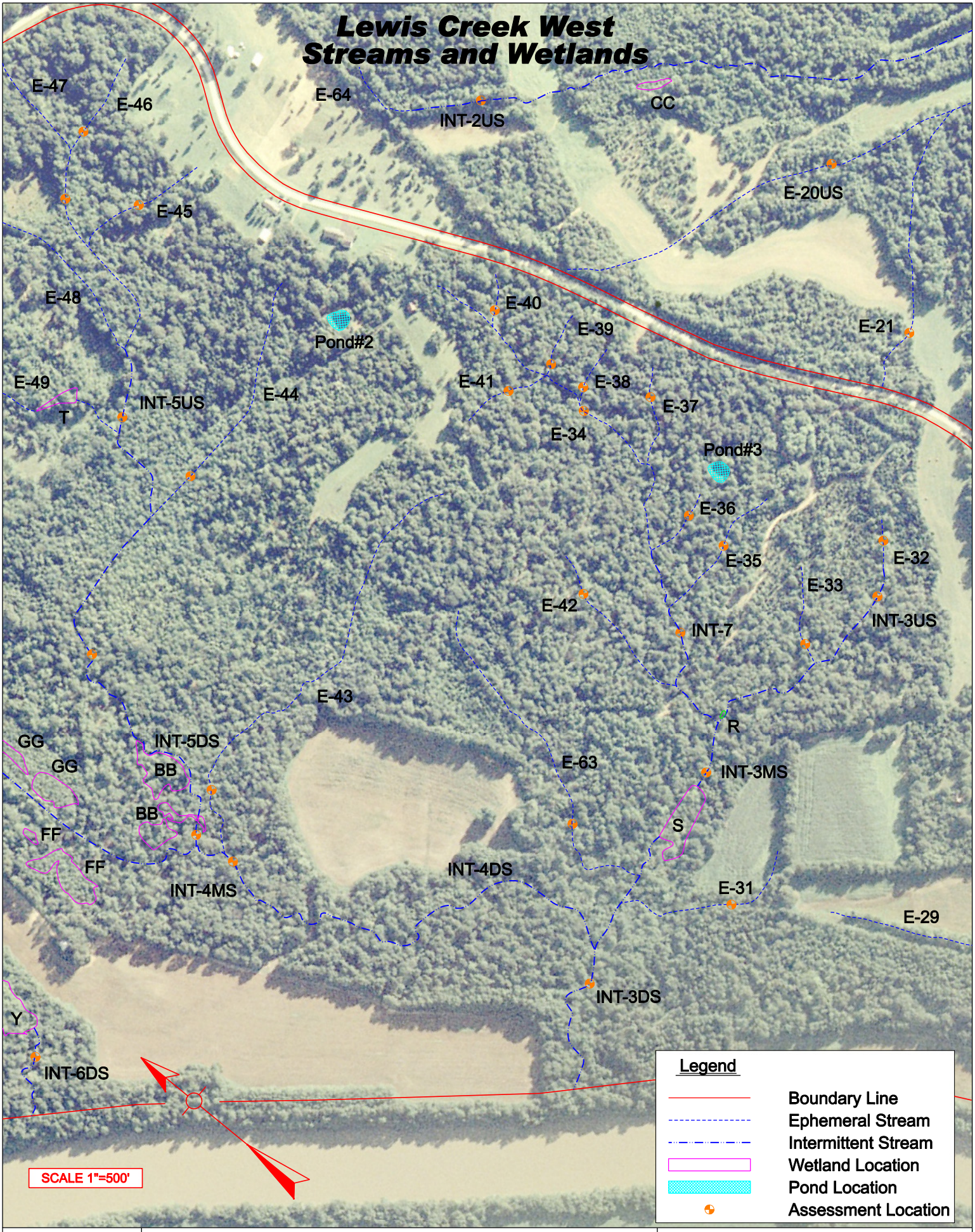
DATE:



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: AERIAL MAP	EXHIBIT 9 (SHEET 2)

DATE:

Lewis Creek West Streams and Wetlands



T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: AERIAL MAP	EXHIBIT 10 (SHEET 3)

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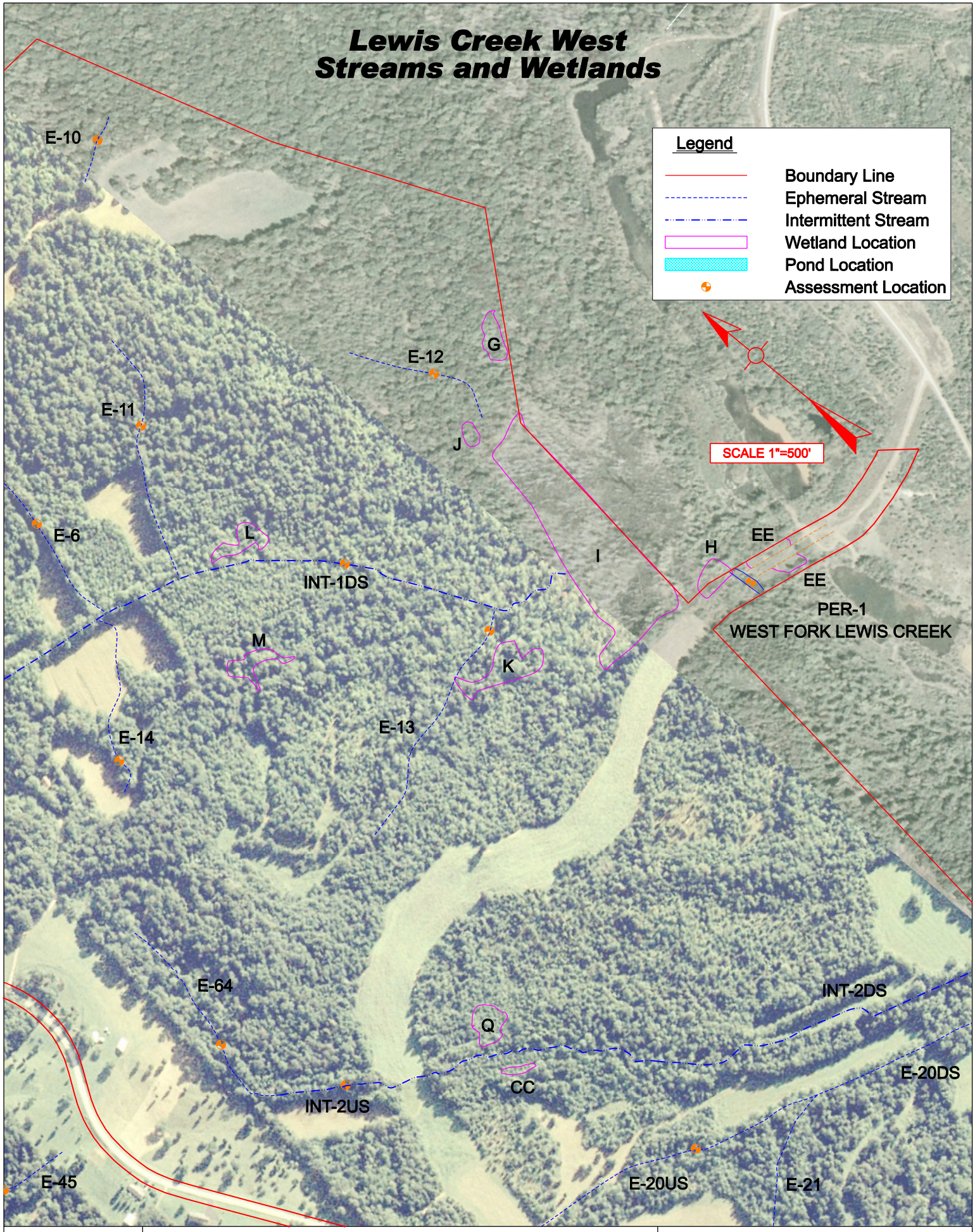

T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: AERIAL MAP	EXHIBIT 11 (SHEET 4)

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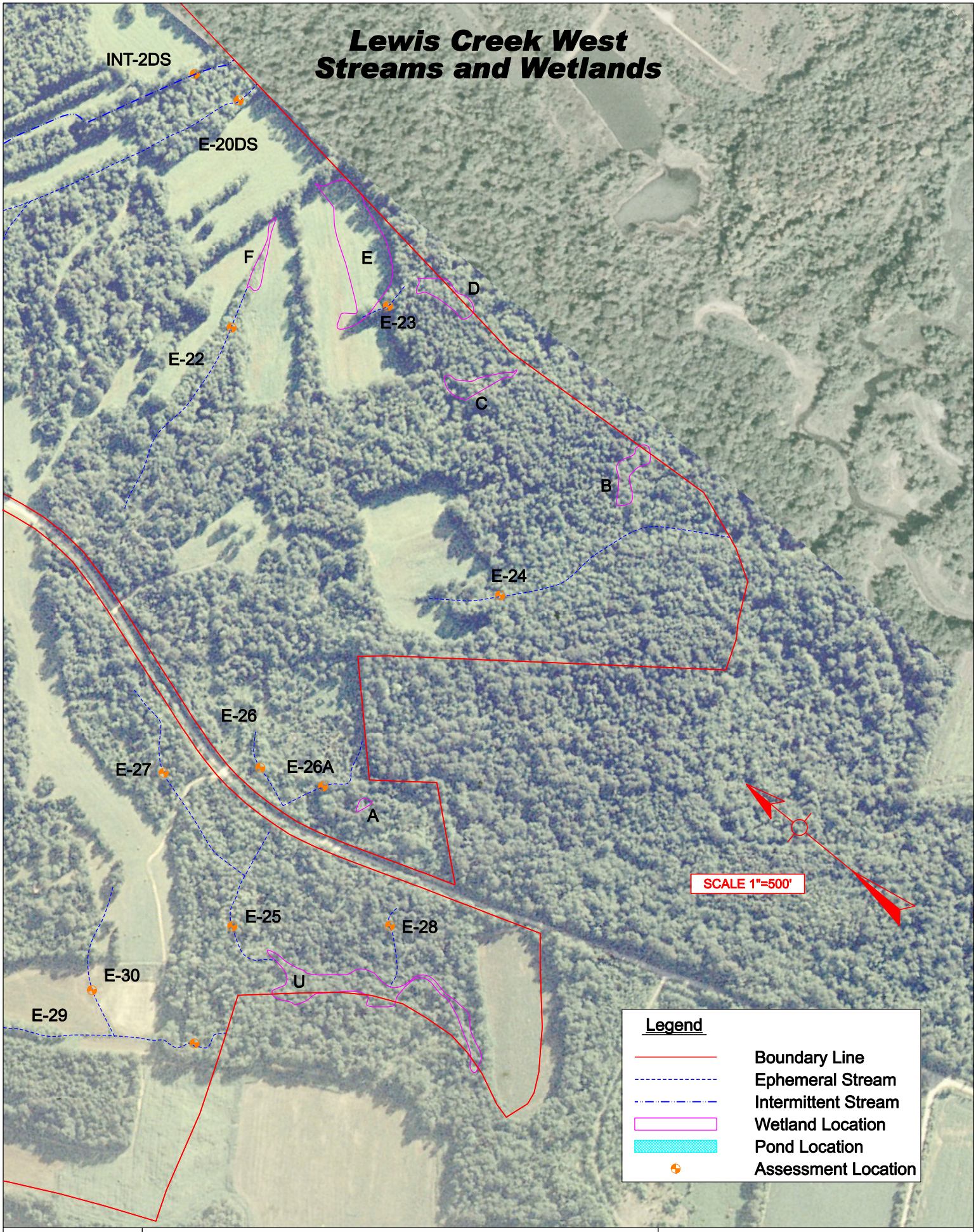
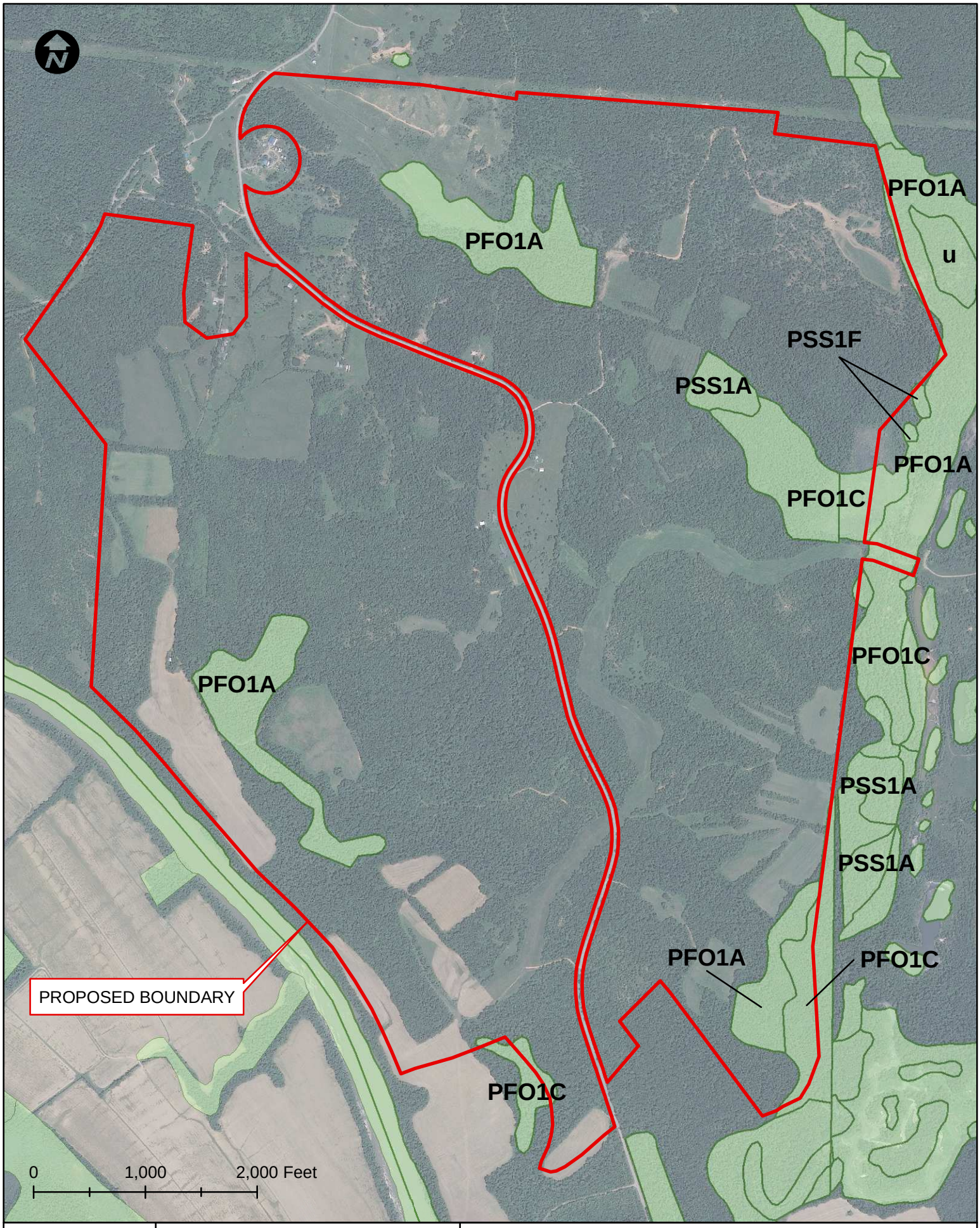


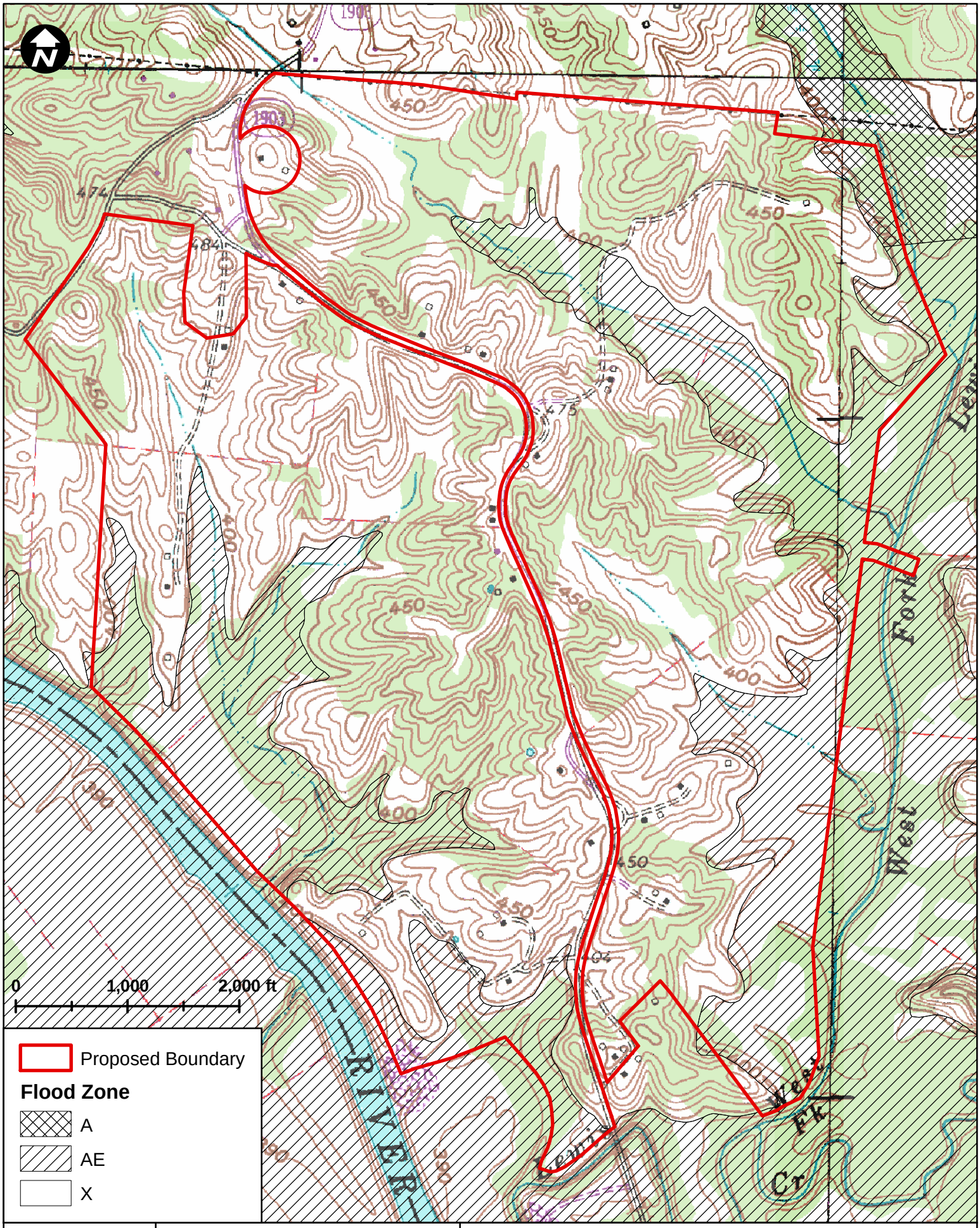
T.H.E. Engineers, Inc.	PROJECT: LEWIS CREEK WEST SITE - JURISDICTIONAL WATERS DELINEATION			UT's OF WEST FORK AND LEWIS CREEK & GREEN RIVER	
	COUNTY: OHIO	STATE: KY	NEAR: CENTERTOWN	ITEM: AERIAL MAP	EXHIBIT 12 (SHEET 5)

DATE:



T. H. E. J-E Engineers, Inc.	PROJECT: Lewis Creek West		Project Extent and NWI Polygons over 2010 NAIP Imagery	
	COUNTY: Ohio	STATE: KY	NEAR: Centertown	EXHIBIT 13

T. H. E. J-E Engineers, Inc.	PROJECT: Lewis Creek West	Project Extent and SSURGO Polygons over 2010 NAIP Imagery	
	COUNTY: Ohio	STATE: KY	NEAR: Centertown	EXHIBIT 14



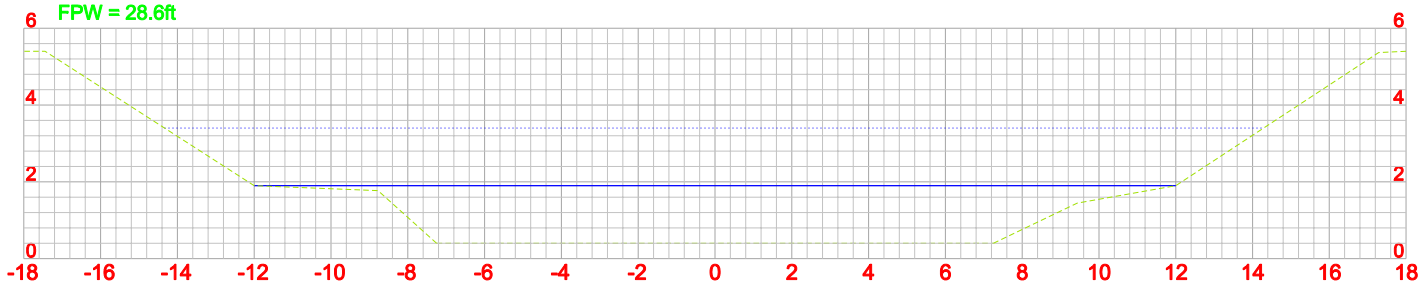
T. H. E. J-E Engineers, Inc.	PROJECT: Lewis Creek West	Project Extent and DFIRM Polygons over 7.5' Topos	
	COUNTY: Ohio	STATE: KY	NEAR: Centertown	EXHIBIT 15

Existing Perennial & Intermittent Cross Sections

BF=Bankfull
FP= Floodprone
Existing Ground

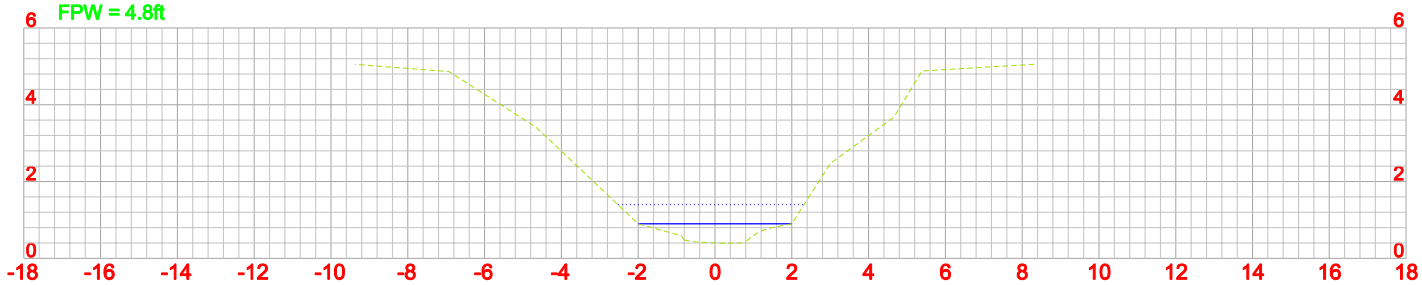
Per-West Fork Lewis Creek

BFW = 24.0ft
BFD max = 1.5ft
FPW = 28.6ft



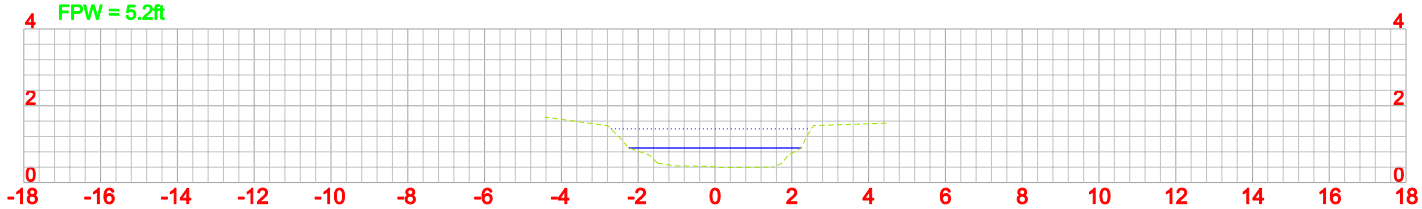
INT-1 US

BFW = 4.0ft
BFD max = 0.5ft
FPW = 4.8ft



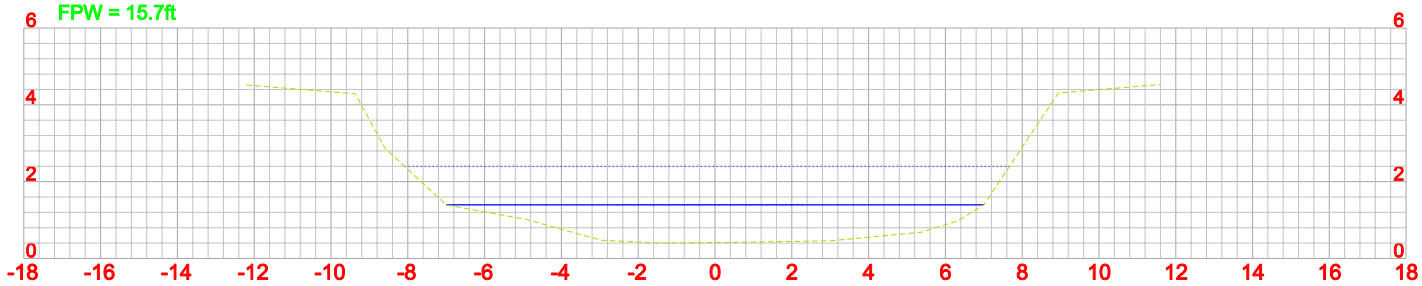
INT-1 UM

BFW = 4.5ft
BFD max = 0.5ft
FPW = 5.2ft



INT-1 MS

BFW = 14.0ft
BFD max = 1.0ft
FPW = 15.7ft



Cross Section Scale: 1"=5'

T.H.E. Engineers, Inc.	PROJECT: Lewis Creek West Site			Existing Cross Sections	
	COUNTY: Ohio	STATE: KENTUCKY	NEAR: Centertown, Ky.	Cross Sections	Exhibit 16

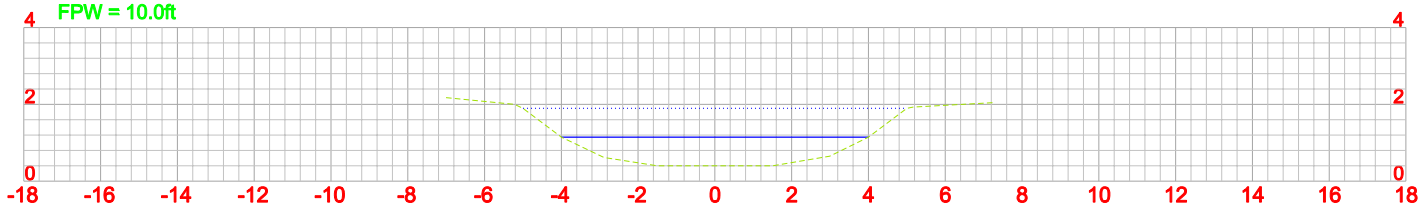
DATE:

Existing Intermittent Cross Sections

BF=Bankfull
FP= Floodprone
Existing Ground

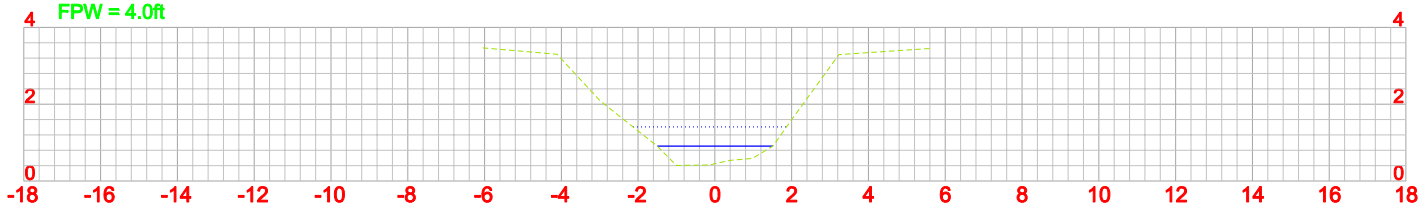
INT-1 DS

BFW = 8.0ft
BFD max = 0.75ft
FPW = 10.0ft



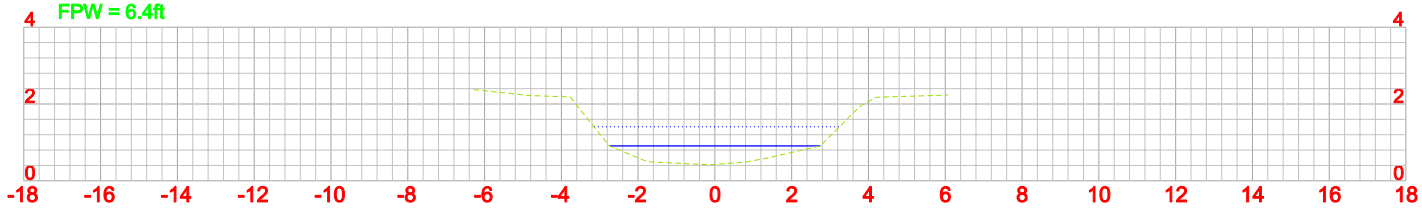
INT-2 US

BFW = 3.0ft
BFD max = 0.5ft
FPW = 4.0ft



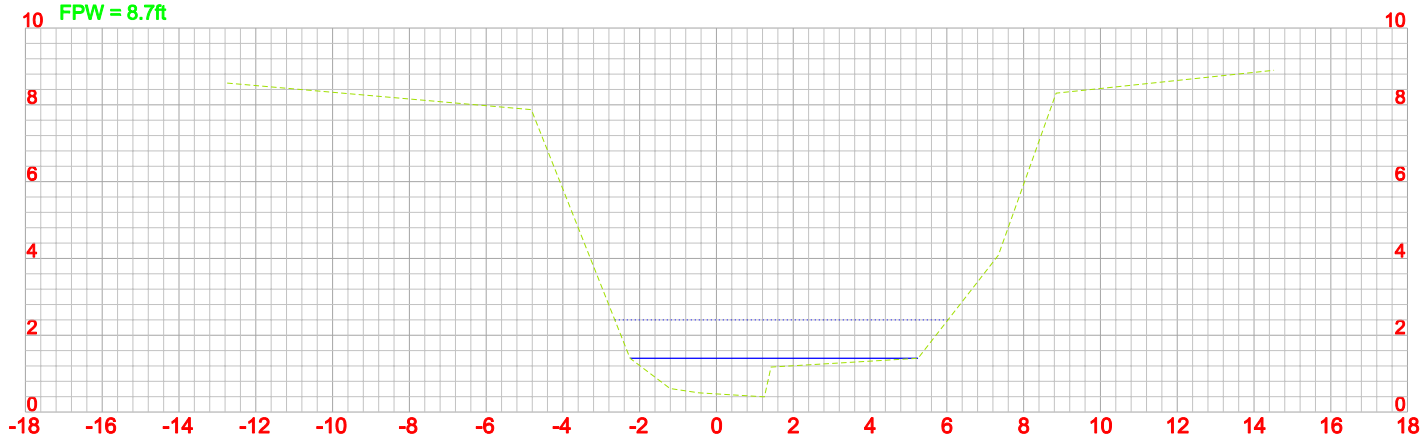
INT-2 DS

BFW = 5.5ft
BFD max = 0.5ft
FPW = 6.4ft



INT-3 US

BFW = 7.5ft
BFD max = 1.0ft
FPW = 8.7ft



Cross Section Scale: 1"=5'

T.H.E. Engineers, Inc.	PROJECT: Lewis Creek West Site			Existing Cross Sections	
	COUNTY: Ohio	STATE: KENTUCKY	NEAR: Centertown, Ky.	Cross Sections	Exhibit 17

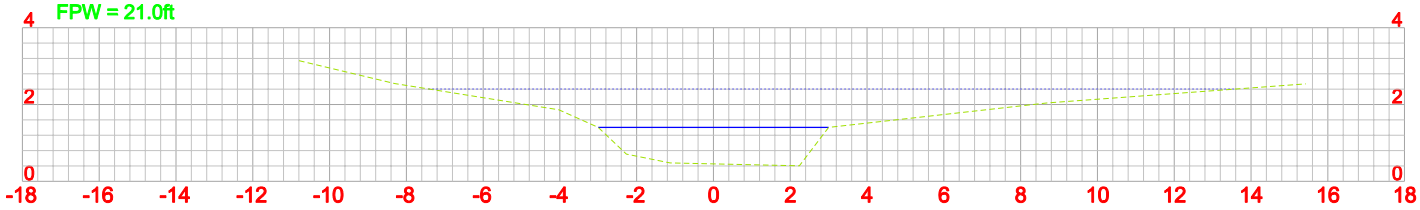
DATE:

Existing Intermittent Cross Sections

BF=Bankfull
FP= Floodprone
Existing Ground

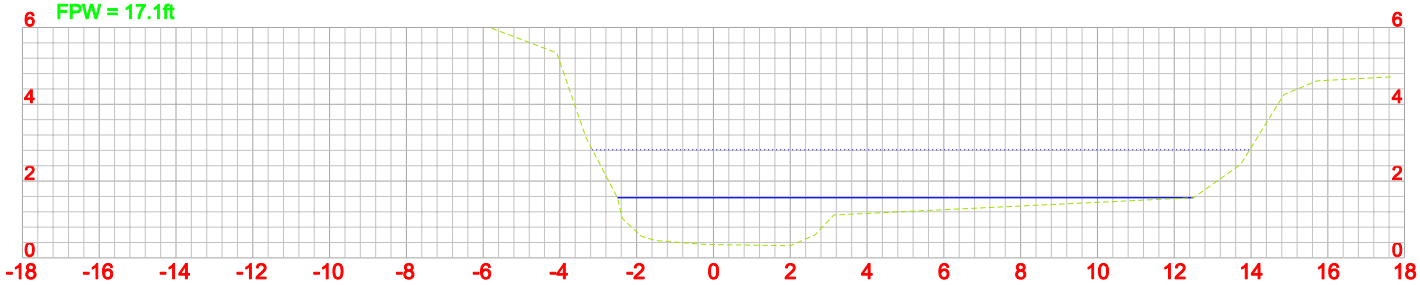
INT-3 MS

BFW = 4.5ft
BFD max = 1.0ft
FPW = 21.0ft



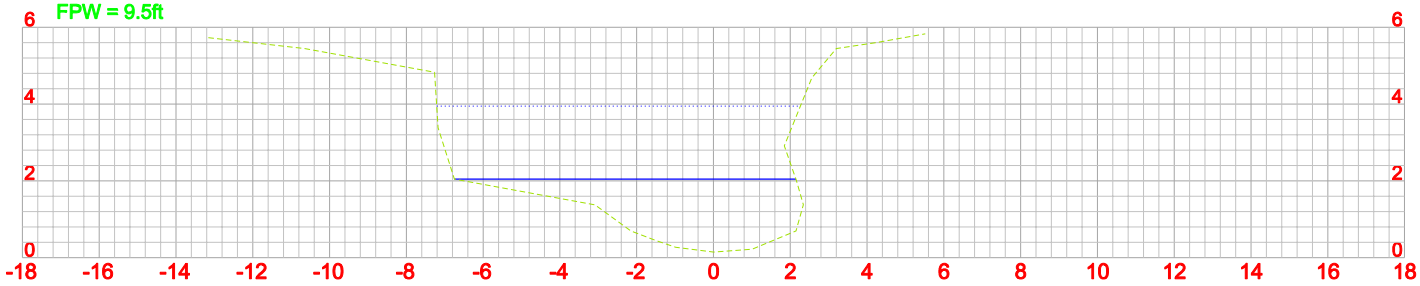
INT-3 DS

BFW = 15.0ft
BFD max = 1.25ft
FPW = 17.1ft



INT-4 US

BFW = 8.9ft
BFD max = 1.9ft
FPW = 9.5ft



INT-4 MS

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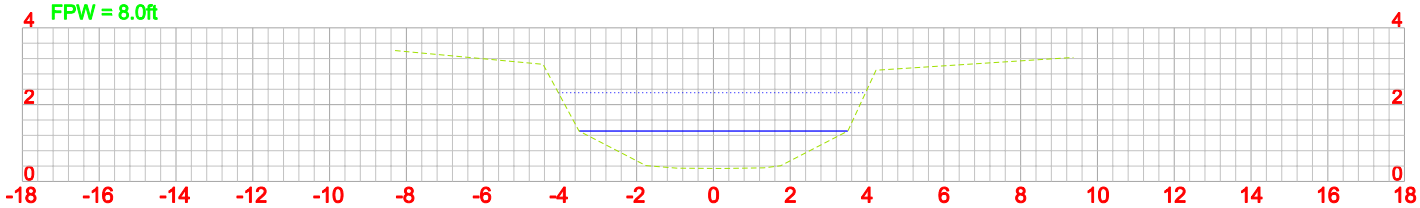
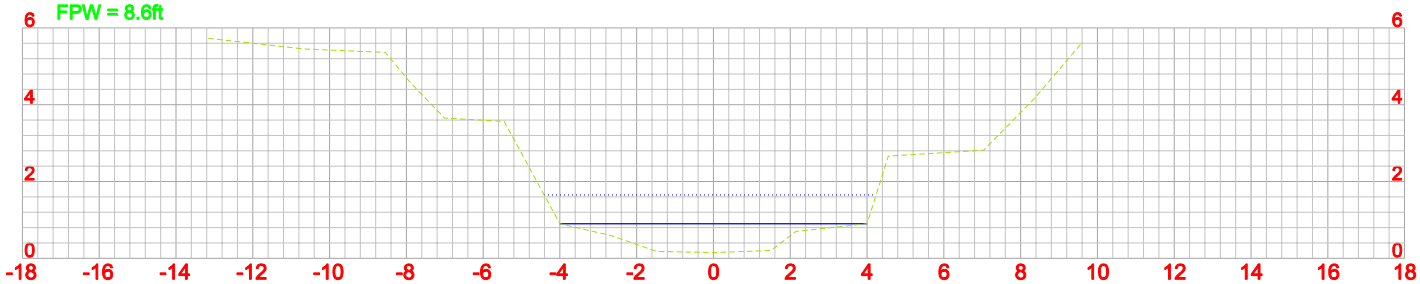
BFD max = 1.0ft
FPW = 8.0ft



INT-4 DS

BFW = 8.0ft
BFD max = 0.75ft
FPW = 8.6ft



Cross Section Scale: 1"=5'

T.H.E. Engineers, Inc.	PROJECT: Lewis Creek West Site			Existing Cross Sections	
	COUNTY: Ohio	STATE: KENTUCKY	NEAR: Centertown, Ky.	Cross Sections	Exhibit 18

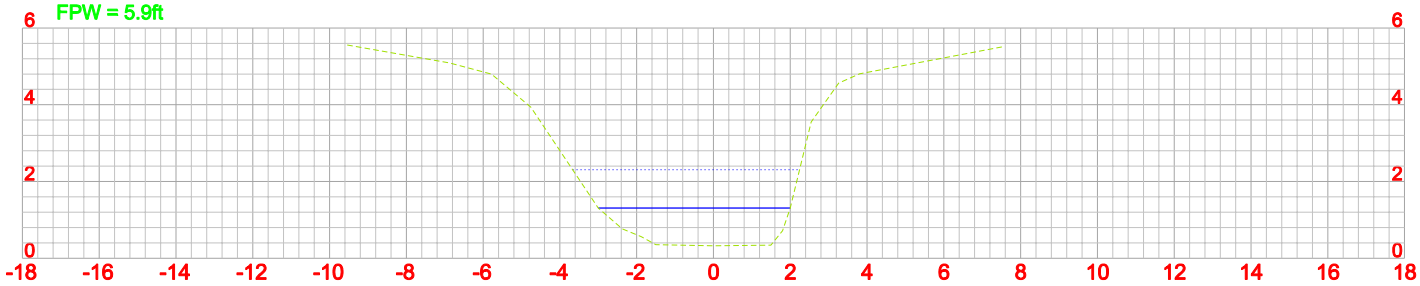
DATE:

Existing Intermittent Cross Sections

BF=Bankfull
FP= Floodprone
Existing Ground

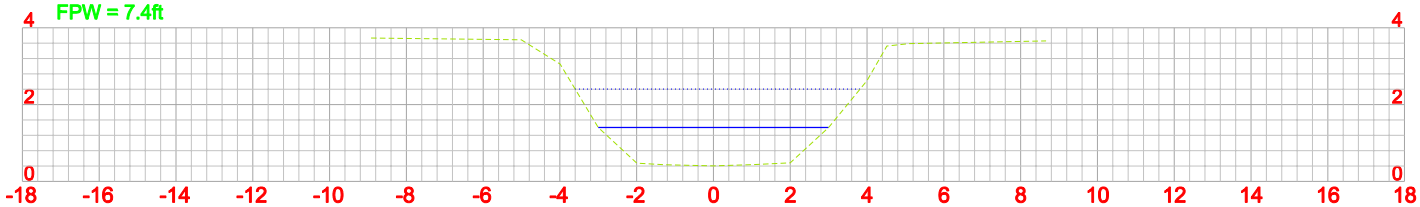
INT-5 US

BFW = 5.0ft
BFD max = 1.0ft
FPW = 5.9ft



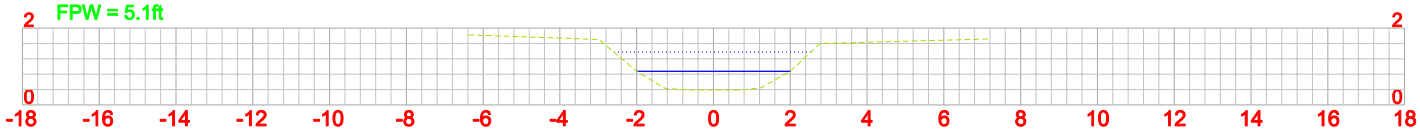
INT-5 MS

BFW = 6.0ft
BFD max = 1.0ft
FPW = 7.4ft



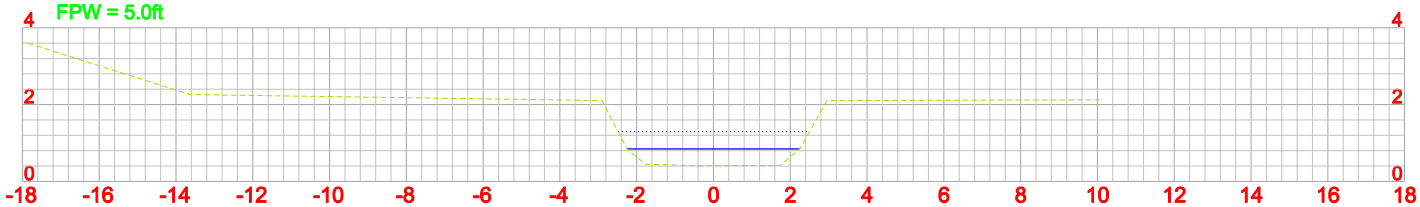
INT-5 DS

BFW = 4.0ft
BFD max = 0.5ft
FPW = 5.1ft



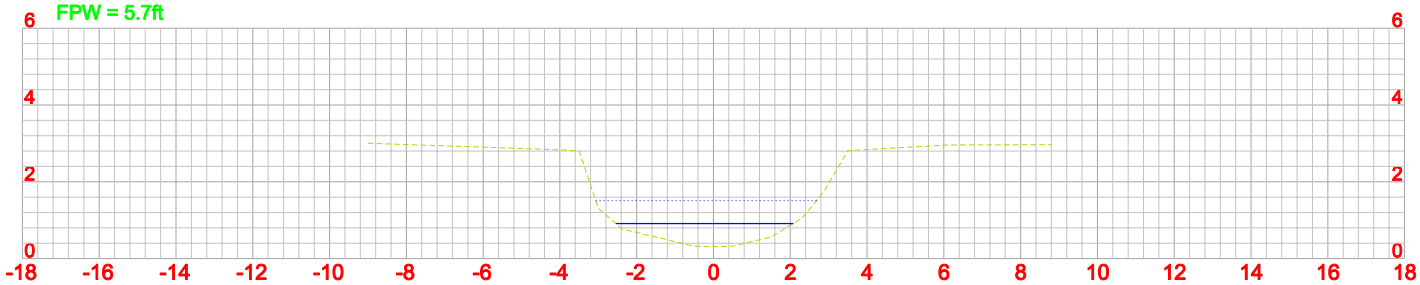
INT-6 US

BFW = 4.5ft
BFD max = 0.45ft
FPW = 5.0ft



INT-6 DS

BFW = 4.6ft
BFD max = 0.60ft
FPW = 5.7ft



Cross Section Scale: 1"=5'

T.H.E. Engineers, Inc.	PROJECT: Lewis Creek West Site			Existing Cross Sections	
	COUNTY: Ohio	STATE: KENTUCKY	NEAR: Centertown, Ky.	Cross Sections	Exhibit 19

DATE:

VIII. APPENDIX

- EPA Rapid Bioassessment Protocol Field Data Sheets
  - Photographs
- Wetland Delineation Forms
  - Photographs

Low Gradient Stream Data Sheet

STREAM NAME: *PER-1 (West Fork Lewis Creek)*	LOCATION: *Lewis Creek West-at proposed haul road*
STATION: *WP 942* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-48.6* LONG: *86-59-54.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-23-11* TIME:10:10 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *68* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *71.8* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) *7.6* Cond. *3820* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*14.5*	ft
Stream Width BF	*24.0*	ft
Range of Depth	*5.0*	ft
Bankfull Depth	*1.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☑ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☑ Perennial ☐ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore *Buttonbush*
Black willow
River birch
Silver maple
Hophornbeam

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *15* %	Run; *20* %	Pool *65* %
Silt/Clay (<0.06 mm)	*85*	*85*	*100*
Sand (0.06-2 mm)			
Gravel (2-64 mm)	*10*	*10*	
Cobble (64-256 mm)	*5*	*5*	
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 121

NOTES/COMMENTS; Channel incised 3.0 to 4.0 feet. New bankfull channel has formed.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-1 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 993* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-01.0* LONG: *87-00-07.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-24-11* TIME:12:19 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

35 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*8.0*	ft
Range of Depth		ft
Bankfull Depth	*.75*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sweetgum
Hophornbeam
Red oak
Red maple
Green ash

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-1 (MS)*	LOCATION: *Lewis Creek West*
STATION: *WP 997* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-09.4* LONG: *87-00-25.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-24-11* TIME:1:46 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *78.3* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) *7.7* Cond. *234* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*6.0*	ft
Stream Width BF	*14.0*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore
Ironwood
Sweetgum
Red maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*70*	*50*
Sand (0.06-2 mm)		*15*	*10*
Gravel (2-64 mm)		*15*	*40*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 81

NOTES/COMMENTS; Channel incised/entrenched. Gravel from road surfacing.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-1 (UM)*	LOCATION: *Lewis Creek West*
STATION: *WP 1059* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-16.1* LONG: *87-00-37.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME:3:45 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

20 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Buttonbush
Black willow
Sweetgum
Red maple
River birch

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 85

NOTES/COMMENTS; Overgrown pasture immediately upstream, with cattle.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-1 (US)*	LOCATION: *Lewis Creek West (at Rt 1903)*
STATION: *WP 1086* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/ Lewis Creek*
LAT: *37-22-30.4* LONG: *87-01-02.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-22-11* TIME:12:28 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

5 % Cloud Cover

P-Chem: Temp (°F) *78.0* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) *9.5* Cond. *267* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*4.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☐ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *2*

Dom. Tree/Shrub Taxa
Redcedar
Sycamore

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *20* %	Pool *80* %
Silt/Clay (<0.06 mm)		*100*	*100*
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 86

NOTES/COMMENTS Channel incised/entrenched. Bankfull channel formed in places.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-2 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 17* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-30.2* LONG: *87-00-01.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-16-11* TIME:5:26 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *82* °F. Inches rainfall in past 24 hours *0* in

30 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.5*	ft
Stream Width BF	*5.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sweetgum
Ash sp.
Shagbark Hickory
Red maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-2 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 24* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-47.2* LONG: *87-00-27.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-17-11* TIME: 12:43 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Sycamore
Red Maple
Tulip Poplar

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *95* %	Pool *5* %
Silt/Clay (<0.06 mm)		*50*	*50*
Sand (0.06-2 mm)		*50*	*50*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 72

NOTES/COMMENTS; Channel moderately incised & entrenched.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-3 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 56* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-20.3* LONG: *87-00-56.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 5:20 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
Cloudy ☐	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

90 % Cloud Cover

P-Chem: Temp (°F) *74.0* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *145* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.5*	ft
Stream Width BF	*15.0*	ft
Range of Depth		ft
Bankfull Depth	*1.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☑ Intermittent ☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Sugarberry*, *Sycamore*, *Silver maple*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- ☐ Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *10* %	Pool *90* %
Silt/Clay (<0.06 mm)		*100*	*100*
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 96

NOTES/COMMENTS Channel incised/entrenched as it approaches the Green River.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-3 (MS)*	LOCATION: *Lewis Creek West*
STATION: *WP 55* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-22.9* LONG: *87-00-47.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 4:35 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

5 % Cloud Cover

P-Chem: Temp (°F) *68.2* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *111* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*4.5*	ft
Stream Width BF	*6.0*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☑ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Ironwoode
Sycamore
Red maple
Sweetgum

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *10* %	Pool *90* %
Silt/Clay (<0.06 mm)		*10*	*10*
Sand (0.06-2 mm)		*90*	*90*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

146

NOTES/COMMENTS; Stream in pretty good condiation. Typical Rosgen "E" channel. Channel dry and not well defined a short distance downstream. Channel incised and water pooled at lower end.

High Gradient Stream Data Sheet

STREAM NAME: *INT-3 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 51* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-22.0* LONG: *87-00-33.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 3:27 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *76* °F. Inches rainfall in past 24 hours *0* in

80 % Cloud Cover

P-Chem: Temp (°F) *69.3* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *66.3* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*2.5*	ft
Stream Width BF	*7.5*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments	
☐ Island	☐ Waterfalls	
☐ Other	☐ Culverts	

Stream Flow; ☐ Dry ☑ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☑ Intermittent ☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Sugar maple*, *Sycamore*, *Sweetgum*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *50* %	Pool *50* %
Silt/Clay (<0.06 mm)			
Sand (0.06-2 mm)			
Gravel (2-64 mm)		*5*	*5*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock		95	*95*

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 94

NOTES/COMMENTS; Channel very incised/entrenched.

Low Gradient Stream Data Sheet

STREAM NAME: *INT-4 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 72* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-25.6* LONG: *87-00-56.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 11:00 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *55* °F. Inches rainfall in past 24 hours *.6* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*8.0*	ft
Range of Depth		ft
Bankfull Depth	*0.75*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
American Elm
Sugarberry
Sugar maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 100

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-4 (MS)*	LOCATION: *Lewis Creek West*
STATION: *WP 75* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-35.0* LONG: *87-01-04.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 11:40 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *61.5* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *94.5* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*3.5*	ft
Stream Width BF	*7.0*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Ironwood
Green Ash
Red maple
River Birch

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *90* %	Pool *10* %
Silt/Clay (<0.06 mm)		*90*	*90*
Sand (0.06-2 mm)		*10*	*10*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

101

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-4 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 1238* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-4.4* LONG: *87-01-14.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 10:35 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *55* °F. Inches rainfall in past 24 hours *0* in

100 % Cloud Cover

P-Chem: Temp (°F) *56.7* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *52.8* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*4.3*	ft
Stream Width BF	*8.9*	ft
Range of Depth		ft
Bankfull Depth	*1.9*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Tulip Poplar
Slippery Elm
Sugar maple
Sassafras

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *33* %	Run; *34* %	Pool *33* %
Silt/Clay (<0.06 mm)	*40*	*40*	*60*
Sand (0.06-2 mm)	*50*	*50*	*40*
Gravel (2-64 mm)	*10*	*10*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

74

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-5 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 78* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-36.6* LONG: *87-01-05.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 12:50 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *65* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.5*	ft
Stream Width BF	*4.0*	ft
Range of Depth		ft
Bankfull Depth	*0.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☑ Intermittent ☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Sycamore*, *Sweetgum*, *Red maple*, *Yellow Poplar*, *Spicebush*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- ☐ Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 99

NOTES/COMMENTS; Channel much smaller at lower end, above confluence with I-74

Low Gradient Stream Data Sheet

STREAM NAME: *INT-5 (MS)*	LOCATION: *Lewis Creek West*
STATION: *WP 107* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-44.4* LONG: *87-01-00.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 12:00 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *68* °F. Inches rainfall in past 24 hours *0* in

15 % Cloud Cover

P-Chem: Temp (°F) *58.5* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *88.0* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*4.0*	ft
Stream Width BF	*6.0*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☑ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Shagbark Hickory
Ironwood
River Birch
Yellow Poplar
Spicebush

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *5* %	Pool *95* %
Silt/Clay (<0.06 mm)		*30*	*30*
Sand (0.06-2 mm)		*70*	*70*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-5 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 84* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-05.2* LONG: *87-00-51.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 3:20 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *68.1* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *75.2* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*5.0*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☑ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore
Sweetgum
Red Maple
Yellow Poplar
Spicebush

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *70* %	Pool *30* %
Silt/Clay (<0.06 mm)			
Sand (0.06-2 mm)		*100*	*100*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 83

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-6 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 2* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-36.1* LONG: *87-01-18.9*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-21-11* TIME: 2:30 ☐AM ☑PM	INVESTIGATORS; *Rick Heil, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *78* °F. Inches rainfall in past 24 hours *.01* in

50 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*4.6*	ft
Range of Depth		ft
Bankfull Depth	*0.6*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☐ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *2*

Dom. Tree/Shrub Taxa
Red Maple
Sugarberry
River Birch
Slippery Elm

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 85

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *INT-6 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 4* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-44.0* LONG: *87-01-17.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-21-11* TIME: 5:03 ☐AM ☑PM	INVESTIGATORS; *Rick Heil, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *84* °F. Inches rainfall in past 24 hours *.01* in

20 % Cloud Cover

P-Chem: Temp (°F) *72.1* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *117* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2-5*	ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*0.45*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☑ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep
Well

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar Maple
Sweetgum
Green Ash
Slippery Elm

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *70* %	Pool *30* %
Silt/Clay (<0.06 mm)		*70*	*70*
Sand (0.06-2 mm)		*30*	*30*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 120

NOTES/COMMENTS; Well above wetland, drains through wetland into stream.

High Gradient Stream Data Sheet

STREAM NAME: *INT-7*	LOCATION: *Lewis Creek West*
STATION: *WP 42* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-27.2* LONG: *87-00-41.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 1:30 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

50 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar maple
Sycamore
Hophornbeam
Sweetgum
Tulip poplar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*80*	
Sand (0.06-2 mm)		*10*	
Gravel (2-64 mm)		*10*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 71

NOTES/COMMENTS; Channel incised.

Low Gradient Stream Data Sheet

STREAM NAME: *E-1*	LOCATION: *Lewis Creek West*
STATION: *WP 1085* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-28.2* LONG: *87-00-57.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-26-11* TIME:12:17 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☐No

Air temperature ____ °F. Inches rainfall in past 24 hours ____ in

____ % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) ____ % Saturation ____ pH(S.U.) ____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*2.0*	ft
Stream Width BF	*4.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☐ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *2*

Dom. Tree/Shrub Taxa
Red maple
Redcedar

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle ____ %	Run; *20* %	Pool *80* %
Silt/Clay (<0.06 mm)		*100*	*100*
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 77

NOTES/COMMENTS; Channel very incised/entrenched at mouth. Trees-shrubs sparse.

Low Gradient Stream Data Sheet

STREAM NAME: *E-2*	LOCATION: *Lewis Creek West*
STATION: *WP 1071* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-19.2* LONG: *87-00-43.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-26-11* TIME:10-10 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☐ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *2*

Dom. Tree/Shrub Taxa
River birch (2)

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 68

NOTES/COMMENTS; Cow pasture ditch.

Low Gradient Stream Data Sheet

STREAM NAME: *E-3*	LOCATION: *Lewis Creek West*
STATION: *WP 1083* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-22.1* LONG: *87-00-33.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-26-11* TIME:11:40 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Tulip poplar
Blackgum
Red maple
Sycamore

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 87

NOTES/COMMENTS; E-6 parallels E-7 for their length, then both peter out at lower end. New dirt roads are present (probably coal exporaton).

Low Gradient Stream Data Sheet

STREAM NAME: *E-4*	LOCATION: *Lewis Creek West*
STATION: *WP 1053* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-14.9* LONG: *87-00-33.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME:3:00 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

70 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.5*	ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Sweetgum
Red maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*75*	
Sand (0.06-2 mm)		*23*	
Gravel (2-64 mm)		*2 (small)*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-5*	LOCATION: *Lewis Creek West*
STATION: *WP 1061* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-20.9* LONG: *87-00-18.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME: *4:36* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *82* °F. Inches rainfall in past 24 hours *0* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Discharge	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees	☑ Shrubs
☐ Grasses	☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa
Beech
Hophornbeam
Red maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 95

NOTES/COMMENTS; Trees sparse. Defined channel only in a few places, and filled/peters out at lower end. May want to disregard.

Low Gradient Stream Data Sheet

STREAM NAME: *E-6*	LOCATION: *Lewis Creek West*
STATION: *WP 998* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-11.5* LONG: *87-00-15.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-24-11* TIME:2:11 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *87* °F. Inches rainfall in past 24 hours *0* in

35 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*4.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Red maple
Dogwood
Sweetgum
Pinoak
Tulip poplar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*60*	
Sand (0.06-2 mm)		*40*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 97

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-7*	LOCATION: *Lewis Creek West*
STATION: *WP 1000* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-22.0* LONG: *87-00-12.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-24-11* TIME: *3:51* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:	Now	Past 24 hours
	☐	☐ Heavy rain
	☐	☐ Steady rain
	☐	☐ Intermittent showers
	☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *90* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
White oak
Hophornbeam
Sourwood
Hickory
Sweetgum

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **98**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-8*	LOCATION: *Lewis Creek West*
STATION: *WP 938* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-22.8* LONG: *87-00-07.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-22-11* TIME: *6:40* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER: Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Red maple
Tulip poplar
Wild cherry
Paw paw
Sweetgum

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *95* %	Pool *5* %
Silt/Clay (<0.06 mm)		*60*	*80*
Sand (0.06-2 mm)		*40*	*20*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 85

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-9*	LOCATION: *Lewis Creek West*
STATION: *WP 940* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-24.4* LONG: *87-00-00.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-22-11* TIME: *7:00* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:	Now	Past 24 hours
	☐	☐ Heavy rain
	☐	☐ Steady rain
	☐	☐ Intermittent showers
	☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*4.0*	ft
Range of Depth		ft
Bankfull Depth	*.4*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Red maple
Tulip poplar
Sweetgum

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*90*	
Sand (0.06-2 mm)		*10*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 96

NOTES/COMMENTS; Recent clearing. Channel peters out at bottom.

High Gradient Stream Data Sheet

STREAM NAME: *E-10*	LOCATION: *Lewis Creek West*
STATION: *WP 936* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-19.9* LONG: *86-59-58.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-22-11* TIME: *5:56* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *88* °F. Inches rainfall in past 24 hours *0* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Redcedar
Basswood
Sweetgum
Elm
Dogwood

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 86

NOTES/COMMENTS; Channel peters out at bottom.

High Gradient Stream Data Sheet

STREAM NAME: *E-11*	LOCATION: *Lewis Creek West*
STATION: *WP 1004* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-11.0* LONG: *87-00-08.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME: *9:06* ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:	Now	Past 24 hours
	☐	☐ Heavy rain
	☐	☐ Steady rain
	☐	☐ Intermittent showers
	☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *72* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*8.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sweetgum
Hophornbeam
Ironwood
White oak
Beech

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*90*	
Sand (0.06-2 mm)		*10*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 107

NOTES/COMMENTS; Large channel for size of watershed. Appears to have gone through channel evoluation.

High Gradient Stream Data Sheet

STREAM NAME: *E-12*	LOCATION: *Lewis Creek West*
STATION: *WP 27* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-03.0* LONG: *86-59-56.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-19-11* TIME: *10:11* ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

40 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.25*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.75*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Sweetgum*, *Basswood*, *Chestnut oak*, *Sycamore*, *Tulip poplar*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*95*	
Sand (0.06-2 mm)		*5*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 82

NOTES/COMMENTS; Slight to moderate incision.

Low Gradient Stream Data Sheet

STREAM NAME: *E-13*	LOCATION: *Lewis Creek West*
STATION: *WP 991* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-54.7* LONG: *87-00-04.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-24-11* TIME:11:46 ☑AM ☐PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *82* °F. Inches rainfall in past 24 hours *0* in

15 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*10.0*	ft
Range of Depth		ft
Bankfull Depth	*1.0*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Green ash
Hophornbeam
Sweetgum
Red maple
Hickory

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 111

NOTES/COMMENTS; Assessment point near confluence of Tribs E-1 and E-21.

High Gradient Stream Data Sheet

STREAM NAME: *E-14*	LOCATION: *Lewis Creek West*
STATION: *WP 995* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-02.7* LONG: *87-00-21.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-24-11* TIME: *1:10* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *87* °F. Inches rainfall in past 24 hours *0* in

20 % Cloud Cover

P-Chem: Temp (°F) *75* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *206* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*2.0*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☑ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Sweetgum*, *Alder*, *Dogwood*, *Pawpaw*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *30* %	Pool *70* %
Silt/Clay (<0.06 mm)		*70*	*100*
Sand (0.06-2 mm)		*15*	
Gravel (2-64 mm)		*15*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **81**

NOTES/COMMENTS; Channel somewhat encised/entrenched. Lower end of channel filled/plowed under

High Gradient Stream Data Sheet

STREAM NAME: *E-15*	LOCATION: *Lewis Creek West*
STATION: *WP 1047* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-10.0* LONG: *87-00-29.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME: *1:59* ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *87* °F. Inches rainfall in past 24 hours *0* in

70 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees	☑ Shrubs
☐ Grasses	☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa
Sweetgum
Red Maple
River Birch

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*60*	
Sand (0.06-2 mm)		*40*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 119

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-16*	LOCATION: *Lewis Creek West*
STATION: *WP 1049* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-12.2* LONG: *87-00-31.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME:2:30 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

50 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*5.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Sweetgum
Red maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *90* %	Pool *10* %
Silt/Clay (<0.06 mm)		*100*	*100*
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 107

NOTES/COMMENTS; May have formed from head(Int-1) and or overflow channel of Int-1.

Low Gradient Stream Data Sheet

STREAM NAME: *E-17*	LOCATION: *Lewis Creek West*
STATION: *WP 1056* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-14.2* LONG: *87-00-36.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME:3:22 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

30 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Paw Paw
Beech
Sweetgum
Red maple
Sycamore

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 108

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-18*	LOCATION: *Lewis Creek West*
STATION: *WP 1055* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-13.2* LONG: *87-00-35.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-25-11* TIME:3:35 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

30 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	Ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Paw Paw
Beech
Sweetgum
Red maple
Sycamore

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 108

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-19*	LOCATION: *Lewis Creek West*
STATION: *WP 1063* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-22-15.9* LONG: *87-01-02.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-26-11* TIME: 8:37 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson. Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *66* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*2.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore
Red Maple
Tulip Poplar
Pawpaw

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*30*	
Sand (0.06-2 mm)		*70*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 62

NOTES/COMMENTS; Cow access, some erosion/sedimontation

Low Gradient Stream Data Sheet

STREAM NAME: *E-20 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 18* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-28.4* LONG: *87-00-00.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-17-11* TIME:6:00 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

40 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.5*	Ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*.35*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Sugar Berry
Red Oak sp.
Sweetgum
Red maple
Shagbark Hickory

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 77

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-20 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 23* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-34.5* LONG: *87-00-18.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-17-11* TIME: 10:02 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

20 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Dogwood*, *Red Maple*, *Tulip Poplar*, *Red Cedar*, *Sycamore*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *95* %	Pool *5* %
Silt/Clay (<0.06 mm)		*5*	*10*
Sand (0.06-2 mm)		*90*	*90*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)		*5*	
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 85

NOTES/COMMENTS; Braided at sample point, slight incision in places.

High Gradient Stream Data Sheet

STREAM NAME: *E-21*	LOCATION: *Lewis Creek West*
STATION: *WP 20* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-28.0* LONG: *87-00-22.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-17-11* TIME: 6:45 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.30*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
River Birch
Sweetgum
Sycamore
Red Cedar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*40*	*30*
Sand (0.06-2 mm)		*50*	*65*
Gravel (2-64 mm)		*10*	*5*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 70

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-22*	LOCATION: *Lewis Creek West*
STATION: *WP 13* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-22.8* LONG: *87-00-10.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-16-11* TIME:4:15 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

30 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	Ft
Stream Width BF	*1.8*	ft
Range of Depth		ft
Bankfull Depth	*.40*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
River Birch
Sycamore
Elm sp.
Red maple
Pin Oak

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*85*	
Sand (0.06-2 mm)		*5*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)		*5*	
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 94

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-23*	LOCATION: *Lewis Creek West*
STATION: *WP 9* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-18.6* LONG: *87-00-04.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-16-11* TIME:2:31 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

35 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	Ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Sugarberry
Sweetgum
Elm sp.
Sugar maple
Red Oak

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 84

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-24*	LOCATION: *Lewis Creek West*
STATION: *WP 7* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-07.6* LONG: *87-00-11.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-15-11* TIME:5:09 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐Yes ☑No

Air temperature *83* °F. Inches rainfall in past 24 hours *0* in

50 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	Ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata _____

Dom. Tree/Shrub Taxa
Sycamore
Sugar Maple
Sweetgum
Red maple
River Birch

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *90* %	Pool *10* %
Silt/Clay (<0.06 mm)		*90*	*90*
Sand (0.06-2 mm)		*10*	*10*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-25*	LOCATION: *Lewis Creek Westt*
STATION: *WP18* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-7.2* LONG: *87-00-33.9*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-13-11* TIME: 7:21 ☐AM ☑PM	INVESTIGATORS; *John Bottom*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.5*	ft
Stream Width BF	*5.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Maple
Sycamore
Sweetgum
Sugarberry

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 90

NOTES/COMMENTS

High Gradient Stream Data Sheet

STREAM NAME: *E-26*	LOCATION: *Lewis Creek West*
STATION: *WP 5* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-10.3* LONG: *87-00-26.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-15-11* TIME: 4:00 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *83* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
White Ash
Sweetgum
Sycamore
Sugar Maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *90* %	Pool *10* %
Silt/Clay (<0.06 mm)		*10*	*25*
Sand (0.06-2 mm)		*35*	*25*
Gravel (2-64 mm)		*35*	*15*
Cobble (64-256 mm)		*10*	*10*
Boulders (>256 mm)		*5*	*15*
Bedrock		5	*10*

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 88

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-26A*	LOCATION: *Lewis Creek West*
STATION: *WP 3* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-08.0* LONG: *87-00-25.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-15-11* TIME: 3:40 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *82* °F. Inches rainfall in past 24 hours *0* in

70 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☐ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *2*

Dom. Tree/Shrub Taxa
Tulip Poplar
Sweetgum
Sycamore
Sugar Maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*85*	*90*
Sand (0.06-2 mm)			
Gravel (2-64 mm)		*10*	*5*
Cobble (64-256 mm)		*5*	*5*
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 80

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-27*	LOCATION: *Lewis Creek West*
STATION: *WP 14* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-13.3* LONG: *87-00-29.9*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-13-11* TIME: *6:58* ☐ AM ☑ PM	INVESTIGATORS; *John Bottom*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.3*	ft
Stream Width BF	*2.2*	ft
Range of Depth		ft
Bankfull Depth	*.35*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa
Maple
Sycamore
Sweetgum
Dogwood

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **87**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-28*	LOCATION: *Lewis Creek West*
STATION: *WP 11* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-2.2* LONG: *87-00-28.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-13-11* TIME: *6:12* ☐ AM ☑ PM	INVESTIGATORS; *John Bottom*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*.8*	ft
Stream Width BF	*1.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Maple
Sycamore
Beech

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **86**

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-29*	LOCATION: *Lewis Creek West*
STATION: *WP 8* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-5.2* LONG: *87-00-39.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-13-11* TIME: 5:59 ☐AM ☑PM	INVESTIGATORS; *John Bottom*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *80* °F. Inches rainfall in past 24 hours *0* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.4*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☑ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☑ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☑ Shrubs ☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa: *Maple*, *Oak*, *Sweetgum*, *Sugarberry*

Canopy Cover;
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;
- ☐ Dredging
- ☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *75* %	Pool *25* %
Silt/Clay (<0.06 mm)			
Sand (0.06-2 mm)		*50*	*100*
Gravel (2-64 mm)		*50*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

91

NOTES/COMMENTS

Low Gradient Stream Data Sheet

STREAM NAME: *E-30*	LOCATION: *Lewis Creek West*
STATION: *WP4* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-9.8* LONG: *87-00-40.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-13-11* TIME: 4:32 ☐AM ☑PM	INVESTIGATORS; *John Bottom*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *88* °F. Inches rainfall in past 24 hours *0* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*1.5*	ft
Range of Depth		ft
Bankfull Depth	*.1*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☑ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☐ Trees ☐ Shrubs
☐ Grasses ☐ Herbaceous
Number of Strata *0*

Dom. Tree/Shrub Taxa
None

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 28

NOTES/COMMENTS Stream flows through plowed Ag field.

High Gradient Stream Data Sheet

STREAM NAME: *E-31*	LOCATION: *Lewis Creek West*
STATION: *WP 57* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-18.3* LONG: *87-00-50.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 5:47 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
Cloudy ☐	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *76* °F. Inches rainfall in past 24 hours *0* in

90 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Ironwood
Hickory
Sweetgum
River birch

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 83

NOTES/COMMENTS; Somewhat incised.

High Gradient Stream Data Sheet

STREAM NAME: *E-32*	LOCATION: *Lewis Creek West*
STATION: *WP 49* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-23.4* LONG: *87-00-31.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 3:12 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *76* °F. Inches rainfall in past 24 hours *0* in

80 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Dogwood
Sugar maple
Tulip poplar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*90*	
Sand (0.06-2 mm)		*5*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 102

NOTES/COMMENTS; Somewhat incised.

High Gradient Stream Data Sheet

STREAM NAME: *E-33*	LOCATION: *Lewis Creek West*
STATION: *WP 47* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-22.4* LONG: *87-00-38.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 2:41 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar maple
Beech
Sweetgum
Spicebush

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*45*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 70

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-34*	LOCATION: *Lewis Creek West*
STATION: *WP 28* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-35.9* LONG: *87-00-36.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 11:17 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *74* °F. Inches rainfall in past 24 hours *0* in

40 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.5*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

River birch
Sugar maple
Tulip poplar

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 104

NOTES/COMMENTS; Somewhat incised.

High Gradient Stream Data Sheet

STREAM NAME: *E-35*	LOCATION: *Lewis Creek West*
STATION: *WP 40* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-28.0* LONG: *87-00-36.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 1:00 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

25 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees	☑ Shrubs
☐ Grasses	☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar maple
Beech
Hickory sp.
Hophornbean

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*80*	
Sand (0.06-2 mm)		*10*	
Gravel (2-64 mm)		*10*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 73

NOTES/COMMENTS; Incised in places-headcuts

High Gradient Stream Data Sheet

STREAM NAME: *E-36*	LOCATION: *Lewis Creek West*
STATION: *WP 37* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-29.9* LONG: *87-00-36.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 12:37 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

30 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*1.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Sugar maple
White Oak
Tulip Poplar

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*95*	
Sand (0.06-2 mm)		*5*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **99**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-37*	LOCATION: *Lewis Creek West*
STATION: *WP 34* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-34.3* LONG: *87-00-33.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 12:00 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *75* °F. Inches rainfall in past 24 hours *0* in

40 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.25*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar maple
White Oak
Beech
Ironwood
Hickory sp.

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*85*	
Sand (0.06-2 mm)		*10*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 97

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-38*	LOCATION: *Lewis Creek West*
STATION: *WP 31* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-36.6* LONG: *87-00-35.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 11:34 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *74* °F. Inches rainfall in past 24 hours *0* in

40 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Sugar maple
Hophornbean
Sweetgum

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 92

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-39*	LOCATION: *Lewis Creek West*
STATION: *WP 27* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-38.4* LONG: *87-00-35.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 10:53 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *73* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*1.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Sugar maple
Dogwood
Sweetgum
Sycamore

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*80*	
Sand (0.06-2 mm)		*15*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 90

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-40*	LOCATION: *Lewis Creek West*
STATION: *WP 22* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-41.2* LONG: *87-00-34.9*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 10:15 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *70* °F. Inches rainfall in past 24 hours *0* in

25 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar maple
Hickory sp.
White Oak
Ash sp.

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*80*	
Sand (0.06-2 mm)		*15*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **82**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-41*	LOCATION: *Lewis Creek West*
STATION: *WP 24* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-38.6* LONG: *87-00-37.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 10:40 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *72* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Sugar maple
Shagbark Hickory
Tulip Poplar
Black Walnut

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*65*	
Sand (0.06-2 mm)		*35*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **92**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-42*	LOCATION: *Lewis Creek West*
STATION: *WP 45* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-32.0* LONG: *87-00-42.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 2:00 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *77* °F. Inches rainfall in past 24 hours *0* in

60 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*5.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow; ☑ Dry ☐ Pooled ☐ Low ☐ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☐ Intermittent ☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees	☑ Shrubs
☐ Grasses	☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa
Sugar maple
Dogwood
Beech
White Oak

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*45*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)		*5*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 68

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-43*	LOCATION: *Lewis Creek West*
STATION: *WP 109* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-37.5* LONG: *87-01-02.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 2:07 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours ____ in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
River Birch
Sweetgum
Red Maple
Ironwood

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle ____ %	Run; *100* %	Pool ____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 100

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-44*	LOCATION: *Lewis Creek West*
STATION: *WP 86* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-46.9* LONG: *87-00-52.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 3:45 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours ____ in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*.50*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore
Sweetgum
Red Maple
Blackgum
Paw Paw

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 80

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-45*	LOCATION: *Lewis Creek West*
STATION: *WP 90* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-55.3* LONG: *87-00-42.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 4:25 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Beech
Sweetgum
Red Maple
Red Cedar
Spicebush

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 83

NOTES/COMMENTS; Incised in places; little defined channel in places.

High Gradient Stream Data Sheet

STREAM NAME: *E-46*	LOCATION: *Lewis Creek West*
STATION: *WP 93* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-58.7* LONG: *87-00-41.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 5:00 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *70* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*3.0*	ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Red maple
Hickory sp.
Red Cedar
Yellow Poplar
Sweetgum

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 78

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-47*	LOCATION: *Lewis Creek West*
STATION: *WP 91* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-57.6* LONG: *87-00-44.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 4:45 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	Ft
Stream Width BF	*1.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Dogwood
Sweetgum
Red Maple
Blackgum
Paw Paw

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*75*	
Sand (0.06-2 mm)		*25*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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 90

NOTES/COMMENTS; Incised in places; little defined channel in places.

High Gradient Stream Data Sheet

STREAM NAME: *E-48*	LOCATION: *Lewis Creek West*
STATION: *WP 82* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-00.0* LONG: *87-00-48.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 2:35 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *70* °F. Inches rainfall in past 24 hours *.6* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Red maple
Ash sp.
Yellow Poplar

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*60*	
Sand (0.06-2 mm)		*40*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 76

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-49*	LOCATION: *Lewis Creek West*
STATION: *WP 97* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-56.7* LONG: *87-00-55.8*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 9:20 ☑ AM ☐ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *57* °F. Inches rainfall in past 24 hours *0* in

100 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.25*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Red Cedar
White Ash
Yellow Poplar
Red Oak
Sweetgum

Canopy Cover;

☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*95*	
Sand (0.06-2 mm)		*5*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 92

NOTES/COMMENTS;

Low Gradient Stream Data Sheet

STREAM NAME: *E-50*	LOCATION: *Lewis Creek West*
STATION: *WP 80* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-51.8* LONG: *87-01-08.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 1:35 ☐AM ☑PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *68* °F. Inches rainfall in past 24 hours *.6* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*1.5*	ft
Range of Depth		ft
Bankfull Depth	*0.25*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sweetgum
Red Maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*100*	
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

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 not new fall and not 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 new fall, 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 Availability	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 despoits of fine material, increased bar development; 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 3-4 times longer than if it was 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 2-3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2-1 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	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 frequently 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; disruptive 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 has inpacted 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

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-51 (DS)*	LOCATION: *Lewis Creek West*
STATION: *WP 1190* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-57.5* LONG: *87-01-09.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 12:30 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

100 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*2.7*	ft
Range of Depth		ft
Bankfull Depth	*.60*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sweetgum
Tulip Poplar
Honeysuckle

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *70* %	Run; _____ %	Pool *30* %
Silt/Clay (<0.06 mm)	*40*		*40*
Sand (0.06-2 mm)	*40*		*40*
Gravel (2-64 mm)	*20*		*20*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 75

NOTES/COMMENTS; Stream has a section that goes through wetland and then becomes braided downstream to main channel.

High Gradient Stream Data Sheet

STREAM NAME: *E-51 (MS)*	LOCATION: *Lewis Creek West*
STATION: *WP 1204* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-03.8* LONG: *87-01-05.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 11:00 ☑ AM ☐ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

25 % Cloud Cover

P-Chem: Temp (°F) *58.1* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *47* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.8*	ft
Stream Width BF	*4.9*	ft
Range of Depth		ft
Bankfull Depth	*1.3*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Dogwood
Sycamore
Red Maple
Red Cedar
Sassfras

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*25*	*25*
Sand (0.06-2 mm)		*40*	*50*
Gravel (2-64 mm)		*35*	*25*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **88**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-51 (US)*	LOCATION: *Lewis Creek West*
STATION: *WP 1205* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-06.0* LONG: *87-01-05.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 12:00 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

5 % Cloud Cover

P-Chem: Temp (°F) *60.1* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *60.4* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.3*	ft
Stream Width BF	*2.2*	ft
Range of Depth		ft
Bankfull Depth	*0.8*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Green Ash
Sycamore
Red Maple
Sweetgum

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *50* %	Pool *50* %
Silt/Clay (<0.06 mm)		*35*	*60*
Sand (0.06-2 mm)		*40*	*40*
Gravel (2-64 mm)		*25*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 99

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-52*	LOCATION: *Lewis Creek West*
STATION: *WP 1184* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-06.4* LONG: *87-01-00.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-14-11* TIME: 3:45 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *82* °F. Inches rainfall in past 24 hours *0* in

100 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.8*	ft
Stream Width BF	*3.2*	ft
Range of Depth		ft
Bankfull Depth	*.40*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☑ Grasses ☑ Herbaceous
Number of Strata *4*

Dom. Tree/Shrub Taxa
Red Cedar
Hackberry
Yellow Poplar
Sugar Maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☑ Channelization
(☐ Full ☑ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*50*	*35*
Sand (0.06-2 mm)		*50*	*65*
Gravel (2-64 mm)			*5*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 67

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-53*	LOCATION: *Lewis Creek West*
STATION: *WP 1240* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-05.1* LONG: *87-01-13.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 10:55 ☑ AM ☐ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *55* °F. Inches rainfall in past 24 hours *0* in

100 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.8*	ft
Stream Width BF	*2.7*	ft
Range of Depth		ft
Bankfull Depth	*0.5*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Dogwood
Red Cedar
Winged Elm
Red Maple
Cherry

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*30*	
Sand (0.06-2 mm)		*70*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 78

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-54*	LOCATION: *Lewis Creek West*
STATION: *WP 1242* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-08.5* LONG: *87-01-17.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 11:20 ☑ AM ☐ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *55* °F. Inches rainfall in past 24 hours *0* in

70 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*2.0*	ft
Stream Width BF	*3.8*	ft
Range of Depth		ft
Bankfull Depth	*.60*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Red maple
Sycamore
Beech
Yellow Poplar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *70* %	Pool *30* %
Silt/Clay (<0.06 mm)		*25*	*20*
Sand (0.06-2 mm)		*35*	*70*
Gravel (2-64 mm)		*40*	*10*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **110**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-55*	LOCATION: *Lewis Creek West*
STATION: *WP 1216* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-12.9* LONG: *87-01-14.6*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 4:26 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.4*	ft
Stream Width BF	*5.1*	ft
Range of Depth		ft
Bankfull Depth	*0.65*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments
☐ Island	☐ Waterfalls
☐ Other	☐ Culverts

Stream Flow;

☑ Dry	☐ Pooled	☐ Low	☐ Normal
☐ High	☐ Very Rapid or Torrential		

Stream Type;

☐ Perennial	☐ Intermittent
☑ Ephemeral	☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees	☑ Shrubs
☐ Grasses	☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

Beech
Tulip Poplar
Slippery Elm
Red Cedar
Red Oak

Canopy Cover;

- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging

☐ Channelization

(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *20* %	Run; *60* %	Pool *20* %
Silt/Clay (<0.06 mm)	*20*	*20*	
Sand (0.06-2 mm)	*50*	*50*	*80*
Gravel (2-64 mm)	*30*	*30*	*20*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 102

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-56*	LOCATION: *Lewis Creek West*
STATION: *WP 1219* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-14.9* LONG: *87-01-14.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 4:50 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*0.70*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Dogwood
Sugar Maple
White Oak
Red Cedar
Beech

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*20*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)		*30*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 85

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-57*	LOCATION: *Lewis Creek West*
STATION: *WP 1214* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-14.5* LONG: *87-01-13.0*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 4:00 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.9*	ft
Stream Width BF	*3.0*	ft
Range of Depth		ft
Bankfull Depth	*0.40*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Beech
Sweetgum
Winged Elm
Green Ash

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*70*	
Sand (0.06-2 mm)		*30*	
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 90

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-58*	LOCATION: *Lewis Creek West*
STATION: *WP 1243* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-10.5* LONG: *87-01-18.1*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 11:50 ☑ AM ☐ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *0* in

50 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.8*	ft
Stream Width BF	*2.9*	ft
Range of Depth		ft
Bankfull Depth	*0.65*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;

☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous

Number of Strata *3*

Dom. Tree/Shrub Taxa

White Oak
Red Maple
Sweetgum
Red Cedar

Canopy Cover;

☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;

Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *100* %	Pool _____ %
Silt/Clay (<0.06 mm)		*20*	
Sand (0.06-2 mm)		*50*	
Gravel (2-64 mm)		*30*	
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 99

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-59*	LOCATION: *Lewis Creek West*
STATION: *WP 1235* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-15.9* LONG: *87-01-17.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 6:08 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.2*	ft
Range of Depth		ft
Bankfull Depth	*0.40*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Beech
Red Maple
Blackgum
Red Cedar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *70* %	Pool *30* %
Silt/Clay (<0.06 mm)		*80*	*80*
Sand (0.06-2 mm)			
Gravel (2-64 mm)		*20*	*20*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 92

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-60*	LOCATION: *Lewis Creek West*
STATION: *WP 1222* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-16.4* LONG: *87-01-19.7*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-15-11* TIME: 5:30 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *60* °F. Inches rainfall in past 24 hours *.6* in

5 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.2*	ft
Stream Width BF	*2.0*	ft
Range of Depth		ft
Bankfull Depth	*0.40*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Beech
Sugar Maple
Tulip Poplar
Red Cedar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *50* %	Pool *50* %
Silt/Clay (<0.06 mm)		*30*	*30*
Sand (0.06-2 mm)		*70*	*70*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **91**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-61*	LOCATION: *Lewis Creek West*
STATION: *WP 1253* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-01.0* LONG: *87-01-24.3*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 2:00 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *65* °F. Inches rainfall in past 24 hours *0* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.9*	ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*0.45*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Paw Paw
Sycamore
Winged Elm
Tulip Poplar

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*30*	*30*
Sand (0.06-2 mm)		*40*	*50*
Gravel (2-64 mm)		*20*	*20*
Cobble (64-256 mm)		*5*	
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 96

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-62*	LOCATION: *Lewis Creek West*
STATION: *WP 1248* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-22-03.1* LONG: *87-01-24.5*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *9-16-11* TIME: 1:15 ☐ AM ☑ PM	INVESTIGATORS; *John Bottom, Julie Clark*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *65* °F. Inches rainfall in past 24 hours *0* in

10 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*0.9*	ft
Stream Width BF	*1.8*	ft
Range of Depth		ft
Bankfull Depth	*0.3*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Tulip Poplar
Red Maple

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *70* %	Pool *30* %
Silt/Clay (<0.06 mm)		*50*	*55*
Sand (0.06-2 mm)		*50*	*45*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **96**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-63*	LOCATION: *Lewis Creek West*
STATION: *WP 62* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green*
LAT: *37-21-25.6* LONG: *87-00-51.2*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *1-25-12* TIME: 1:15 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson, Jason Britton*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☑	☐ Intermittent showers
☐	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? .80 ☑ Yes ☐ No

Air temperature *37* °F. Inches rainfall in past 24 hours *0* in

100 % Cloud Cover

P-Chem: Temp (°F) *43.4* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *54.9* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.5*	ft
Stream Width BF	*4.5*	ft
Range of Depth		ft
Bankfull Depth	*0.5*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☑ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore
Sugar Maple
Sugarberry
Beech

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*70*	*70*
Sand (0.06-2 mm)		*30*	*30*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 **110**

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *E-64*	LOCATION: *Lewis Creek West*
STATION: *WP 63* DRAINAGE AREA (AC)	BASIN/WATERSHED *Green River/Lewis Creek*
LAT: *37-21-55.4* LONG: *87-00-20.4*	COUNTY; *Ohio* USGS 7.5 TOPO;
DATE: *8-17-11* TIME: 12:43 ☐ AM ☑ PM	INVESTIGATORS; *Bill Sampson. Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☑	☑ Clear/sunny

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air temperature *85* °F. Inches rainfall in past 24 hours *0* in

0 % Cloud Cover

P-Chem: Temp (°F) *N/A* D.O. (mg/l) _____ % Saturation _____ PH(S.U.) _____ Cond.µs *N/A* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width BW	*1.0*	ft
Stream Width BF	*2.5*	ft
Range of Depth		ft
Bankfull Depth	*.35*	cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☑ Dry ☐ Pooled ☐ Low ☐ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☑ Shrubs
☐ Grasses ☑ Herbaceous
Number of Strata *3*

Dom. Tree/Shrub Taxa
Sycamore
Red Maple
Tulip Poplar
Red Oak

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☑ Fully Shaded (75-100%)

Channel Alterations;
Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle _____ %	Run; *95* %	Pool *5* %
Silt/Clay (<0.06 mm)		*70*	*70*
Sand (0.06-2 mm)		*30*	*30*
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% 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 not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% 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. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
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 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% 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 50% 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**
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 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of 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 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
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	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 frequently 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; disruptive 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 85

NOTES/COMMENTS; Channel moderately incised & entrenched.

PER-1 (West Fork Lewis Creek), Looking upstream

PER-1 (West Fork Lewis Creek), Looking downstream

INT-1, Looking downstream in
Upper-mid reach

INT-1, Looking upstream in
Middle reach

INT-1, Looking downstream in
Downstream reach

INT-2, Looking downstream in Upstream reach

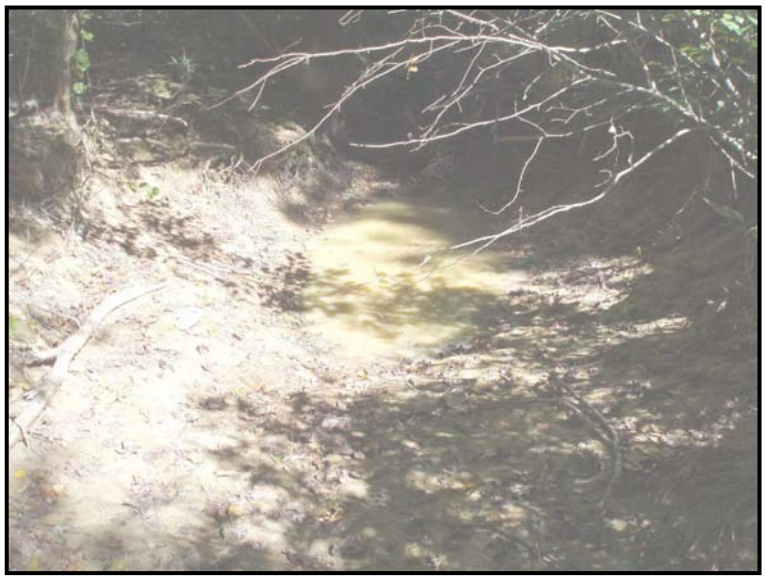
INT-2, Looking downstream in Downstream reach

INT-3, Looking upstream in Upstream reach

INT-3, Looking downstream in Middle reach

INT-3, Looking downstream in Downstream reach

INT-4, Looking downstream in Upstream reach



INT-4, Looking upstream in Middle reach

INT-4, Looking downstream in Downstream reach

INT-5, Looking downstream in Upstream reach

INT-5, Looking downstream in Middle reach

INT-5, Looking downstream in Downstream reach

INT-6, Looking upstream (toward well/spring) in Upstream reach

INT-6, Looking downstream in Downstream reach

INT-7, Looking upstream

INT-7, Looking downstream

Ephemeral 1 (E-1)

Ephemeral 2 (E-2)

Ephemeral 3 (E-3)

Ephemeral 4 (E-4)

Ephemeral 5 (E-5)

Ephemeral 6 (E-6)

Ephemeral 7 (E-7)

Ephemeral 8 (E-8)

Ephemeral 9 (E-9)

Ephemeral 10 (E-10)

Ephemeral 11 (E-11)

Ephemeral 12 (E-12)

Ephemeral 13 (E-13)

Ephemeral 14 (E-14)

Ephemeral 15 (E-15)

Ephemeral 16 (E-16)

Ephemeral 17 (E-17)

Ephemeral 18 (E-18)

Ephemeral 19 (E-19)

Ephemeral 20 (E-20)

Ephemeral 21 (E-21)

Ephemeral 22 (E-22)

Ephemeral 23 (E-23)

Ephemeral 24 (E-24)

Ephemeral 25 (E-25)

Ephemeral 26 (E-26)

Ephemeral 26A (E-26A)

Ephemeral 27 (E-27)

Ephemeral 28 (E-28)

Ephemeral 29 (E-29)

Ephemeral 30 (E-30)

Ephemeral 31 (E-31)

Ephemeral 32 (E-32)

Ephemeral 33 (E-33)

Ephemeral 34 (E-34)

Ephemeral 35 (E-35)

Ephemeral 36 (E-36)

Ephemeral 37 (E-37)

Ephemeral 38 (E-38)

Ephemeral 39 (E-39)

Ephemeral 40 (E-40)

Ephemeral 41 (E-41)

Ephemeral 42 (E-42)

Ephemeral 43 (E-43)

Ephemeral 44 (E-44)

Ephemeral 45 (E-45)

Ephemeral 46 (E-46)

Ephemeral 47 (E-47)

Ephemeral 48 (E-48)

Ephemeral 49 (E-49)

Ephemeral 50 (E-50)

Ephemeral 51 (E-51)

Ephemeral 52 (E-52)

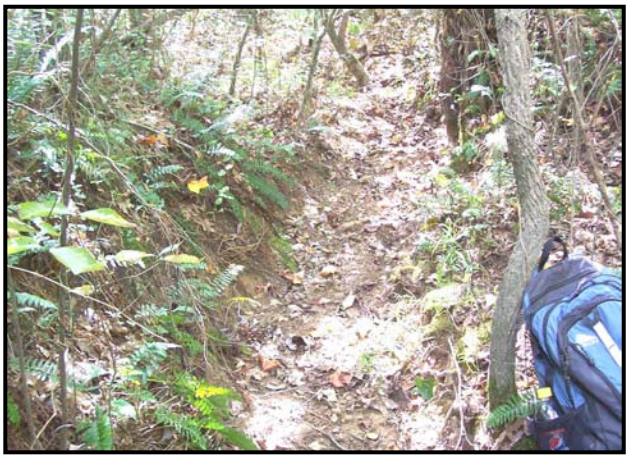
Ephemeral 53 (E-53)

Ephemeral 54 (E-54)

Ephemeral 55 (E-55)

Ephemeral 56 (E-56)

Ephemeral 57 (E-57)



Ephemeral 58 (E-58)

Ephemeral 59 (E-59)

Ephemeral 60 (E-60)

Ephemeral 61 (E-61)

Ephemeral 62 (E-62)

Ephemeral 63 (E-63)

Ephemeral 64 (E-64)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland A		City/County: Ohio	Sampling Date: 8-15-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 785
Investigator(s): Bill Sampson, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Old pond		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 21' 06.3"	Long: 87° 00' 24.4"	Datum:
Soil Map Unit: Wellston silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Isolated (no outflow from pond). Boundary WP's 786-793.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Silver maple (*Acer saccharinum*)	15	Yes	FACW
2. Red maple (*A. rubrum*)	7	No	FAC
3. Sycamore (*Platanus occidentalis*)	10	Yes	FACW
4. River birch (*Betula nigra*)	5	No	FACW
5. Sweetgum (*Liquidambar styraciflua*)	5	No	FAC
Sapling/Shrub Stratum (Plot Size:)			
1. none			
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size:)			
1. none			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks: Another tree – Green ash (*Fraxinus pennsylvanica*); 5%; not a dominant; FACW. Site sparsely vegetated.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	40	X 2 =	80
FAC Species:	12	X 3 =	36
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	52		116(B)

Prevalence Index = B/A = **2.2**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL A1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”	10YR 4/2	90	2.5YR 4/4	10	C	M	SICLLO	
2-4”	10YR 4/2	70	2.5YR 4/4	30	C	M	SICLLO	
4-8”	10YR 4/2	60	2.5YR 4/4	40	C	M	SICLLO	
8-12”	10YR 4/2	70	2.5YR 4/4	30	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Temporarily flooded. Would retain water after rain.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland B		City/County: Ohio	Sampling Date: 8-16-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 794
Investigator(s): Bill Sampson, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain		Local Relief: ☐ concave ☐ convex ☐ none Flat	
Slope: <2%	Lat: 37° 21' 06.7"	Long: 87° 00' 02.3"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Confined between dredge berms. Boundary WP's 795-813.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Silver maple (*Acer saccharinum*)	40	Yes	FACW
2. Hophornbeam (*Ostrya virginiana*)	10	No	FACU
3. Sycamore (*Platanus occidentalis*)	10	No	FACW
4. Green ash (*Frasinus pennsylvanica*)	10	No	FACW
5. Swamp white oak (*Quercus bicolor*)	10	No	FACW
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Green ash (*F. pennsylvanica*)	5	No	FACW
2. Silver maple (*Acer saccharinum*)	15	Yes	FACW
3. Hophornbeam (*O. virginiana*)	10	Yes	FACU
4. Blackgum (*Nyssa sylvatica*)	5	No	FAC
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. False nettle (*Boehmeria cylindrica*)	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 5 ft)			
1. Trumpet vine (*Campsis radicans*)	5	Yes	FAC
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	95	X 2 =	190
FAC Species:	10	X 3 =	30
FACU Species:	20	X 4 =	80
UPL Species:		X 5 =	
Column Totals:(A)	125		300(B)

Prevalence Index = B/A = **2.4**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL B1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”	10YR 4/2	75	10YR 3/1	25	C	M	SICLLO	
2-4”	7.5YR 4/2	100			C	M	SICLLO	
4-11”	7.5YR 4/2	60	2.5YR 4/8	40	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland C		City/County: Ohio	Sampling Date: 8-16-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 814
Investigator(s): Bill Sampson, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain		Local Relief: ☐ concave ☐ convex ☐ none Flat	
Slope: <2%	Lat: 37° 21' 13.2"	Long: 87° 00' 03.5"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Boundary WP's 815-834.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Silver maple (*Acer saccharinum*)	35	Yes	FACW
2. Cottonwood (*Populus deltoides*)	5	No	FAC
3. Shellbark hickory (*Carya laciniosa*)	5	No	FAC
4. Cherrybark oak (*Quercus pagodai*)	15	Yes	FACW
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Cottonwood (*Populus deltoides*)	5	No	FAC
2. Silver maple (*Acer saccharinum*)	15	Yes	FACW
3. Bitternut hickory (*Carya cordiformis*)	2	No	FACU
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Lizards tail (*Saururus cernuus*)	5	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 5 ft)			
1. Trumpet vine (*Campsis radicans*)	5	Yes	FAC
2. Grapevine (*Vitis* sp.)	5	Yes	
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	25	X 1=	25
FACW Species:	65	X 2 =	130
FAC Species:	15	X 3 =	45
FACU Species:	2	X 4 =	8
UPL Species:		X 5 =	
Column Totals:(A)	107		208(B)

Prevalence Index = B/A = **1.9**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL C1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12”	10YR 4/2	75	2.5YR 4/6	25	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland D	City/County: Ohio	Sampling Date: 8-16-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 835
Investigator(s): Bill Sampson, Rick Heil	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 18.0"	Long: 87° 00' 02.8"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Boundary WP's 836-852.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Silver maple (*Acer saccharinum*)	20	Yes	FACW
2. Sycamore (*Platanus occidentalis*)	20	Yes	FACW
3. Hophornbeam (*Ostrya virginiana*)	5	No	FACU
4. Green ash (*Fraxinus pennsylvanica*)	5	No	FACW
5. Sugarberry (*Celtis laevigata*)	5	No	FACW
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Green ash (*F. pennsylvanica*)	2	No	FACW
2. Swamp white oak *(Quercus bicolor)*	5	Yes	FACW
3. Hawthorn (*Crataegus sp.*)	5	Yes	
4. Blackgum (*Nyssa sylvatica*)	5	Yes	FAC
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. False nettle (*Boehmeria cylindrica*)	10	Yes	FACW
2. Poison ivy (*Toxidendren radicans*)	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 5 ft)			
1. Trumpet vine (*Campsis radicans*)	20	Yes	FAC
2.			
Remarks: Another tree – Sweetgum (*Liquidambar styraciflua*); 5%; not a dominant; FAC.			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	67	X 2 =	134
FAC Species:	35	X 3 =	105
FACU Species:	5	X 4 =	20
UPL Species:		X 5 =	
Column Totals:(A)	107		259(B)

Prevalence Index = B/A = **2.4**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL D1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1”	10YR 5/2	50	2.5YR 4/6	50	C	M	SICLLO	
1-3”	10YR 5/2	65	2.5YR 4/6	35	C	M	SICLLO	
3-12”	10YR 4/2	50	2.5YR 4/8	50	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks: Soils borderline at station location. Higher % of gray toward West Fork Lewis Cr (10YR 5/2-70%; 2.5YR 4/6-30%) 10-12”.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland E	City/County: Ohio	Sampling Date: 8-16-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 874
Investigator(s): Bill Sampson, Rick Heil	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 22.7"	Long: 87° 00' 01.8"	Datum:

Soil Map Unit: Henshaw silt loam	Cowardin Classification: PEM1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☒ Yes ☐ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Boundary WP's 853-873.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:)			
1. none			
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Barnyard grass (*Echinochloa muricata*)	80	Yes	FACW
2. Sedge (*Carex sp.*)	5	No	FACW
3. Beggarsticks (*Bidens sp.*)	1	No	FACW
4. *Foxtail millet (*	1	No	FACU
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	86	X 2 =	172
FAC Species:		X 3 =	
FACU Species:	1	X 4 =	4
UPL Species:		X 5 =	
Column Totals:(A)	87		176(B)

Prevalence Index = B/A = **2.0**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL D1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1”	10YR 5/2	60	5YR 4/6	40	C	M	SICLLO	
1-4”	5YR 5/2	100			C	M	SICLLO	
4-12”	10YR 5/2	70	5YR 4/6	30	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland F		City/County: Ohio	Sampling Date: 8-16-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 875
Investigator(s): Bill Sampson, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Hill slope		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 21' 23.4"	Long: 87° 00' 07.6"	Datum:
Soil Map Unit: Stendal silt loam		Cowardin Classification: PFO1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Located outside of floodplain. Down dip/lower 25% of wetland is unforested (dominated by barnyard grass). Boundary WP's 876-891.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.Red maple (*Acer rubrum*)	50	Yes	FAC
2.American elm (*Ulmus americana*)	5	No	FACW
3.River birch (*Betula nigra*)	15	No	FACW
4.Sycamore (*Platanus occidentalis*)	5	No	FACW
5.Black willow (*Salix nigra*)	5	No	FACW
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Green ash (*Fraxinus pennsylvanica*)	3	No	FACW
2.American elm (*Ulmus americana*)	5	No	FACW
3.Red maple (*Acer rubrum*)	15	Yes	FACW
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Poison ivy (*Toxidendren radicans*)	5	Yes	FAC
2. Sensitive fern (*Onoclea sensibilis*)	2	Yes	FACW
3. False nettle (*Boehmeria cylindrica*)	2	Yes	FACW
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	42	X 2 =	84
FAC Species:	70	X 3 =	210
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	112		294(B)

Prevalence Index = B/A = **2.6**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL F1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5”	2.5Y 5/2	80	7.5YR 5/8	20	C	M	SICLLO	
5-11”	10YR 7/2	65	7.5YR 5/8	35	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland G		City/County: Ohio	Sampling Date: 8-19-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 914
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain		Local Relief: ☐ concave ☐ convex ☐ none Flat	
Slope: <2%	Lat: 37° 22' 58.7"	Long: 87° 43' 33.5"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected. Boundary WP's 915-935.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ironwood (*Carpinus caroliniana*)	5	No	FAC
2. Red maple (*Acer rubrum*)	25	Yes	FAC
3. Sycamore (*Platanus occidentalis*)	15	Yes	FACW
4. River birch (*Betula nigra*)	10	No	FACW
5. Sweetgum (*Liquidambar styraciflua*)	5	No	FAC
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Green ash (*Fraxinus pennsylvanica*)	5	No	FACW
2. Ironwood (*Carpinus caroliniana*)	5	No	FAC
3. Sycamore (*Platanus occidentalis*)	5	No	FACW
4. Red maple (*Acer rubrum*)	10	Yes	FAC
5. Roughleaf dogwood (*Cornus drummondii*)	1	No	FAC
6. Buttonbush (*Cephalanthus occidentalis*)	1	No	OBL
Herbaceous Stratum (Plot Size: 5 ft)			
1. Greenbriar (*Smilax sp.*)	3	Yes	
2. False nettle (*Boehmeria cylindrica*)	3	Yes	FACW
3. Sedge (*Carex sp.*)	5	Yes	
4. Sensitive fern (Onoclea sensibilis)	3	Yes	FACW
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across all Strata: 8 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
	1		1
OBL Species:	46	X 1=	92
FACW Species:	51	X 2 =	53
FAC Species:	35	X 3 =	105
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	133		251(B)

Prevalence Index = B/A = **1.9**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL G

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3”	10YR 5/2	95	2.5YR 4/6	5	C	M	SICLLO	
3-12	10YR 5/2	75	2.5YR 4/6	25	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland H	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 943
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 48.8"	Long: 86° 59' 54.9"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). At proposed haulroad on right descending side of creek. Boundary WP's 944-947.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	40	Yes	OBL
2. Black willow (*Salix nigra*)	10	Yes	FACW
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Barnyard grass (Echinochloa muricata)	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	40	X 1=	40
FACW Species:	50	X 2 =	100
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	90		140(B)

Prevalence Index = B/A = **1.6**

Hydrophytic Vegetation Indicators:

☒ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL H1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12”	7.5YR 5/2	85	2.5YR 4/6	15	C	M	SICLLO	Uniform throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland I-Trans 1; Sta 1	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 948
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 58.3"	Long: 86° 59' 55.3"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Wetland has been drained. Wetland I boundary WP's 949-964.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	40	Yes	OBL
2. Black willow (*Salix nigra*)	15	Yes	FACW
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Clearweed (*Pilea pumila*)	40	Yes	FACW
2. Sedge (*Carex sp.*)	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	40	X 1=	40
FACW Species:	60	X 2 =	120
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	100		160(B)

Prevalence Index = B/A = **1.6**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL H1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12”	7.5YR 5/2	85	2.5YR 4/6	15	C	M	SICLLO	Uniform throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland I-Trans 2; Sta 2	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 952
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 55.8"	Long: 86° 59' 55.6"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☒ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Wetland has been drained. Wetland I boundary WP's 949-964.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	30	Yes	OBL
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp.*)	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	30	X 1=	30
FACW Species:	40	X 2 =	80
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	70		110(B)

Prevalence Index = B/A = **1.6**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL I-Sta 2

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-4”	7.5YR 5/1	80	2.5YR 4/6	20	C	M	SICLLO	
4-6”	10YR 5/1	75	2.5YR 4/6	25	C	M	SICLLO	
6”+	10YR 6/1	85	2.5YR 4/6	15	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland I-Trans 3; Sta 3	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 954
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 53.4"	Long: 86° 59' 56.5"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Wetland has been drained. Wetland I boundary WP's 949-964.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	40	Yes	OBL
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp. A*)	20	Yes	FACW
2. Sedge (*Carex sp. B*)	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	40	X 1=	40
FACW Species:	25	X 2 =	50
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	65		90(B)

Prevalence Index = B/A = **1.4**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL I-Sta 3

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-4”	7.5YR 6/2	80	2.5YR 4/6	20	C	M	SICLLO	
4-10”	10YR 6/2	90	2.5YR 4/6	10	C	M	SICLLO	
10”+	10YR 5/2	55	2.5YR 4/6	45	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland I-Trans 3; Sta 4	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 955
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 53.6"	Long: 86° 59' 57.4"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A

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

Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**

Remarks: Connected (to West Fork Lewis Creek). Sta 4 is approximately 100 ft from Sta 3. Wetland I boundary WP's 949-964.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	30	Yes	OBL
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp.*)	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			

Remarks:.

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	30	X 1=	30
FACW Species:	10	X 2 =	20
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	40		50(B)

Prevalence Index = B/A = **1.3**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL I-Sta 4

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-12”	10YR 5/2	80	2.5YR 4/6	20	C	M	SICLLO	Uniform throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Wetland has been drained.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland I-Trans 4; Sta 5	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 957
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 51.1"	Long: 86° 59' 57.7"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Wetland has been drained. Wetland I boundary WP's 949-964.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	25	Yes	OBL
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp.*)	10	No	FACW
2. Barnyard grass (*Echinochloa muricata*)	65	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	25	X 1=	25
FACW Species:	75	X 2 =	150
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	100		175(B)

Prevalence Index = B/A = **1.8**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL I-Sta 5

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-10”	10YR 5/2	80	2.5YR 4/6	20	C	M	SICLLO	
10”+	10YR 5/2	90	2.5YR 4/6	10	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland I-Trans 4; Sta 6	City/County: Ohio	Sampling Date: 8-23-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 958
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Floodplain	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 51.3"	Long: 86° 59' 58.7"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PSS1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No	Are "Normal Circumstances" present? ☐ Yes ☒ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Sta 6 approximately 100 ft from Sta 5. Wetland I boundary WP's 949-964.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Buttonbush (*Cephalanthus occidentalis*)	15	Yes	OBL
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp.*)	5	No	FACW
2. Barnyard grass (*Echinochloa muricata*)	70	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	15	X 1=	15
FACW Species:	75	X 2 =	150
FAC Species:		X 3 =	
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	90		165(B)

Prevalence Index = B/A = **1.8**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL I-Sta 6

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-6”	10YR 5/2	30	2.5YR 4/6	70	C	M	SICLLO	
6-12”	10YR 5/2	60	2.5YR 4/6	40	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Wetland has been drained. Vegetation so dense hard to see hydrology indicators.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland J		City/County: Ohio	Sampling Date: 8-24-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 955
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Slight depression		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 22' 00.8"	Long: 86° 59' 57.2"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Boundary WP's 956-971.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. River birch (*Betula nigra*)	20	Yes	FACW
2. Red maple (*A. rubrum*)	10	No	FAC
3. Swamp white oak (*Quercus bicolor*)	15	Yes	FACW
4. Shagbark hickory (*Cayra ovata*)	7	No	FACU
5. Sweetgum (*Liquidambar styraciflua*)	7	No	FAC
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Ironwood (*Carpinus virginiana*)	5	No	FAC
2. Sweetgum (*Liquidambar styraciflua)*	6	Yes	FAC
3. Buttonbush (*Cephalanthus occidentalis*)	2	No	OBL
4. Cherrybark oak (*Quercus pagodai*)	10	Yes	FACW
5. Green ash (*Fraxinus pennsylvanica*)	5	No	FACW
Herbaceous Stratum (Plot Size: 5 ft)			
1. Lizards tail (*Saururus cernuus*)	2	Yes	OBL
2. Poison ivy (*Toxidendron radicans*)	2	Yes	FAC
3. Greenbriar (*Smilax sp.)*	2	Yes	
4. False nettle (*Boehmeria cylindrica*)	2	Yes	FACW
5. Sedge (*Carex sp.)*	2	Yes	FACW
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across all Strata: 8 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	4	X 1=	4
FACW Species:	54	X 2 =	108
FAC Species:	40	X 3 =	120
FACU Species:	7	X 4 =	28
UPL Species:		X 5 =	
Column Totals:(A)	115		290(B)

Prevalence Index = B/A = **2.5**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL A1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1”								Topsoil
1-12”	10YR 6/2	60	2.5YR 4/6	40	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland K		City/County: Ohio	Sampling Date: 8-24-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 972
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Slight depression		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 21' 53.2"	Long: 87° 00' 04.7"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Fed by seep at toe of hill. Boundary WP's 972-990.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cottonwood (*Populus deltoides*)	40	Yes	FAC
2. Red maple (*A. rubrum*)	15	Yes	FAC
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10.ft)			
1. Ironwood (*Carpinus virginiana*)	7	Yes	FAC
2. Sweetgum (*Liquidambar styraciflua)*	10	Yes	FAC
3. Red maple (*Acer rubrum*)	10	Yes	FAC
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Lizards tail (*Saururus cernuus*)	5	Yes	OBL
2. False nettle (*Boehmeria cylindrica*)	15	Yes	FAC
3. Greenbriar (*Smilax sp.)*	2	No	
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across all Strata: 7 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	5	X 1=	5
FACW Species:	15	X 2 =	30
FAC Species:	82	X 3 =	246
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	102		(B)281

Prevalence Index = B/A = **2.8**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL K1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6”								Topsoil
6-12”	10YR 4/1	100	2.5YR 4/6	40	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland L	City/County: Ohio	Sampling Date: 8-25-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: WP 1005
Investigator(s): Bill Sampson, Jason Britton	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Toe of hill	Local Relief: ☒ concave ☐ convex ☐ none	

Slope: <2%	Lat: 37° 22' 04.4"	Long: 87° 00' 08.7"	Datum:

Soil Map Unit: Bonnie silt loam	Cowardin Classification: PFO1B
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Fed by seep at toe of hill. Near INT-1. Boundary WP's 1006-1021.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pin oak (*Quercus palustris*)	10	Yes	FACW
2. Red maple (*Acer rubrum*)	15	Yes	FAC
3. River birch (*Betula nigra*)	5	No	FACW
4. Blackgum (*Nyssa sylvatica*)	15	Yes	FAC
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Ironwood (*Carpinus caroliniana*)	5	Yes	FAC
2. River birch (*B. nigra*)	5	Yes	FACW
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Lizards tail (*Saururus cernuus*)	10	Yes	OBL
2. Sedge (*Carex sp.*)	3	No	FACW
3. Greenbriar (*Smilax sp.*)	3	No	
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	10	X 1=	10
FACW Species:	23	X 2 =	46
FAC Species:	35	X 3 =	105
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	68		(B)161

Prevalence Index = B/A = **2.4**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL L1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4”								Topsoil
4-7”	10YR 4/1	80	2.5YR 3/6	20	C	M	SICLLO	
7-12”	10YR 4/1	100			C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland M		City/County: Ohio	Sampling Date: 8-25-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 1023
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Toe of hill		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 22' 01.2"	Long: 87° 00' 13.9"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Fed by seep at toe of hill. Near INT-1. Boundary WP's 1024-1039.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sycamore (*Platanus occidentalis*)	15	Yes	FACW
2. Red maple (*Acer rubrum*)	15	Yes	FAC
3. River birch (*Betula nigra*)	10	No	FACW
4.Hophornbeam (*Ostrya virginiana*)	5	No	FAC
5. Swamp white oak (*Quercus bicolor*)	10	No	FACW
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Red maple (*Acer rubrum*)	10	Yes	FAC
2. Hophornbeam (*Ostrya virginiana*)	5	Yes	FACW
3. Swamp white oak (*Quercus bicolor*)	5	Yes	FACW
4. Green ash (*Fraxinus pennsylvanica*)	5	Yes	FACW
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Lizards tail (*Saururus cernuus*)	15	Yes	OBL
2. False nettle (*Boeharia cylindrica*)	2	No	FACW
3. Arrowhead (*Sagittaria latifolia*)	2	No	OBL
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 7 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 86 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	17	X 1=	17
FACW Species:	47	X 2 =	94
FAC Species:	25	X 3 =	75
FACU Species:	10	X 4 =	40
UPL Species:		X 5 =	
Column Totals:(A)	99		(B)226

Prevalence Index = B/A = **2.4**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL M1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1”								Topsoil
1-12”	10YR 4/1	75	2.5YR 4/6	25	C	M	SICLLO	Same throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland N		City/County: Ohio	Sampling Date: 8-25-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 1044
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Toe of hill		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 22' 08.3"	Long: 87° 00' 27.6"	Datum:
Soil Map Unit: Fondorf-Wellston-Rosine silt loam		Cowardin Classification: PFO1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Fed by seep at toe of hill. Near INT-1. Boundary WP's 1044-1046.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Black gum (*Nyssa sylvatica*)	30	Yes	FAC
2. Red maple (*Acer rubrum*)	40	Yes	FAC
3.			
4.			
5.			
Sapling/Shrub Stratum ( )			
1. none			
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Lizards tail (*Saururus cernuus*)	10	Yes	OBL
2. False nettle (*Boehmaria cylindrica*)	5	Yes	FACW
3. *Impatiens sp*.	5	Yes	FACW
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	10	X 1=	10
FACW Species:	10	X 2 =	20
FAC Species:	70	X 3 =	210
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	90		(B)240

Prevalence Index = B/A = **2.7**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL N1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
1-12”	10YR 5/1	100			C	M	SICLLO	Same throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland O		City/County: Ohio	Sampling Date: 8-26-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 1064
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Old farm pond		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 22' 14.6"	Long: 87° 01' 0.0"	Datum:
Soil Map Unit: Stendal & Fondorf-Wellston-Rosine SL-		Cowardin Classification: PEM1H	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Isolated (No outflow). Cattle access. Boundary WP's 1065-1068.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum ( )			
1. none			
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Barnyard grass (*Echinochloa muricata*)	15	Yes	FACW
2. Arrowhead (*Sagittaria latifolia*)	10	Yes	OBL
3. Cocklebur (*Xanthium strumarium*)	7	Yes	FAC
4. Smartweed (*Polygonum pensylvanicum*)	2	No	FACW
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	10	X 1=	10
FACW Species:	17	X 2 =	34
FAC Species:	7	X 3 =	21
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	34		(B)65

Prevalence Index = B/A = **1.9**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL N1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-12”	7.5YR 4/2	85	2.5YR 4/6	15	C	M		SICLLO

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☐ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland P		City/County: Ohio	Sampling Date: 8-26-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 1073
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Hill slope		Local Relief: ☐ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 22' 23.7"	Long: 87° 00' 45.0"	Datum:
Soil Map Unit: Stendal silt loam		Cowardin Classification: PEM1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Cattle access. Boundary WP's 1073-1082.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (10 ft)			
1. Red maple (*Acer rubrum*)	2	Yes	FAC
2. Sweetgum (*Liquidambar styraciflua*)	2	Yes	FAC
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Rush (*Juncus effusus*)	80	Yes	FACW
2. Sedge (*Carex sp.*)	1	No	FACW
3. Bonset (*Eupatorium perfoliatum*)	5	No	FACW
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	86	X 2 =	172
FAC Species:	4	X 3 =	12
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	90		(B)184

Prevalence Index = B/A = **2.0**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL N1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2”								Topsoil
2-12”	10YR 4/2	90	5YR 4/6	10	C	M		SICLLO

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West/Wetland Q	City/County: Ohio	Sampling Date: 9-13-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: 1
Investigator(s): Bill Sampson, Julie Clark	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Bottom	Local Relief: ☐ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 43.9"	Long: 87° 00' 20.1"	Datum:

Soil Map Unit: Stendal silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected (to West Fork Lewis Creek). Boundary WP's 1086-1108.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. River birch (*Betula nigra*)	35	Yes	FACW
2. Sycamore (*Platanus occidentalis*)	5	No	FACW
3. Red maple (*Acer rubrum*)	10	Yes	FAC
4. Sweetgum (*Liquidambar styraciflua*)	5	No	FAC
5.			
Sapling/Shrub Stratum (10 ft)			
1. Red maple (*Acer rubrum*)	25	Yes	FAC
2. *Green ash (Fraxinus pennsylvanica)*	1	No	FACW
3. River birch (*Betula nigra*)	10	Yes	FACW
4.			
5.			
Herbaceous Stratum (Plot Size:)			
1. none			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			

Remarks: Sensitive fern and false nettle common throughout wetland area.

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	46	X 2 =	92
FAC Species:	40	X 3 =	120
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	86		(B)212

Prevalence Index = B/A = **2.5**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL N1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3”	2.5Y 7/1	90	7.5YR 5/8	10	C	M		SiClLo

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved):

Type: Probably hard clay layer

Depth (in): 4 in

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West-Wetland R		City/County: Ohio	Sampling Date: 9-14-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 53
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Hillslope		Local Relief: ☐ concave ☐ convex ☐ none Flat	
Slope: <2%	Lat: 37° 21' 23.9"	Long: 87° 00' 43.0"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PEM1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected. Wetland area is approximately 15 ft x 30 ft at the top of the bank of INT-3, near the confluence with E-42. Wetland is created by spring.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Sweetgum (*Liquidambar styraciflua*)	20	Yes	FAC
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. False nettle (*Boehmerica cylindrica*)	5	No	FACW
2. Lizards tail (*Saururus cernuus*)	10	Yes	OBL
3. Sedge (*Carex sp.*)	15	Yes	OBL
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	25	X 1=	25
FACW Species:	5	X 2 =	10
FAC Species:	20	X 3 =	60
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	50		95(B)

Prevalence Index = B/A = **1.9**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: _____

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1”								Organic layer
1-10”	10YR 4/1	100	NONE		C	M	SICLLO	Same throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West-Wetland S		City/County: Ohio	Sampling Date: 9-15-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 62
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): Valley		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 21' 22.7"	Long: 87° 00' 47.6"	Datum:
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PFO1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected. Wetland area approximately 0.8 acres.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sycamore (*Platanus occidentalis*)	15	Yes	FACW
2. River birch (*Betula nigra*)	15	Yes	FACW
3. Sweetgum (*Liquidambar styraciflua*)	5	No	FAC
4. Cottonwood (*Populus deltoides*)	5	No	FAC
5. Red maple (*Acer rubrum*)	5	No	FAC
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Ironwood (*Carpinus caroliniana*)	20	Yes	FAC
2. American elm (*Ulmus americana*)	5	Yes	FACW
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. False nettle (*Boehmeria cylindrica*)	10	Yes	FACW
2. Whitegrass (*Leersia virginica*)	25	Yes	FACW
3. Poison ivy (*Toxidendren radicans*)	1	No	FAC
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. Grapevine (*Vitis sp.*)	5		
2. Trumpet vine (*Campsis radicans*)	2	Yes	FAC
Remarks: Lizards tail and false nettle common throughout.			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across all Strata: 7 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:		X 1=	
FACW Species:	70	X 2 =	140
FAC Species:	38	X 3 =	114
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	108		254(B)

Prevalence Index = B/A = **2.4**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: _____

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6”								Sand
6-10”	7.5YR 4/1	90	2.5YR 3/6	10	C	M	SICLLO	
10+	7.5YR 4/1	100	NONE		C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Water 6 inches below surface.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West-Wetland T		City/County: Ohio	Sampling Date: 9-16-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP 99
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): low spot		Local Relief: ☒ concave ☐ convex ☐ none	
Slope: <2%	Lat: 37° 21' 52.6"	Long: 87° 00' 52.7"	Datum:
Soil Map Unit: Stendal silt loam		Cowardin Classification: PFO1B/PSS1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Connected. Wetland fed by seep, located within E-49 channel, above the confluence with INT-5.	

VEGETATION – Use scientific names of plants

Tree Stratum ( )	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:10 ft)			
1. Sweetgum (*Liquidambar styraciflua*)	5	Yes	FAC
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. False nettle (*Boehmerica cylindrica*)	2	No	FACW
2. Whitegrass (*Leersia virginica*)	15	Yes	FACW
3. Franks sedge (*Carex frankii*)	30	Yes	OBL
4. Smartweed (*Polygonium punctatum*)	5	No	OBL
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1.			
2.			
Remarks: Lizards tail and false nettle common throughout.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	35	X 1=	35
FACW Species:	17	X 2 =	34
FAC Species:	5	X 3 =	15
FACU Species:		X 4 =	
UPL Species:		X 5 =	
Column Totals:(A)	57		84(B)

Prevalence Index = B/A = **1.5**

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: _____

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1”								Topsoil/organic layer
1-5”	7.5YR 5/1	100	NONE		C	M	SICLLO	Sand mixed in
5-7”	10YR 5/1	65	2.5YR 3/6	35	C	M	SICLLO	Sand mixed in
7+	10YR 4/1	100	NONE		C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Fed by seep.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland U	City/County: Ohio	Sampling Date: 9-14-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: 1 of 2
Investigator(s): Julie Clark, John Bottom	Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland	Local Relief: ☒ concave ☐ convex ☐ none	

Slope:	Lat: 37° 21' 57.7"	Long: 87° 00' 29.6"	Datum:

Soil Map Unit: Weinbach silt loam and Stendal silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. overcup oak (*Quercus lyrata*)	20	Yes	OBL
2. green ash (*Fraxinus pennsylvanica*)	50	Yes	FACW
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. buttonbush (*Cephalanthus occidentalis*)	60	Yes	OBL
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: -)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: -)			
1. none			
2.			
Remarks: Also, *Boehmeria cylindrica* and *Heliotropium indicum* present in wetland but not in sampling plot.			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☒ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	2.5Y 5/2	80	7.5YR 4/6	20	C	M		
1-12	2.5Y 6/2	90	7.5YR 5/6	10	C	M	CL LO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Drains to Green River and likely receives backwater flooding. Flagging in field says Wetland 1.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland U	City/County: Ohio	Sampling Date: 9-14-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: 2 of 2
Investigator(s): Julie Clark, John Bottom	Section, Township, Range:	
Landform (hillslope, terrace, etc.): flat valley	Local Relief: ☒ concave ☐ convex ☐ none	

Slope:	Lat: 37° 21' 01.5"	Long: 87° 00' 31.6"	Datum:

Soil Map Unit: Weinbach silt loam and Stendal silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. river birch (*Betula nigra*)	30	Yes	FACW
2. silver maple (*Acer saccharinum*)	40	Yes	FACW
3. green ash (*Fraxinus pennsylvanica*)	30	Yes	FACW
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. *F. pennsylvanica*	15	Yes	FACW
2. slippery elm (*Ulmus rubra*)	20	Yes	FAC
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: -)			
1. lizard's tail (*Saururus cernuus*)	10	No	OBL
2. false nettle (*Boehmeria cylindrica*)	30	Yes	FACW
3. trumpet creeper (*Campsis radicans*)	8	No	FAC
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: -)			
1. none			
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 6/3	100						
2-10	2.5Y 6/2	90	10YR 5/6	5	C	M	CL LO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Drains to Green River

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland V		City/County: Ohio	Sampling Date: 9-14-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, John Bottom		Section, Township, Range:	
Landform (hillslope, terrace, etc.): swale in pasture		Local Relief: ☒ concave ☐ convex ☐ none	
Slope:	Lat: 37° 22' 05.1"	Long: 87° 01' 02.8"	Datum:
Soil Map Unit: Steff SL & Frondorf-Wellston-Rosine com-		Cowardin Classification: PEM1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: -)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.)			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size: -)			
1.			
2.			
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. mistflower (*Conoclinium coelestinum*)	7	Yes	FAC
2. straw-colored flatsedge (*Cyperus strigosus*)	20	Yes	FACW
3. lady's thumb (*Polygonum caespitosum*)	7	Yes	FACU
4. paspalum sp. (*Paspalum* species)	5	No	-
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: -)			
1.			
2.			
Remarks: pasture gets mowed			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 1

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 6/2	90	7.5YR 4/6	10	C	M, PL	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Stream drains into and out of wetland. Farmed wetland – mowed horse pasture. Flagging in field says Wetland 2.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland W		City/County: Ohio	Sampling Date: 9-15-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, John Bottom		Section, Township, Range:	
Landform (hillslope, terrace, etc.): stream floodplain		Local Relief: ☐ concave ☒ convex ☐ none	
Slope:	Lat: 37° 21' 59.9"	Long: 87° 01' 08.3"	Datum:
Soil Map Unit: Steff silt loam		Cowardin Classification: PSS1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 20' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. black willow (*Salix nigra*)	15	Yes	FACW
2. sycamore (*Platanus occidentalis*)	50	Yes	FACW
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15'x15')			
1. *S. nigra*	40	Yes	FACW
2. buttonbush (*Cephalanthus occidentalis*)	5	No	OBL
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5')			
1. smartweed (*Polygonum punctatum*)	10	No	OBL
2. false nettle (*Boehmeria cylindrica*)	7	No	FACW
3. Nepalese eulalia (*Microstegium vimineum*)	60	Yes	FAC
4. spotted touch-me-not (*Impatiens capensis*)	5	No	FACW
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: -)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 3

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
2-10	2.5Y 7/2	95	10YR 5/8	5	C	M	SI LO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Willow wetland with stream above and below. Low quality – lots of invasive *Microstegium*. Flagging in field says Wetland 3.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland X	City/County: Ohio	Sampling Date: 9-15-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, John Bottom	Section, Township, Range:	
Landform (hillslope, terrace, etc.): old pond - dry	Local Relief: ☒ concave ☐ convex ☐ none	

Slope:	Lat: 37° 21' 59.9"	Long: 87° 01' 08.3"	Datum:
Soil Map Unit: Stendal silt loam	Cowardin Classification: PSS1B		

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

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 15 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. river birch (*Betula nigra*)	15	Yes	FACW
2. cottonwood (*Populus deltoides*)	20	Yes	FAC
3. red maple (*Acer rubrum*)	30	Yes	FAC
4. sweetgum (*Liquidambar styraciflua*)	5	No	FAC
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. *L. styraciflua*	15	Yes	FAC
2. *B. nigra*	10	No	FACW
3. *A. rubrum*	50	Yes	FAC
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. mistflower (*Conoclinium coelestinum*)	<5	No	FAC
2. sedge sp. (*Carex* species)	10	Yes	-
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: -)			
1. none			
2.			

Remarks: Excluded *Carex* sp. from dominance calculation since an indicator status could not be determined w/out species-level ID. Lots of mossy hummocks.

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 4

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 7/2	95	7.5YR 5/8	5	C	M	SI LO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-8”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Old pond, not holding water. Large hole in dam drains pond to stream. Flagging in field says Wetland 4.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland Y	City/County: Ohio	Sampling Date: 9-21-11
Applicant/Owner: Armstrong	State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, Rick Heil	Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland	Local Relief: ☒ concave ☐ convex ☐ none	

Slope:	Lat: 37° 21' 38.2"	Long: 87° 01' 17.8"	Datum:

Soil Map Unit: Stendal silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. river birch (*Betula nigra*)	10	No	FACW
2. silver maple (*Acer saccharinum*)	60	Yes	FACW
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. buttonbush (*Cephalanthus occidentalis*)	20	Yes	OBL
2. *B. nigra*	25	Yes	FACW
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. false nettle (*Boehmeria cylindrica*)	30	Yes	FACW
2. sensitive fern (*Onoclea sensibilis*)	5	No	FACW
3. lizard's tail (*Saururus cernuus*)	15	Yes	OBL
4. Asiatic dayflower (*Commelina communis*)	10	No	FAC
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 30 ft)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☒ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 5

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 6/2	70	7.5YR 4/6	30	C	M	SICLLO	
2-6	2.5Y 6/3	60	10YR 4/4	40	C	M	SICLLO	
6-12	2.5Y 7/2	90	7.5YR 5/8	10	C	M, PL	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Ephemeral stream braids through wetland. Drainage eventually reaches Green River. Note in field - combo of pink and orange flagging, labeled as Wetland 5.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland Z		City/County: Ohio	Sampling Date: 9-21-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland		Local Relief: ☒ concave ☐ convex ☐ none	
Slope:	Lat: 37° 21' 43.8"	Long: 87° 01' 18.1"	Datum:
Soil Map Unit: Stendal silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (*Acer rubrum*)	10	No	FAC
2. silver maple (*Acer saccharinum*)	30	Yes	FACW
3. sweetgum (*Liquidambar styraciflua*)	15	Yes	FAC
4. green ash (*Fraxinus pennsylvanica*)	7	No	FACW
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. *L. styraciflua*	10	Yes	FAC
2. buttonbush (*Cephalanthus occidentalis*)	8	Yes	OBL
3. slippery elm (*Ulmus rubra*)	5	Yes	FAC
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. false nettle (*Boehmeria cylindrica*)	20	Yes	FACW
2. sensitive fern (*Onoclea sensibilis*)	30	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 30 ft)			
1. poison ivy (*Toxicodendron radicans*)	5	Yes	FAC
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across all Strata: 8 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 6

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 7/2	80	7.5YR 5/6	20	C	M, PL	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Ephemeral stream runs along wetland boundary. Flagging labeled in field as Wetland 6.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland AA		City/County: Ohio	Sampling Date: 9-21-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): spring / seep		Local Relief: ☒ concave ☐ convex ☐ none	
Slope:	Lat: 37° 21' 44.3"	Long: 87° 01' 16.7"	Datum:
Soil Map Unit: Stendal silt loam		Cowardin Classification: PEM1C	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15'x15')			
1. buttonbush (*Cephalanthus occidentalis*)	10	Yes	OBL
2. green ash (*Fraxinus pennsylvanica*)	5	No	FACW
3. sweetgum (*Liquidambar styraciflua*)	15	Yes	FAC
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. lizard's tail (*Saururus cernuus*)	5	No	OBL
2. sensitive fern (*Onoclea sensibilis*)	8	No	FACW
3. false nettle (*Boehmeria cylindrica*)	50	Yes	FACW
4. smartweed (*Polygonum punctatum*)	15	Yes	OBL
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 15'x30')			
1. Japanese honeysuckle (*Lonicera japonica*)	5	Yes	FAC
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 7

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 5/1	100	-				SA LO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in): to 0.5”

Water Table Present? ☐ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in): to surface

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Well/spring drains to wetland, which drains to intermittent stream. Flagging in field says Wetland 7.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland BB		City/County: Ohio	Sampling Date: 9-21-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 2
Investigator(s): Julie Clark, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland		Local Relief: ☒ concave ☐ convex ☐ none	
Slope:	Lat: 37° 21' 38.9"	Long: 87° 01' 04.0"	Datum:
Soil Map Unit: Melvin silt loam		Cowardin Classification: PFO1C	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. river birch (*Betula nigra*)	20	Yes	FACW
2. sycamore (*Platanus occidentalis*)	8	No	FACW
3. green ash (*Fraxinus pennsylvanica*)	10	No	FACW
4. red maple (*Acer rubrum*)	10	No	FAC
5. sweetgum (*Liquidambar styraciflua*	15	Yes	FAC
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. spicebush (*Lindera benzoin*)	15	Yes	FACW
2. hornbean (*Carpinus caroliniana*)	7	Yes	FAC
3. *B. nigra*	5	No	FACW
4. *A. rubrum*	5	No	FAC
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. lizard's tail (*Saururus cernuus*)	5	Yes	OBL
2. greenbrier sp. (*Smilax* species)	5	-	-
3. river cane (*Arundinaria gigantea*)	10	Yes	FACW
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 30 ft)			
1. none			
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 8

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
1-4	2.5Y 6/2	90	7.5YR 5/8	10	C	M	SICLLO	
4-12	2.5Y 6/3	50	7.5YR 5/8	50	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in): in areas

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Braided stream channels running through wetland. Drains to stream. Flagging in field says Wetland 8.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland BB	City/County: Ohio	Sampling Date: 10-3-12
Applicant/Owner: Armstrong	State: KY	Sampling Point: 2 of 2
Investigator(s): Bill Sampson, John Bottom	Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland	Local Relief: ☒ concave ☐ convex ☐ none Flat	

Slope: <2%	Lat: 37° 21' 39.8"	Long: 87° 01' 04.7"	Datum:

Soil Map Unit: Clifty gravely silt loam	Cowardin Classification: PFO1C
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: The wetland consisted of separate wetland areas in close proximity to each other.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sycamore (*Platanus occidentalis*)	10	Yes	FACW
2. Swamp chestnut oak (*Quercus michauxii*)	20	Yes	FACW
3. Sweetgum (*Liquidambar styraciflua*)	15	Yes	FAC
4. Silver maple (*Acer saccharinum*)	5	No	FACW
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. Sweetgum (*L. styraciflua*)	10	Yes	FACW
2. *Hornbeam* (*Carpinus caroliniana*)	10	Yes	FAC
3. Buttonbush (*Cephalanthus occidentalis*)	3	No	OBL
4. Green ash (*Fraxinus pennsylvanica*)	10	Yes	FACW
5. Spicebush (*Lindera benzoin*)	5	No	FAC
Herbaceous Stratum (Plot Size: 5 ft)			
1. False nettle (*Boehmeria cylindrica*)	25	Yes	FACW
2. Giant cane (*Arundinaria gigantia*)	7	No	FACW
3. Smartweed (*Polygonum aviculare*)	5	No	FAC
4. Poison ivy (*Toxidendron radicans*)	2	No	FAC
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 5 ft)			
1. Greenbriar (*Smilax rotundifolia*)	3	Yes	FAC
2.			
Remarks:			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across all Strata: 8 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 8

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 5/2	90	5YR 4/6	10	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in): i

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Stream channel running through wetland, and low spots holding water.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland CC		City/County: Ohio	Sampling Date: 9-23-11
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland		Local Relief: ☒ concave ☐ convex ☐ none	
Slope:	Lat: 37° 21' 42.8"	Long: 87° 00' 21.5"	Datum:
Soil Map Unit: Stendal silt loam		Cowardin Classification: PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks:	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (*Acer rubrum*)	30	Yes	FAC
2. green ash (*Fraxinus pennsylvanica*)	20	Yes	FACW
3. sweetgum (*Liquidambar styraciflua*)	10	No	FAC
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. *A. rubrum*	60	Yes	FAC
2. *F. pennsylvanica*	15	Yes	FACW
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. false nettle (*Boehmeria cylindrica*)	5	Yes	FACW
2. sensitive fern (*Onoclea sensibilis*)	<5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 30 ft)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 9

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5Y 7/2	80	7.5YR 5/8	20	C	M	SI LO	
3-10	2.5Y 7/3	90	7.5YR 5/8	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in): 0-12”

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Drains to stream. Flagging in field will say Wetland 9.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland DD		City/County: Ohio	Sampling Date: 1-30-12
Applicant/Owner: Armstrong		State: KY	Sampling Point: 1 of 1
Investigator(s): Julie Clark, Rick Heil		Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland		Local Relief: ☒ concave ☐ convex ☐ none	
Slope:	Lat: 37° 22' 13.2"	Long: 87° 00' 28.0"	Datum: NAD 83
Soil Map Unit: Stendal silt loam,occasionally flooded (Sn)		Cowardin Classification: PFO1C	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☒ Yes ☐ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☒ Yes ☐ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Majoring of area was recently logged, therefore, vegetation is problematic. Vegetation was assessed in section of wetland that had not been disturbed.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. sweetgum (*Liquidambar styraciflua*)	25	Yes	FAC
2. river birch (*Betula nigra*)	40	Yes	FACW
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. red maple (*A. rubrum*)	10	Yes	FAC
2. *L. styraciflua*	7	Yes	FAC
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. none			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size: 30 ft)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: DD

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 7/1	80	10YR 5/8	20	C	M	SI LO	
6-10	2.5Y 7/1	70	10YR 6/8	30	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in): to 2”

Water Table Present? ☒ Yes ☐ No Depth (in): at surface

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in): to surface

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: WP 1732-1872. Pics 1-3. Disturbed wetland due to logging. Drains to stream.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland EE		City/County: Ohio	Sampling Date: 9-11-12
Applicant/Owner: Armstrong		State: KY	Sampling Point: WP65
Investigator(s): Bill Sampson, Jason Britton		Section, Township, Range:	
Landform (hillslope, terrace, etc.): floodplain		Local Relief: ☐ concave ☐ convex ☐ none	
Slope: <2 %	Lat: 37° 21' 47.6"	Long: 86° 59' 52.8"	Datum: NAD 83
Soil Map Unit: Bonnie silt loam		Cowardin Classification: PEM1B/PSS1B	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)			
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No		Are "Normal Circumstances" present? ☒ Yes ☐ No	
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No		(If needed, explain in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: Area originally delineated for Lewis Creek East (Wetland B), but now expanded. Old haul road bisects area and not supporting wetland soils or vegetation.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. American Elm *(Ulmus acericana)*	20	Yes	FACW
2. Buttonbush *(Cephalanthus occidentalis)*	10	Yes	OBL
3. Green ash *(Fraxinus pennsylvatica)*	7	No	FACW
4. Black willow *(Salix nigra)*	8	No	OBL
5. Red maple *(Acer rubrum)*	2	No	FAC
Herbaceous Stratum (Plot Size: 5 ft)			
1. Beggarsticks *(Bidens aristosa)*	30	Yes	FACW
2. Cocklebur *(Xanthium strumurium)*	10	Yes	FAC
3. Pigweed *(Amaranthus retroflexus)*	25	Yes	FACU
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks:			

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: DD

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								Brown/dark soil
3-6	10YR 5/2	85	5YR 4/6	15	RM	M	SiClLo	
6-10	10YR 6/2	50	10YR 5/6	50	RM	M	SiClLo	Sandstone pebbles mixed in

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ 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)

Field Observations:

Surface Water Present? ☒ Yes ☐ No Depth (in):

Water Table Present? ☒ Yes ☐ No Depth (in):

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (in):

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: WP 66-77. Old haul road through site.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland FF	City/County: Ohio	Sampling Date: 9-27-12
Applicant/Owner: Armstrong	State: KY	Sampling Point: 1 of 1
Investigator(s): Bill Sampson, John Bottom	Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland	Local Relief: ☒ concave ☐ convex ☐ none Slightly sloping	

Slope: 2-4%	Lat: 37° 21' 47.8"	Long: 87° 01' 10.6"	Datum:

Soil Map Unit: Fondorf-Wellston silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: The wetland consisted of three separate wetland areas in close proximity to each other.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. River birch (*Betula nigra*)	50	Yes	FACW
2. Red maple (*Acer rubrum*)	30	Yes	FAC
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. Red maple (A. rubrum)	35	Yes	FAC
2. Sweetgum (*Liquidambar styraciflua*)	10	Yes	FAC
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp.*)	2	Yes	FACW+
2. Poison ivy (*Toxidendron radicans*)	2	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks: Herbaceous vegetation sparse.			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 8

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								Brown/organic layer
3-10	10YR 6/2	60	10YR 4/6	40	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in): i

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Braided stream channels running through wetland, and low spots holding water.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Lewis Creek West / Wetland GG	City/County: Ohio	Sampling Date: 9-27-12
Applicant/Owner: Armstrong	State: KY	Sampling Point: 1 of 1
Investigator(s): Bill Sampson, John Bottom	Section, Township, Range:	
Landform (hillslope, terrace, etc.): bottomland	Local Relief: ☒ concave ☐ convex ☐ none Slightly sloping	

Slope: 2-4%	Lat: 37° 21' 48.0"	Long: 87° 01' 08.1"	Datum:

Soil Map Unit: Fondorf-Wellston silt loam	Cowardin Classification: PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (if no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☒ No	Are "Normal Circumstances" present? ☒ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☒ No	(If needed, explain in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No Hydric Soil Present? ☒ Yes ☐ No Wetland Hydrology Present? ☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ **Yes** ☐ **No**
Remarks: The wetland consisted of two separate wetland areas in close proximity to each other.	

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. River birch (*Betula nigra*)	50	Yes	FACW
2. Red maple (*Acer rubrum*)	30	Yes	FAC
3.			
4.			
5.			
Sapling/Shrub Stratum (Plot Size:15 ft)			
1. Red maple (A. rubrum)	35	Yes	FAC
2. Sweetgum (*Liquidambar styraciflua*)	10	Yes	FAC
3.			
4.			
5.			
Herbaceous Stratum (Plot Size: 5 ft)			
1. Sedge (*Carex sp.*)	2	Yes	FACW+
2. Poison ivy (*Toxidendron radicans*)	2	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Woody Vine (Plot Size:)			
1. none			
2.			
Remarks: Herbaceous vegetation sparse. Same vegetation as Wetland FF.			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species:	____	X 1=	____
FACW Species:		X 2 =	
FAC Species:		X 3 =	
FACU Species:	____	X 4 =	____
UPL Species:	____	X 5 =	____
Column Totals:(A)			(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide Supporting Data)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ☒ **Yes** ☐ **No**

SOIL

Sampling Point: WL 8

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

Depth (in)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								Brown/organic layer
3-4	10YR 6/2	98	10YR 4/6	2	C	M	SICLLO	
4-10	10YR 6/2	80	10YR 4/6	20	C	M	SICLLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2cm Muck (A10) **(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)
- ☐ Fe-Mn Masses (F12)**(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13)**(LRR N, MLRA 136)**
- ☐ Piedmont Floodplain Soils (F19)**(MLRA 148)**

Indicators for Problematic Hydric Soils[3]

- ☐ 2 cm Muck (A10)**(MLRA 147)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136,147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if ovserved): none

Type:

Depth (in):

Hydric Soil Present? ☒ **Yes** ☐ **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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)
- ☒ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ 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)

Field Observations:

Surface Water Present? ☐ Yes ☒ No Depth (in):

Water Table Present? ☐ Yes ☒ No Depth (in):

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (in): i

Wetland Hydrology Present? ☒ **Yes** ☐ **No**

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

Remarks: Braided stream channels running through wetland, and low spots holding water.

Wetlands & Pond Photos

Wetland A

Wetland B

Wetland C

Wetland D

Wetland E

Wetland F

Wetland G

Wetland H

Wetland I

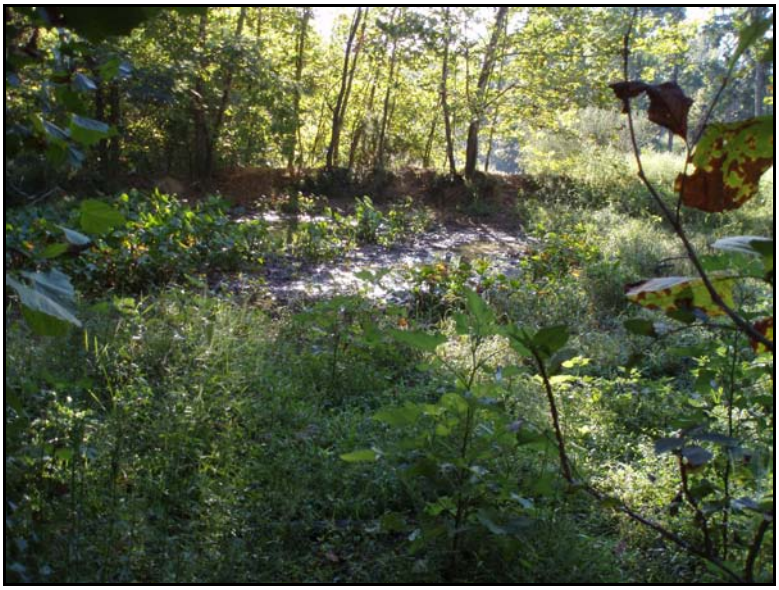
Wetland J

Wetland K

Wetland L

Wetland M

Wetland N



Wetland O

Wetland P

Wetland Q

Wetland R

Wetland S

Wetland T

Wetland U

Wetland V

Wetland W

Wetland X

Wetland Y

Wetland Z

Wetland AA

Wetland BB

Wetland CC

Wetland DD

Wetland DD,
disturbed by logging

Wetland EE

Wetland FF

Wetland GG

Pond 1

Pond 2

Pond 3