

Hall Run, Salt Run and Lower East Fork Little Miami River Preservation and Restoration Opportunities Inventory Report Clermont County, Ohio



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I. STUDY DESCRIPTION

This Riparian Assessment and Mitigation Opportunities Inventory is being developed in conjunction with the Eastern Corridor Multimodal Projects, and is a continuation of planning efforts established by the Eastern Corridor Major Investment Study (MIS) 2000, the Eastern Corridor Land Use Vision Plan (LUV) 2002, the Eastern Corridor Green Infrastructure Master Plan (2005), and the Eastern Corridor Multi-Modal Transportation Projects Tier 1 PE/EIS work. The advanced mitigation strategy being developed for the Eastern Corridor, as a continuation of land use visioning work, Green Infrastructure Planning, Tier 1 studies and resource agency and public input, provides opportunity for a watershed-based mitigation approach and coordination with local watershed and conservation programs. One such local watershed project is outlined in the 2003 Lower East Fork Watershed Management Plan (LEFMP).

The LEFMP, adopted in December 2003, identifies goals and management objectives for improving conditions in the Lower East Fork Little Miami River (Lower EFLMR) and its main tributaries, including Hall Run and Salt Run. The Hall Run, Salt Run and Lower EFLMR watersheds occur partly within the Eastern Corridor project area. As a result, a unique opportunity is available for linking local watershed planning efforts with mitigation strategies being developed for the Eastern Corridor. This coordination effort not only supports objectives of the LEFMP, but also supports objectives of Clermont County's Project XLC Phase I agreement and Phase II Stormwater Management Planning, and can also potentially be structured as part of the County local match contribution to the Eastern Corridor transportation improvements.

The 2003 LEFMP outlines a number of specific strategies (objectives) for Hall Run, Salt Run and the Lower EFLMR designed to maintain full support of these streams and their designated uses. These strategies are described in Chapter 5 of the LEFMP, and pertinent excerpts are included in Appendix G of this inventory document.

The management strategies recommended in the LEFMP were developed to address a range of pollutant sources in these watersheds, including: point source discharges, urban stormwater runoff, on-site wastewater treatment systems, agricultural runoff, habitat/riparian modification and hydromodification (see Appendix G). This Riparian Assessment and Mitigation Opportunities Inventory focuses on one aspect (objective) of the 2003 LEFMP, specifically riparian and physical stream assessments, as an initial step in carrying forward the LEFMP objectives for Hall Run, Salt Run and a portion of the Lower East Fork. This physical data was used to identify preliminary implementation projects consistent with the LEFMP that will be further developed (conceptual and final design) as funding sources and project sponsorship become available. Conceptual plan development on a project-by-project basis will include identification of key sources contributing to habitat/riparian modifications in these watersheds, and specific measures to address these sources will be developed during final design.

The Hall Run, Salt Run and portion of the Lower EFLMR watersheds assessed for this inventory are located in the northwest portion of Clermont County (see Exhibit 1). Work consisted of riparian assessments, Ohio Environmental Protection Agency (OEPA) Qualitative Habitat Evaluation Indices (QHEI's), Headwater Habitat Evaluation Indices (HHEI's), Headwater Macroinvertebrate Field Evaluation Indices (HMFIEI), and identification of potential riparian preservation and restoration areas.

II. PURPOSE OF THIS STUDY AND ASSESSMENT STRATEGY

Purpose - This study focuses on one aspect (objective) of the 2003 LEFMP, specifically riparian and physical stream assessments, as an initial step in carrying forward the LEFMP objectives for Hall Run, Salt Run and a portion of the Lower East Fork. Information from this study was used to identify potential implementation project(s) consistent with 2003 LEFMP management objectives for these watersheds. Two general types of projects were identified: 1) preservation projects and 2) restoration projects; with restoration projects being further divided into primary and secondary projects (see Section IV.B). A key objective of this study is to link with the Eastern Corridor advanced mitigation strategy to provide opportunities for other interested sponsor(s) (public or private) needing to meet compensatory mitigation requirements as a result of impacts to aquatic resources. The proposed work would also identify projects potentially eligible for OEPA 319 grant funds and/or federal-aid highway funding - for which riparian assessment work may be used as local match credit - in an effort to further implement objectives of the LEFMP for Hall Run, Salt Run and Lower EFLMR. Once funding and/or sponsorship become available for individual projects, conceptual and final design will be developed. Conceptual plans will include identification of key sources contributing to habitat/riparian modifications in these watersheds, and specific measures to address these sources will be developed during final design.

Assessment Strategy - The assessment strategy for Hall Run, Salt Run and Lower EFLMR consisted of: 1) use of aerial photographs and other available secondary source mapping to define stream mainstems and suitable tributaries for assessment, 2) conducting a walk-over survey of stream corridors for delineation into segments based on qualitative estimation of changes in OEPA use designation using observed field conditions for preliminary approximation of QHEI and HHEI scores, 3) collection of QHEI, HHEI and/or HMF EI data per OEPA guidelines from 19 representative stream reaches within these delineated stream segments, and 4) use of QHEI, HHEI, HMF EI and other field data to identify potential priority preservation and restoration projects within each watershed.

Results of this study are further described in Sections III and IV, presented on Exhibits 2a, 2b, 3, 4, and 5, on QHEI, HHEI and HMF EI data sheets in Appendices B and C, respectively, and in representative photographs in Appendix E.

III. RESULTS OF RIPARIAN ASSESSMENTS AND PROVISIONAL USE DESIGNATIONS

In general, the riparian areas (stream banks and immediately adjacent areas) along Hall Run, Salt Run and Lower EFLMR are disturbed and degraded as a result of vegetation (trees, shrubs and herbs) removal, or because of trash accumulation in areas of intense use and/or development. In areas of less intense use, disturbances are nearly absent. Removal of vegetation in riparian areas in many cases has led to bank erosion and siltation of stream bottom substrates. In areas of complete, wide and undisturbed riparian vegetation, channel conditions are more varied with greater diversity and separation of instream habitats for the occurrence of aquatic organisms. A summary of conditions noted in each watershed during field surveys conducted for this project is presented in Sections III.A, B, and C, and detailed in Tables 1 and 2, below, attached Table A, on QHEI, HHEI and HMFIEI data sheets in Appendices B and C, respectively, and in representative photographs in Appendix E. A summary of secondary source information of QHEI's and other OEPA quality attainment information is presented in Appendix A.

A. Hall Run

Hall Run occurs in the East Fork Little Miami River sub-basin of the Little Miami River Drainage Basin. Hall Run is located entirely within western Clermont County. It originates east of I-275 south of Clough Pike and flows generally northeast through predominantly residential and commercial areas before crossing under Round Bottom Road and emptying into the Lower EFLMR (see Exhibit 2a). Hall Run has a total length of approximately 6.4 miles and drains a land area of approximately 4.9 square miles. Hall Run has an OEPA Aquatic Life Use Designation of Warmwater Habitat (WWH), and is also designated as an Agricultural, and Industrial Water supply, and a Primary Contact Recreational water (OEPA, 2005).

A walkover survey of the Hall Run mainstem and selected tributaries indicated differences between the lower, lower middle, middle, and upper portions of Hall Run (see Exhibit 2a). In general, the lower portion of Hall Run, from the confluence with the Lower EFLMR to just west of I-275, is of lower quality with typically open riparian area, silt and sand embedded substrate and moderate availability of instream habitats for aquatic organisms. The lower middle portion of Hall Run from just west of I-275 to Virginia Lane is generally of high quality with little to no instream or riparian disturbances, boulder, boulder slab and bedrock substrates and good availability of instream habitats for aquatic organisms. The middle portion of Hall Run, from Virginia Lane to just south of Glenrose Lane, is generally disturbed with residential development encroaching on the riparian area and stream channel, numerous areas of denuded riparian vegetation, more frequent occurrences of stream bottom substrate siltation and less frequent availability of instream habitats for aquatic organisms. The upper portion of Hall Run, from just south of Glenrose Lane to Regent Road, is disturbed with significant amounts of riparian vegetation removal occurring on both banks in a number of locations, silt embedded substrate and the general lack of instream habitat for aquatic organisms.

A summary of conditions observed in the Hall Run watershed during field surveys conducted for this project is presented in Table 1 below. A detailed summary of specific physical conditions by stream site is presented in attached Table A.

Table 1. Summary of Conditions in Hall Run

Provisional Use Designation	Conditions
Modified Warmwater Habitat	<p>Hall Run Lower Mainstem from confluence with EFLMR to just west of I-275 (RM 0.0-0.8); Site 9 Typical Habitat Substrate dominated by cobble with considerable amounts of boulder/slab, gravel and sand; some downstream areas with heavy silt. The slightly sinuous channel is fairly wide with mostly shallow flowing water and few deep pools. Instream cover includes overhanging vegetation, shallows, rootwads, boulders, logs and woody debris which support numerous fish and macroinvertebrates. Development is poor with moderate to high stability. Vegetation in riparian areas is absent in many portions to narrow, is mostly young and scrubby to intermediate in age where present. Areas of heavy to severe bank erosion. Adjacent land uses include commercial nursery, agricultural cropland and woodland.</p> <p>Key Physical Disturbances Lack of vegetation in riparian areas leading to siltation of stream bottom substratum and contributing to changes in channel morphology. QHEI Score = 48.5</p> <p>Hall Run Headwater from just south of Glenrose Lane to Regent Road (RM 5.1-6.0); Site 2 Typical Habitat Substrate dominated by gravel and sand with considerable amounts of silt. The slightly sinuous channel is fairly narrow with mostly shallow flowing water and few deep pools. Instream cover includes undercut banks, overhanging vegetation, rootwads, logs and woody debris which support numerous fish and macroinvertebrates. Development is poor to fair with low to moderate stability. Vegetation in riparian areas is absent in many portions to narrow, is mostly young and scrubby to intermediate in age where present. Mostly little to no bank erosion, with a few specific areas of moderate bank erosion. Adjacent land uses include residential development and scrubby woodland.</p> <p>Key Physical Disturbances Numerous areas of riparian vegetation removal, moderate bank erosion, instream siltation and substantial amounts of trash and other refuse in the channel contributing to changes in channel morphology. QHEI Score = 52.25 (QHEI assessment due to pools >40 cm deep)</p>
Warmwater Habitat	<p>Hall Run Upper Mainstem from just west of I-275 to just south of Glenrose Lane (RM 0.8-5.1); Sites 12 and 13 Typical Habitat Substrate is dominated by bedrock, boulder/slab, and cobble with some areas of gravel, sand and silt. Sinuosity ranges from low to moderate and the channel is fairly wide with mostly flowing water and numerous deep pools. Instream cover includes undercut banks, overhanging vegetation, shallows, rootmats, deep pools, rootwads, boulders, aquatic macrophytes, and logs and woody debris which support numerous fish and macroinvertebrates. Development is poor to fair with high stability. Vegetation in riparian areas ranges from mature and nearly completely continuous and wide to young, scrubby and narrow or completely absent (in a few areas). Areas of moderate bank erosion. Adjacent land uses include woodland, residential and some commercial development, with mostly woodland downstream and mostly residential upstream.</p> <p>Key Physical Disturbances Riparian vegetation removal (especially in the upstream residential reaches), steep bank slumping, numerous ATV trails and considerable amounts of trash within the channel contributing to changes in channel morphology (especially in the upstream residential reaches). QHEI Scores = 71.0 (Site 12) and 62.0 (Site 13)</p>
Modified Class I PHWH	<p>Hall Run Headwater Tributary (see Exhibit 2a); Site 4 Typical Habitat Substrate is dominated by silt with some areas of cobble, gravel and sand. The recovering, low sinuosity channel is mostly narrow, channelized, with shallow flowing water from a recent rain event. Instream cover includes overhanging vegetation, rootmats, rootwads, aquatic macrophytes, and logs and woody debris which support minimal macroinvertebrates. Vegetation in riparian areas ranges from young, scrubby and narrow to completely absent (in a few areas). Adjacent land uses include residential, shrub or oldfield.</p> <p>Key Physical Disturbances Riparian vegetation removal leading to instream siltation, channelization, and numerous ATV trails contributing to changes in channel morphology (especially west of I-275). HHEI Score = 31 (use designation based on HMF EI score of 2)</p>
Class I PHWH	<p>Hall Run Headwater (see Exhibit 2a); Site 1 Typical Habitat</p>

Table 1. Summary of Conditions in Hall Run

Provisional Use Designation	Conditions
	<p>Substrate is dominated by sand and silt with some areas of gravel. The dry, natural, meandering channel is fairly narrow, and has a mostly wide wooded riparian area. Adjacent land uses include immature forest and residential development (at the downstream end).</p> <p>Key Physical Disturbances Lack of flow (low energy and volume input) with little to no changes in channel morphology; some accumulated trash within the channel. HHEI Score = 28</p> <p>Hall Run Headwater Tributary (see Exhibit 2a); Site 3 Typical Habitat Substrate is dominated by sand and silt with some areas of cobble and gravel. The dry, natural, low sinuosity channel is fairly narrow, and has a mostly wide, very scrubby, wooded riparian area. Adjacent land uses include immature, scrubby forest and residential development (at the upstream end).</p> <p>Key Physical Disturbances Lack of flow (low energy and volume input) with little to no changes in channel morphology; some accumulated trash within the channel. HHEI Score = 29</p>
Modified Class II PHWH	<p>Hall Run Headwater Tributary (see Exhibit 2a); Site 14 Typical Habitat Substrate is dominated by cobble and silt with some areas of boulder/slabs, gravel and sand. The recovering, somewhat sinuous channel is moderately wide to narrow and channelized (in places), and has mostly shallow flowing water from recent rains. Instream cover includes overhanging vegetation, a few boulder/slabs and pools, rootwads, and lots of logs and woody debris which support minimal macroinvertebrates. Vegetation in riparian areas ranges from young, scrubby and narrow to completely absent (in a few areas). Adjacent land use is residential development.</p> <p>Key Physical Disturbances Riparian vegetation removal leading to instream siltation, channelization, and trash within the channel contributing to changes in channel morphology. HHEI Score = 66</p>
Class II PHWH	<p>Hall Run Headwater Tributary (see Exhibit 2a); Site 15 Typical Habitat Substrate is dominated by bedrock and cobble with some areas of boulder/slabs, gravel, sand and sections of heavy silt (especially in the upstream reaches). The natural, somewhat sinuous channel is moderately wide and has flowing water from recent rains and moderately deep pools. Instream cover includes overhanging vegetation, boulder/slabs, pools, rootwads, and logs and woody debris which support a moderately diverse macroinvertebrate population. Vegetation in riparian areas ranges from mostly wide to moderate and open (in places). Adjacent land uses include immature, scrubby forest and residential development.</p> <p>Key Physical Disturbances Heavy silt in the upstream reaches, small sections of open riparian area (no trees, shrubs and herbs) and trash within the channel contributing to changes in channel morphology. HHEI Score = 80 (use designation based on HMF EI score of 13)</p> <p>Hall Run Headwater Tributary (see Exhibit 2a); Site 16 Typical Habitat Substrate is dominated by cobble and sand with some areas of boulder/slabs, bedrock, gravel, and silt. The natural, slightly sinuous channel is moderately wide and has flowing water from recent rains and moderately deep pools. Instream cover includes overhanging vegetation, boulder/slabs, pools, rootwads, and logs and woody debris which support a moderately diverse macroinvertebrate population. Vegetation in riparian areas ranges from wide to mostly moderate and open (in places). Adjacent land uses include immature, scrubby forest and residential development.</p> <p>Key Physical Disturbances Small sections of open riparian area (no trees, shrubs and herbs) and trash within the channel contributing to changes in channel morphology. HHEI Score = 74 (use designation based on HMF EI score of 9)</p>

Summary of Physical Disturbances in the Hall Run Watershed - As noted in this survey, the key physical disturbances in the Hall Run watershed include riparian vegetation removal in residential and developing areas, siltation of stream bottom substrates from lack of riparian cover and bank erosion caused by development and recreational activities, primarily ATV traffic, in the riparian area and adjacent floodplain. There is also an accumulation of large amounts of trash in the stream channel especially in the upper portions of the watershed, and the dumping of yard and other wastes into the stream channel. Trash and yard waste has accumulated in the channel to such a degree in some locations that flow has been diverted onto the adjacent floodplain or has scoured and eroded the adjacent banks and underlying stream bottom substrate materials increasing downstream siltation. Also noted were a number of point source discharges from failing household septic systems.

B. Salt Run

Salt Run occurs in the East Fork Little Miami River sub-basin of the Little Miami River Drainage Basin. Salt Run is located entirely within western Clermont County. The Salt Run mainstem originates at Jackson Lake located between Old State Route 74 (SR 74)/Batavia Pike and State Route 32. It flows generally northeast for a short distance through residential area before entering the Cincinnati Nature Center. After exiting the Cincinnati Nature Center, Salt Run flows through agricultural bottomland before crossing under Round Bottom Road and emptying into the Lower EFLMR (see Exhibit 2a). The Salt Run mainstem has a total length of approximately 4.1 miles and drains a land area of approximately 6.6 square miles. Salt Run has an OEPA Aquatic Life Use Designation of Warmwater Habitat (WWH), and is also designated as an Agricultural, and Industrial Water supply, and a Primary Contact Recreational water (OEPA, 2005).

In general, the Salt Run lower mainstem, from the confluence with Lower EFLMR to Round Bottom Road, is of lower quality with considerable amounts of riparian vegetation removal occurring on both banks, silt and sand embeddedness of substrate and moderate to good availability of instream habitats for aquatic organisms. The Salt Run upper mainstem from Round Bottom Road to Cincinnati Nature Center, and from Cincinnati Nature Center to Old SR 74, is generally of higher quality with only few small areas of instream or riparian disturbances. Substrate is dominated by cobble/gravel (from Round Bottom Road to Cincinnati Nature Center) and boulder/slabs/cobble (from Cincinnati Nature Center to Old SR 74) providing moderate amounts of good instream habitats for aquatic organisms. The Salt Run headwater tributary, from the northwest boundary of the Cincinnati Nature Center to just west of Rumpke Road, is generally of higher quality with little to no instream or riparian disturbances, cobble/gravel dominated substrates with some boulder, boulder/slabs and bedrock and moderate availability of instream habitats for aquatic organisms. The Salt Run headwater tributary, from the southeast boundary of the Cincinnati Nature Center to the south side of Tealtown Road, is generally of lower quality with typically open riparian area (no trees, shrubs and herbs) and/or young, scrubby riparian vegetation. Substrate is dominated by cobble and gravel with moderate silt and sand embeddedness limiting the availability of good instream habitats for aquatic organisms. A large section of the upper reaches of this Salt Run headwater tributary is also in culvert beneath residential development.

A summary of conditions observed in the Salt Run watershed during field surveys conducted for this project is presented in Table 2 below. A detailed summary of specific physical conditions by stream site is presented in attached Table A.

Table 2. Summary of Conditions in Salt Run

Provisional Use Designation	Conditions
Modified Warmwater Habitat	<p><u>Salt Run Headwater Tributary from Cincinnati Nature Center to Tealtown Road (RM 1.5-2.2); Site 5</u> <u>Typical Habitat</u> Substrate dominated by cobble and gravel with some boulder/slab, sand; some upstream areas with heavy silt. The channelized (in places) and slightly sinuous channel is fairly wide to fairly narrow with mostly shallow flowing water and several deep pools. Instream cover includes undercut banks, overhanging vegetation, rootmats, rootwads, boulders, instream macrophytes, and logs and woody debris which support numerous fish and macroinvertebrates. Development is poor with moderate stability. Vegetation in riparian areas is absent in many portions to narrow, mostly young and scrubby to intermediate in age where present. Areas of moderate bank erosion. The upstream section (in the vicinity of Nature Run Road) is all within culvert under residential development. Adjacent land uses include scrubby woodland, oldfield and residential development.</p> <p><u>Key Physical Disturbances</u> Channelization, areas of riparian vegetation removal and trash adjacent to and within the channel contributing to changes in channel morphology. <u>QHEI Score = 51.25 (QHEI assessment due to pools >40 cm deep)</u></p>
Warmwater Habitat	<p><u>Salt Run Lower Mainstem from confluence with EFLMR to Round Bottom Road (RM 0.0-0.4); Site 19</u> <u>Typical Habitat</u> Substrate is dominated by gravel and sand with some areas of boulder/slabs, boulder, cobble and areas with considerable amounts of silt. The moderately sinuous channel is wide with flowing water and numerous very deep pools. Instream cover includes undercut banks, overhanging vegetation, shallows, deep pools, rootwads, aquatic macrophytes, and logs and woody debris which support numerous fish and macroinvertebrates. Development is poor to fair with low stability. Vegetation in riparian areas ranges from moderately wide and mature to young, scrubby and narrow or completely absent. Areas of moderate to heavy or severe bank erosion. Adjacent land uses include woodland and agricultural cropland.</p> <p><u>Key Physical Disturbances</u> Riparian vegetation removal, steep bank slumping, and siltation contributing to changes in channel morphology. <u>QHEI Score = 66.5</u></p> <p><u>Salt Run Upper Mainstem from Round Bottom Road to Cincinnati Nature Center (RM 0.4-1.0) and Headwater from Cincinnati Nature Center to Old SR 74 (RM 2.4-3.7); Sites 10 and 17, respectively</u> <u>Typical Habitat</u> Substrate is dominated by gravel/sand in the lower portions and bedrock/cobble in the upper portions with considerable amounts of silt in the lower portions. The moderately sinuous channel is moderately wide with flowing water and numerous very deep pools. Instream cover includes undercut banks, overhanging vegetation, shallows, deep pools, rootmats, rootwads, backwaters, and logs and woody debris which support numerous fish and macroinvertebrates. Development is fair with low stability in the lower portions and high stability in the upper portions. Vegetation in riparian areas is mostly wide and mature on steep slopes with a few areas of narrow, scrubby or completely absent (mostly in the lower portion). Areas of moderate bank erosion. Adjacent land uses include woodland, roadway right-of-way, and some residential.</p> <p><u>Key Physical Disturbances</u> Small areas of riparian vegetation removal and siltation (in the lower portion). Little to no changes in channel morphology. <u>QHEI Scores = 68.75 (Site 10) and 66.0 (Site 17; QHEI assessment due to pools >40 cm deep)</u></p> <p><u>Salt Run Headwater Tributary (see Exhibit 2a); Site 18</u> <u>Typical Habitat</u> Substrate is dominated by cobble with some areas of bedrock, boulder/slabs, gravel, sand and areas with some silt. The moderately sinuous channel is fairly wide with flowing water and numerous deep pools. Instream cover includes undercut banks, overhanging vegetation, deep pools, rootwads, boulder/slabs, and logs and woody debris which support numerous fish and macroinvertebrates. Development is poor to fair with high stability. Vegetation in riparian areas is mostly wide and mature on steep slopes to completely absent (in one small area). Areas of moderate bank erosion. Adjacent land uses include</p>

Table 2. Summary of Conditions in Salt Run

Provisional Use Designation	Conditions
	<p>woodland and residential development. Key Physical Disturbances Riparian vegetation removal, steep bank slumping, and siltation contributing to changes in channel morphology. QHEI Score = 67.5 (QHEI assessment due to pools >40 cm deep)</p> <p>Salt Run Headwater Tributary (see Exhibit 2a); Site 7 Typical Habitat Substrate is dominated by cobble and gravel with some areas of bedrock, boulder/slabs, boulder, sand and areas with some silt. The moderately sinuous channel is fairly wide with flowing water and several deep pools. Instream cover includes undercut banks, overhanging vegetation, deep pools, rootmats, rootwads, boulder/slabs, and logs and woody debris which support numerous fish and macroinvertebrates. Development is fair with high stability. Vegetation in riparian areas is wide and mature on steep slopes to completely absent (in one small area). Areas of moderate bank erosion. Adjacent land uses include woodland and residential development. Key Physical Disturbances Small areas of riparian vegetation removal and siltation. Little to no changes in channel morphology. QHEI Score = 62.0 (QHEI assessment due to pools >40 cm deep)</p>
Class I PHWH	<p>Salt Run Headwater Tributary (see Exhibit 2a); Site 8 Typical Habitat Substrate is dominated by bedrock and cobble with some areas of boulder/slabs, gravel, sand and considerable amount of silt (especially in the upper reaches). The natural, moderately sinuous channel is moderately wide, and has mostly shallow flowing water from recent rains and a few deep pools. Vegetation in riparian areas ranges from mostly wide and scrubby to narrow and completely absent (in one small section). Adjacent land uses include immature, scrubby forest, agricultural cropland and highway right-of-way (at the upstream end). Key Physical Disturbances Small areas of riparian vegetation removal and siltation. Little to no changes in channel morphology. HHEI Score = 85 (use designation based on HMFEE score of 5)</p>
Modified Class II PHWH	<p>Salt Run Headwater Tributary (see Exhibit 2a); Site 6 Typical Habitat Substrate is dominated by cobble and gravel with some areas of boulder/slabs, bedrock, sand and considerable amount of silt (especially in the upper reaches). The recovering, somewhat sinuous channel is moderately wide to narrow and channelized (in places), and has mostly shallow flowing water from recent rains. Instream cover includes overhanging vegetation, a few boulder/slabs and pools, rootwads, and lots of logs and woody debris which support a moderately diverse macroinvertebrate population. Vegetation in riparian areas ranges from young, scrubby and wide to completely absent. Adjacent land uses include immature, scrubby woods and residential development. Key Physical Disturbances Riparian vegetation removal leading to instream siltation, channelization, and trash within the channel contributing to changes in channel morphology. HHEI Score = 73 (use designation based on HMFEE score of 9)</p>

Summary of Physical Disturbances in the Salt Run Watershed - As noted in this survey, the key physical disturbances in the Salt Run watershed include some riparian vegetation removal in residential and commercial areas, siltation of stream bottom substrates from lack of riparian cover, and the accumulation of minor amounts of trash in the stream channel.

C. Lower East Fork Little Miami River

The EFLMR occurs within the Little Miami River Drainage Basin, and is its largest tributary. The EFLMR is located in the Interior Plateau Ecoregion with headwaters that begin in Highland County, Ohio. It flows generally southwest into East Fork Lake, then generally

northwest to the confluence with the Little Miami River in Clermont County, Ohio, south of the City of Milford. The EFLMR has a total length of 81.7 miles and drains a land area of 500 square miles (ODNR, 1960). The entire EFLMR is a State Resource Water with an Exceptional Warmwater Habitat Aquatic Life Use Designation (OEPA, 2005). The EFLMR is also designated as a Public, Agricultural, and Industrial Water supply, and a Primary Contact Recreational water (OEPA, 2005). The EFLMR, from East Fork Lake (RM 20.5) to the mouth, is listed as a superior high quality water (OEPA, 2005), however, aquatic life use and recreational use are listed as impaired in the Section 303(d) TMDL Priority List for 2004, from upstream Stonelick Creek to the mouth (OEPA, 2005).

In general, the Lower EFLMR, from I-275 to the confluence with Salt Run (RM 2.3 to 5.2), is of lower quality, typically with vegetation in riparian areas that is absent to narrow, scrubby and immature with a few scattered mature canopy trees, cobble/gravel, sand and silt substrate with moderate amounts of embeddedness, and good to excellent availability of instream habitats for aquatic organisms.

Typical habitat conditions include undercut banks, overhanging vegetation, shallows, rootmats deep pools (>2.3 feet), rootwads, oxbows/backwaters, aquatic macrophytes, logs and woody debris. Channel morphology includes overall low sinuosity, poor to fair development and moderate stability. Numerous fish and macroinvertebrates were also noted. Adjacent land use is mostly agricultural on the left descending bank and commercial/light industrial on the right descending bank.

Key physical disturbances observed along the Lower EFLMR include riparian vegetation removal, areas of bank stabilization through the use of artificial materials, areas of heavy siltation, and minor amounts of trash within the channel. The QHEI score for the Lower EFLMR is 74.5 and corresponds with a provisional life use designation of Warmwater Habitat.

A detailed summary of specific physical conditions in the Lower EFLMR is presented in attached Table A.

IV. PRESERVATION AND RESTORATION OPPORTUNITIES

A. Background

The USEPA reports that as imperviousness within a watershed increases, the quality of aquatic life decreases. Increased imperviousness leads to increased water quantities, velocities and available energy, which causes changes in stream morphology due to scouring, which leads to stream instability. As described in the LEFMP, as the amount of runoff reaching a stream increases, the stream will naturally adjust the channel, changing its shape/morphology to accommodate increased flow. While the channel is adjusting to the increased flow a considerable amount of streambank and streambed erosion will occur leading to potentially substantial sediment input to the stream. As a result of these morphological and associated water quality changes, aquatic habitats can become drastically altered. Some may be completely destroyed and others may form in new locations.

The LEFMP also indicates that wide, well-forested riparian corridors significantly contribute to the overall health of stream ecosystems. Deep, well developed root systems assist in stabilizing the stream channel, and prevent or reduce bank erosion. This vegetation also acts as a filter, removing nutrients and toxicants from surface runoff before it enters the stream. Overhanging vegetative canopies provide detritus (leaves and woody debris) as a necessary food source for aquatic organisms, as well as shade which lowers water temperatures and helps keep dissolved oxygen levels elevated.

Preliminary preservation and restoration projects identified for the Hall Run, Salt Run and a portion of the Lower EFLMR during this study were selected based on the potential for realization of the greatest benefit to riparian and physical stream habitat. As projects are further developed, they will include specific components/measures designed to either maintain (in the case of preservation) or achieve (in the case of restoration) current Aquatic Life Use Designation status as assigned by the OEPA. Preliminary projects are more specifically described in Sections D, E and F, below.

B. General Disturbances

Within the Hall Run, Salt Run and Lower EFLMR watersheds, increases in impervious surfaces from development has likely lead to increased runoff, increased water quantities and increased flow energy which has contributed to changes in channel morphology and other physical stream disturbances. This inventory, which focused on riparian and physical stream assessments as an initial step in carrying forward watershed management objectives, identified a number of key physical disturbances in these watersheds that, if addressed by source, could lead to more stable channel conditions and overall improvement in habitat structure, biology, and water quality. Observed physical disturbances, potential sources, and examples of potential actions to improve conditions are summarized in Table 3 and displayed on Exhibits 3 and 4.

It should be noted that the impairment sources and potential solutions listed in Table 3 are preliminary and will be refined as preservation and restoration projects are further developed. Key to conceptual plan development for each project will be to more specifically evaluate and

identify impairment sources causing riparian/habitat modifications in individual stream reaches, and to include measures to address these sources in the final design.

Table 3. Key Physical Disturbances in the Hall Run, Salt Run and Lower EFLMR Watersheds

Observed Riparian/Stream Disturbance	Possible Source(s)	Potential Actions
Riparian Vegetation and Stream Buffer Removal	Clearing for Stream Access by Individual Homeowners; Adjacent Development; ATV Use	Riparian Planting; Buffer Zone Creation; Limitation of ATV Use in Floodplain and Riparian Areas; Conservation Easements or Other Preservation
Stream Bank Stabilization/ Erosion	Development onto Stream and Floodplain Areas by Individual Homeowners; Subdivision Development; ATV Traffic Eroding Banks	Stream Bank and Riparian Stabilization Plantings; Introduction and Enforcement of Best Management Practices (BMP's); Install Silt Fences; Limitation of ATV Use in Floodplain and Riparian Areas; Conservation Easements or Other Preservation
Stream Bed Siltation	Lack of Riparian Vegetation from Clearing; Runoff from Adjacent Development; ATV Traffic up to and onto Stream Banks and Floodplain Areas	Riparian Planting; Buffer Zone Creation; Construction of In-Channel Silt Removal Mechanisms (e.g., revetments, boulder clusters, etc.); Introduction and Enforcement of Best Management Practices (BMP's); Install Silt Fences; Limitation of ATV Use in Floodplain and Riparian Areas; Conservation Easements or Other Preservation
Trash Accumulation, Open Dumping and Waste Discharge	Primarily from Individual Homeowners, as well as from Sporadic Illegal Dumpers	Periodic Patrol of Impairment Areas and Enforcement of Local Litter Control and Clean Water Act Dredge and Fill Laws; Creation of Educational Materials to Prevent Dumping of Yard and Other Wastes into Streams; Periodic Voluntary "Stream Sweeps" to Remove Waste from Channels; Repair of Failing Household Septic Systems Discharging into Stream Channels

Physical disturbances in the Hall Run watershed, especially in the upper portions, were more widespread when compared to Salt Run or the Lower EFLMR. Overall, assessment data collected from this study indicate that portions of the Hall Run and Salt Run watersheds, and all of the Lower EFLMR are not meeting Warmwater Habitat (WWH) or Exceptional Warmwater Habitat (EWH) criteria, respectively, as designated by the OEPA.

C. Criteria For Identification of Potential Mitigation Opportunities (Projects)

Two general types of mitigation opportunities were identified: 1) preservation projects and 2) restoration projects. Restoration projects were further divided into primary and secondary projects, with primary projects signifying a higher priority need for restoration. The criteria used for identifying specific projects are outlined below.

Preservation Projects: Three projects identified (see Exhibit 5)

- Criteria 1 – meet OEPA designated use.
- Criteria 2 – exhibit good quality riparian and instream habitat (for streams with no designated use).

Restoration Projects: Six projects identified (see Exhibit 5)

Primary Restoration Projects (four)

- Criteria 1 – do not meet OEPA designated use.
- Criteria 2 – exhibit poor quality riparian and/or instream habitat (for streams with no designated use).

Secondary Restoration Projects (two)

- Criteria 1 – meet OEPA designated use, but exhibit higher concentration of impairment, such as riparian vegetation disturbance and trash accumulation (see Exhibit 3) and bank erosion and siltation (see Exhibit 4).

Specific project opportunities within the Hall Run, Salt Run and Lower EFLMR watersheds are described in more detail below.

D. Hall Run Projects/Opportunities

A total of four potential projects (one preservation, two primary restoration and one secondary restoration) were identified for the Hall Run watershed based on existing conditions, and data gathered through walkover surveys, and QHEI/HHEI assessments (see Exhibit 5).

1. Preservation Opportunity

a. Hall Run Mainstem - I-275 to Virginia Lane (RM 0.8-3.2)

Existing Conditions - Designated by OEPA as Warmwater Habitat (WWH). Currently exhibiting a provisional use designation of Warmwater Habitat (based on QHEI collected for this study). Nearly exceptional conditions with regards to habitat structure, channel morphology, and biology. Little to no development activities in floodplain and riparian areas. Very high QHEI score (71.0), 4 points from Exceptional Warmwater Habitat (EWH).

Key Physical Disturbances - Very small areas of riparian vegetation removal. Little to no riparian/channel modifications.

Preliminary Preservation Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Hall Run Mainstem.
- Replanting of native species in small areas of riparian vegetation removal.
- Creation of an “OEPA recommended” vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a “rule of thumb” minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.

Once funding and/or sponsorship becomes available for this project, these and other potential opportunities/actions will be evaluated and included in the final preservation plan.

2. Primary Restoration Opportunities

a. Hall Run Mainstem – mouth to I-275 (RM 0.0-0.8)

Existing Conditions - Designated by OEPA as Warmwater Habitat (WWH). Currently exhibiting a provisional use designation of Modified Warmwater Habitat (Modified WWH) with a QHEI score of 48.5 (from this study). This portion of stream is degraded by riparian vegetation removal, which has lead to siltation and embeddedness of substrate materials, and caused a lack of suitable instream cover for biological organisms. Further degradation is caused by channelization and attempts at bank stabilization through the use of artificial materials.

Key Physical Disturbances - Numerous areas of riparian vegetation removal, moderate bank erosion and instream siltation, and substantial amounts of trash and other refuse in channel contributing to riparian/channel modifications.

Preliminary Restoration Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Hall Run Mainstem.
- Replanting of native species in areas of riparian vegetation removal.
- Creation of an “OEPA recommended” vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a “rule of thumb” minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The

actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.

- Removal of artificial bank stabilization materials.
- Stream bank stabilization through planting of native species, installation of silt fences, and/or revetments.

Once funding and/or sponsorship becomes available for this project, these and other potential restoration opportunities/measures will be evaluated and included in the final restoration plan. Conceptual plan development will include identification of key sources contributing to habitat/riparian modifications in this stream reach, and specific measures to address these sources will be included in the final design.

b. Hall Run Headwater - Glenrose Lane to Regent Road (RM 5.1-6.0)

Existing Conditions - Designated by OEPA as Warmwater Habitat (WWH). Hall Run Headwater is currently exhibiting a provisional use designation of Modified Warmwater Habitat (Modified WWH) with a QHEI score of 52.5 (from this study). It is degraded by riparian vegetation removal, which has led to siltation and embeddedness of substrate materials, and caused a lack of suitable instream cover for biological organisms. This portion is further degraded by All Terrain Vehicle (ATV) traffic causing large amounts of erosion and subsequent stream channel siltation, and by the dumping of yard waste and trash into the stream channel from adjacent residential properties.

Key Physical Disturbances - Numerous areas of riparian vegetation removal, moderate to severe amounts of riparian erosion and instream siltation, and substantial amounts of trash and other refuse in channel contributing to riparian/channel modifications.

Preliminary Restoration Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Hall Run Headwater.
- Replanting of native species in areas of riparian vegetation removal and areas of ATV traffic.
- Creation of an "OEPA recommended" vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a "rule of thumb" minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.

- Removal of trash and yard wastes from stream channel through periodic voluntary "Stream Sweeps".
- Prevention of open dumping of yard and other wastes into the stream through periodic patrol of impairment areas and enforcement of local litter control and clean water act dredge and fill laws, and through creation of educational materials to encourage adjacent residents to keep the stream clean.
- Limitation of ATV use in floodplain and riparian areas through establishment of conservation easements.
- Repair failing household septic systems discharging into stream channels to improve overall conditions for water quality and biological organisms.

Once funding and/or sponsorship becomes available for this project, these and other potential restoration opportunities/measures will be evaluated and included in the final restoration plan. Conceptual plan development will include identification of key sources contributing to habitat/riparian modifications in this stream reach, and specific measures to address these sources will be included in the final design.

3. Secondary Restoration Opportunities

a. Hall Run Mainstem - Virginia Lane to Glenrose Lane (RM 3.2-5.1)

Existing Conditions - Designated by OEPA as Warmwater Habitat (WWH). This portion of stream is currently exhibiting a provisional use designation of Warmwater Habitat (WWH) with a QHEI score of 62.0 (from this study). Although meeting the OEPA designated use, a higher concentration of riparian disturbance, trash accumulation, bank erosion and siltation were noted (see Exhibits 3 and 4) which, if left unchecked, could threaten the future attainment status of this portion of Hall Run Mainstem.

Key Physical Disturbances - Numerous areas of riparian vegetation removal, substantial amounts of trash and other refuse in channel and moderate bank erosion and instream siltation contributing to riparian/channel modifications.

Preliminary Restoration Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Hall Run Mainstem.
- Replanting of native species in areas of riparian vegetation removal.
- Creation of an "OEPA recommended" vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a "rule of thumb" minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The

actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.

- Removal of trash and yard wastes from stream channel through periodic voluntary “Stream Sweeps”.
- Stream bank stabilization through planting of native species, installation of silt fences, and/or revetments.

Once funding and/or sponsorship becomes available for this project, these and other potential restoration opportunities/measures will be evaluated and included in the final restoration plan. Conceptual plan development will include identification of key sources contributing to habitat/riparian modifications in this stream reach, and specific measures to address these sources will be included in the final design.

E. Salt Run Projects/Opportunities

A total of four potential projects (two preservation, one primary restoration, and one secondary restoration) were identified for the Salt Run Watershed based on existing conditions, and data gathered through walkover surveys, and either QHEI or HHEI assessments (see Exhibit 5).

1. Preservation Opportunities

a. Salt Run Headwater - Cincinnati Nature Center to Old SR 74 (RM 2.4 to 3.7)

Existing Conditions - Mainstem designated by OEPA as Warmwater Habitat (WWH). This portion of stream is currently exhibiting a provisional use designation of Warmwater Habitat (based on QHEI/HHEI collected for this study). Very good habitat structure, channel morphology and biology. Little to no development in floodplain and riparian areas.

Key Physical Disturbances - Small areas of riparian vegetation removal, bank slumping and instream siltation. Little to no changes in channel morphology.

Preliminary Preservation Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Salt Run Headwater.
- Replanting of native species in small areas of riparian vegetation removal.
- Creation of an “OEPA recommended” vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a “rule of thumb” minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with

input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.

- Stream bank stabilization through planting of native species, installation of silt fences, and/or revetments.

Once funding and/or sponsorship becomes available for this project, these and other potential opportunities/actions will be evaluated and included in the final preservation plan.

b. Salt Run Headwater Tributary - Cincinnati Nature Center to I-275 (RM 0.5-1.0)

Existing Conditions - No OEPA use designation. Currently exhibiting a provisional use designation of Warmwater Habitat (based on QHEI/HHEI collected for this study). Very good habitat structure, channel morphology, and biology. Little to no development in floodplain and riparian areas.

Key Physical Disturbances - Small areas of riparian vegetation removal and instream siltation. Little to no changes in channel morphology.

Preliminary Preservation Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Salt Run Headwater Tributary.
- Replanting of native species in small areas of riparian vegetation removal.
- Creation of an "OEPA recommended" vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a "rule of thumb" minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.

Once funding and/or sponsorship becomes available for this project, these and other potential opportunities/actions will be evaluated and included in the final preservation plan.

2. Primary Restoration Opportunity

a. Salt Run Headwater Tributary - Cincinnati Nature Center to Flick Lane (RM 1.5-2.6)

Existing Conditions - No OEPA use designation. Currently exhibiting a provisional use designation of Modified Warmwater Habitat (Modified WWH) with QHEI score of 51.25 (lower portion), and modified Class II PHWH with an HMFEL score of 9 (upper

portion) (base on data collected for this study). This portion of stream is degraded by riparian vegetation removal, which has lead to siltation and embeddedness of substrate materials, and caused a lack of suitable instream cover for biological organisms. Also degraded by channelization.

Key Physical Disturbances - Numerous areas of riparian vegetation removal, areas of bank erosion and instream siltation, lack of instream cover and channelization, and some trash in stream channel contributing to riparian/channel modifications.

Preliminary Restoration Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Salt Run Headwater Tributary.
- Replanting of native species in areas of riparian vegetation removal.
- Creation of an “OEPA recommended” vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a “rule of thumb” minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.
- Stream bank stabilization through planting of native species, installation of silt fences, and/or revetments.
- Removal of trash from stream channel through periodic voluntary “Stream Sweeps”.
- Prevention of open dumping of yard and other wastes into the stream through periodic patrol of impairment areas and enforcement of local litter control and clean water act dredge and fill laws, and through creation of educational materials to encourage adjacent residents to keep the stream clean.

Once funding and/or sponsorship becomes available for this project, these and other potential restoration opportunities will be evaluated and included in the final restoration plan. Conceptual plan development will include identification of key sources contributing to habitat/riparian modifications in this stream reach, and specific measures to address these sources will be included in the final design.

3. Secondary Restoration Opportunity

a. Salt Run Mainstem - mouth to Cincinnati Nature Center (RM 0.0-1.0)

Existing Conditions - Mainstem designated by OEPA as Warmwater Habitat (WWH). It is currently exhibiting a provisional use designation of Warmwater Habitat

(WWH) with QHEI scores of 66.5 and 68.75 (based on data collected for this study). Although meeting the OEPA designated use, a higher concentration of riparian disturbance, trash accumulation, bank erosion and siltation were noted (see Exhibits 3 and 4) which, if left unchecked, could threaten the future attainment status of this portion of Salt Run Mainstem.

Key Physical Disturbances - Areas of riparian vegetation removal, bank slumping and instream siltation contributing to riparian/channel modifications.

Preliminary Restoration Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of Salt Run Mainstem.
- Replanting of native species in small areas of riparian vegetation removal.
- Creation of an "OEPA recommended" vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a "rule of thumb" minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.
- Stream bank stabilization through planting of native species, installation of silt fences, and/or revetments.

Once funding and/or sponsorship becomes available for this project, these and other potential restoration opportunities/measures will be evaluated and included in the final restoration plan. Conceptual plan development will include identification of key sources contributing to habitat/riparian modifications in this stream reach, and specific measures to address these sources will be included in the final design.

F. Lower East Fork Little Miami River Project/Opportunity

The entire length of the Lower EFLMR, from I-275 to the confluence with Salt Run was identified as a project area based on the nature of the existing conditions, noted during walkover surveys and QHEI assessment. This project is further described below.

Existing Conditions - The Lower EFLMR (RM 2.3-5.2) is designated by the OEPA as Exceptional Warmwater Habitat (EWH). It is currently exhibiting a provisional use designation of Warmwater Habitat (WWH) with a QHEI score of 74.5 (from this study). Most of the Lower EFLMR from I-275 to the mouth of Salt Run is degraded by riparian vegetation removal, which has led to siltation and embeddedness of substrate materials. This portion of river has also been degraded by bank erosion and shaping activities, as well as by attempts at bank stabilization through the use of artificial materials.

Key Physical Disturbances - Numerous areas of riparian vegetation removal and bank erosion with large amounts of instream siltation contributing to riparian/channel modifications.

Preliminary Opportunities

- Establishment of conservation easements to prevent degradation or development in floodplain or riparian areas of this portion of the Lower EFLMR.
- Replanting of native species in areas of riparian vegetation removal and areas of ATV traffic.
- Creation of an "OEPA recommended" vegetated buffer in the riparian area that is 50-100 feet wide on either side of the stream, using native species to protect and enhance current conditions. According to the OEPA a vegetated buffer of 50-120 feet on both sides of the bankfull channel is a "rule of thumb" minimum necessary to maintain a high quality aquatic ecosystem (OEPA, 2005). The actual final buffer widths would be identified during further planning and with input from regulatory agencies, local stakeholders/landowners, and consideration of stream/watershed attributes and quality.
- Removal of artificial bank stabilization materials.
- Stream bank stabilization through planting of native species, installation of silt fences, and/or revetments.

Once funding and/or sponsorship becomes available for this project, these and other potential preservation/restoration opportunities will be evaluated and included in the final plan. Conceptual plan development will include identification of key sources contributing to habitat/riparian modifications in this stream reach, and specific measures to address these sources will be included in the final design.

V. NEXT STEPS

Watershed Coordination Efforts - A key component to the successful advancement of the recommended projects is continued coordination within Clermont County and including key watershed stakeholders and resource agencies. Criteria should be established for prioritizing and scheduling project implementation, qualification for funding and local match credit, and establishing parameters for mitigation banking.

Identify Funding Sources and/or Project Sponsors - A key objective of this study is to link with the Eastern Corridor advanced mitigation strategy to provide opportunities for other interested sponsor(s) (public or private) needing to meet compensatory mitigation requirements as a result of impacts to aquatic resources. The proposed work also identifies projects potentially eligible for OEPA 319 grant funds and/or federal-aid highway funding – for which riparian assessment work may be used as local match credit – in an effort to further implement objectives of the Lower East Fork Management Plan for Hall Run, Salt Run and Lower EFLMR watersheds.

A useful tool for coordination of potential mitigation projects is the Mitigation Clearinghouse, hosted by the OEPA, Division of Surface Water. The purpose of the Mitigation Clearinghouse is to promote the exchange of information between applicants seeking projects for mitigation of impacts that may be part of a Section 401 Water Quality Certification, and individuals that may have property or projects that are available (OEPA, 2005). Mitigation Clearinghouse Data Sheets are used to facilitate the exchange of specific information for potential restoration, enhancement or preservation opportunities. Mitigation Clearinghouse Data Sheets for the nine potential projects identified in this Inventory Report are included in Appendix D. After review and identification of projects to pursue, the next step is to submit the proposed project(s) Mitigation Clearinghouse Data Sheet(s) to OEPA, Division of Surface Water, as directed on the Mitigation Clearinghouse Data Sheet.

Identify Willing Participants - A key component to project advancement is identifying private land owners who are willing to participate in the proposed restoration and preservation efforts. The majority of land within the Hall Run, Salt Run and Lower EFLMR watersheds proposed for preservation or restoration (i.e. the strip of land immediately adjacent to the stream on both sides) is privately owned (see Appendix F). An important next step would involve coordination with landowners and other stakeholders to identify willing participants; activities may include development of educational materials, informing the public about the potential benefits realized by implementing proposed project(s), and providing the opportunity for public input through individual landowner contact and/or public meetings.

Develop Conceptual and Final Preservation/Restoration Plans – This Riparian Assessment and Mitigation Opportunities Inventory focused on riparian and physical stream assessments as an initial step in carrying forward the LEFMP objectives for Hall Run, Salt Run and a portion of the Lower East Fork. Preliminary implementation projects consistent with the LEFMP are identified that will be further developed through the conceptual and final design phases as funding sources and project sponsorship become available. Key to conceptual plan development for each project will be to more specifically evaluate and identify impairment sources causing riparian/habitat modifications in individual (project) stream reaches, and to evaluate measures and identify strategies to address these sources. Conceptual plans will

consist of initial layout of the preservation or restoration design, identification of funding source and/or sponsor, initial resource agency coordination/review, and identification of permitting and banking issues. Final plan development will consist of detailed design and identification of performance measures, permit application, monitoring plan development, and other needs as identified through review of the conceptual plan and agency coordination.

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TABLES

Table A. Summary of Conditions at Stream Survey Sites.

Site Number	Stream Name	Drainage Area (mi ²)	River Mile	Observed Stream Features/Conditions				QHEI or HHEI Score	Provisional Use Designation
				Flow Regime	Bottom Substrate	Riparian Corridor	Adjacent Habitats		
1	Hall Run Headwater	0.09	6.68	Natural, dry	Sand / silt dominated, gravel and leaf pack/woody debris also present	Mostly wide, immature and scrubby	Scrubby woodland, residential and agricultural	HHEI = 28	Class I PHWH
2	Hall Run Headwater	1.09	5.85	Natural, flowing	Gravel / sand dominated, cobble, silt and artificial substrates also present	Wide to moderately wide, immature and scrubby and open sections	Woodland and residential	QHEI = 52.25	Modified Warmwater Habitat
3	Hall Run Headwater Tributary	0.03	0.02	Natural, dry	Sand / silt dominated, cobble, gravel and leaf pack/woody debris also present	Mostly wide, immature and scrubby	Scrubby woodland and residential	HHEI = 29	Class I PHWH
4	Hall Run Headwater Tributary	0.13	0.41	Natural, channelized, flowing	Silt dominated, cobble, gravel, sand and leaf pack/woody debris also present	Mostly open, with some narrow, scrubby, young wooded corridor	Scrubby woods, oldfield and residential	HHEI = 31	Modified Class I PHWH (based on HMFEI score = 2) ^[1]
5	Salt Run Headwater Tributary	0.58	1.82	Natural, channelized, flowing	Cobble / gravel dominated, boulder/slabs, sand and silt also present	One side moderately narrow to narrow, young, scrubby corridor and one side very narrow to open	Scrubby woodland, oldfield and residential	QHEI = 51.25 ^[2]	Modified Warmwater Habitat
6	Salt Run Headwater Tributary	0.12	2.53	Natural, flowing	Cobble / gravel dominated, boulder/slabs, bedrock, sand, silt and leaf pack/woody debris also present	Wide to narrow immature and scrubby and open sections	Scrubby woodland and residential	HHEI = 73	Modified Class II PHWH (based on HMFEI score = 9) ^[1]

Table A. Summary of Conditions at Stream Survey Sites.

Site Number	Stream Name	Drainage Area (mi ²)	River Mile	Observed Stream Features/Conditions				QHEI or HHEI Score	Provisional Use Designation
				Flow Regime	Bottom Substrate	Riparian Corridor	Adjacent Habitats		
7	Salt Run Headwater Tributary	0.57	0.79	Natural, flowing	Cobble / gravel dominated, bedrock, boulder/slabs, boulder, sand and silt also present	Mostly wide, mature steep sloped wooded corridor	Mostly steep sloped woodland and a little residential	QHEI = 62.0 ^[2]	Warmwater Habitat
8	Salt Run Headwater Tributary	0.18	1.41	Natural, flowing	Bedrock / cobble dominated, boulder/slabs, gravel, sand, silt and leaf pack/woody debris also present	Mostly wide immature and scrubby to narrow on one side	Scrubby woodland and agricultural	HHEI = 85	Class I PHWH (based on HMFEI score = 5) ^[1]
9	Hall Run Lower Mainstem	4.82	0.33	Natural, channelized, flowing	Cobble dominated, boulder/slabs, boulder, gravel, sand and silt also present	One side narrow and scrubby and one side very narrow to open	Scrubby woods, oldfield, residential and commercial	QHEI = 48.5	Modified Warmwater Habitat
10	Salt Run Upper Mainstem	6.27	0.67	Natural, flowing	Gravel / sand dominated, cobble, detritus and silt also present	Mostly wide, young and scrubby with some narrow sections	Woodland and residential	QHEI = 68.75	Warmwater Habitat
11	Lower East Fork Little Miami River	492.1	3.46	Natural, flowing	Gravel / sand dominated, boulder, cobble, detritus and silt also present	Moderately wide, young and scrubby to narrow and open	Woodland, commercial and urban/industrial	QHEI = 74.5	Warmwater Habitat
12	Hall Run Upper Mainstem	3.64	2.22	Natural, flowing	Bedrock/Boulder/slabs dominated, boulder, cobble, gravel, sand and silt also present	Wide, mostly mature, wooded corridor on steep slope	Mostly steep sloped woodland and a little residential	QHEI = 71.0	Warmwater Habitat

Table A. Summary of Conditions at Stream Survey Sites.

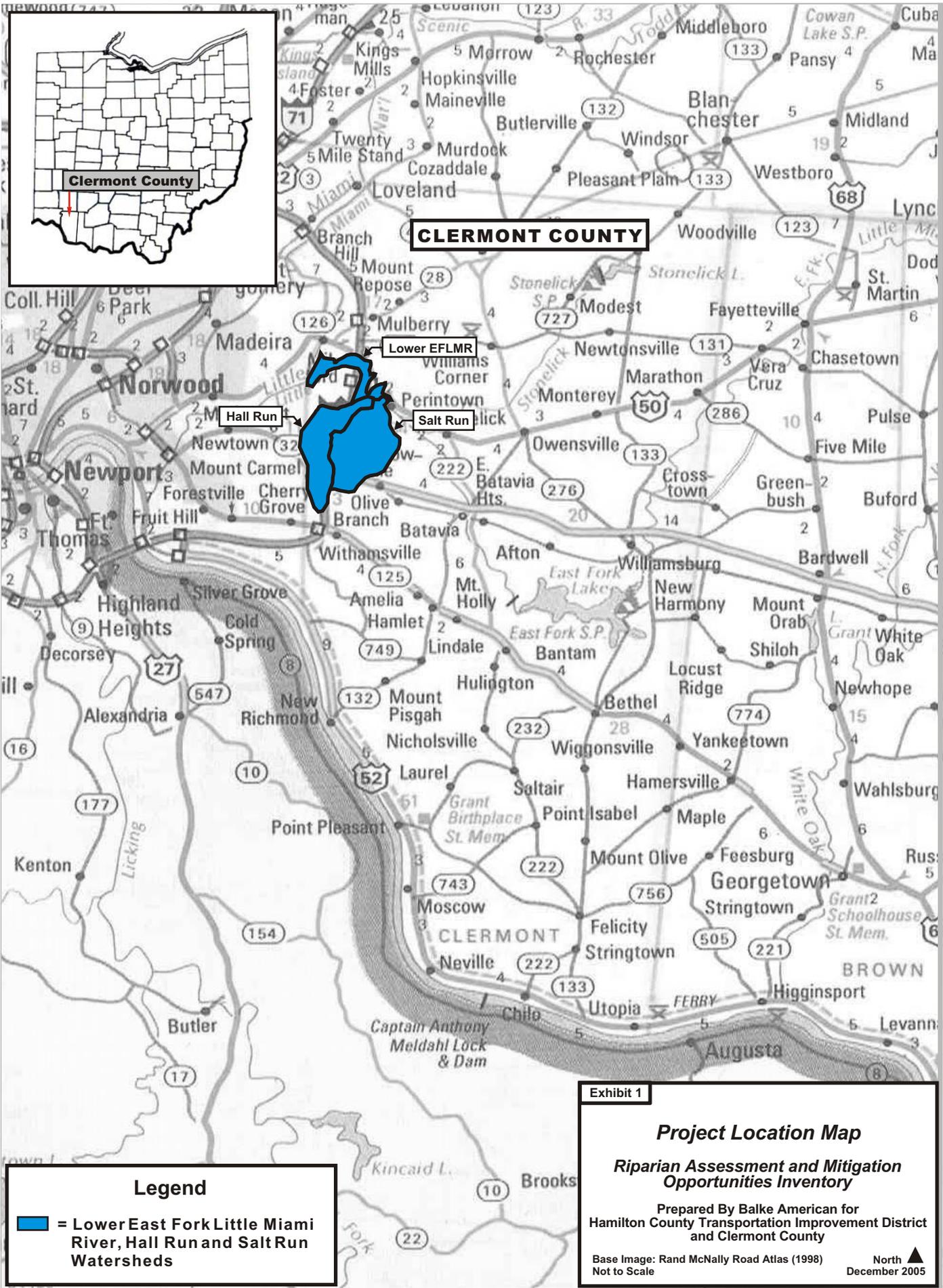
Site Number	Stream Name	Drainage Area (mi ²)	River Mile	Observed Stream Features/Conditions				QHEI or HHEI Score	Provisional Use Designation
				Flow Regime	Bottom Substrate	Riparian Corridor	Adjacent Habitats		
13	Hall Run Upper Mainstem	2.49	3.94	Natural, flowing	Cobble dominated, bedrock, boulder/slabs, gravel, sand and silt also present	Wide, mix of young, scrubby and mature on one side and narrow on the other side	Scrubby woodland and residential	QHEI = 62.0	Warmwater Habitat
14	Hall Run Headwater Tributary	0.17	0.01	Natural, channelized, flowing	Cobble / silt dominated, boulder/slabs, gravel, sand, and leaf pack/woody debris also present	Narrow, young and scrubby to open riparian corridor	Mostly residential and some scrubby woods	HHEI = 66	Modified Class II PHWH
15	Hall Run Headwater Tributary	0.44	0.13	Natural, flowing	Bedrock / cobble dominated, boulder/slabs, gravel, sand, silt and leaf pack/woody debris also present	Mostly wide to moderately wide, immature, scrubby woods	Scrubby woodland and residential	HHEI = 80	Class II PHWH (based on HMFEI score = 13) ^[1]
16	Hall Run Headwater Tributary	0.14	0.08	Natural, flowing	Cobble / sand dominated, boulder/slabs, bedrock, gravel and silt also present	Mostly moderately wide, immature, scrubby woods, but areas of wide and narrow also	Scrubby woodland and residential	HHEI = 74	Class II PHWH (based on HMFEI score = 9) ^[1]
17	Salt Run Headwater	0.54	2.6	Natural, flowing	Bedrock / cobble dominated, boulder/slabs, boulder, gravel, sand and silt also present	Mostly wide, mature woods on steep slope	Mostly steep sloped woodland and a little residential	QHEI = 66.0 ^[2]	Warmwater Habitat
18	Salt Run Headwater Tributary	0.56	0.16	Natural, flowing	Cobble dominated, bedrock, boulder/slabs, gravel, sand and silt also present	Mostly wide, mature woods on steep slopes	Mostly steep sloped woodland and a little residential	QHEI = 67.5 ^[2]	Warmwater Habitat

Table A. Summary of Conditions at Stream Survey Sites.

Site Number	Stream Name	Drainage Area (mi ²)	River Mile	Observed Stream Features/Conditions				QHEI or HHEI Score	Provisional Use Designation
				Flow Regime	Bottom Substrate	Riparian Corridor	Adjacent Habitats		
19	Salt Run Lower Mainstem	6.48	0.17	Natural, flowing	Gravel / sand dominated, boulder/slabs, boulder, cobble and silt also present	Moderately wide, mix of mature and scrubby to completely open	Woodland (scrubby in places) and agricultural	QHEI = 66.5	Warmwater Habitat

- [1] Headwater Macroinvertebrate Field Evaluation Index (HMFEL) used as per ODOT-OES guidance (ODOT, January 2004); i.e. investigator did not concur with the designation assigned by the HHEI, therefore a HMFEL was conducted.
- [2] Stream assessed using a QHEI form due to the presence of pools greater than 15.7 inches (40 centimeters) deep.

EXHIBITS



CLERMONT COUNTY

Lower EFLMR

Hall Run

Salt Run

Legend

= Lower East Fork Little Miami River, Hall Run and Salt Run Watersheds

Exhibit 1

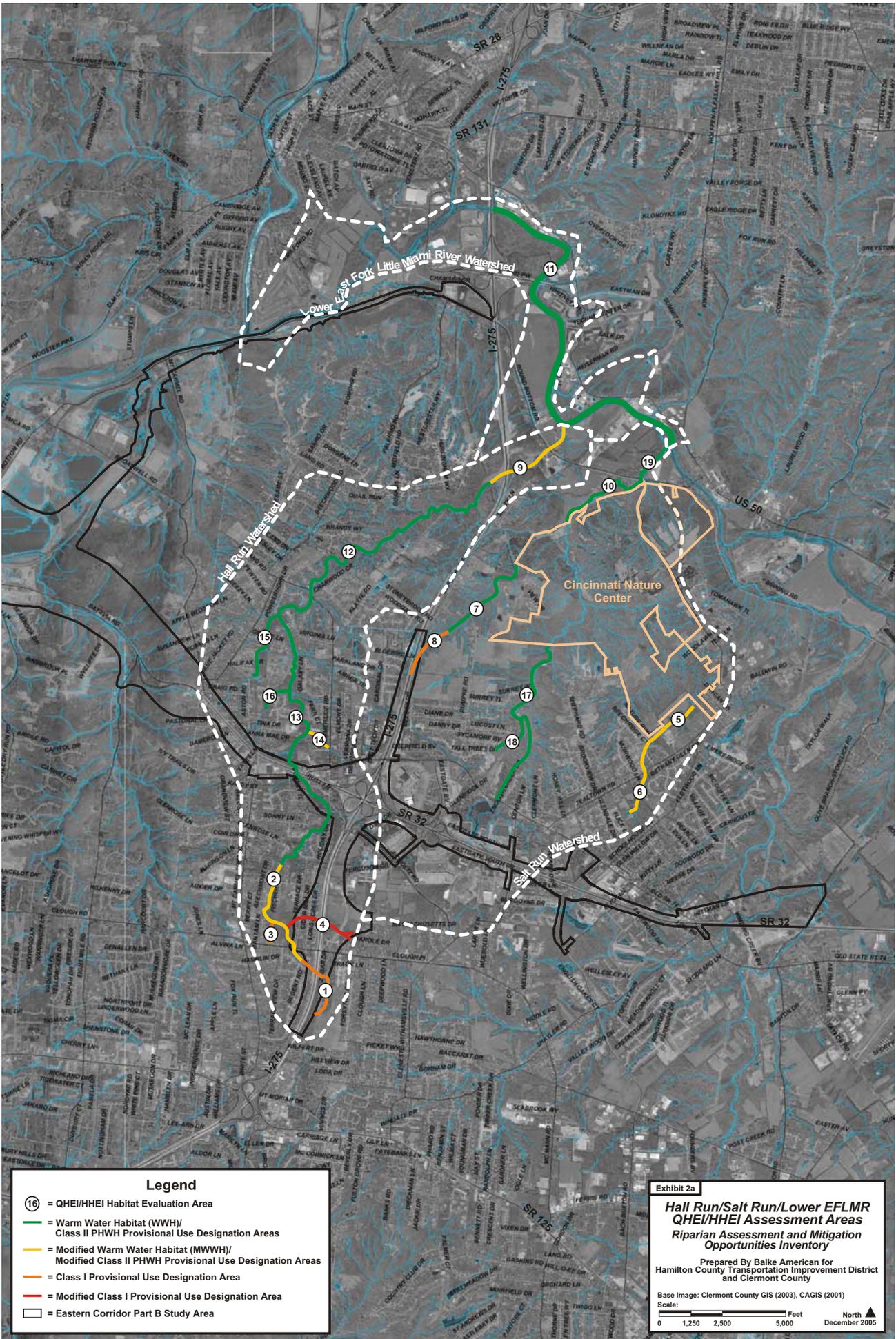
Project Location Map

Riparian Assessment and Mitigation Opportunities Inventory

Prepared By Balke American for Hamilton County Transportation Improvement District and Clermont County

Base Image: Rand McNally Road Atlas (1998)
Not to Scale

North December 2005



Legend

- ⑬ = QHEI/HHEI Habitat Evaluation Area
- = Warm Water Habitat (WWH)/ Class II PHWH Provisional Use Designation Areas
- = Modified Warm Water Habitat (MWWH)/ Modified Class II PHWH Provisional Use Designation Areas
- = Class I Provisional Use Designation Area
- = Modified Class I Provisional Use Designation Area
- = Eastern Corridor Part B Study Area

Exhibit 2a

Hall Run/Salt Run/Lower EFLMR QHEI/HHEI Assessment Areas Riparian Assessment and Mitigation Opportunities Inventory

Prepared by Balke American for Hamilton County Transportation Improvement District and Clermont County

Base Image: Clermont County GIS (2003), CAGIS (2001)

Scale: 0 1,250 2,500 5,000 Feet

North

December 2005

QHEI/HHEI Evaluation Information

Non-Headwater Areas

- ⑨ = Hall Run Lower Mainstem (RM 0.0-0.8), QHEI Score = 48.5; Provisional Use Designation = Modified Warm Water Habitat (MWWH)
- ⑩ = Salt Run Upper Mainstem (RM 0.4-1.0), QHEI Score = 68.75; Provisional Use Designation = Warm Water Habitat (WWH)
- ⑪ = Lower East Fork Little Miami River (RM 2.3-5.2), QHEI Score = 74.5; Provisional Use Designation = Warm Water Habitat (WWH)
- ⑫ = Hall Run Upper Mainstem (RM 0.8-3.4), QHEI Score = 71.0; Provisional Use Designation = Warm Water Habitat (WWH)
- ⑬ = Hall Run Upper Mainstem (RM 3.4-5.1), QHEI Score = 62.0; Provisional Use Designation = Warm Water Habitat (WWH)
- ⑲ = Salt Run Lower Mainstem (RM 0.0-0.4), QHEI Score = 66.5; Provisional Use Designation = Warm Water Habitat (WWH)

Headwater Areas

- ① = Hall Run Headwater, HHEI Score = 28; Provisional Use Designation = Class I PHWH
- ② = Hall Run Headwater (RM 5.1-6.0), QHEI Score = 52.25 (>40cm pools); Provisional Use Designation = Modified Warm Water Habitat (MWWH)
- ③ = Hall Run Headwater Tributary, HHEI Score = 29; Provisional Use Designation = Class I PHWH
- ④ = Hall Run Headwater Tributary; Provisional Use Designation = Modified Class I PHWH (based on HMF EI Score = 2)
- ⑤ = Salt Run Headwater Tributary, QHEI Score = 51.25 (>40cm pools); Provisional Use Designation = Modified Warm Water Habitat (MWWH)
- ⑥ = Salt Run Headwater Tributary; Provisional Use Designation = Modified Class II PHWH (based on HMF EI Score = 9)
- ⑦ = Salt Run Headwater Tributary, QHEI Score = 62.0 (>40cm pools); Provisional Use Designation = Warm Water Habitat (WWH)
- ⑧ = Salt Run Headwater Tributary; Provisional Use Designation = Class I PHWH (based on HMF EI Score = 5)
- ⑭ = Hall Run Headwater Tributary, HHEI Score = 66; Provisional Use Designation = Modified Class II PHWH
- ⑮ = Hall Run Headwater Tributary; Provisional Use Designation = Class II PHWH (based on HMF EI Score = 13)
- ⑯ = Hall Run Headwater Tributary; Provisional Use Designation = Class II PHWH (based on HMF EI = 9)
- ⑰ = Salt Run Headwater (RM 2.4-3.7), QHEI Score = 66.0 (>40cm pools); Provisional Use Designation = Warm Water Habitat (WWH)
- ⑱ = Salt Run Headwater Tributary, QHEI Score = 67.5 (>40cm pools); Provisional Use Designation = Warm Water Habitat (WWH)

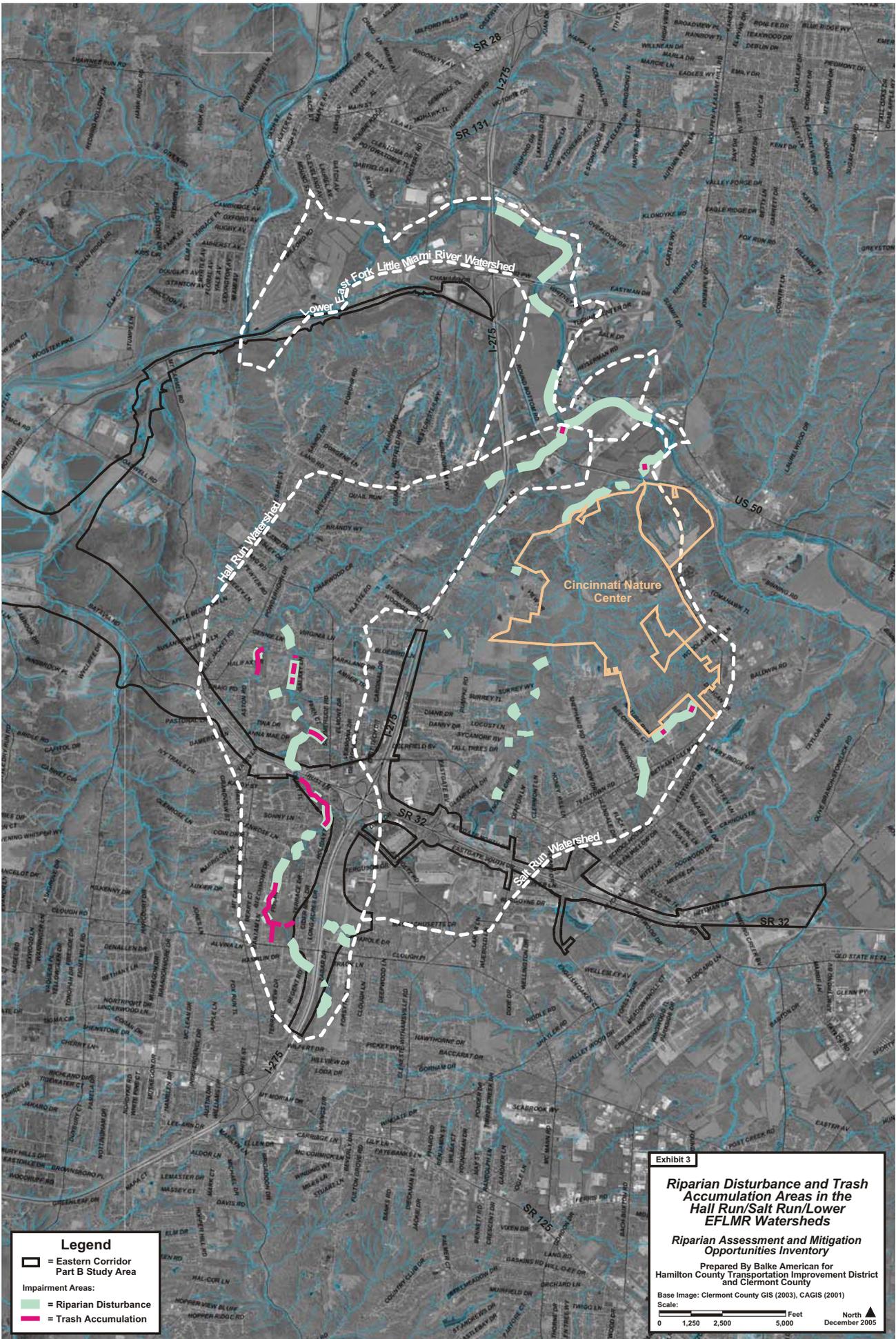
Exhibit 2b

Hall Run/Salt Run/Lower EFLMR QHEI/HHEI Assessment Areas Key

Riparian Assessment and Mitigation Opportunities Inventory

Prepared By Balke American for
Hamilton County Transportation Improvement District
and Clermont County

December 2005



Legend

- = Eastern Corridor Part B Study Area
- Impairment Areas:**
- = Riparian Disturbance
- = Trash Accumulation

Exhibit 3

Riparian Disturbance and Trash Accumulation Areas in the Hall Run/Salt Run/Lower EFLMR Watersheds

Riparian Assessment and Mitigation Opportunities Inventory

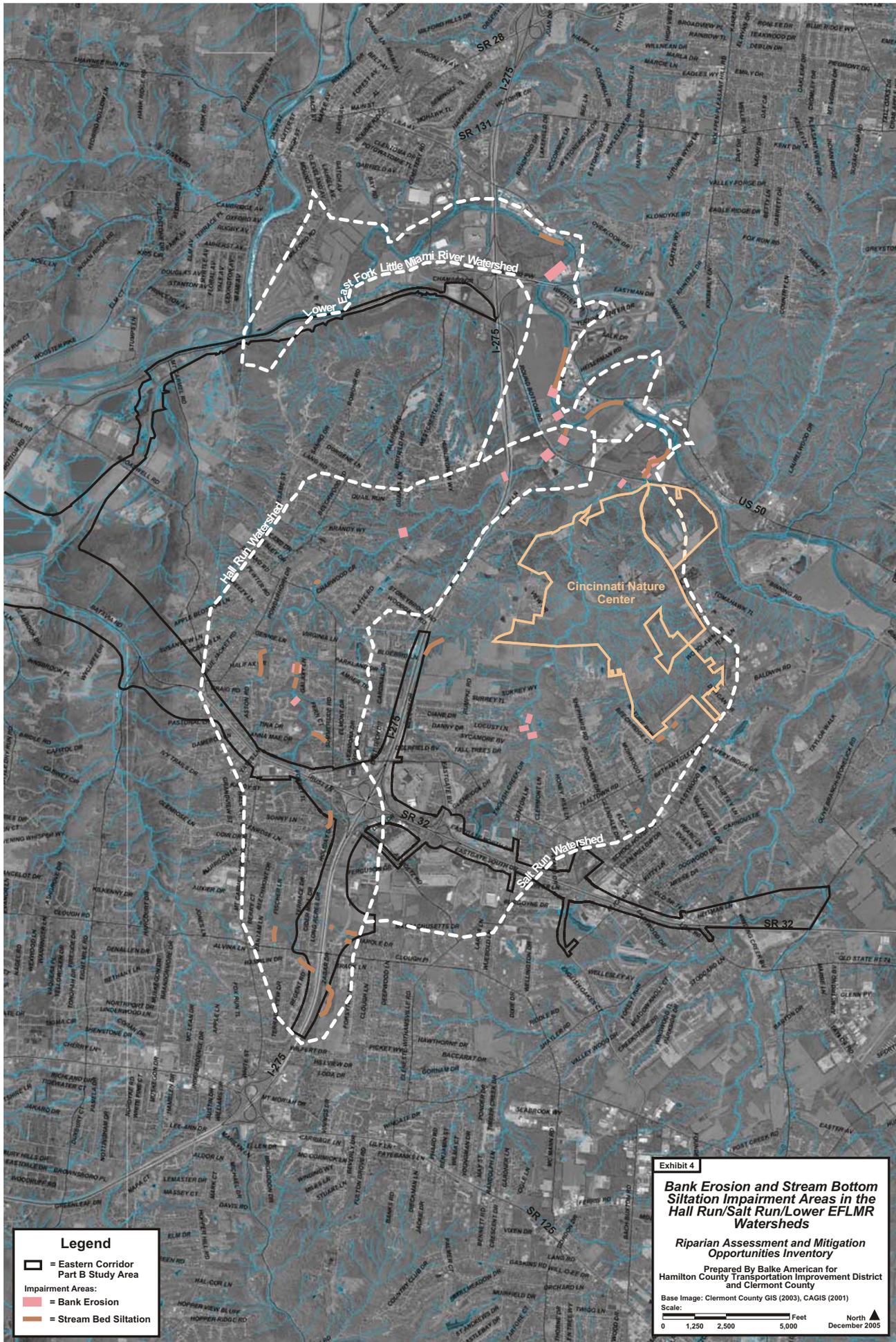
Prepared By Balke American for Hamilton County Transportation Improvement District and Clermont County

Base Image: Clermont County GIS (2003), CAGIS (2001)

Scale: 0 1,250 2,500 5,000 Feet

North

December 2005



Legend

- = Eastern Corridor Part B Study Area

Impairment Areas:

- = Bank Erosion
- = Stream Bed Siltation

Exhibit 4

Bank Erosion and Stream Bottom Siltation Impairment Areas in the Hall Run/Salt Run/Lower EFLMR Watersheds

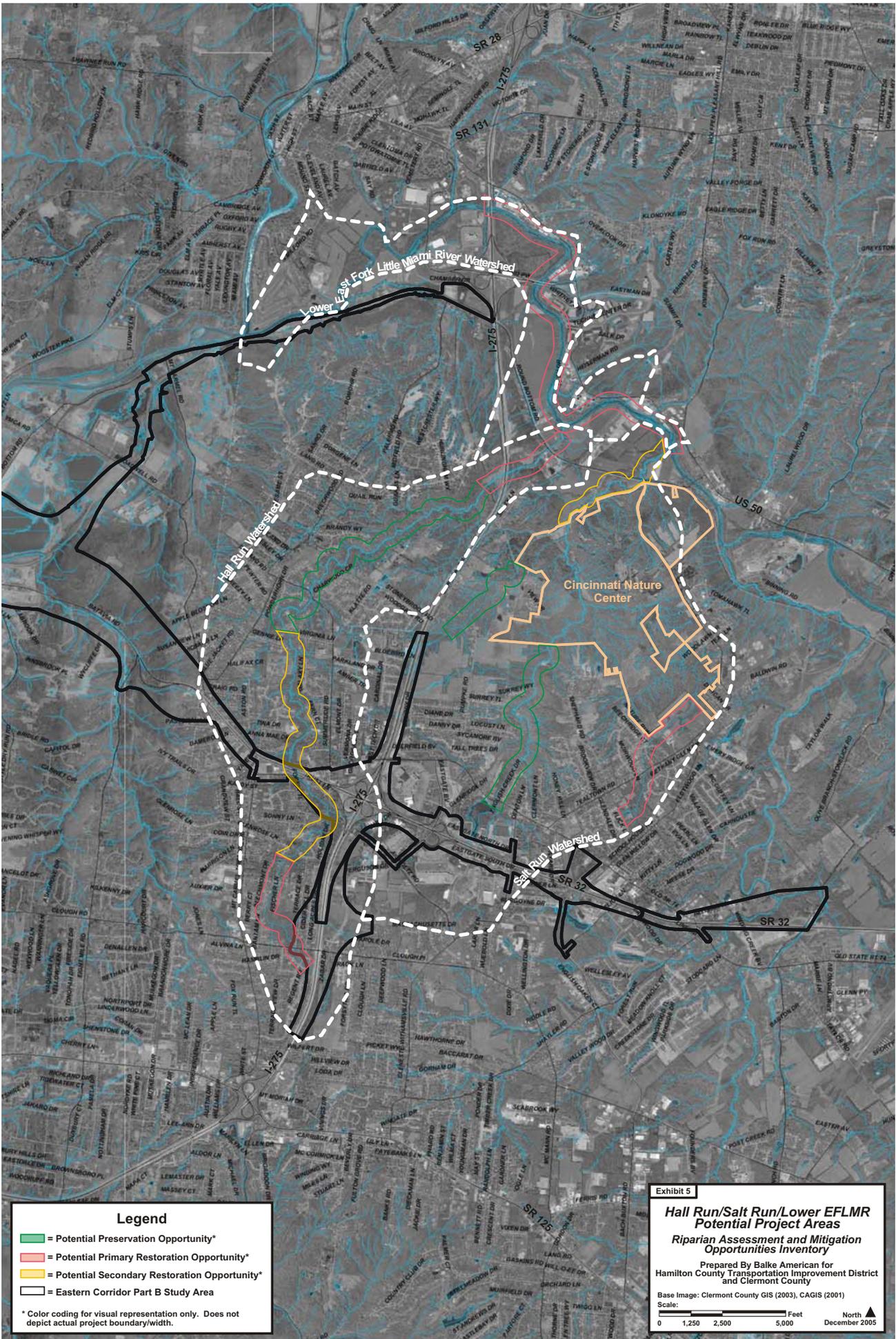
Riparian Assessment and Mitigation Opportunities Inventory

Prepared By Balke American for Hamilton County Transportation Improvement District and Clermont County

Base Image: Clermont County GIS (2003), CAGIS (2001)

Scale: 0 1,250 2,500 5,000 Feet North

December 2005



Legend

- █ = Potential Preservation Opportunity*
- █ = Potential Primary Restoration Opportunity*
- █ = Potential Secondary Restoration Opportunity*
- = Eastern Corridor Part B Study Area

* Color coding for visual representation only. Does not depict actual project boundary/width.

Exhibit 5

Hall Run/Salt Run/Lower EFLMR Potential Project Areas

Riparian Assessment and Mitigation Opportunities Inventory

Prepared By Balke American for
Hamilton County Transportation Improvement District
and Clermont County

Base Image: Clermont County GIS (2003), CAGIS (2001)

Scale: 0 1,250 2,500 5,000 Feet

North

December 2005

APPENDICES

- Appendix A. Summary of Secondary Source Information for Hall Run, Salt Run and Lower EFLMR**
- Appendix B. OEPA Qualitative Habitat Evaluation Index (QHEI) Worksheets**
- Appendix C. OEPA Headwater Habitat Evaluation Index (HHEI) Worksheets**
- Appendix D. OEPA Mitigation Clearinghouse Data Sheets**
- Appendix E. Photographs**
- Appendix F. Land Ownership Along Riparian Areas**
- Appendix G. 2003 Lower East Fork Management Plan (LEFMP) Management Strategies for Hall Run, Salt Run and the Lower East Fork Little Miami River (excerpts from Chapter 5 of the LEFMP)**

Appendix A

Summary of Secondary Source Information for Hall Run, Salt Run and Lower EFLMR

SUMMARY OF PREVIOUS OEPA STUDIES FOR THE LOWER EAST FORK LITTLE MIAMI RIVER

Introduction

The East Fork Little Miami River (EFLMR) is the largest tributary to the Little Miami River, with a total length of 81.7 miles. The East Fork drains a land area of approximately 500 square miles. The East Fork is located in the Interior Plateau Ecoregion with headwaters that begin in Highland County, Ohio. It flows generally southwest into East Fork lake, then generally northwest to the confluence with the Little Miami River in Clermont County, Ohio, south of the City of Milford. The entire East Fork River is a State Resource Water with an Exceptional Warmwater Habitat Aquatic Life Use Designation. The EFLMR is also designated as a Public, Agricultural, and Industrial Water supply, and a Primary Contact Recreational water.

The OEPA Division of Surface Water conducted biological and water quality studies in the East Fork as part of a larger study of the Little Miami River (LMR) and its selected tributaries and published findings in a report dated 1995. The 1995 OEPA Report included a number of sample sites on the East Fork within and in the vicinity of the Eastern Corridor Project Study Area. The report shows that the attainment status within the East Fork has marginally deteriorated, since studies conducted in the early 1980's, due primarily to declines in the fish community. The number of river miles in *full* attainment of Exceptional Warmwater Habitat (EWH) status decreased from 10.0 in 1982 to 7.1 in 1995, while the miles in *partial* attainment increased from 4.8 to 7.8.

A total of 22 sampling locations in the East Fork were described in the 1995 OEPA Report. Conventional water chemistry, organic water chemistry, sediment metals chemistry, sediment organics, datasonde, macroinvertebrates, and/or fish data were collected at these sampling locations. For purposes of the Eastern Corridor project, the following is a summary of the results of data collected at eight OEPA sampling locations near the project study area (generally between the confluence with Little Miami River and River Mile [RM] 5.0). A tabular summary of these OEPA sample locations and data collected at each site is presented below.

Summary of OEPA Sample Sites in Proximity to the Eastern Corridor Study Area (from the LMR to Approximately RM 5.0)

OEPA EFLMR Sample Sites	1995 Data Collected	Location
RM 0.77	Water Quality	East of confluence with LMR north of Round Bottom Road
RM 0.80	Benthos	East of confluence with LMR north of Round Bottom Road
RM 1.4	Fish and QHEI	East of confluence with LMR north of Round Bottom Road west of I-275
RM 1.7	Fish and QHEI	East of confluence with LMR north of Round Bottom Road west of I-275
RM 1.9	Benthos	East of confluence with LMR north of Round Bottom Road west of I-275
RM 4.0	Water Quality	East of I-275 west of US 50
RM 4.7	Fish, Benthos and QHEI	East of I-275 west of US 50

Summary of OEPA Sample Sites in Proximity to the Eastern Corridor Study Area (from the LMR to Approximately RM 5.0)

OEPA EFLMR Sample Sites	1995 Data Collected	Location
RW 4.85	Water Quality	East of I-275 west of US 50

Aquatic Life Use Attainment Status of the East Fork in the Project Vicinity

Within the lower 8.8 miles of the East Fork, which is designated as Exceptional Warmwater Habitat, 5.2 miles are reported as being in *full* attainment of the EWH designation, 2.2 miles are reported as being in *partial* attainment, and the attainment status of 1.4 miles is unknown. According to the 1995 OEPA study, some of the causes for partial attainment include sedimentation, nutrient enrichment, ammonia, the disappearance of waterwillow downstream from the Lower East Fork WWTP (at RM 4.9), and less habitat.

The East Fork was noted to be in partial attainment of the EWH designation for most of the sites in proximity to the Eastern Corridor Project Study Area. The sample site located at RM 4.7 east of I-275 west of US 50, outside the project study area, was noted as being in *full* attainment of the EWH attainment status. The biological and physical data used by OEPA to assess aquatic life use attainment status are summarized in the table below:

Summary of 1995 OEPA Biological and Physical Data of the EFLMR at Sample Locations in Proximity to the Eastern Corridor Study Area

River Mile	IBI	Mlwb	ICI ¹	QHEI	Attainment of EWH Status
0.80	—	—	50	—	Partial
1.40	39*	10	—	65.0	Partial
1.70	36*	10.2	—	70.5	Partial
1.90	—	—	1.9	—	Partial
4.70	44 ^{ns}	10.1	44 ^{ns}	68.5	Full

[ns] nonsignificant departure from ecoregional biocriteria for WWH or EWH (>4 IBI or ICI units, or >0.5 Mlwb units)
 * Indicates significant departure from applicable biocriteria.

Water Quality of the East Fork

General Water Quality of the EFLMR Mainstem - In general, stream flows in the EFLMR from May through September followed an overall pattern of decline, as they did for the LMR, with flow in the lower East Fork (below East Fork Lake) being regulated by releases from Harsha Reservoir. Datasonde continuous monitors recorded a Dissolved Oxygen (D.O.) concentration, at RM 0.77, below the minimum EWH criteria of 6.0 mg/l for one day during the study period. Datasonde monitors also recorded D.O. concentrations at RM 2.5 and 4.3 well above the 6.0 mg/l minimum EWH criteria during the period from

September 28 to October 1. Most of the ammonia-N values recorded in the East Fork were at or below the detection limit of 0.05 mg/l. However, the ammonia-N values were frequently elevated in the Batavia Waste Water Treatment Plant (WWTP) mixing zone (RM 13.35). Nitrate +nitrite-N and total phosphorus concentrations were also observed to increase in the Batavia WWTP mixing zone, the Middle East Fork WWTP mixing zone (RM 12.59) and downstream from the Clermont County Lower East Fork Regional WWTP (RM 4.9). Lower concentrations reflecting background conditions were recorded between RMs 6.75 to 9.10 and RMs 0.77 to 4.00.

Water Quality at Sites in Proximity to the Eastern Corridor Study Area - The following table summarizes water quality data recorded at RMs 0.77, 4.00 and 4.85 for samples reported in the 1995 OEPA Little Miami River and Selected Tributaries Biological and Water Quality Report.

Summary of 1995 OEPA Water Quality Data

Parameter	RM 0.77 ^[a]	RM 4.00 ^[a]	RM 4.85 ^[a]
Temperature (°C)	24.94	25.5	24.39
D.O (mg/l)	6.7	7.53	7.64
pH (SU)	8.068	8.05	7.76
Cl (mg/l)	29.2	28.6	54.3
Conductivity (µmhos/cm)	445.8	444.1	608.1
NO ₃ -NO ₂ -N (mg/l)	2.125	2.341	3.724
NO ₂ -N (mg/l)	0.044	0.035	0.075
NH ₃ -N (mg/l)	0.050	0.050	0.073
Total Phosphorous (mg/l)	—	—	—
Total Iron (µg/l)	2034.0	2183.0	1961.1
Hardness (mg/l)	186.0	175.8	196.6

[a] Values represent the average of six grab samples collected between 01 July, and 09 September.

Physical Habitat for Aquatic Life

Physical habitats were evaluated at three sampling locations within and in proximity to the Eastern Corridor Project Study Area as detailed in tabular form previously. QHEI scores suggest that the EFLMR segment from RM 1.4 to 4.7 is relatively homogenous. In general, within this segment, pools are deeper (> 36 inches) when compared to pools in the upper river segment (upstream of East Fork Lake), substrates are predominated by smaller sizes (gravel, sand, hardpan, and silt) compared to bedrock, bedrock fragments, and gravel found upstream, and the large riffle-run complexes, in the upper segment,

are replaced by smaller riffles and runs. Severely eroding banks also appeared to be more common in the lower segment due to increased riparian encroachment. The three QHEI scores recorded by the OEPA for this river segment and reported in the 1995 study are as follows: 65.0 at RM 1.4, 70.5 at RM 1.7 and 68.5 at RM 4.7.

Macroinvertebrate Assemblages

As stated in the 1995 OEPA Report, the lower East Fork (downstream of East Fork Lake) supports a diverse number of aquatic macroinvertebrate fauna. As reported in the 1995 study, three macroinvertebrate sample locations occurred in proximity to the project study area with the total number of taxa at each site as follows: 77 at RM 0.80, 78 at RM 1.90 and 85 at RM 4.70.

Fish Assemblages

A higher than normal incidence of external deformities, eroded fins, lesions and tumors (DELTs) were found throughout the East Fork as described in the 1995 OEPA Report. The actual number of fish weighed with an anomaly increased from 4-5 fish at the two sampling locations (RMs 12.7 and 15.5) upstream from the Middle Fork WWTP to 7-16 fish in the vicinity of I-275. The percentages of top carnivores was also noted to show a declining trend from upstream to downstream. Upstream of Batavia, top carnivores were noted to have declined from comprising approximately 26 percent of the total number of individuals to an average of approximately 6.6 percent. The decline in top carnivores was reported as being indicative of an impact to fish assemblages in the mainstem. Some of the declines in the lower five miles of the East Fork were reported as possibly being due to changes in physical habitat as reflected by lower QHEI scores compared to upstream sites.

As reported in the 1995 OEPA Biological Study, fish species were collected at three sample locations. As stated in the 1995 OEPA Report, a total of 1,359 fish comprised of 43 species were collected from three sites determined to be in proximity to the Eastern Corridor Project Study Area. The 1995 OEPA Report described the three fish sampling locations in proximity to the study area as having a total number of species at each site as follows: 33 at RM 1.40, 34 at RM 1.70 and 37 at RM 4.70.

Summary of OEPA Use Designations and Attainment Information for Hall Run, Salt Run and Lower East Fork Little Miami River

Stream	Aquatic Life Use (ALU) ^[1]	Other Uses ^[1]	Information Source (<i>in italics</i>) and 305(b) or 303(d) Stream Segment	Segment Length	River Miles Attaining ALU and ALU Attainment Level ^[2]	Mean Segment QHEI (Min. - Max.) ^[2]	Causes and Sources of Impairment ^[2]
Hall Run	WWH	AWS, IWS, PCR	<i>2000 305(b) Report Appendices D1 and F:</i> Hall Run	5.7	1.5 - Partial	56.5 (48.5-64.5)	Causes: Organic enrichment, habitat alterations, priority organics, metals Sources: Sanitary sewer overflow, urban runoff, channelization-Development, spills OEPA Comments: This is a small stream which drains suburban Cincinnati communities. Besides urban NPS impacts, the stream may be subject to flashy hydrology. A sewer line break/spill in 1998 indicates potential for significant nutrients/solids input. A large landscaping business near the mouth is also a runoff concern.
Salt Run	WWH	AWS, IWS, PCR	<i>2000 305(b) Report Appendices D1 and F:</i> Salt Run	3.0	2.0 - Partial	N/A	Causes: Siltation, nutrients Sources: Urban runoff OEPA Comments: Stormwater flow appear to have led to unstable banks and bank erosion; Clermont County data indicates some nutrient elevation, probably due to stormwater inputs.

Summary of OEPA Use Designations and Attainment Information for Hall Run, Salt Run and Lower East Fork Little Miami River

Stream	Aquatic Life Use (ALU) ^[1]	Other Uses ^[1]	Information Source (<i>in italics</i>) and 305(b) or 303(d) Stream Segment	Segment Length	River Miles Attaining ALU and ALU Attainment Level ^[2]	Mean Segment QHEI (Min. - Max.) ^[2]	Causes and Sources of Impairment ^[2]
East Fork Little Miami River	WWH - headwaters to RM 75 EWH - all other segments	SRW, PWS, AWS, IWS, PCR	2000 305(b) Report Appendices D1 and F: East Fork - mouth to Stonelick Creek	8.8	1.9 - Full (Threatened) 6.9 - Partial	72.75 (65.0-87.0)	Causes: Nutrients Sources: Municipal point sources, non-irrigated crop production, urban runoff OEPA Comments: Partial attainment due to fish indices failing to meet EWH potential, but overall, good communities present and macroinvertebrates very good to exceptional; nutrients elevated especially downstream of Lower East Fork and Milford WWTP's
			2000 305(b) Report Appendices D1 and F: East Fork - Stonelick Creek to East Fork Lake	11.7	2.5 - Full (Threatened) 4.7 - Partial 4.5 - None	84.8 (78.5-89.0)	Causes: Flow alteration, nutrients Sources: Flow regulation/modification, municipal point sources, urban runoff, non-irrigated crop production
			2002 303(d) List of Prioritized Impaired Waters (Table 6): East Fork - mouth to Stonelick Creek	8.8	NA	N/A	Use impaired: Aquatic Life
			2002 & 2004 305(b) Integrated Report Appendix C: East Fork small tributaries (drainage areas < 50 square miles) AND large tributaries (drainage areas > 50 square miles) from mouth to Stonelick Creek	N/A	Small streams: 9.2% - Full 72.5% - Partial 18.3% - Non Large streams: 21.6% - Full 78.4% - Partial	N/A	Causes: Nutrients, unknown, siltation, organic enrichment, flow alteration, habitat alteration, pathogens Sources: Major municipal point source, combined sewer overflow, sanitary sewer overflow, non-irrigated crop production, sewer line construction, urban runoff/storm sewer, dredging, dam construction, streambank de-stabilization

[1] Source: Ohio Administrative Code Section 3745-1-18 (effective date 7/21/02); Use Designation Codes: EWH = Exceptional Warmwater Habitat, WWH = Warmwater Habitat, LRW = Limited Resource Water, SRW = State Resource Water, PWS = Public Water Supply, AWS = Agricultural Water Supply, IWS = Industrial Water Supply, PCR = Primary Contact, Recreation, SCR = Secondary Contact Recreation

[2] Source: Ohio EPA 1996, 2000 and 2002 Ohio Water Resource Inventories (305(b) Reports); ALU Attainment Codes: Full = all biological indices meet criteria, Full (Threatened) = meeting criteria but some activity may threaten this condition in the near future, Partial = one index is meeting and one or more is not meeting criteria, None = no indices are meeting criteria or at least one is in the poor or very poor narrative range.

Appendix B

OEPA Qualitative Habitat Evaluation Index (QHEI) Worksheets

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 52.25

Stream: Hall Run Headwater RM: 5.85 Date: 9/26/05 River Code: _____
 Location: Site 2 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 14

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY	Max 20
<input type="checkbox"/> BLDER/SLABS (10)			<input checked="" type="checkbox"/> GRAVEL (7)	<u>30</u> <u>40</u>	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)
<input type="checkbox"/> BOULDER (9)			<input checked="" type="checkbox"/> SAND (6)	<u>40</u> <u>30</u>	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)
<input type="checkbox"/> COBBLE (8)		<u>5</u>	<input type="checkbox"/> BEDROCK (5)		<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)		<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)	<u>10</u> <u>10</u>	<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)
<input type="checkbox"/> SILT (2)	<u>20</u>	<u>15</u>			<input type="checkbox"/> COAL FINES (-2)	<input type="checkbox"/> SILT HEAVY (-2)
						<input type="checkbox"/> SILT MODERATE (-1)
						<input type="checkbox"/> SILT NORMAL (0)
						<input type="checkbox"/> SILT FREE (1)

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 7

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*) Max 20

TYPE (Check ALL That Apply)	Max 20
<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input type="checkbox"/> POOLS > 70cm (2)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> ROOTWADS (1)
<input type="checkbox"/> ROOTMATS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)
	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)
	<input type="checkbox"/> EXTENSIVE >75% (11)
	<input type="checkbox"/> MODERATE 25-75% (7)
	<input checked="" type="checkbox"/> SPARSE 5-25% (3)
	<input type="checkbox"/> NEARLY ABSENT <5% (1)

COMMENTS: _____

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 10.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	Max 20
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING	<input type="checkbox"/> IMPOUND.
<input type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input checked="" type="checkbox"/> RECOVERED (4)	<input checked="" type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION	<input type="checkbox"/> ISLANDS
<input checked="" type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input checked="" type="checkbox"/> LOW (1)	<input type="checkbox"/> CANOPY REMOVAL	<input type="checkbox"/> LEVEED
<input type="checkbox"/> NONE (1)	<input checked="" type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING	<input type="checkbox"/> BANK SHAPING
				<input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 7.75

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION	Max 10
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input checked="" type="checkbox"/> NONE OR LITTLE (3)	
<input checked="" type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input type="checkbox"/> MODERATE (2)	
<input type="checkbox"/> NARROW 5-10m (2)	<input checked="" type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> HEAVY OR SEVERE (1)	
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)		
<input checked="" type="checkbox"/> NONE (0)			

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)	MORPHOLOGY	POOL / RUN / RIFFLE CURRENT VELOCITY	Max 12
<input type="checkbox"/> >1m (6)	(Check One or 2 & Average)	(Check ALL That Apply)	
<input type="checkbox"/> 0.7-1m (4)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)	<input type="checkbox"/> EDDIES (1)
<input checked="" type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)	<input type="checkbox"/> INTERSTITIAL (-1)
<input type="checkbox"/> 0.2-0.4m (1)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input type="checkbox"/> MODERATE (1)	<input type="checkbox"/> INTERMITTENT (-2)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input checked="" type="checkbox"/> SLOW (1)	<input type="checkbox"/> VERY FAST (1)

COMMENTS: _____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE: 0

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS	Max 8
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input type="checkbox"/> LOW (1)	<input type="checkbox"/> NONE (2)
<input checked="" type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input checked="" type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)		

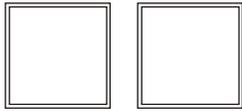
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 8

6) GRADIENT (feet / mile) 35.4 DRAINAGE AREA (sq.mi) 1.09 %POOL: 10 %RIFFLE: 15 %GLIDE: 65 %RUN: 10
 (from USGS)

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Clear</u>	Water Stage: <u>Slightly Above Normal</u>	Canopy- % Open: <u>40 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
12 feet	0.4 feet	1.5 feet	N/A	N/A	N/A	N/A	N/A	N/A

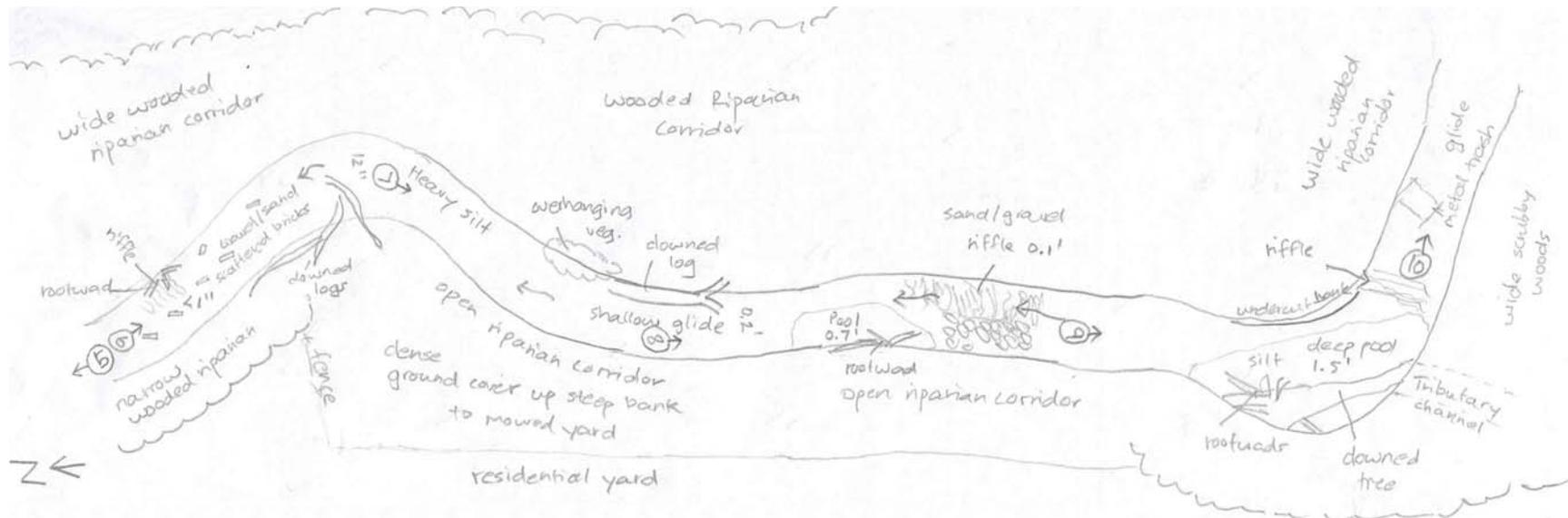
Gradient

■ - Low, □ - Moderate, □ - High

Major Suspected Sources of Impacts (Check All That Apply):

- None
- Industrial
- WWTP
- Ag
- Livestock
- Silviculture
- Construction
- Urban Runoff
- CSOs
- Suburban Impacts
- Mining
- Channelization
- Riparian Removal
- Landfills
- Natural
- Dams
- Other Flow Alteration
- Other _____

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes/No

- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
- Is there water upstream? How far: _____
- Is there water close downstream? How far: _____
- Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 51.25

Stream: Salt Run Headwater Tributary RM: 1.82 Date: 9/27/05 River Code: _____
 Location: Site 5 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 17 Max 20

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY		
<input type="checkbox"/> BLDER/SLABS (10)	<u>5</u>	<u>5</u>	<input checked="" type="checkbox"/> GRAVEL (7)	<u>40</u>	<u>30</u>	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)
<input type="checkbox"/> BOULDER (9)			<input type="checkbox"/> SAND (6)	<u>20</u>	<u>20</u>	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)
<input checked="" type="checkbox"/> COBBLE (8)	<u>30</u>	<u>40</u>	<input type="checkbox"/> BEDROCK (5)			<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)
<input type="checkbox"/> SILT (2)	<u>5</u>	<u>5</u>				<input type="checkbox"/> COAL FINES (-2)	<input type="checkbox"/> SILT FREE (1)

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 9 Max 20

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*)
 EXTENSIVE >75% (11)
 MODERATE 25-75% (7)
 SPARSE 5-25% (3)
 NEARLY ABSENT <5% (1)

TYPE (Check ALL That Apply)

<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input type="checkbox"/> POOLS > 70cm (2)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input checked="" type="checkbox"/> ROOTWADS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)
<input checked="" type="checkbox"/> ROOTMATS (1)		

COMMENTS: _____

CHANNEL: 7.5 Max 20

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

MODIFICATIONS / OTHER
 SNAGGING IMPOUND.
 RELOCATION ISLANDS
 CANOPY REMOVAL LEVEED
 DREDGING BANK SHAPING
 ONE SIDE CHANNEL MODIFICATIONS

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input type="checkbox"/> NONE (6)	<input type="checkbox"/> HIGH (3)
<input type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input checked="" type="checkbox"/> MODERATE (2)
<input checked="" type="checkbox"/> LOW (2)	<input type="checkbox"/> FAIR (3)	<input checked="" type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)
<input checked="" type="checkbox"/> NONE (1)	<input checked="" type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)	

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 5.75 Max 10

• River Right Looking Downstream •

RIPARIAN WIDTH

L R (Per Bank)

WIDE >50m (4)
 MODERATE 10-50m (3)
 NARROW 5-10m (2)
 VERY NARROW < 5m (1)
 NONE (0)

EROSION / RUNOFF - FLOODPLAIN QUALITY

L R (Most Predominant Per Bank)

FOREST, SWAMP (3)
 SHRUB OR OLD FIELD (2)
 RESID., PARK, NEW FIELD (1)
 FENCED PASTURE (1)

L R (Per Bank)

CONSERVATION TILLAGE (1)
 OPEN PASTURE / ROWCROP (0)
 URBAN OR INDUSTRIAL (0)
 MINING / CONSTRUCTION (0)

BANK EROSION

L R (Per Bank)

NONE OR LITTLE (3)
 MODERATE (2)
 HEAVY OR SEVERE (1)

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 4 Max 12

MAX. DEPTH (Check 1)

>1m (6)
 0.7-1m (4)
 0.4-0.7m (2)
 0.2-0.4m (1)
 < 0.2m (Pool = 0)

MORPHOLOGY

(Check One or 2 & Average)

POOL WIDTH > RIFFLE WIDTH (2)
 POOL WIDTH = RIFFLE WIDTH (1)
 POOL WIDTH < RIFFLE WIDTH (0)

POOL / RUN / RIFFLE CURRENT VELOCITY

(Check ALL That Apply)

TORRENTIAL (-1) EDDIES (1)
 FAST (1) INTERSTITIAL (-1)
 MODERATE (1) INTERMITTENT (-2)
 SLOW (1) VERY FAST (1)

NO POOL (0)

COMMENTS: _____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH

* Best Areas > 10cm (2)
 Best areas 5-10cm (1)
 Best areas < 5cm (Riffle = 0)

RUN DEPTH

MAX > 50 (2)
 MAX < 50 (1)

RIFFLE / RUN SUBSTRATE

STABLE (e.g., Cobble, Boulder) (2)
 MOD. STABLE (e.g., Large Gravel) (1)
 UNSTABLE (Fine Gravel, Sand) (0)

RIFFLE / RUN EMBEDDEDNESS

EXTENSIVE (-1) MODERATE (0)
 LOW (1) NONE (2)

RIFFLE: 0 Max 8

NO RIFFLE (0)

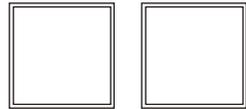
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 8 Max 10

6) GRADIENT (feet / mile) 39.2 DRAINAGE AREA (sq.mi) 0.58 %POOL: 20 %RIFFLE: 60 %GLIDE: 10 %RUN: 10
 (from USGS)

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Clear</u>	Water Stage: <u>Normal</u>	Canopy- % Open: <u>70 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

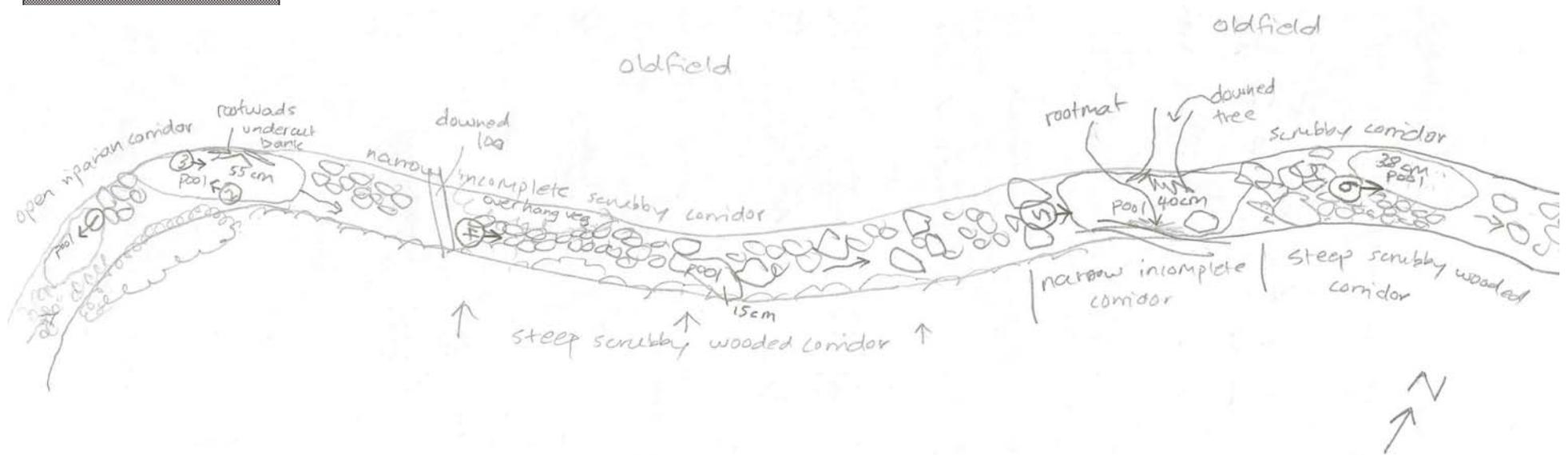
Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
12 feet	0.33 feet	1.80 feet	N/A	N/A	N/A	N/A	N/A	N/A

Gradient
 - Low, - Moderate, - High

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural Dams
 - Other Flow Alteration
 - Other _____

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where:
 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

- Yes/No
- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
 - Is there water upstream? How far: _____
 - Is there water close downstream? How far: _____
 - Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 62.0

Stream: Salt Run Headwater Tributary RM: 0.79 Date: 9/27/05 River Code: _____
 Location: Site 7 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 16

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY	Max 20
<input type="checkbox"/> BLDER/SLABS (10)	10	15	<input checked="" type="checkbox"/> GRAVEL (7)	20	20	Substrate Origin (Check 1 or 2 & Average) Silt Cover (Check 1 or 2 & Average)
<input type="checkbox"/> BOULDER (9)	10	10	<input type="checkbox"/> SAND (6)	10	15	
<input checked="" type="checkbox"/> COBBLE (8)	40	30	<input type="checkbox"/> BEDROCK (5)	5	5	<input type="checkbox"/> LIMESTONE (1) <input type="checkbox"/> RIP/RAP (0) <input type="checkbox"/> SILT HEAVY (-2)
<input type="checkbox"/> HARDPAN (4)	_____	_____	<input type="checkbox"/> DETRITUS (3)	_____	_____	<input type="checkbox"/> HARDPAN (0) <input checked="" type="checkbox"/> SILT MODERATE (-1)
<input type="checkbox"/> MUCK (2)	_____	_____	<input type="checkbox"/> ARTIFIC. (0)	_____	_____	<input type="checkbox"/> SANDSTONE (0) <input type="checkbox"/> WETLANDS (0) <input type="checkbox"/> SILT NORMAL (0)
<input type="checkbox"/> SILT (2)	15	5				<input type="checkbox"/> SHALE (-1) <input type="checkbox"/> LACUSTRINE (0) <input type="checkbox"/> SILT FREE (1)
					<input type="checkbox"/> COAL FINES (-2)	

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 13

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*) Max 20

TYPE (Check ALL That Apply)	Max 20
<input checked="" type="checkbox"/> UNDERCUT BANKS (1) <input type="checkbox"/> POOLS > 70cm (2) <input type="checkbox"/> OXBOWS, BACKWATERS (1)	<input type="checkbox"/> EXTENSIVE >75% (11) <input checked="" type="checkbox"/> MODERATE 25-75% (7) <input type="checkbox"/> SPARSE 5-25% (3) <input type="checkbox"/> NEARLY ABSENT <5% (1)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1) <input checked="" type="checkbox"/> ROOTWADS (1) <input type="checkbox"/> AQUATIC MACROPHYTES (1)	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) (1) <input checked="" type="checkbox"/> BOULDERS (1) <input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)	
<input checked="" type="checkbox"/> ROOTMATS (1)	

COMMENTS: _____

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 15

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	Max 20
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input checked="" type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING <input type="checkbox"/> IMPOUND.	
<input checked="" type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION <input type="checkbox"/> ISLANDS	
<input type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)	<input type="checkbox"/> CANOPY REMOVAL <input type="checkbox"/> LEVEED	
<input type="checkbox"/> NONE (1)	<input type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING <input type="checkbox"/> BANK SHAPING	
				<input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 9

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION	Max 10
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> CONSERVATION TILLAGE (1)	<input type="checkbox"/> NONE OR LITTLE (3) <input checked="" type="checkbox"/> MODERATE (2) <input type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input type="checkbox"/> OPEN PASTURE / ROWCROP (0)	
<input type="checkbox"/> NARROW 5-10m (2)	<input type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> URBAN OR INDUSTRIAL (0)	
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	<input type="checkbox"/> MINING / CONSTRUCTION (0)	
<input type="checkbox"/> NONE (0)			

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)	MORPHOLOGY	POOL / RUN / RIFFLE CURRENT VELOCITY	Max 12
<input type="checkbox"/> >1m (6)	(Check One or 2 & Average)	(Check ALL That Apply)	<input type="checkbox"/> NO POOL (0)
<input type="checkbox"/> 0.7-1m (4)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1) <input type="checkbox"/> EDDIES (1)	
<input checked="" type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1) <input type="checkbox"/> INTERSTITIAL (-1)	
<input type="checkbox"/> 0.2-0.4m (1)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input type="checkbox"/> MODERATE (1) <input type="checkbox"/> INTERMITTENT (-2)	
<input type="checkbox"/> < 0.2m (Pool = 0)		<input checked="" type="checkbox"/> SLOW (1) <input type="checkbox"/> VERY FAST (1)	

COMMENTS: _____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE: 0

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS	Max 8
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1) <input checked="" type="checkbox"/> MODERATE (0)	<input type="checkbox"/> NO RIFFLE (0)
<input type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input type="checkbox"/> LOW (1) <input type="checkbox"/> NONE (2)	
<input checked="" type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)		

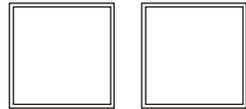
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 4

6) GRADIENT (feet / mile) 170.0 DRAINAGE AREA (sq.mi) 0.57 %POOL: 15 %RIFFLE: 70 %GLIDE: 10 %RUN: 5

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Clear</u>	Water Stage: <u>Normal</u>	Canopy- % Open: <u>10 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

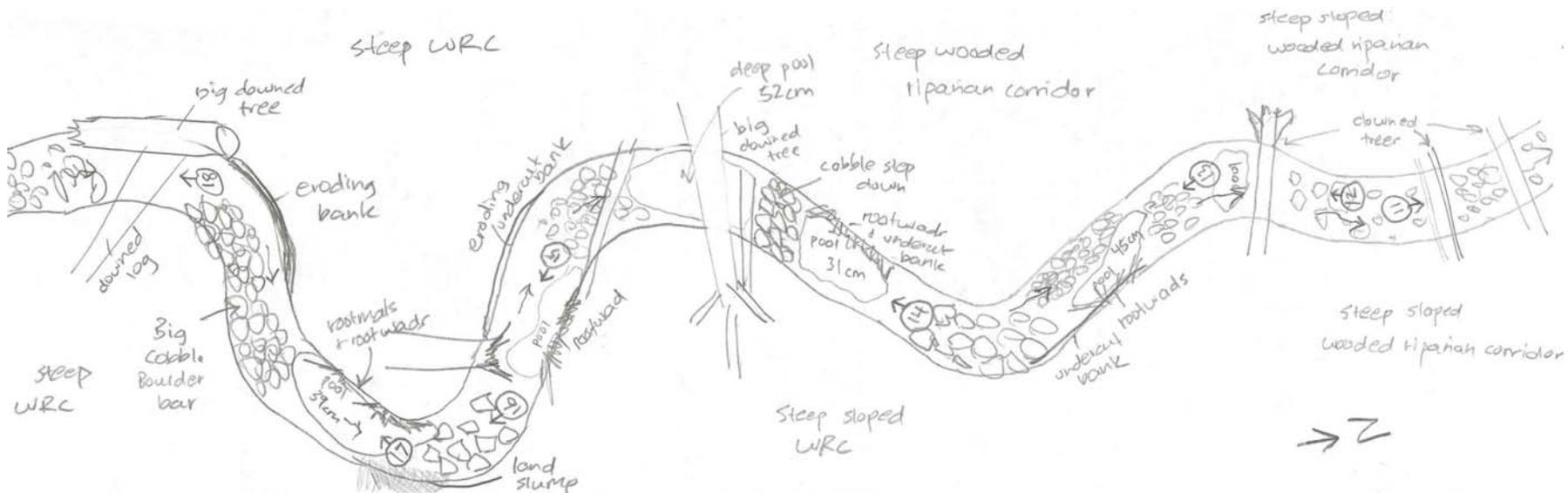
Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
18 feet	0.20 feet	1.71 feet	N/A	N/A	N/A	N/A	N/A	N/A

Gradient
 - Low, - Moderate, - High

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural
 - Dams
 - Other Flow Alteration
 - Other Some siltation

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes/No

- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
- Is there water upstream? How far: _____
- Is there water close downstream? How far: _____
- Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 48.5

Stream: Hall Run Lower Mainstem RM: 0.33 Date: 9/28/05 River Code: _____
 Location: Site 9 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 18 Max 20

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY			
<input type="checkbox"/> BLDER/SLABS (10)	10	10	<input type="checkbox"/> GRAVEL (7)	30	35	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)	
<input type="checkbox"/> BOULDER (9)	5	5	<input type="checkbox"/> SAND (6)	20	10	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)	<input type="checkbox"/> SILT HEAVY (-2)
<input checked="" type="checkbox"/> COBBLE (8)	30	40	<input type="checkbox"/> BEDROCK (5)			<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)	<input type="checkbox"/> SILT MODERATE (-1)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)	<input checked="" type="checkbox"/> SILT NORMAL (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)	<input type="checkbox"/> SILT FREE (1)
<input type="checkbox"/> SILT (2)	5					<input type="checkbox"/> COAL FINES (-2)		

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 7 Max 20

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*)
 EXTENSIVE >75% (11)
 MODERATE 25-75% (7)
 SPARSE 5-25% (3)
 NEARLY ABSENT <5% (1)

TYPE (Check *ALL* That Apply)

<input type="checkbox"/> UNDERCUT BANKS (1)	<input type="checkbox"/> POOLS > 70cm (2)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input type="checkbox"/> ROOTWADS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)
<input type="checkbox"/> ROOTMATS (1)		

COMMENTS: _____

CHANNEL: 8 Max 20

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input type="checkbox"/> NONE (6)	<input checked="" type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING	<input type="checkbox"/> IMPOUND.
<input type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input checked="" type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION	<input type="checkbox"/> ISLANDS
<input checked="" type="checkbox"/> LOW (2)	<input type="checkbox"/> FAIR (3)	<input checked="" type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)	<input checked="" type="checkbox"/> CANOPY REMOVAL	<input type="checkbox"/> LEVEED
<input checked="" type="checkbox"/> NONE (1)	<input checked="" type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING	<input checked="" type="checkbox"/> BANK SHAPING
				<input checked="" type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 3.5 Max 10

• River Right Looking Downstream •

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input type="checkbox"/> WIDE >50m (4)	<input type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input type="checkbox"/> MODERATE 10-50m (3)	<input checked="" type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input checked="" type="checkbox"/> NARROW 5-10m (2)	<input checked="" type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input checked="" type="checkbox"/> HEAVY OR SEVERE (1)
<input checked="" type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	
<input checked="" type="checkbox"/> NONE (0)		

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 4 Max 12

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input type="checkbox"/> >1m (6)	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input type="checkbox"/> 0.7-1m (4)	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input checked="" type="checkbox"/> MODERATE (1)
<input checked="" type="checkbox"/> 0.2-0.4m (1)		<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input type="checkbox"/> EDDIES (1)
		<input type="checkbox"/> INTERSTITIAL (-1)
		<input type="checkbox"/> INTERMITTENT (-2)
		<input type="checkbox"/> VERY FAST (1)

COMMENTS: _____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE: 4 Max 8

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input checked="" type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> LOW (1)
			<input type="checkbox"/> NONE (2)

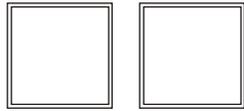
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 4 Max 10

6) GRADIENT (feet / mile) 69.8 DRAINAGE AREA (sq.mi) 4.82 %POOL: 15 %RIFFLE: 60 %GLIDE: 10 %RUN: 15

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Clear</u>	Water Stage: <u>Normal</u>	Canopy- % Open: <u>95 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

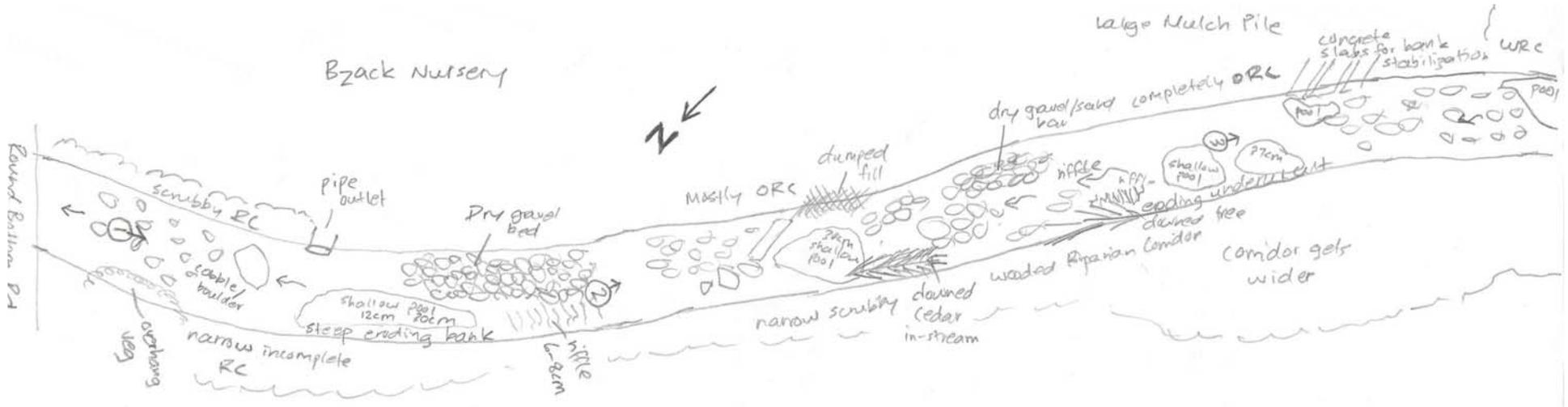
Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
20 feet	0.39 feet	1.21 feet	N/A	N/A	N/A	N/A	N/A	N/A

Gradient
 - Low, - Moderate, - High

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural
 - Dams
 - Other Flow Alteration
 - Other Dumping fill

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes/No

- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
- Is there water upstream? How far: _____
- Is there water close downstream? How far: _____
- Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 68.75

Stream: Salt Run Upper Mainstem RM: 0.67 Date: 9/28/05 River Code: _____
 Location: Site 10 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 10.5 Max 20

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY	
<input type="checkbox"/> BLDER/SLABS (10)	_____	_____	<input checked="" type="checkbox"/> GRAVEL (7)	<u>10</u> <u>60</u>	Substrate Origin (Check 1 or 2 & Average)	
<input type="checkbox"/> BOULDER (9)	_____	_____	<input checked="" type="checkbox"/> SAND (6)	<u>50</u> <u>10</u>	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)
<input type="checkbox"/> COBBLE (8)	_____	<u>30</u>	<input type="checkbox"/> BEDROCK (5)	_____	<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)
<input type="checkbox"/> HARDPAN (4)	_____	_____	<input type="checkbox"/> DETRITUS (3)	<u>10</u>	<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)
<input type="checkbox"/> MUCK (2)	_____	_____	<input type="checkbox"/> ARTIFIC. (0)	_____	<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)
<input type="checkbox"/> SILT (2)	<u>30</u>	_____	_____	_____	<input type="checkbox"/> COAL FINES (-2)	<input type="checkbox"/> SILT FREE (1)

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 16 Max 20

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and AVERAGE)

<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input checked="" type="checkbox"/> POOLS > 70cm (2)	<input checked="" type="checkbox"/> OXBOWS, BACKWATERS (1)	<input type="checkbox"/> EXTENSIVE >75% (11)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input checked="" type="checkbox"/> ROOTWADS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)	<input checked="" type="checkbox"/> MODERATE 25-75% (7)
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)	<input type="checkbox"/> SPARSE 5-25% (3)
<input checked="" type="checkbox"/> ROOTMATS (1)	_____	_____	<input type="checkbox"/> NEARLY ABSENT <5% (1)

COMMENTS: _____

CHANNEL: 13 Max 20

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING
<input checked="" type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION
<input type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input checked="" type="checkbox"/> LOW (1)	<input type="checkbox"/> CANOPY REMOVAL
<input type="checkbox"/> NONE (1)	<input type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)	_____	<input type="checkbox"/> DREDGING

IMPOUND. ISLANDS
 LEVEED BANK SHAPING
 ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: _____

RIPARIAN: 8.25 Max 10

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and AVERAGE per bank)

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input type="checkbox"/> MODERATE 10-50m (3)	<input checked="" type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input checked="" type="checkbox"/> NARROW 5-10m (2)	<input type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	_____
<input type="checkbox"/> NONE (0)	_____	_____

CONSERVATION TILLAGE (1) OPEN PASTURE / ROWCROP (0) URBAN OR INDUSTRIAL (0) MINING / CONSTRUCTION (0)

COMMENTS: _____

POOL: 10 Max 12

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input checked="" type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input type="checkbox"/> 0.7-1m (4)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input checked="" type="checkbox"/> MODERATE (1)
<input type="checkbox"/> 0.2-0.4m (1)	_____	<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)	_____	<input type="checkbox"/> EDDIES (1)
_____	_____	<input type="checkbox"/> INTERSTITIAL (-1)
_____	_____	<input type="checkbox"/> INTERMITTENT (-2)
_____	_____	<input type="checkbox"/> VERY FAST (1)

NO POOL (0)

COMMENTS: _____

RIFFLE: 3 Max 8

CHECK ONE OR CHECK 2 AND AVERAGE			
RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input checked="" type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)	_____	<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> LOW (1)
_____	_____	_____	<input type="checkbox"/> NONE (2)

NO RIFFLE (0)

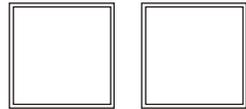
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 8 Max 10

6) GRADIENT (feet / mile) 35.4 DRAINAGE AREA (sq.mi) 6.27 %POOL: 30 %RIFFLE: 25 %GLIDE: 30 %RUN: 15
 (from USGS)

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>500 m</u>	Water Clarity: <u>Slightly Murky</u>	Water Stage: <u>Normal</u>	Canopy- % Open: <u>70 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
125 feet	2.0 feet	> 4.5 feet	N/A	N/A	N/A	N/A	N/A	N/A

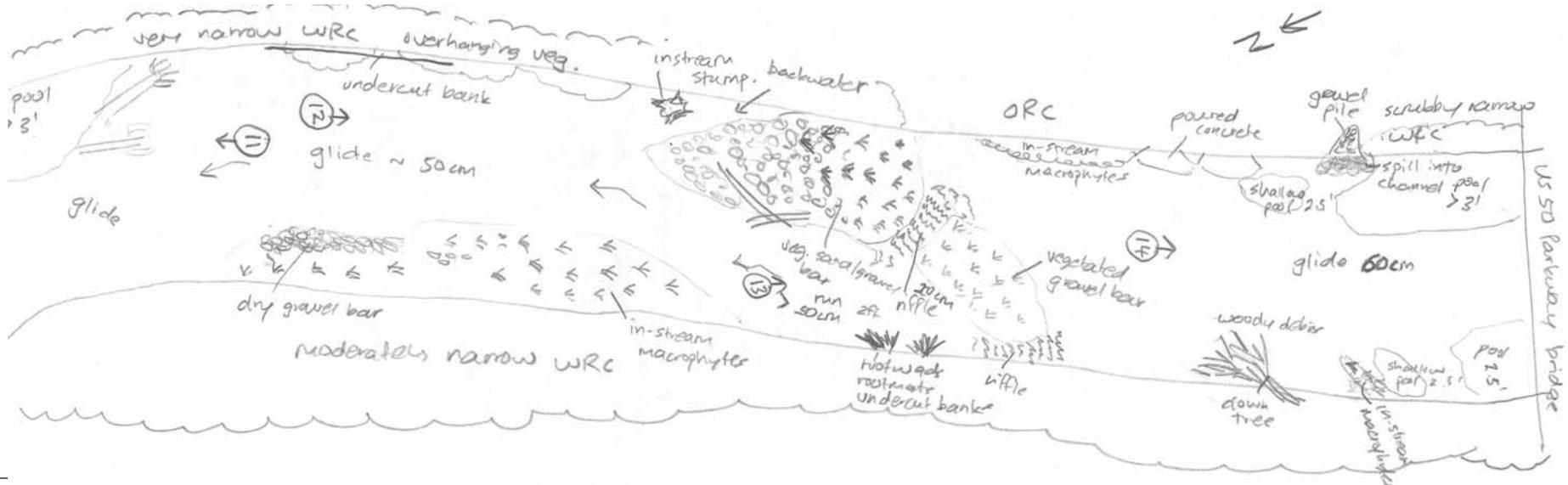
Gradient

■ - Low, □ - Moderate, □ - High

Major Suspected Sources of Impacts (Check All That Apply):

- None
- Industrial
- WWTP
- Ag
- Livestock
- Silviculture
- Construction
- Urban Runoff
- CSOs
- Suburban Impacts
- Mining
- Channelization
- Riparian Removal
- Landfills
- Natural
- Dams
- Other Flow Alteration
- Other Dumping fill

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where:
 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
- Is there water upstream? How far: _____
- Is there water close downstream? How far: _____
- Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 71.0

Stream: Hall Run Upper Mainstem RM: 2.22 Date: 9/28/05 River Code: _____
 Location: Site 12 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 18

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY		
<input type="checkbox"/> BLDER/SLABS (10)	<u>30</u>	<u>30</u>	<input type="checkbox"/> GRAVEL (7)	<u>10</u>	<u>10</u>	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)
<input type="checkbox"/> BOULDER (9)	<u>5</u>		<input type="checkbox"/> SAND (6)	<u>10</u>	<u>10</u>	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)
<input type="checkbox"/> COBBLE (8)	<u>10</u>	<u>20</u>	<input checked="" type="checkbox"/> BEDROCK (5)	<u>40</u>	<u>30</u>	<input type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)
<input type="checkbox"/> SILT (2)	<u>5</u>					<input type="checkbox"/> COAL FINES (-2)	<input type="checkbox"/> SILT FREE (1)

Max 20

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 15

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*) Max 20

TYPE (Check ALL That Apply)	
<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input checked="" type="checkbox"/> POOLS > 70cm (2)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input type="checkbox"/> ROOTWADS (1)
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> BOULDERS (1)
<input type="checkbox"/> ROOTMATS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)

Max 20

EXTENSIVE >75% (11)
 MODERATE 25-75% (7)
 SPARSE 5-25% (3)
 NEARLY ABSENT <5% (1)

COMMENTS: _____

CHANNEL: 14

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input checked="" type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING
<input type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION
<input checked="" type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)	<input type="checkbox"/> CANOPY REMOVAL
<input type="checkbox"/> NONE (1)	<input type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING

Max 20

IMPOUND.
 ISLANDS
 LEVEED
 BANK SHAPING
 ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 9

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input type="checkbox"/> NARROW 5-10m (2)	<input type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	
<input type="checkbox"/> NONE (0)		

Max 10

CONSERVATION TILLAGE (1)
 OPEN PASTURE / ROWCROP (0)
 URBAN OR INDUSTRIAL (0)
 MINING / CONSTRUCTION (0)

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 7

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input checked="" type="checkbox"/> 0.7-1m (4)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input type="checkbox"/> MODERATE (1)
<input type="checkbox"/> 0.2-0.4m (1)		<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input type="checkbox"/> EDDIES (1)
		<input type="checkbox"/> INTERSTITIAL (-1)
		<input type="checkbox"/> INTERMITTENT (-2)
		<input type="checkbox"/> VERY FAST (1)

Max 12

NO POOL (0)

COMMENTS: _____

RIFFLE: 4

CHECK ONE OR CHECK 2 AND AVERAGE			
RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input checked="" type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> LOW (1)
			<input type="checkbox"/> NONE (2)

Max 8

NO RIFFLE (0)

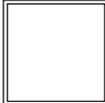
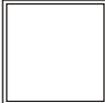
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 4

6) GRADIENT (feet / mile) 95.6 DRAINAGE AREA (sq.mi) 3.64 %POOL: 20 %RIFFLE: 35 %GLIDE: 35 %RUN: 10
 (from USGS)

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

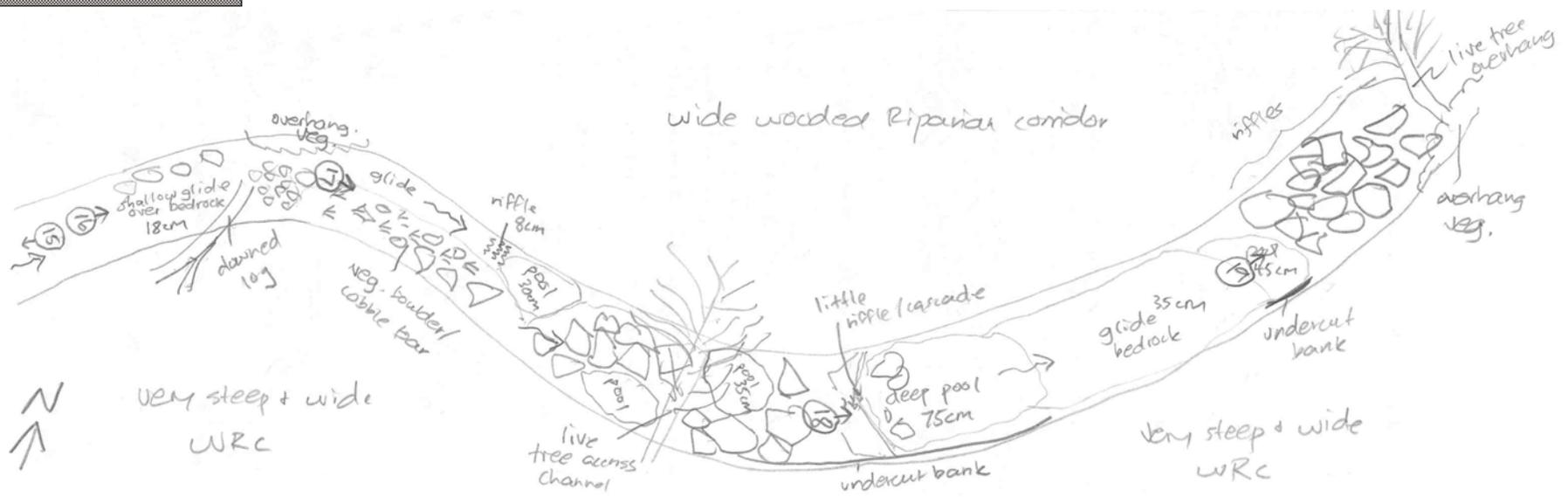
		Gear:	Distance:	Water Clarity:	Water Stage:	Canopy- % Open:
First Sampling Pass	N/A	150 m	Clear	Normal	30 %	

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural Dams
 - Other Flow Alteration
 - Other _____

Subjective Rating (1-10)	Aesthetic Rating (1-10)	Stream Measurements:								
		Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
		18 feet	0.82 feet	2.5 feet	N/A	N/A	N/A	N/A	N/A	N/A

Gradient
 - Low, - Moderate, - High

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where:
 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

- Yes/No
- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
 - Is there water upstream? How far: _____
 - Is there water close downstream? How far: _____
 - Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 62.0

Stream: Hall Run Upper Mainstem RM: 3.94 Date: 9/29/05 River Code: _____
 Location: Site 13 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 18

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY			
<input type="checkbox"/> BLDER/SLABS (10)	15	20	<input type="checkbox"/> GRAVEL (7)	10	20	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)	
<input type="checkbox"/> BOULDER (9)			<input type="checkbox"/> SAND (6)	10	5	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)	<input type="checkbox"/> SILT HEAVY (-2)
<input checked="" type="checkbox"/> COBBLE (8)	10	50	<input type="checkbox"/> BEDROCK (5)	40	5	<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)	<input type="checkbox"/> SILT MODERATE (-1)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)	<input checked="" type="checkbox"/> SILT NORMAL (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)	<input type="checkbox"/> SILT FREE (1)
<input type="checkbox"/> SILT (2)	15					<input type="checkbox"/> COAL FINES (-2)		

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 10

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*) Max 20

TYPE (Check ALL That Apply)		
<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input type="checkbox"/> POOLS > 70cm (2)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input checked="" type="checkbox"/> ROOTWADS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)
<input type="checkbox"/> ROOTMATS (1)		

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE >75% (11)
 MODERATE 25-75% (7)
 SPARSE 5-25% (3)
 NEARLY ABSENT <5% (1)

COMMENTS: _____

CHANNEL: 13

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

MODIFICATIONS / OTHER Max 20

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input checked="" type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING	<input type="checkbox"/> IMPOUND.
<input type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION	<input type="checkbox"/> ISLANDS
<input checked="" type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)	<input checked="" type="checkbox"/> CANOPY REMOVAL	<input type="checkbox"/> LEVEED
<input type="checkbox"/> NONE (1)	<input checked="" type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING	<input type="checkbox"/> BANK SHAPING
				<input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 7

• River Right Looking Downstream •

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input checked="" type="checkbox"/> NARROW 5-10m (2)	<input checked="" type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	
<input type="checkbox"/> NONE (0)		

L R (Per Bank)
 CONSERVATION TILLAGE (1)
 OPEN PASTURE / ROWCROP (0)
 URBAN OR INDUSTRIAL (0)
 MINING / CONSTRUCTION (0)

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input type="checkbox"/> 0.7-1m (4)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input checked="" type="checkbox"/> MODERATE (1)
<input checked="" type="checkbox"/> 0.2-0.4m (1)		<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input type="checkbox"/> INTERSTITIAL (-1)
		<input type="checkbox"/> INTERMITTENT (-2)
		<input type="checkbox"/> VERY FAST (1)

Max 12

COMMENTS: _____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE: 5

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input checked="" type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> LOW (1)
			<input type="checkbox"/> NONE (2)

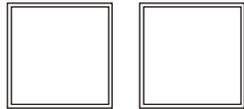
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 4

6) GRADIENT (feet / mile) 85.6 DRAINAGE AREA (sq.mi) 2.49 %POOL: 15 %RIFFLE: 55 %GLIDE: 20 %RUN: 10

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Slightly Murky</u>	Water Stage: <u>Slightly Above Normal</u>	Canopy- % Open: <u>25 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

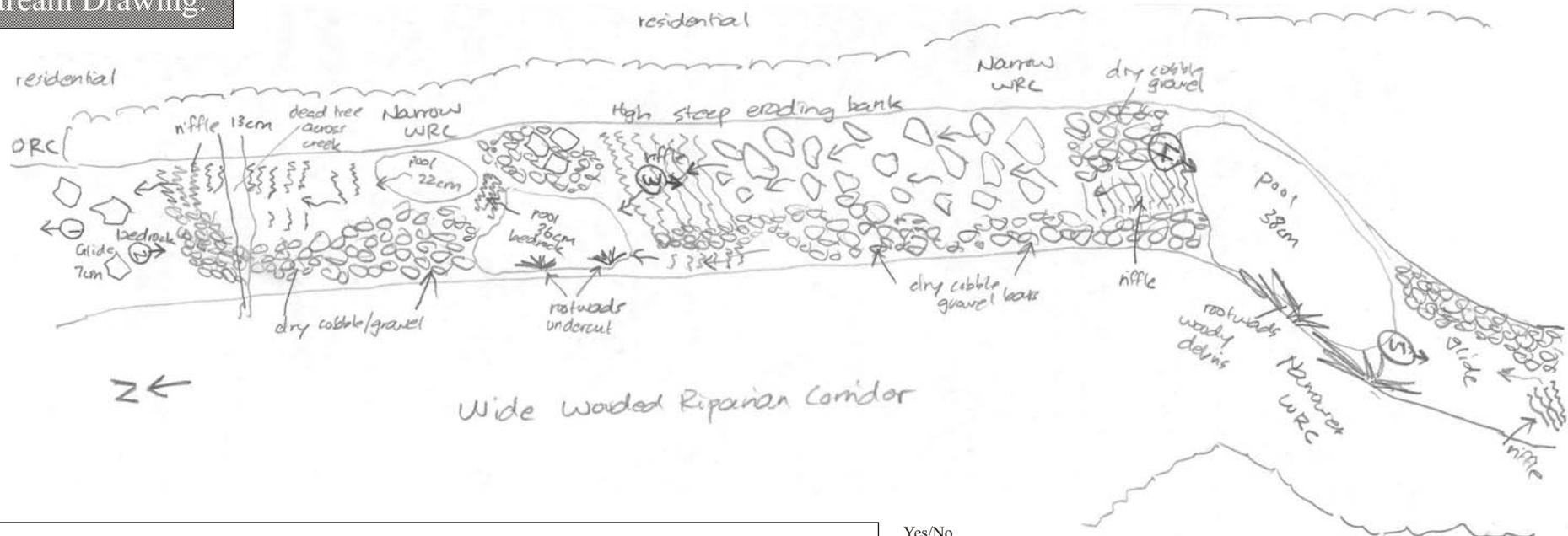
Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
18 feet	0.46 feet	1.25 feet	N/A	N/A	N/A	N/A	N/A	N/A

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural Dams
 - Other Flow Alteration
 - Other _____

Gradient - Low, - Moderate, - High

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

- Yes/No
- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
 - Is there water upstream? How far: _____
 - Is there water close downstream? How far: _____
 - Is dry channel mostly natural?

oldfield

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 66.0

Stream: Salt Run Headwater RM: 2.24 Date: 9/30/05 River Code: _____
 Location: Site 17 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 16 Max 20

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY			
<input type="checkbox"/> BLDER/SLABS (10)	<u>5</u>	<u>5</u>	<input type="checkbox"/> GRAVEL (7)	<u>5</u>	<u>20</u>	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)	
<input type="checkbox"/> BOULDER (9)		<u>5</u>	<input type="checkbox"/> SAND (6)	<u>5</u>	<u>5</u>	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)	<input type="checkbox"/> SILT HEAVY (-2)
<input checked="" type="checkbox"/> COBBLE (8)	<u>20</u>	<u>60</u>	<input checked="" type="checkbox"/> BEDROCK (5)	<u>60</u>	<u>5</u>	<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)	<input type="checkbox"/> SILT MODERATE (-1)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)	<input checked="" type="checkbox"/> SILT NORMAL (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)	<input type="checkbox"/> SILT FREE (1)
<input type="checkbox"/> SILT (2)	<u>5</u>					<input type="checkbox"/> COAL FINES (-2)		

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 13 Max 20

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*)
 EXTENSIVE >75% (11)
 MODERATE 25-75% (7)
 SPARSE 5-25% (3)
 NEARLY ABSENT <5% (1)

TYPE (Check ALL That Apply)

<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input type="checkbox"/> POOLS > 70cm (2)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input checked="" type="checkbox"/> ROOTWADS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)
<input type="checkbox"/> ROOTMATS (1)		

COMMENTS: _____

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 15 Max 20

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input checked="" type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING	<input type="checkbox"/> IMPOUND.
<input checked="" type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION	<input type="checkbox"/> ISLANDS
<input type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)	<input type="checkbox"/> CANOPY REMOVAL	<input type="checkbox"/> LEVEED
<input type="checkbox"/> NONE (1)	<input type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING	<input type="checkbox"/> BANK SHAPING
				<input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

RIPARIAN: 8 Max 10

• River Right Looking Downstream •

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input type="checkbox"/> NARROW 5-10m (2)	<input checked="" type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	
<input type="checkbox"/> NONE (0)		

COMMENTS: _____

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

POOL: 6 Max 12

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input type="checkbox"/> 0.7-1m (4)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input checked="" type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input checked="" type="checkbox"/> MODERATE (1)
<input type="checkbox"/> 0.2-0.4m (1)		<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input type="checkbox"/> EDDIES (1)
		<input type="checkbox"/> INTERSTITIAL (-1)
		<input type="checkbox"/> INTERMITTENT (-2)
		<input type="checkbox"/> VERY FAST (1)

COMMENTS: _____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE: 4 Max 8

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input checked="" type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> LOW (1)
			<input type="checkbox"/> NONE (2)

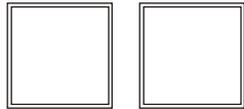
COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 4 Max 10

6) GRADIENT (feet / mile) 119.2 DRAINAGE AREA (sq.mi) 0.54 %POOL: 30 %RIFFLE: 40 %GLIDE: 20 %RUN: 10
 (from USGS)

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Clear</u>	Water Stage: <u>Normal</u>	Canopy- % Open: <u>35 %</u>
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Subjective Rating (1-10)

Aesthetic Rating (1-10)

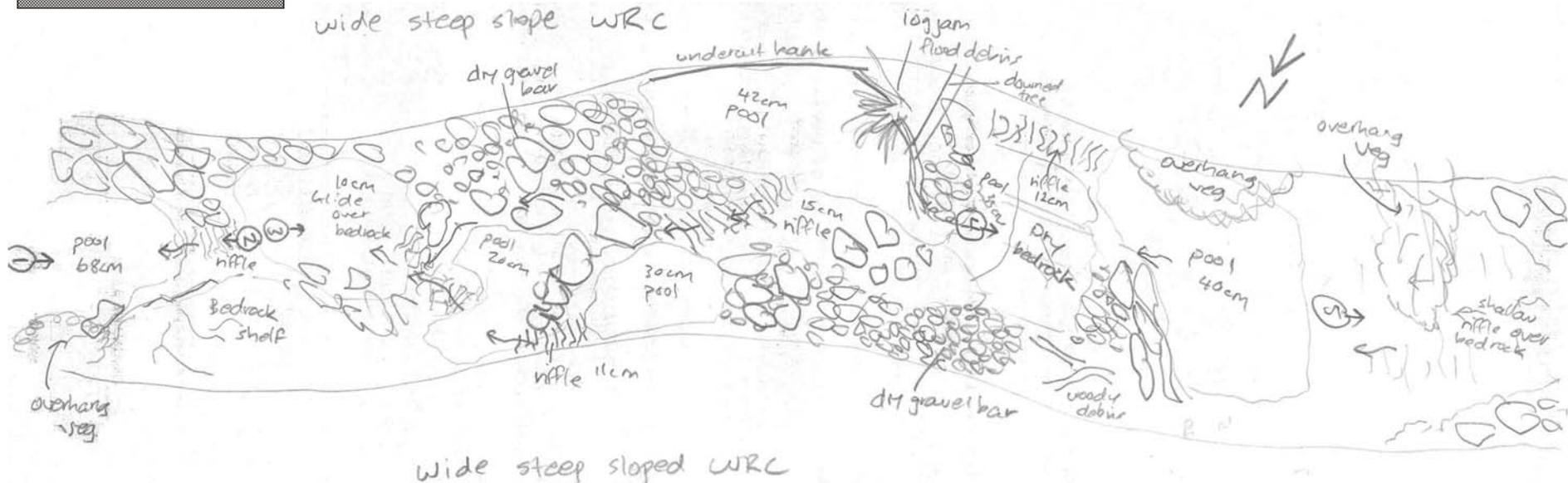
Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
18 feet	0.56 feet	2.23 feet	N/A	N/A	N/A	N/A	N/A	N/A

Gradient
 - Low, - Moderate, - High

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural Dams
 - Other Flow Alteration

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

- Yes/No
- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
 - Is there water upstream? How far: _____
 - Is there water close downstream? How far: _____
 - Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 67.5

Stream: Salt Run Headwater Tributary RM: 0.16 Date: 9/30/05 River Code: _____
 Location: Site 18 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 19 Max 20

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY			
<input type="checkbox"/> BLDER/SLABS (10)	15	20	<input type="checkbox"/> GRAVEL (7)	5	30	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)	
<input type="checkbox"/> BOULDER (9)			<input type="checkbox"/> SAND (6)	20	5	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)	<input type="checkbox"/> SILT HEAVY (-2)
<input checked="" type="checkbox"/> COBBLE (8)	15	40	<input type="checkbox"/> BEDROCK (5)	40	5	<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)	<input type="checkbox"/> SILT MODERATE (-1)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)	<input checked="" type="checkbox"/> SILT NORMAL (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)	<input type="checkbox"/> SILT FREE (1)
<input type="checkbox"/> SILT (2)	5					<input type="checkbox"/> COAL FINES (-2)		

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 13 Max 20

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and *AVERAGE*)
 EXTENSIVE >75% (11)
 MODERATE 25-75% (7)
 SPARSE 5-25% (3)
 NEARLY ABSENT <5% (1)

TYPE (Check ALL That Apply)

<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input type="checkbox"/> POOLS > 70cm (2)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input checked="" type="checkbox"/> ROOTWADS (1)	<input type="checkbox"/> AQUATIC MACROPHYTES (1)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input checked="" type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)
<input checked="" type="checkbox"/> ROOTMATS (1)		

COMMENTS: _____

CHANNEL: 14 Max 20

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input checked="" type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING	<input type="checkbox"/> IMPOUND.
<input checked="" type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION	<input type="checkbox"/> ISLANDS
<input type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input type="checkbox"/> LOW (1)	<input type="checkbox"/> CANOPY REMOVAL	<input type="checkbox"/> LEVEED
<input type="checkbox"/> NONE (1)	<input checked="" type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING	<input type="checkbox"/> BANK SHAPING
				<input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

RIPARIAN: 9 Max 10

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and *AVERAGE* per bank)

• River Right Looking Downstream •

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input checked="" type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input type="checkbox"/> NARROW 5-10m (2)	<input type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	
<input type="checkbox"/> NONE (0)		

COMMENTS: _____

POOL: 5 Max 12

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input type="checkbox"/> 0.7-1m (4)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input checked="" type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input type="checkbox"/> MODERATE (1)
<input type="checkbox"/> 0.2-0.4m (1)		<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input type="checkbox"/> INTERSTITIAL (-1)
		<input type="checkbox"/> INTERMITTENT (-2)
		<input type="checkbox"/> VERY FAST (1)

COMMENTS: _____

RIFFLE: 3.5 Max 8

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input checked="" type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> LOW (1)
			<input type="checkbox"/> NONE (2)

COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 4 Max 10

6) GRADIENT (feet / mile) 232 DRAINAGE AREA (sq.mi) 0.56 %POOL: 15 %RIFFLE: 45 %GLIDE: 30 %RUN: 10
 (from USGS)

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:



First Sampling Pass	Gear: <u>N/A</u>	Distance: <u>150 m</u>	Water Clarity: <u>Clear</u>	Water Stage: <u>Normal</u>	Canopy- % Open: <u>35 %</u>
---------------------	------------------	------------------------	-----------------------------	----------------------------	-----------------------------

Subjective Rating (1-10)

Aesthetic Rating (1-10)

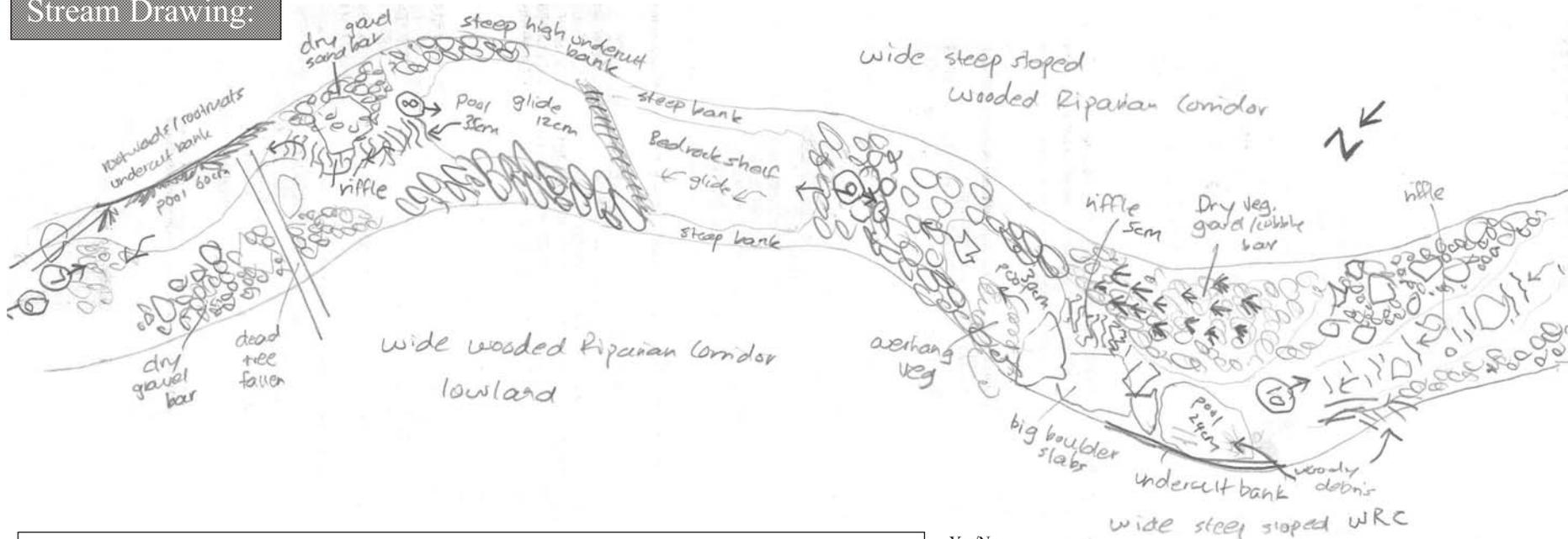
Stream Measurements:

Average Width	Average Depth	Maximum Depth	Avg. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
12 feet	0.52 feet	1.97 feet	N/A	N/A	N/A	N/A	N/A	N/A

Gradient
 - Low, - Moderate, - High

- Major Suspected Sources of Impacts (Check All That Apply):
- None
 - Industrial
 - WWTP
 - Ag
 - Livestock
 - Silviculture
 - Construction
 - Urban Runoff
 - CSOs
 - Suburban Impacts
 - Mining
 - Channelization
 - Riparian Removal
 - Landfills
 - Natural Dams
 - Other Flow Alteration
 - Other _____

Stream Drawing:



Instructions for Scoring the Alternative Cover Metric: Each cover type should receive a score of between 0 and 3, where:
 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

- Yes/No
- Is Stream Ephemeral (no pools, totally dry or only damp spots)?
 - Is there water upstream? How far: _____
 - Is there water close downstream? How far: _____
 - Is dry channel mostly natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI SCORE: 66.5

Stream: Salt Run Lower Mainstem RM: 0.17 Date: 9/30/05 River Code: _____
 Location: Site 19 Crew: Balke American (Michael de Villiers)

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Estimate % present)

SUBSTRATE SCORE: 13 Max 20

TYPE	POOL	RIFFLE	POOL	RIFFLE	SUBSTRATE QUALITY			
<input type="checkbox"/> BLDER/SLABS (10)	<u>5</u>		<input checked="" type="checkbox"/> GRAVEL (7)	<u>10</u>	<u>60</u>	Substrate Origin (Check 1 or 2 & Average)	Silt Cover (Check 1 or 2 & Average)	
<input type="checkbox"/> BOULDER (9)	<u>5</u>		<input checked="" type="checkbox"/> SAND (6)	<u>50</u>	<u>20</u>	<input type="checkbox"/> LIMESTONE (1)	<input type="checkbox"/> RIP/RAP (0)	<input checked="" type="checkbox"/> SILT HEAVY (-2)
<input type="checkbox"/> COBBLE (8)		<u>10</u>	<input type="checkbox"/> BEDROCK (5)			<input checked="" type="checkbox"/> TILLS (1)	<input type="checkbox"/> HARDPAN (0)	<input checked="" type="checkbox"/> SILT MODERATE (-1)
<input type="checkbox"/> HARDPAN (4)			<input type="checkbox"/> DETRITUS (3)			<input type="checkbox"/> SANDSTONE (0)	<input type="checkbox"/> WETLANDS (0)	<input type="checkbox"/> SILT NORMAL (0)
<input type="checkbox"/> MUCK (2)			<input type="checkbox"/> ARTIFIC. (0)			<input type="checkbox"/> SHALE (-1)	<input type="checkbox"/> LACUSTRINE (0)	<input type="checkbox"/> SILT FREE (1)
<input type="checkbox"/> SILT (2)	<u>30</u>	<u>10</u>				<input type="checkbox"/> COAL FINES (-2)		

Extent of Embeddedness (Check 1 or 2 & Average)
 EXTENSIVE (-2) NORMAL (0)
 MODERATE (-1) NONE (1)

TOTAL NUMBER OF SUBSTRATE TYPES: 4 or more (2) 3 or less (0)
 NOTE: (Ignore sludge that originates from point-sources; High Quality Only, score 5 or >)
 COMMENTS: _____

COVER SCORE: 14 Max 20

2) INSTREAM COVER (See back for instructions for additional cover scoring method)

AMOUNT (Check *ONLY* 1 or check 2 and AVERAGE)

<input checked="" type="checkbox"/> UNDERCUT BANKS (1)	<input checked="" type="checkbox"/> POOLS > 70cm (2)	<input type="checkbox"/> OXBOWS, BACKWATERS (1)	<input type="checkbox"/> EXTENSIVE >75% (11)
<input checked="" type="checkbox"/> OVERHANGING VEGETATION (1)	<input type="checkbox"/> ROOTWADS (1)	<input checked="" type="checkbox"/> AQUATIC MACROPHYTES (1)	<input checked="" type="checkbox"/> MODERATE 25-75% (7)
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) (1)	<input type="checkbox"/> BOULDERS (1)	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS (1)	<input type="checkbox"/> SPARSE 5-25% (3)
<input type="checkbox"/> ROOTMATS (1)			<input type="checkbox"/> NEARLY ABSENT <5% (1)

COMMENTS: _____

CHANNEL: 12 Max 20

3) CHANNEL MORPHOLOGY (Check *ONLY* One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS / OTHER	
<input type="checkbox"/> HIGH (4)	<input type="checkbox"/> EXCELLENT (7)	<input checked="" type="checkbox"/> NONE (6)	<input type="checkbox"/> HIGH (3)	<input type="checkbox"/> SNAGGING	<input type="checkbox"/> IMPOUND.
<input checked="" type="checkbox"/> MODERATE (3)	<input type="checkbox"/> GOOD (5)	<input type="checkbox"/> RECOVERED (4)	<input type="checkbox"/> MODERATE (2)	<input type="checkbox"/> RELOCATION	<input type="checkbox"/> ISLANDS
<input type="checkbox"/> LOW (2)	<input checked="" type="checkbox"/> FAIR (3)	<input type="checkbox"/> RECOVERING (3)	<input checked="" type="checkbox"/> LOW (1)	<input checked="" type="checkbox"/> CANOPY REMOVAL	<input type="checkbox"/> LEVEED
<input type="checkbox"/> NONE (1)	<input checked="" type="checkbox"/> POOR (1)	<input type="checkbox"/> RECENT OR NO RECOVERY (1)		<input type="checkbox"/> DREDGING	<input type="checkbox"/> BANK SHAPING
				<input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: _____

RIPARIAN: 4.5 Max 10

4) RIPARIAN ZONE AND BANK EROSION - (Check *ONE* box per bank or check 2 and AVERAGE per bank)

RIPARIAN WIDTH	EROSION / RUNOFF - FLOODPLAIN QUALITY	BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)
<input type="checkbox"/> WIDE >50m (4)	<input checked="" type="checkbox"/> FOREST, SWAMP (3)	<input type="checkbox"/> NONE OR LITTLE (3)
<input checked="" type="checkbox"/> MODERATE 10-50m (3)	<input type="checkbox"/> SHRUB OR OLD FIELD (2)	<input checked="" type="checkbox"/> MODERATE (2)
<input type="checkbox"/> NARROW 5-10m (2)	<input type="checkbox"/> RESID., PARK, NEW FIELD (1)	<input checked="" type="checkbox"/> HEAVY OR SEVERE (1)
<input type="checkbox"/> VERY NARROW < 5m (1)	<input type="checkbox"/> FENCED PASTURE (1)	
<input checked="" type="checkbox"/> NONE (0)		

COMMENTS: _____

POOL: 9 Max 12

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

MAX. DEPTH (Check 1)	MORPHOLOGY (Check One or 2 & Average)	POOL / RUN / RIFFLE CURRENT VELOCITY (Check ALL That Apply)
<input checked="" type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2)	<input type="checkbox"/> TORRENTIAL (-1)
<input type="checkbox"/> 0.7-1m (4)	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1)	<input type="checkbox"/> FAST (1)
<input type="checkbox"/> 0.4-0.7m (2)	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<input type="checkbox"/> MODERATE (1)
<input type="checkbox"/> 0.2-0.4m (1)		<input checked="" type="checkbox"/> SLOW (1)
<input type="checkbox"/> < 0.2m (Pool = 0)		<input type="checkbox"/> INTERSTITIAL (-1)
		<input type="checkbox"/> EDDIES (1)
		<input type="checkbox"/> INTERMITTENT (-2)
		<input type="checkbox"/> VERY FAST (1)

COMMENTS: _____

RIFFLE: 4 Max 8

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input checked="" type="checkbox"/> * Best Areas > 10cm (2)	<input type="checkbox"/> MAX > 50 (2)	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) (2)	<input type="checkbox"/> EXTENSIVE (-1)
<input type="checkbox"/> Best areas 5-10cm (1)	<input checked="" type="checkbox"/> MAX < 50 (1)	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) (1)	<input checked="" type="checkbox"/> MODERATE (0)
<input type="checkbox"/> Best areas < 5cm (Riffle = 0)		<input type="checkbox"/> UNSTABLE (Fine Gravel, Sand) (0)	<input type="checkbox"/> NONE (2)

COMMENTS: _____

* Best areas must be large enough to support a population of riffle-obligate fish species

GRADIENT: 10 Max 10

6) GRADIENT (feet / mile) 24.8 DRAINAGE AREA (sq.mi) 6.48 %POOL: 30 %RIFFLE: 30 %GLIDE: 30 %RUN: 10
 (from USGS)

Appendix C

OEPA Headwater Habitat Evaluation Index (HHEI) Worksheets

SITE NAME/LOCATION Hall Run Headwater

SITE NUMBER Site 1 RIVER BASIN Hall Run DRAINAGE AREA (mi²) 0.09

LENGTH OF STREAM REACH (ft) 200 LAT. N39°04'52" LONG. W84°17'18" RIVER CODE N/A RIVER MILE 6.68

DATE 9/26/05 SCORER Balke American (Michael de Villiers) COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY

	SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.				HHEI METRIC POINTS																											
1.	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">TYPE</th> <th style="width: 20%;">PERCENT</th> <th style="width: 10%;">TYPE</th> <th style="width: 20%;">PERCENT</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> BLDR SLABS [16 pts]</td> <td>_____</td> <td><input checked="" type="checkbox"/> SILT [3 pts]</td> <td style="text-align: center;">20</td> </tr> <tr> <td><input type="checkbox"/> BOULDER (>256 mm) [16 pts]</td> <td>_____</td> <td><input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]</td> <td style="text-align: center;">5</td> </tr> <tr> <td><input type="checkbox"/> BEDROCK [16 pts]</td> <td>_____</td> <td><input type="checkbox"/> FINE DETRITUS [3 pts]</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> COBBLE (65-256 mm) [12 pts]</td> <td>_____</td> <td><input type="checkbox"/> CLAY or HARDPAN [0 pts]</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]</td> <td style="text-align: center;">15</td> <td><input type="checkbox"/> MUCK [0 pts]</td> <td>_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]</td> <td style="text-align: center;">60</td> <td><input type="checkbox"/> ARTIFICIAL [3 pts]</td> <td>_____</td> </tr> </tbody> </table> <p style="margin-top: 10px;"> Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>0</u> (A) (B) </p> <p> SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9 TOTAL NUMBER OF SUBSTRATE TYPES: 4 </p>	TYPE	PERCENT	TYPE	PERCENT	<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	20	<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5	<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____	<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	15	<input type="checkbox"/> MUCK [0 pts]	_____	<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	60	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____			<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Substrate Max = 40</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">13</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">A + B</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Pool Depth Max = 30</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Bankfull Width Max = 30</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">15</div>
TYPE	PERCENT	TYPE	PERCENT																													
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	20																													
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5																													
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____																													
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____																													
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	15	<input type="checkbox"/> MUCK [0 pts]	_____																													
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	60	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____																													
2.	<p>Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 30 centimeters [20 pts]</td> <td><input type="checkbox"/> > 5 cm - 10 cm [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 22.5 - 30 cm [30 pts]</td> <td><input type="checkbox"/> < 5 cm [5 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 10 - 22.5 cm [25 pts]</td> <td><input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]</td> </tr> </tbody> </table> <p>COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 0</p>	<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]																									
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]																															
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]																															
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]																															
3.	<p>BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 4.0 meters [30 pts]</td> <td><input checked="" type="checkbox"/> > 1.0 - 1.5 m [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]</td> <td><input type="checkbox"/> ≤ 1.0 m [5 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]</td> <td></td> </tr> </tbody> </table> <p>COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 1.3</p>	<input type="checkbox"/> > 4.0 meters [30 pts]	<input checked="" type="checkbox"/> > 1.0 - 1.5 m [15 pts]	<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]	<input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]																										
<input type="checkbox"/> > 4.0 meters [30 pts]	<input checked="" type="checkbox"/> > 1.0 - 1.5 m [15 pts]																															
<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]																															
<input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]																																

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH		FLOODPLAIN QUALITY	
L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Per Bank)	Wide > 10m	(Most Predominant per Bank)	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Narrow < 5m		Residential, Park, New Field	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture	Mining or Construction

COMMENTS Residential encroachment at downstream end

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry Channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input checked="" type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input checked="" type="checkbox"/> Flat to Moderate	<input checked="" type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	--	--	---	--

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Hall Run Distance from Evaluated Stream 1.0 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 18 NRCS Soil Map Stream Order 1st

County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/25/05 Quantity: 0.32 inches

Photograph Information: Photo's 1 (upstream), 2-4 (downstream); see representative Photo 1 in Appendix E

Elevated Turbidity? (Y/N): N/A Canopy (% open): 15%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: Some suburban trash (plastics, paper)

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

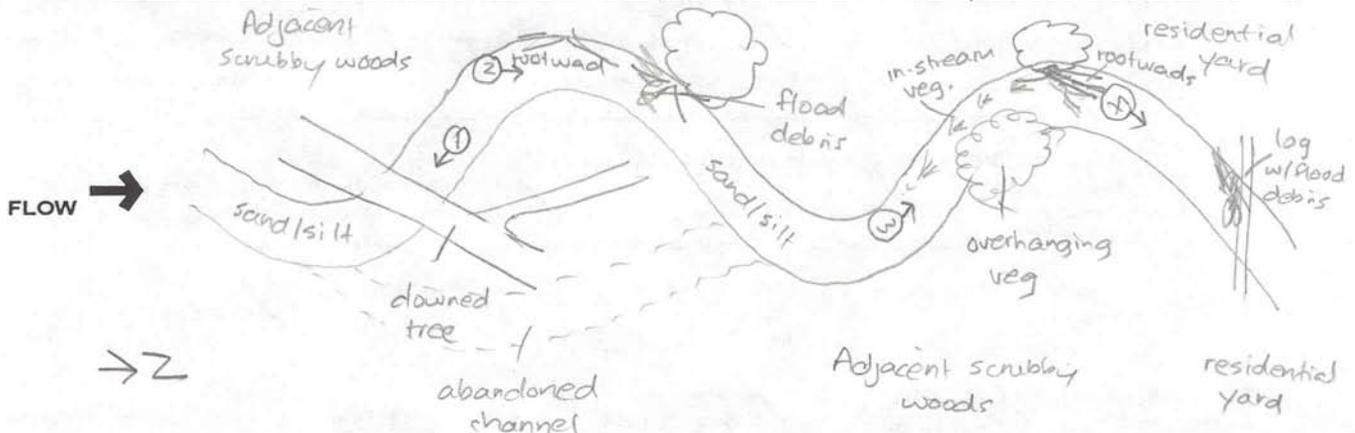
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: No biology present

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Hall Run Distance from Evaluated Stream 0.02 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 1st
County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/25/05 Quantity: 0.32 inches
Photograph Information: Photo's 11-12 (upstream), 13-14 (downstream), 15 (upstream); see representative Photo 3 in Appendix E
Elevated Turbidity? (Y/N): N/A Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) N/A Dissolved Oxygen (mg/l) N/A pH (S.U.) N/A Conductivity (µmhos/cm) N/A
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

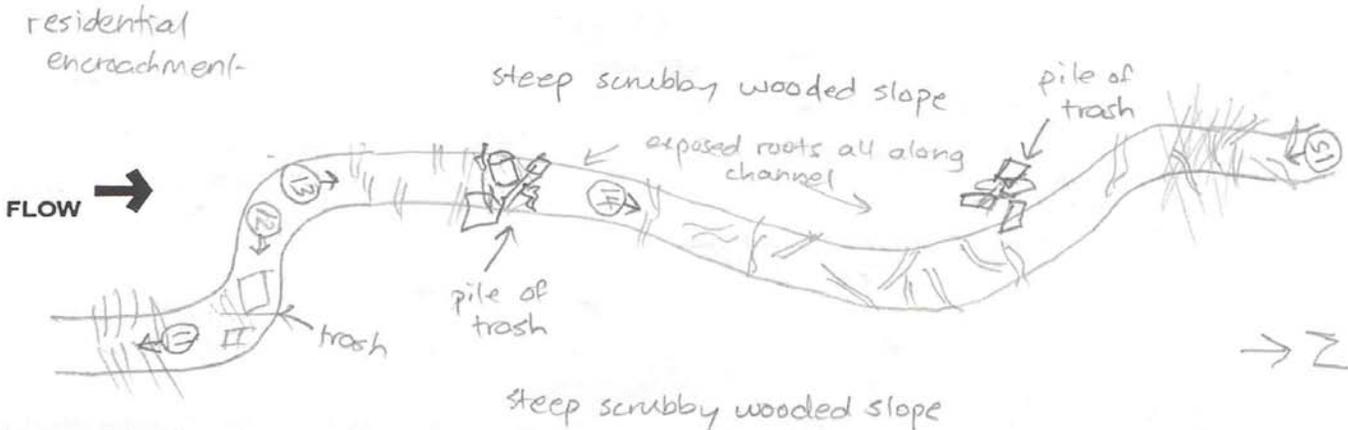
Additional comments/description of pollution impacts: Some suburban trash (plastics, paper, wood)

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology: No biology present

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



SITE NAME/LOCATION Hall Run Headwater Tributary

 SITE NUMBER Site 4

 RIVER BASIN Hall Run

 DRAINAGE AREA (mi²) 0.13

 LENGTH OF STREAM REACH (ft) 200

 LAT. N39°05'16"

 LONG. W84°17'19"

 RIVER CODE N/A

 RIVER MILE 0.41

 DATE 9/26/05

 SCORER Balke American (Michael de Villiers)

COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS:
 NONE / NATURAL CHANNEL
 RECOVERED
 RECOVERING
 RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> <input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> SILT [3 pts]	50
<input type="checkbox"/> <input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> <input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> <input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> <input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10	<input type="checkbox"/> <input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input type="checkbox"/> <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> <input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> <input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> <input type="checkbox"/> ARTIFICIAL [3 pts]	_____

 Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10 (A)

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

5

2. **Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

 COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

9

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]	

 COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

0.7

HHEI METRIC POINTS

Substrate Max = 40

11

A + B

Pool Depth Max = 30

15

Bankfull Width Max = 30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆
RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide > 10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow < 5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry Channel, no water (Ephemeral)

 COMMENTS Flow from recent rain
SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE
 Flat (0.5 ft/100 ft)
 Flat to Moderate
 Moderate (2 ft/100 ft)
 Moderate to Severe
 Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

- WWH Name: Hall Run Distance from Evaluated Stream 0.41 mile
- CWH Name: _____ Distance from Evaluated Stream _____
- EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 2nd
 County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/25/05 Quantity: 0.32 inches
 Photograph Information: Photo's 16-20 (upstream); see representative Photo 4 in Appendix E
 Elevated Turbidity? (Y/N): N Canopy (% open): 80%
 Were samples collected for water chemistry? (Y/N): Y (Note lab sample no. or id. and attach results) Lab Number: N/A
 Field Measures: Temp (°C) 22.7 Dissolved Oxygen (mg/l) 5.0 pH (S.U.) 7.9 Conductivity (µmhos/cm) 409
 Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

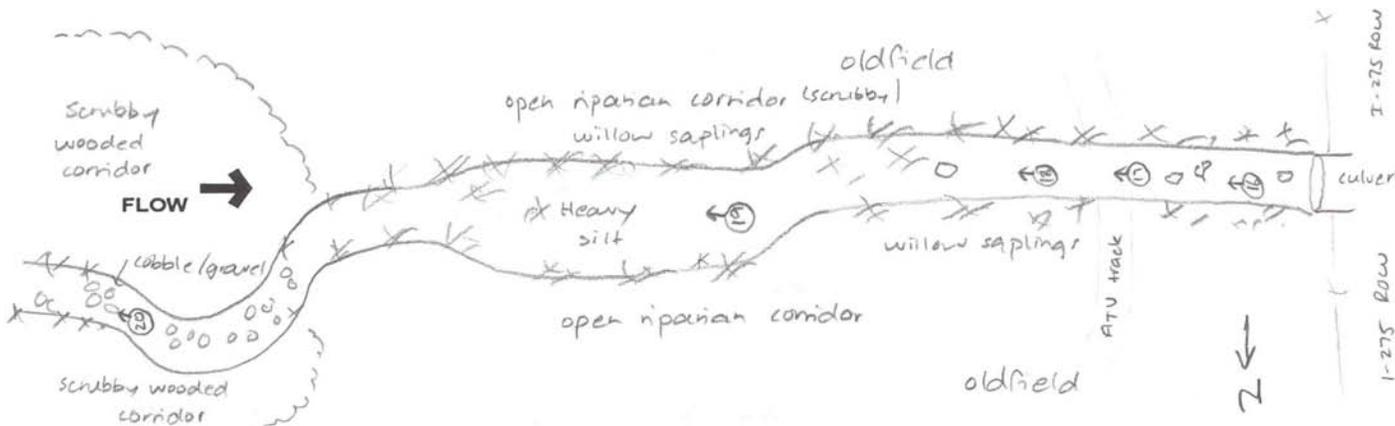
Additional comments/description of pollution impacts: Heavy silt; in-stream wetland located upstream

BIOTIC EVALUATION

Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
 Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N
 Comments Regarding Biology: Hirudinea, hemiptera and isopoda present (see Site 4 HMFEI form)

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Site 4 (9/26/05)

3. Macroinvertebrate Scoring Sheet:

THE HEADWATER MACROINVERTEBRATE FIELD EVALUATION INDEX (HMFEI) SCORING SHEET

Indicate Abundance of Each Taxa Above each White Box.

Record HMFEI Scoring Value Points Within each Box.

For EPT taxa, also indicate the different taxa present.

Key: V = Very Abundant (> 50); A = Abundant (10-50); C = Common (3 - 9); R = Rare (< 3)

Sessile Animals (Porifera , Cnidaria , Bryozoa) (HMFEI pts = 1)	<input type="text"/>	Crayfish (Decapoda) (HMFEI pts = 2)	<input type="text"/>	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	<input type="text"/>
Aquatic Worms (Turbellaria , Oligochaeta , Hirudinea) (HMFEI pts = 1)	A <input type="text" value="1"/>	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	<input type="text"/>	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	<input type="text"/>
Sow Bugs (Isopoda) (HMFEI pts = 1)	R <input type="text" value="1"/>	Riffle Beetles (Dryopidae , Elmidae , Ptilodactylidae) (HMFEI pts = 2)	<input type="text"/>	Crane-fly Larvae (Tipulidae) (HMFEI pts = 3)	<input type="text"/>
Scuds (Amphipoda) (HMFEI pts = 1)	<input type="text"/>	Larvae of other Flies (Diptera) Name: (HMFEI pts = 1)	<input type="text"/>	EPT TAXA* Total No. EPT Taxa = _____	
Water Mites (Hydracarina) (HMFEI pts = 1)	<input type="text"/>	Midges (Chironomidae) (HMFEI pts = 1)	<input type="text"/>	Mayfly Nymphs (Ephemeroptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	<input type="text"/>	Snails (Gastropoda) (HMFEI pts = 1)	<input type="text"/>		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	<input type="text"/>	Clams (Bivalvia) (HMFEI pts = 1)	<input type="text"/>	Stonefly Nymphs (Plecoptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Other Beetles (Coleoptera) (HMFEI pts = 1)	<input type="text"/>	Other Taxa:			
Other Taxa: Hemiptera	A	Other Taxa:		Caddisfly Larvae (Trichoptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Other Taxa:		Other Taxa:			

*Note: EPT identification based upon Family or Genus level of taxonomy

Voucher Sample ID N/A

Time Spent (minutes): 25

Notes on Macroinvertebrates: (Predominant Organisms; Other Common Organisms; Diversity Estimate)

Site 4: Hirudinea predominant; very low diversity

Final HMFEI Calculated Score (Sum of All White Box Scores) =

2

IF Final HMFEI Score is > 19, Then CLASS III PHWH STREAM
 IF Final HMFEI Score is 7 to 19, Then CLASS II PHWH STREAM
 IF Final HMFEI Score is < 7, Then CLASS I PHWH STREAM

SITE NAME/LOCATION Salt Run Headwater Tributary

SITE NUMBER Site 6 RIVER BASIN Salt Run DRAINAGE AREA (mi²) 0.12

LENGTH OF STREAM REACH (ft) 200 LAT. N39°06'09" LONG. W84°14'42" RIVER CODE N/A RIVER MILE 2.53

DATE 9/27/05 SCORER Balke American (Michael de Villiers) COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY

<p>1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">TYPE</th> <th style="text-align: center;">PERCENT</th> <th style="text-align: left;">TYPE</th> <th style="text-align: center;">PERCENT</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> BLDR SLABS [16 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> SILT [3 pts]</td> <td style="text-align: center;">20</td> </tr> <tr> <td><input type="checkbox"/> BOULDER (>256 mm) [16 pts]</td> <td style="text-align: center;">_____</td> <td><input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]</td> <td style="text-align: center;">5</td> </tr> <tr> <td><input type="checkbox"/> BEDROCK [16 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> FINE DETRITUS [3 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]</td> <td style="text-align: center;">35</td> <td><input type="checkbox"/> CLAY or HARDPAN [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]</td> <td style="text-align: center;">25</td> <td><input type="checkbox"/> MUCK [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> SAND (<2 mm) [6 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> ARTIFICIAL [3 pts]</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table> <p style="text-align: center;">Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>45</u> (A) (B)</p> <p>SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 TOTAL NUMBER OF SUBSTRATE TYPES: 7</p> <p>2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 30 centimeters [20 pts]</td> <td><input type="checkbox"/> > 5 cm - 10 cm [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 22.5 - 30 cm [30 pts]</td> <td><input type="checkbox"/> < 5 cm [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]</td> <td><input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]</td> </tr> </tbody> </table> <p>COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 20</p> <p>3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 4.0 meters [30 pts]</td> <td><input type="checkbox"/> > 1.0 - 1.5 m [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]</td> <td><input type="checkbox"/> ≤ 1.0 m [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]</td> <td></td> </tr> </tbody> </table> <p>COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 2.2</p>	TYPE	PERCENT	TYPE	PERCENT	<input type="checkbox"/> BLDR SLABS [16 pts]	5	<input type="checkbox"/> SILT [3 pts]	20	<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5	<input type="checkbox"/> BEDROCK [16 pts]	5	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	35	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____	<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	25	<input type="checkbox"/> MUCK [0 pts]	_____	<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____	<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]	<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]	<input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]		<p>HHEI METRIC POINTS</p> <p>Substrate Max = 40</p> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto; text-align: center;">28</div> <p>A + B</p> <hr/> <p>Pool Depth Max = 30</p> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto; text-align: center;">25</div> <hr/> <p>Bankfull Width Max = 30</p> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto; text-align: center;">20</div>
TYPE	PERCENT	TYPE	PERCENT																																						
<input type="checkbox"/> BLDR SLABS [16 pts]	5	<input type="checkbox"/> SILT [3 pts]	20																																						
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This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH		FLOODPLAIN QUALITY		L	R
<input checked="" type="checkbox"/>	Wide > 10m	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Moderate 5-10m	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Narrow < 5m	<input type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	None	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry Channel, no water (Ephemeral)

COMMENTS Flow from recent rain

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input checked="" type="checkbox"/> Flat (0.5 ft/100 ft)	<input checked="" type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
--	--	---	---	--

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Salt Run Distance from Evaluated Stream 2.53 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Batavia NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 1st
County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/26/05 Quantity: 0.33 inches

Photograph Information: Photo's 7 (downstream), 8-10 (upstream); see representative Photo 6 in Appendix E

Elevated Turbidity? (Y/N): N Canopy (% open): 60%

Were samples collected for water chemistry? (Y/N): Y (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) 18.9 Dissolved Oxygen (mg/l) 6.1 pH (S.U.) 7.8 Conductivity (µmhos/cm) 501

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: Minor amount of suburban trash (plastics, paper)

BIOTIC EVALUATION

Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

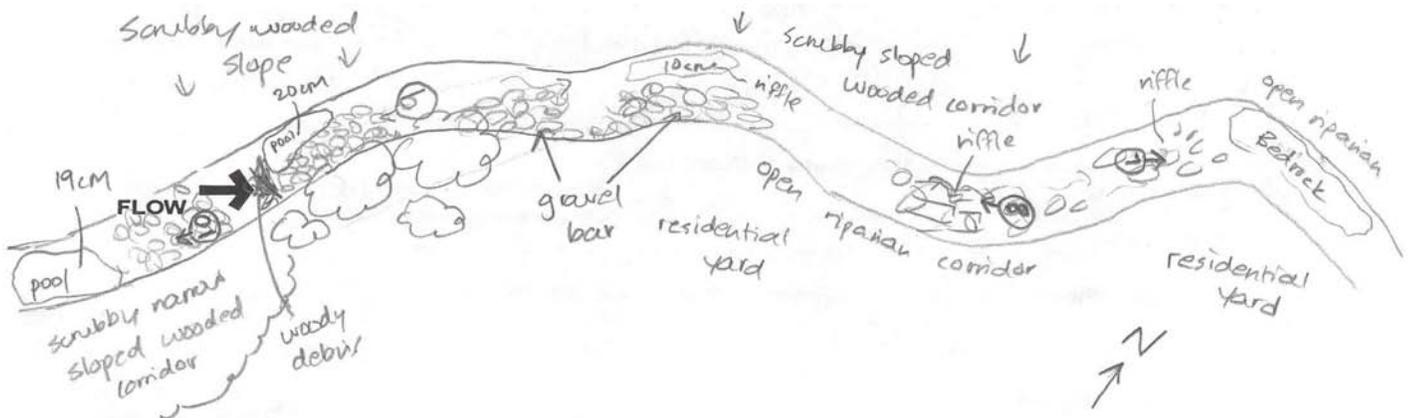
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N

Comments Regarding Biology: Predominantly hirudinea, hemiptera and gastropoda present (see Site 6 HMFEL form)

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Site 6 (9/27/05)

3. Macroinvertebrate Scoring Sheet:

THE HEADWATER MACROINVERTEBRATE FIELD EVALUATION INDEX (HMFEI) SCORING SHEET

Indicate Abundance of Each Taxa Above each White Box.

Record HMFEI Scoring Value Points Within each Box.

For EPT taxa, also indicate the different taxa present.

Key: V = Very Abundant (> 50); A = Abundant (10-50); C = Common (3 - 9); R = Rare (< 3)

Sessile Animals (Porifera , Cnidaria , Bryozoa) (HMFEI pts = 1)	<input type="text"/>	Crayfish (Decapoda) (HMFEI pts = 2)	C <input type="text" value="2"/>	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	<input type="text"/>
Aquatic Worms (Turbellaria , Oligochaeta , Hirudinea) (HMFEI pts = 1)	V <input type="text" value="1"/>	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	<input type="text"/>	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	C <input type="text" value="3"/>
Sow Bugs (Isopoda) (HMFEI pts = 1)	C <input type="text" value="1"/>	Riffle Beetles (Dryopidae , Elimidae , Ptilodactylidae) (HMFEI pts = 2)	<input type="text"/>	Crane-fly Larvae (Tipulidae) (HMFEI pts = 3)	<input type="text"/>
Scuds (Amphipoda) (HMFEI pts = 1)	C <input type="text" value="1"/>	Larvae of other Flies (Diptera) Name: (HMFEI pts = 1)	<input type="text"/>	EPT TAXA* Total No. EPT Taxa = _____	
Water Mites (Hydracarina) (HMFEI pts = 1)	<input type="text"/>	Midges (Chironomidae) (HMFEI pts = 1)	<input type="text"/>	Mayfly Nymphs (Ephemeroptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	<input type="text"/>	Snails (Gastropoda) (HMFEI pts = 1)	A <input type="text" value="1"/>		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	<input type="text"/>	Clams (Bivalvia) (HMFEI pts = 1)	<input type="text"/>	Stonefly Nymphs (Plecoptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Other Beetles (Coleoptera) (HMFEI pts = 1)	<input type="text"/>	Other Taxa:			
Other Taxa: Hemiptera	A	Other Taxa:		Caddisfly Larvae (Trichoptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Other Taxa:		Other Taxa:			

*Note: EPT identification based upon Family or Genus level of taxonomy

Voucher Sample ID N/A

Time Spent (minutes): 20

Notes on Macroinvertebrates: (Predominant Organisms; Other Common Organisms; Diversity Estimate)

Site 6: Hirudinea, hemiptera and gastropoda predominant; low diversity

Final HMFEI Calculated Score (Sum of All White Box Scores) =

9

IF Final HMFEI Score is > 19, Then CLASS III PHWH STREAM
 IF Final HMFEI Score is 7 to 19, Then CLASS II PHWH STREAM
 IF Final HMFEI Score is < 7, Then CLASS I PHWH STREAM

SITE NAME/LOCATION Salt Run Headwater Tributary
 SITE NUMBER Site 8 RIVER BASIN Salt Run DRAINAGE AREA (mi²) 0.18
 LENGTH OF STREAM REACH (ft) 200 LAT. N39°07'08" LONG. W84°16'30" RIVER CODE N/A RIVER MILE 1.41
 DATE 9/27/05 SCORER Balke American (Michael de Villiers) COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY

<p>1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">TYPE</th> <th style="width: 30%;">PERCENT</th> <th style="width: 15%;">TYPE</th> <th style="width: 30%;">PERCENT</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> BLDR SLABS [16 pts]</td> <td style="text-align: center;">10</td> <td><input type="checkbox"/> SILT [3 pts]</td> <td style="text-align: center;">15</td> </tr> <tr> <td><input type="checkbox"/> BOULDER (>256 mm) [16 pts]</td> <td style="text-align: center;">_____</td> <td><input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]</td> <td style="text-align: center;">5</td> </tr> <tr> <td><input checked="" type="checkbox"/> BEDROCK [16 pts]</td> <td style="text-align: center;">40</td> <td><input type="checkbox"/> FINE DETRITUS [3 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]</td> <td style="text-align: center;">20</td> <td><input type="checkbox"/> CLAY or HARDPAN [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> MUCK [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> SAND (<2 mm) [6 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> ARTIFICIAL [3 pts]</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table> <p style="text-align: center;">Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>70</u> (A) (B)</p> <p>SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 28 TOTAL NUMBER OF SUBSTRATE TYPES: 7</p> <p>2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 30 centimeters [20 pts]</td> <td><input type="checkbox"/> > 5 cm - 10 cm [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 22.5 - 30 cm [30 pts]</td> <td><input type="checkbox"/> < 5 cm [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]</td> <td><input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]</td> </tr> </tbody> </table> <p>COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 21</p> <p>3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 4.0 meters [30 pts]</td> <td><input type="checkbox"/> > 1.0 - 1.5 m [15 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 3.0 m - 4.0 m [25 pts]</td> <td><input type="checkbox"/> ≤ 1.0 m [5 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]</td> <td></td> </tr> </tbody> </table> <p>COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 3.1</p>	TYPE	PERCENT	TYPE	PERCENT	<input type="checkbox"/> BLDR SLABS [16 pts]	10	<input type="checkbox"/> SILT [3 pts]	15	<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5	<input checked="" type="checkbox"/> BEDROCK [16 pts]	40	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	20	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____	<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	_____	<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____	<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]	<input checked="" type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]	<input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]		<p>HHEI METRIC POINTS</p> <p>Substrate Max = 40</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">35</div> <p>A + B</p> <hr/> <p>Pool Depth Max = 30</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">25</div> <hr/> <p>Bankfull Width Max = 30</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">25</div>
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This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH		FLOODPLAIN QUALITY	
L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Per Bank)		(Most Predominant per Bank)	
Wide > 10m		Mature Forest, Wetland	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Narrow < 5m		Residential, Park, New Field	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Mining or Construction	

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry Channel, no water (Ephemeral)

COMMENTS Flow from recent rain

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input checked="" type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input type="checkbox"/> Flat to Moderate	<input checked="" type="checkbox"/> Moderate (2 ft/100 ft)	<input checked="" type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	---	--	--	--

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Salt Run Distance from Evaluated Stream 0.7 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 2nd
County: Clermont Township / City Union

MISCELLANEOUS

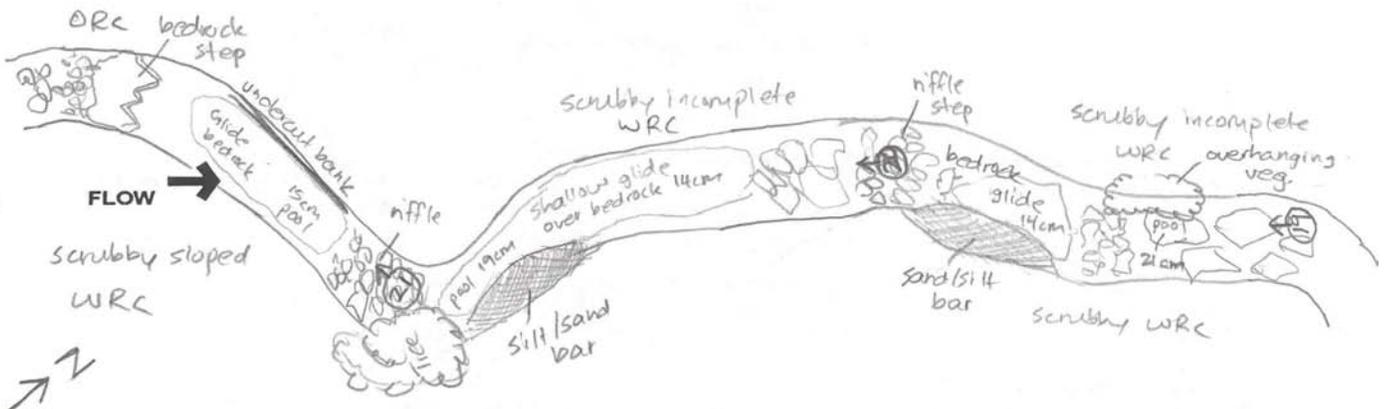
Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/26/05 Quantity: 0.33 inches
Photograph Information: Photo's 19-21 (upstream); see representative Photo 8 in Appendix E
Elevated Turbidity? (Y/N): N Canopy (% open): 25%
Were samples collected for water chemistry? (Y/N): Y (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) 19.4 Dissolved Oxygen (mg/l) 6.5 pH (S.U.) 7.9 Conductivity (µmhos/cm) 968
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____
Additional comments/description of pollution impacts: Heavy sand/silt bar formation

BIOTIC EVALUATION

Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) Y Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N
Comments Regarding Biology: Predominantly hirudinea and hemiptera present (see Site 6 HMFEL form); one northern dusky salamander observed

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Site 8 (9/27/05)

3. Macroinvertebrate Scoring Sheet:

THE HEADWATER MACROINVERTEBRATE FIELD EVALUATION INDEX (HMFEI) SCORING SHEET

Indicate Abundance of Each Taxa Above each White Box.

Record HMFEI Scoring Value Points Within each Box.

For EPT taxa, also indicate the different taxa present.

Key: V = Very Abundant (> 50); A = Abundant (10-50); C = Common (3 - 9); R = Rare (< 3)

Sessile Animals (Porifera , Cnidaria , Bryozoa) (HMFEI pts = 1)	<input type="text"/>	Crayfish (Decapoda) (HMFEI pts = 2)	C <input type="text" value="2"/>	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	<input type="text"/>
Aquatic Worms (Turbellaria , Oligochaeta , Hirudinea) (HMFEI pts = 1)	A <input type="text" value="1"/>	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	<input type="text"/>	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	<input type="text"/>
Sow Bugs (Isopoda) (HMFEI pts = 1)	C <input type="text" value="1"/>	Riffle Beetles (Dryopidae , Elimidae , Ptilodactylidae) (HMFEI pts = 2)	<input type="text"/>	Crane-fly Larvae (Tipulidae) (HMFEI pts = 3)	<input type="text"/>
Scuds (Amphipoda) (HMFEI pts = 1)	<input type="text"/>	Larvae of other Flies (Diptera) Name: (HMFEI pts = 1)	<input type="text"/>	EPT TAXA* Total No. EPT Taxa = _____	
Water Mites (Hydracarina) (HMFEI pts = 1)	<input type="text"/>	Midges (Chironomidae) (HMFEI pts = 1)	<input type="text"/>	Mayfly Nymphs (Ephemeroptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	<input type="text"/>	Snails (Gastropoda) (HMFEI pts = 1)	R <input type="text" value="1"/>		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	<input type="text"/>	Clams (Bivalvia) (HMFEI pts = 1)	<input type="text"/>	Stonefly Nymphs (Plecoptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Other Beetles (Coleoptera) (HMFEI pts = 1)	<input type="text"/>	Other Taxa:			
Other Taxa: Hemiptera	A	Other Taxa:		Caddisfly Larvae (Trichoptera) Taxa Present: [HMFEI pts = _____ No. Taxa (x) 3]	<input type="text"/>
Other Taxa:		Other Taxa:			

*Note: EPT identification based upon Family or Genus level of taxonomy

Voucher Sample ID N/A

Time Spent (minutes): 20

Notes on Macroinvertebrates: (Predominant Organisms; Other Common Organisms; Diversity Estimate)

Site 8: Hirudinea and hemiptera predominant; one northern dusky salamander observed; low diversity

Final HMFEI Calculated Score (Sum of All White Box Scores) =

5

IF Final HMFEI Score is > 19, Then CLASS III PHWH STREAM
IF Final HMFEI Score is 7 to 19, Then CLASS II PHWH STREAM
IF Final HMFEI Score is < 7, Then CLASS I PHWH STREAM

SITE NAME/LOCATION Hall Run Headwater Tributary
 SITE NUMBER Site 14 RIVER BASIN Hall Run DRAINAGE AREA (mi²) 0.17
 LENGTH OF STREAM REACH (ft) 200 LAT. N39°06'32" LONG. W84°17'30" RIVER CODE N/A RIVER MILE 0.01
 DATE 9/29/05 SCORER Balke American (Michael de Villiers) COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY

	SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.																															
	<table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">TYPE</th> <th style="width: 20%;">PERCENT</th> <th style="width: 10%;">TYPE</th> <th style="width: 20%;">PERCENT</th> </tr> <tr> <td><input type="checkbox"/> BLDR SLABS [16 pts]</td> <td style="text-align: center;">5</td> <td><input checked="" type="checkbox"/> SILT [3 pts]</td> <td style="text-align: center;">30</td> </tr> <tr> <td><input type="checkbox"/> BOULDER (>256 mm) [16 pts]</td> <td style="text-align: center;">_____</td> <td><input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]</td> <td style="text-align: center;">5</td> </tr> <tr> <td><input type="checkbox"/> BEDROCK [16 pts]</td> <td style="text-align: center;">_____</td> <td><input type="checkbox"/> FINE DETRITUS [3 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]</td> <td style="text-align: center;">30</td> <td><input type="checkbox"/> CLAY or HARDPAN [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]</td> <td style="text-align: center;">10</td> <td><input type="checkbox"/> MUCK [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> SAND (<2 mm) [6 pts]</td> <td style="text-align: center;">20</td> <td><input type="checkbox"/> ARTIFICIAL [3 pts]</td> <td style="text-align: center;">_____</td> </tr> </table>	TYPE	PERCENT	TYPE	PERCENT	<input type="checkbox"/> BLDR SLABS [16 pts]	5	<input checked="" type="checkbox"/> SILT [3 pts]	30	<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5	<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	30	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____	<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	_____	<input type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____		HHEI METRIC POINTS Substrate Max = 40 <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">21</div> A + B <hr/> Pool Depth Max = 30 <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">25</div> Bankfull Width Max = 30 <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">20</div>	
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	SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15	TOTAL NUMBER OF SUBSTRATE TYPES: 6																														
2.	Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): <table style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> > 30 centimeters [20 pts]</td> <td><input type="checkbox"/> > 5 cm - 10 cm [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 22.5 - 30 cm [30 pts]</td> <td><input type="checkbox"/> < 5 cm [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]</td> <td><input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]</td> </tr> </table>	<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]		MAXIMUM POOL DEPTH (centimeters): 21																							
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]																															
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]																															
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3.	BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box): <table style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> > 4.0 meters [30 pts]</td> <td><input type="checkbox"/> > 1.0 - 1.5 m [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]</td> <td><input type="checkbox"/> ≤ 1.0 m [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]</td> <td></td> </tr> </table>	<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]	<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]	<input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]			AVERAGE BANKFULL WIDTH (meters): 2.0																							
<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]																															
<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]																															
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]																																

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH		FLOODPLAIN QUALITY						
L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide > 10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow < 5m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry Channel, no water (Ephemeral)

COMMENTS Flow from recent rain

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input checked="" type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input type="checkbox"/> Flat to Moderate	<input checked="" type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	---	--	---	--

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Hall Run Distance from Evaluated Stream 0.01 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 1st
County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/29/05 Quantity: 0.34 inches
Photograph Information: Photo's 6 (downstream), 7 (upstream), 8-9 (downstream); see representative Photo 14 in Appendix E
Elevated Turbidity? (Y/N): N Canopy (% open): 40%
Were samples collected for water chemistry? (Y/N): Y (Note lab sample no. or id. and attach results) Lab Number: N/A
Field Measures: Temp (°C) 18.1 Dissolved Oxygen (mg/l) 6.8 pH (S.U.) 7.7 Conductivity (µmhos/cm) 475
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

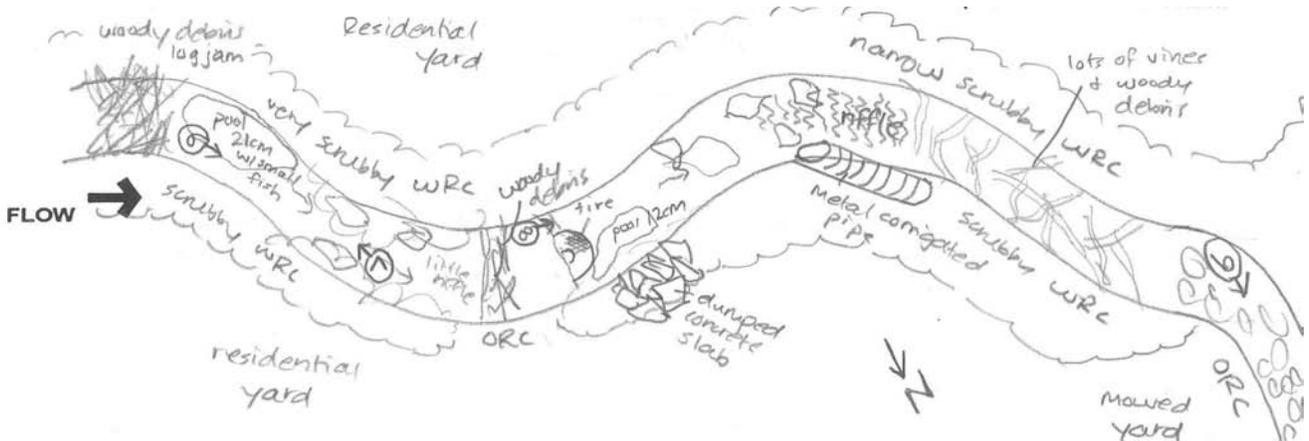
Additional comments/description of pollution impacts: Lots of suburban trash (plastics, paper, metal)

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Y Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N
Comments Regarding Biology: Predominantly hirudinea, amphipoda and isopoda present; some gastropoda

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



SITE NAME/LOCATION Hall Run Headwater Tributary
 SITE NUMBER Site 15 RIVER BASIN Hall Run DRAINAGE AREA (mi²) 0.44
 LENGTH OF STREAM REACH (ft) 200 LAT. N39°07'15" LONG. W84°17'51" RIVER CODE N/A RIVER MILE 0.13
 DATE 9/29/05 SCORER Balke American (Michael de Villiers) COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY

	SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.		HHEI METRIC POINTS																																								
<p>1.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">TYPE</th> <th style="width: 30%;">PERCENT</th> <th style="width: 10%;">TYPE</th> <th style="width: 30%;">PERCENT</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> BLDR SLABS [16 pts]</td> <td style="text-align: center;">15</td> <td><input type="checkbox"/> SILT [3 pts]</td> <td style="text-align: center;">10</td> </tr> <tr> <td><input type="checkbox"/> BOULDER (>256 mm) [16 pts]</td> <td style="text-align: center;">_____</td> <td><input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]</td> <td style="text-align: center;">5</td> </tr> <tr> <td><input checked="" type="checkbox"/> BEDROCK [16 pts]</td> <td style="text-align: center;">30</td> <td><input type="checkbox"/> FINE DETRITUS [3 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]</td> <td style="text-align: center;">30</td> <td><input type="checkbox"/> CLAY or HARDPAN [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> MUCK [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> SAND (<2 mm) [6 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> ARTIFICIAL [3 pts]</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table> <p style="text-align: center;">Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>45</u> (A) (B)</p> <p>SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 28 TOTAL NUMBER OF SUBSTRATE TYPES: 7</p>	TYPE	PERCENT	TYPE	PERCENT	<input type="checkbox"/> BLDR SLABS [16 pts]	15	<input type="checkbox"/> SILT [3 pts]	10	<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5	<input checked="" type="checkbox"/> BEDROCK [16 pts]	30	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	30	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____	<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]	_____	<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____	<p>2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 30 centimeters [20 pts]</td> <td><input type="checkbox"/> > 5 cm - 10 cm [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 22.5 - 30 cm [30 pts]</td> <td><input type="checkbox"/> < 5 cm [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]</td> <td><input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]</td> </tr> </tbody> </table> <p>COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 21</p>	<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<p>3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 4.0 meters [30 pts]</td> <td><input type="checkbox"/> > 1.0 - 1.5 m [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]</td> <td><input type="checkbox"/> ≤ 1.0 m [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]</td> <td></td> </tr> </tbody> </table> <p>COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 3.0</p>	<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]	<input type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]	<input checked="" type="checkbox"/> > 1.5 m - 3.0 m [20 pts]		<p>Substrate Max = 40</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">35</div> <p>A + B</p> <hr/> <p>Pool Depth Max = 30</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">25</div> <hr/> <p>Bankfull Width Max = 30</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">20</div>
TYPE	PERCENT	TYPE	PERCENT																																								
<input type="checkbox"/> BLDR SLABS [16 pts]	15	<input type="checkbox"/> SILT [3 pts]	10																																								
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5																																								
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This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH		FLOODPLAIN QUALITY						
L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide > 10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow < 5m	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry Channel, no water (Ephemeral)

COMMENTS Flow from recent rain

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input checked="" type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input checked="" type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	--	---	---	--

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Hall Run Distance from Evaluated Stream 0.13 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 2nd
County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/29/05 Quantity: 0.34 inches

Photograph Information: Photo's 10 (downstream), 11-13 (upstream); see representative Photo 15 in Appendix E

Elevated Turbidity? (Y/N): N Canopy (% open): 25%

Were samples collected for water chemistry? (Y/N): Y (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) 17.4 Dissolved Oxygen (mg/l) 7.1 pH (S.U.) 7.8 Conductivity (µmhos/cm) 420

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

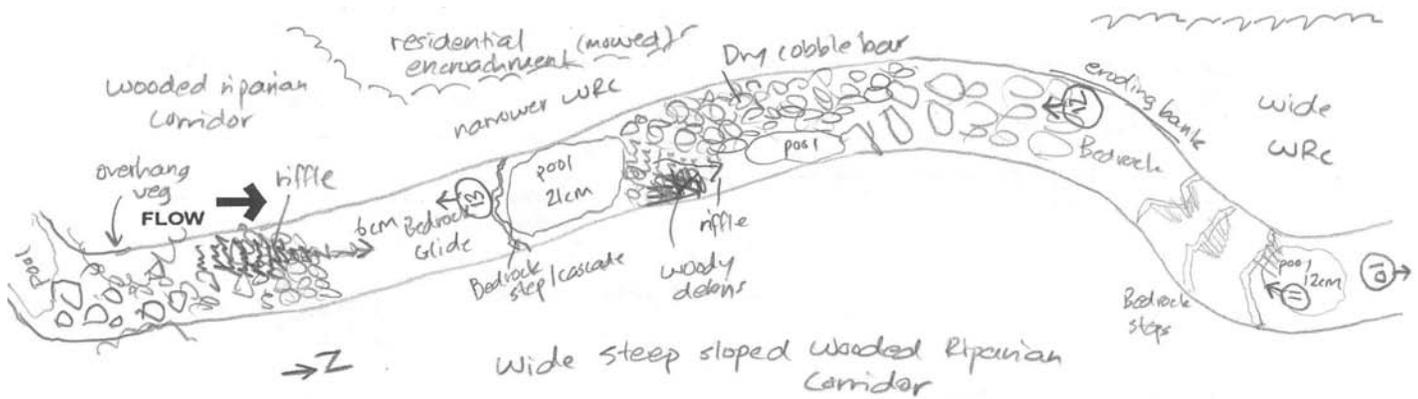
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) Y Voucher? (Y/N) N Salamanders Observed? (Y/N) Y Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N

Comments Regarding Biology: Predominantly hirudinea, hemiptera, isopoda and psephenidae present (see Site 15 HMFEI form); two northern dusky salamanders observed

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Site 15 (9/29/05)

3. Macroinvertebrate Scoring Sheet:

THE HEADWATER MACROINVERTEBRATE FIELD EVALUATION INDEX (HMFEI) SCORING SHEET

Indicate Abundance of Each Taxa Above each White Box.

Record HMFEI Scoring Value Points Within each Box.

For EPT taxa, also indicate the different taxa present.

Key: V = Very Abundant (> 50); A = Abundant (10-50); C = Common (3 - 9); R = Rare (< 3)

Sessile Animals (Porifera , Cnidaria , Bryozoa) (HMFEI pts = 1)	A <input type="text" value="1"/>	Crayfish (Decapoda) (HMFEI pts = 2)	C <input type="text" value="2"/>	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	<input type="text" value=""/>
Aquatic Worms (Turbellaria , Oligochaeta , Hirudinea) (HMFEI pts = 1)	A <input type="text" value="1"/>	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	<input type="text" value=""/>	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	A <input type="text" value="3"/>
Sow Bugs (Isopoda) (HMFEI pts = 1)	V <input type="text" value="1"/>	Riffle Beetles (Dryopidae , Elimidae , Ptilodactylidae) (HMFEI pts = 2)	<input type="text" value=""/>	Crane-fly Larvae (Tipulidae) (HMFEI pts = 3)	R <input type="text" value="3"/>
Scuds (Amphipoda) (HMFEI pts = 1)	A <input type="text" value="1"/>	Larvae of other Flies (Diptera) Name: (HMFEI pts = 1)	<input type="text" value=""/>	EPT TAXA* Total No. EPT Taxa = _____	
Water Mites (Hydracarina) (HMFEI pts = 1)	<input type="text" value=""/>	Midges (Chironomidae) (HMFEI pts = 1)	<input type="text" value=""/>	Mayfly Nymphs (Ephemeroptera) Taxa Present: [HMFEI pts = <input type="text" value=""/> No. Taxa (x) 3]	<input type="text" value=""/>
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	R <input type="text" value="1"/>	Snails (Gastropoda) (HMFEI pts = 1)	C <input type="text" value="1"/>		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	<input type="text" value=""/>	Clams (Bivalvia) (HMFEI pts = 1)	<input type="text" value=""/>	Stonefly Nymphs (Plecoptera) Taxa Present: [HMFEI pts = <input type="text" value=""/> No. Taxa (x) 3]	<input type="text" value=""/>
Other Beetles (Coleoptera) (HMFEI pts = 1)	<input type="text" value=""/>	Other Taxa:			
Other Taxa: Hemiptera	A	Other Taxa:		Caddisfly Larvae (Trichoptera) Taxa Present: [HMFEI pts = <input type="text" value=""/> No. Taxa (x) 3]	<input type="text" value=""/>
Other Taxa:		Other Taxa:			

*Note: EPT identification based upon Family or Genus level of taxonomy

Voucher Sample ID N/A

Time Spent (minutes): 25

Notes on Macroinvertebrates: (Predominant Organisms; Other Common Organisms; Diversity Estimate)

Site 15: Hirudinea, hemiptera, isopoda and psephenidae predominant; two northern dusky salamander observed; moderate diversity

Final HMFEI Calculated Score (Sum of All White Box Scores) =

13

IF Final HMFEI Score is > 19, Then CLASS III PHWH STREAM
IF Final HMFEI Score is 7 to 19, Then CLASS II PHWH STREAM
IF Final HMFEI Score is < 7, Then CLASS I PHWH STREAM

SITE NAME/LOCATION Hall Run Headwater Tributary
 SITE NUMBER Site 16 RIVER BASIN Hall Run DRAINAGE AREA (mi²) 0.14
 LENGTH OF STREAM REACH (ft) 200 LAT. N39°06'48" LONG. W84°17'46" RIVER CODE N/A RIVER MILE 0.08
 DATE 9/29/05 SCORER Balke American (Michael de Villiers) COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY

<p>1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">TYPE</th> <th style="text-align: center;">PERCENT</th> <th style="text-align: left;">TYPE</th> <th style="text-align: center;">PERCENT</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> BLDR SLABS [16 pts]</td> <td style="text-align: center;">10</td> <td><input type="checkbox"/> SILT [3 pts]</td> <td style="text-align: center;">10</td> </tr> <tr> <td><input type="checkbox"/> BOULDER (>256 mm) [16 pts]</td> <td style="text-align: center;">_____</td> <td><input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> BEDROCK [16 pts]</td> <td style="text-align: center;">5</td> <td><input type="checkbox"/> FINE DETRITUS [3 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]</td> <td style="text-align: center;">40</td> <td><input type="checkbox"/> CLAY or HARDPAN [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]</td> <td style="text-align: center;">15</td> <td><input type="checkbox"/> MUCK [0 pts]</td> <td style="text-align: center;">_____</td> </tr> <tr> <td><input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]</td> <td style="text-align: center;">20</td> <td><input type="checkbox"/> ARTIFICIAL [3 pts]</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table> <p style="text-align: center;">Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>55</u> (A) (B)</p> <p>SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 18 TOTAL NUMBER OF SUBSTRATE TYPES: 6</p> <p>2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 30 centimeters [20 pts]</td> <td><input type="checkbox"/> > 5 cm - 10 cm [15 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 22.5 - 30 cm [30 pts]</td> <td><input type="checkbox"/> < 5 cm [5 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]</td> <td><input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]</td> </tr> </tbody> </table> <p>COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 19</p> <p>3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><input type="checkbox"/> > 4.0 meters [30 pts]</td> <td><input type="checkbox"/> > 1.0 - 1.5 m [15 pts]</td> </tr> <tr> <td><input checked="" type="checkbox"/> > 3.0 m - 4.0 m [25 pts]</td> <td><input type="checkbox"/> ≤ 1.0 m [5 pts]</td> </tr> <tr> <td><input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]</td> <td></td> </tr> </tbody> </table> <p>COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 3.1</p>	TYPE	PERCENT	TYPE	PERCENT	<input type="checkbox"/> BLDR SLABS [16 pts]	10	<input type="checkbox"/> SILT [3 pts]	10	<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____	<input type="checkbox"/> BEDROCK [16 pts]	5	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	40	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____	<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	15	<input type="checkbox"/> MUCK [0 pts]	_____	<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____	<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<input type="checkbox"/> > 4.0 meters [30 pts]	<input type="checkbox"/> > 1.0 - 1.5 m [15 pts]	<input checked="" type="checkbox"/> > 3.0 m - 4.0 m [25 pts]	<input type="checkbox"/> ≤ 1.0 m [5 pts]	<input type="checkbox"/> > 1.5 m - 3.0 m [20 pts]		<p>HHEI METRIC POINTS</p> <p>Substrate Max = 40</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">24</div> <p>A + B</p> <hr/> <p>Pool Depth Max = 30</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">25</div> <hr/> <p>Bankfull Width Max = 30</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">25</div>
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This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH		FLOODPLAIN QUALITY		L	R
<input checked="" type="checkbox"/> <input type="checkbox"/>	(Per Bank) Wide > 10m	<input type="checkbox"/> <input type="checkbox"/>	(Most Predominant per Bank) Mature Forest, Wetland	<input type="checkbox"/> <input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Moderate 5-10m	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/> <input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/> <input checked="" type="checkbox"/>	Narrow < 5m	<input type="checkbox"/> <input checked="" type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/> <input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/> <input type="checkbox"/>	None	<input type="checkbox"/> <input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/> <input type="checkbox"/>	Mining or Construction

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry Channel, no water (Ephemeral)

COMMENTS Flow from recent rain

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input checked="" type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input checked="" type="checkbox"/> Flat to Moderate	<input checked="" type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	--	--	---	--

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - Yes No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Hall Run Distance from Evaluated Stream 0.08 mile
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangel Name: Withamsville NRCS Soil Map Page: 14 NRCS Soil Map Stream Order 2nd
County: Clermont Township / City Union

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/29/05 Quantity: 0.34 inches

Photograph Information: Photo's 16 (downstream), 17-20 (upstream); see representative Photo 16 in Appendix E

Elevated Turbidity? (Y/N): N Canopy (% open): 15%

Were samples collected for water chemistry? (Y/N): Y (Note lab sample no. or id. and attach results) Lab Number: N/A

Field Measures: Temp (°C) 17.5 Dissolved Oxygen (mg/l) 7.1 pH (S.U.) 7.9 Conductivity (µmhos/cm) 433

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: Minor suburban trash and areas of heavy silt

BIOTIC EVALUATION

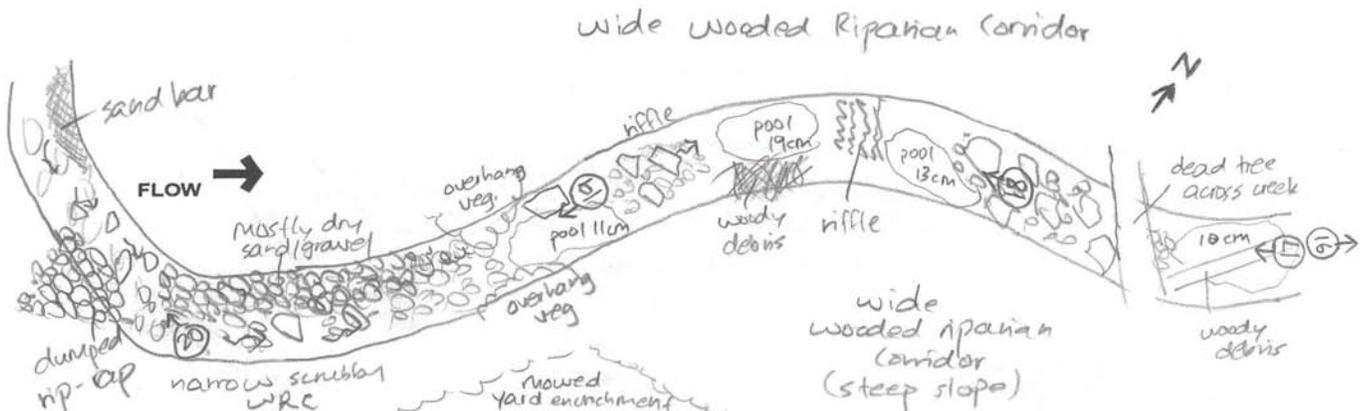
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) Y Voucher? (Y/N) N Salamanders Observed? (Y/N) Y Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N

Comments Regarding Biology: Predominantly hirudinea, hemiptera, and gastropoda present (see Site 16 HMFEL form); nine northern dusky salamanders observed

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Site 16 (9/29/05)

3. Macroinvertebrate Scoring Sheet:

THE HEADWATER MACROINVERTEBRATE FIELD EVALUATION INDEX (HMFEI) SCORING SHEET

Indicate Abundance of Each Taxa Above each White Box.

Record HMFEI Scoring Value Points Within each Box.

For EPT taxa, also indicate the different taxa present.

Key: V = Very Abundant (> 50); A = Abundant (10-50); C = Common (3 - 9); R = Rare (< 3)

Sessile Animals (Porifera , Cnidaria , Bryozoa) (HMFEI pts = 1)	<input type="text"/>	Crayfish (Decapoda) (HMFEI pts = 2)	C <input type="text" value="2"/>	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	<input type="text"/>
Aquatic Worms (Turbellaria , Oligochaeta , Hirudinea) (HMFEI pts = 1)	A <input type="text" value="1"/>	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	<input type="text"/>	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	C <input type="text" value="3"/>
Sow Bugs (Isopoda) (HMFEI pts = 1)	A <input type="text" value="1"/>	Riffle Beetles (Dryopidae , Elimidae , Ptilodactylidae) (HMFEI pts = 2)	<input type="text"/>	Crane-fly Larvae (Tipulidae) (HMFEI pts = 3)	<input type="text"/>
Scuds (Amphipoda) (HMFEI pts = 1)	C <input type="text" value="1"/>	Larvae of other Flies (Diptera) Name: (HMFEI pts = 1)	<input type="text"/>	EPT TAXA* Total No. EPT Taxa = _____	
Water Mites (Hydracarina) (HMFEI pts = 1)	<input type="text"/>	Midges (Chironomidae) (HMFEI pts = 1)	<input type="text"/>	Mayfly Nymphs (Ephemeroptera) Taxa Present: [HMFEI pts = No. Taxa (x) 3]	<input type="text"/>
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	<input type="text"/>	Snails (Gastropoda) (HMFEI pts = 1)	A <input type="text" value="1"/>		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	<input type="text"/>	Clams (Bivalvia) (HMFEI pts = 1)	<input type="text"/>	Stonefly Nymphs (Plecoptera) Taxa Present: [HMFEI pts = No. Taxa (x) 3]	<input type="text"/>
Other Beetles (Coleoptera) (HMFEI pts = 1)	<input type="text"/>	Other Taxa:			
Other Taxa: Hemiptera	V	Other Taxa:		Caddisfly Larvae (Trichoptera) Taxa Present: [HMFEI pts = No. Taxa (x) 3]	<input type="text"/>
Other Taxa:		Other Taxa:			

*Note: EPT identification based upon Family or Genus level of taxonomy

Voucher Sample ID N/A

Time Spent (minutes): 30

Notes on Macroinvertebrates: (Predominant Organisms; Other Common Organisms; Diversity Estimate)

Site 16: Hirudinea, hemiptera, and gastropoda predominant; nine northern dusky salamander observed; moderate diversity

Final HMFEI Calculated Score (Sum of All White Box Scores) =

9

IF Final HMFEI Score is > 19, Then CLASS III PHWH STREAM
IF Final HMFEI Score is 7 to 19, Then CLASS II PHWH STREAM
IF Final HMFEI Score is < 7, Then CLASS I PHWH STREAM

Appendix D

**OEPA Mitigation Clearinghouse
Data Sheets**



Contact Information:

Name: Paul Braasch Organization: Clermont County
 Address: 2379 Clermont Center Drive Batavia Ohio 45103
Street City State Zip Code
 Phone Number: (513) 732-7745 Fax Number: (513) 732-7310
 E-mail Address for Mitigation Contact: pbraasch@co.clermont.oh.us

OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Hall Run Mainstem - I-275 to Virginia Lane (RM 0.8-3.2)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/07/52 Longitude (d/m/s): 84/16/48
 Notes on Lat/Long: Position approximately in center of 2.4-mile reach
 Nearest Road Intersection: Summerside Road crossing of Hall Run Mainstem (Middle Portion)
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Hall Run (mid)	Perennial	No	12,672	Preservation	WWH	100/100



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Hall Run Mainstem (middle lower portion) flows into the East Fork Little Miami River. In general, the section from just west of I-275 to Virginia Lane (RM 0.8-3.2) consists predominantly of good quality instream substrate and riparian corridor. Adjacent land use includes primarily steep sloped woodland and a little residential development. The riparian corridor is mostly complete, wide and undisturbed.

Preservation opportunities include: establishment of conservation easement to prevent degradation or development in floodplain or riparian areas, replanting of small areas of riparian removal, repair of one section of steep bank slumping, and creation of 50-100 foot vegetated buffer to protect and enhance current conditions.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the preservation effort.

Photographs (if available): A brief text description should accompany each photograph.
 Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

Questions and data sheets can be submitted electronically at:
mitigationclearinghouse@epa.state.oh.us

If submitting a hard copy of this data sheet, mail it to the address listed at the right, or fax it to the Division of Surface Water at: (614) 644-2745.

Ohio EPA
 Division of Surface Water
 P.O. Box 1049
 Columbus, Ohio 43216-1049
 attn: Mitigation Clearinghouse

If you need assistance completing this data sheet, contact the Division of Surface Water at: (614) 644-2001.

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____

Mitigation Clearinghouse Data Sheet
Hall Run Mainstem (Middle Lower Portion)
Photo Sheet



Photo 1: Hall Run Mainstem (middle lower portion); view downstream showing natural bedrock/boulder/slabs cascade section and complete, wide, steep sloped wooded riparian corridor.



Photo 2: Hall Run Mainstem (middle lower portion); view downstream showing bedrock dominated substrate with glide, small riffle and pool habitat and steep sloped, wide wooded riparian corridor on both banks.



Contact Information:

Name: Paul Braasch Organization: Clermont County
 Address: 2379 Clermont Center Drive Batavia Ohio 45103
Street City State Zip Code
 Phone Number: (513) 732-7745 Fax Number: (513) 732-7310
 E-mail Address for Mitigation Contact: pbraasch@co.clermont.oh.us

OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Hall Run Mainstem - mouth to I-275 (RM 0.0-0.8)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/08/19 Longitude (d/m/s): 84/15/40
 Notes on Lat/Long: Position approximately in center of 0.8-mile reach
 Nearest Road Intersection: Round Bottom Road crossing of Hall Run Mainstem (Lower Portion)
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources PROPOSED on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Hall Run (Lower)	Perennial	No	4,224	Restoration	WWH	0-50/0-50



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Hall Run Mainstem (lower portion) flows into the East Fork Little Miami River. In general, the section from the mouth to just west of I-275 (RM 0.0-0.8) is of lower quality and has been modified by channelization and riparian removal. Adjacent land use includes agricultural field, residential, commercial (landscaping company) and highway right-of-way. The riparian corridor has been degraded by riparian removal leaving a mostly narrow, incomplete, scrubby to completely open corridor, which has led to siltation and embeddedness of substrate materials. The Hall Run Mainstem (lower portion) is further degraded by areas of channelization and artificial bank stabilization.

Restoration opportunities (with the goal of increasing the current QHEI score) include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting in areas of riparian removal, creation of 50-100 foot vegetated buffer with native species, removal of artificial bank stabilization materials, and natural stream bank stabilization.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the restoration effort.

Photographs (if available): A brief text description should accompany each photograph.
Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

Questions and data sheets can be submitted electronically at:
mitigationclearinghouse@epa.state.oh.us

If submitting a hard copy of this data sheet, mail it to the address listed at the right, or fax it to the Division of Surface Water at: (614) 644-2745.

Ohio EPA
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P.O. Box 1049
Columbus, Ohio 43216-1049
attn: Mitigation Clearinghouse

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B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____

Mitigation Clearinghouse Data Sheet
Hall Run Mainstem (Lower Portion)
Photo Sheet

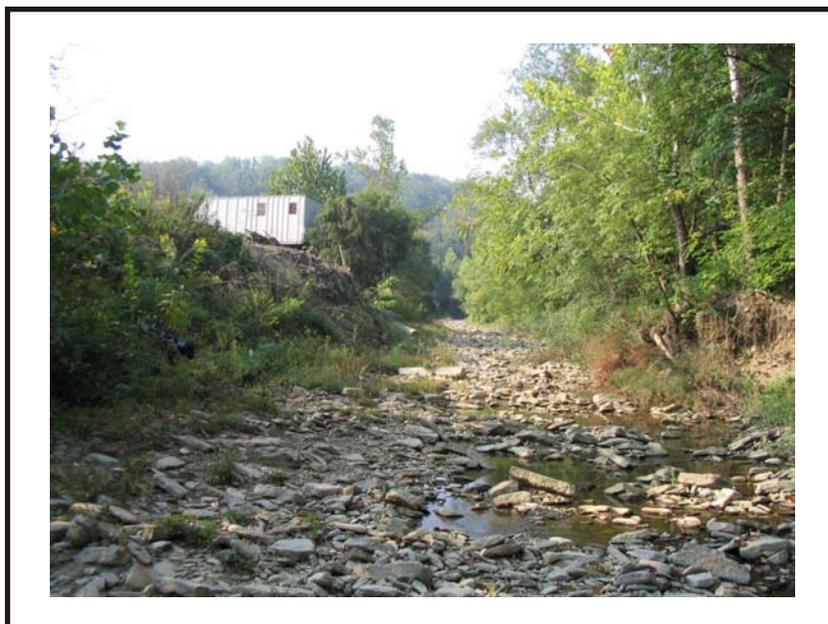


Photo 1: Hall Run Mainstem (lower portion); view upstream showing denuded riparian corridor on RDB and scrubby narrow riparian corridor on LDB through channelized section of stream.



Photo 2: Hall Run Mainstem (lower portion); view upstream showing unstable, eroding bank and narrow, scrubby wooded riparian corridor on LDB.



Contact Information:

Name: Paul Braasch Organization: Clermont County
 Address: 2379 Clermont Center Drive Batavia Ohio 45103
Street City State Zip Code
 Phone Number: (513) 732-7745 Fax Number: (513) 732-7310
 E-mail Address for Mitigation Contact: pbraasch@co.clermont.oh.us

OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Hall Run HW - Glenrose Ln to Regent Rd (RM 5.1-6.0)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/05/21 Longitude (d/m/s): 84/17/51
 Notes on Lat/Long: Position approximately in center of 0.9-mile reach
 Nearest Road Intersection: Clough Pike crossing of Hall Run Headwater
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Hall Run HW	Intermittent	Yes	4,752	Restoration	WWH	0-50/0-50

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Hall Run Headwater flows into the East Fork Little Miami River. In general, the section from just south of Glenrose Lane to Regent Road (RM 5.1-6.0) is of lower quality due to encroachment from residential development. Adjacent land use includes primarily residential and some young, scrubby woodland. The riparian corridor has been degraded by encroachment from residential development resulting in areas of cleared riparian corridor, dumping of yard waste and trash into the stream channel and a section of wooded corridor degraded by multiple All Terrain Vehicle (ATV) tracks.

Restoration opportunities (with the goal of increasing the current QHEI score) include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting in areas of riparian removal and areas of ATV traffic, creation of 50-100 foot vegetated buffer with native species, removal of trash and yard wastes through voluntary "Stream Sweeps", prevention of open dumping of yard and other wastes, limitation of ATV use in floodplain and riparian areas, and repair failing household septic systems discharging into the stream channel.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the restoration effort.

Photographs (if available): A brief text description should accompany each photograph.
 Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

Questions and data sheets can be submitted electronically at:
mitigationclearinghouse@epa.state.oh.us

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Ohio EPA
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 Columbus, Ohio 43216-1049
 attn: Mitigation Clearinghouse

If you need assistance completing this data sheet, contact the Division of Surface Water at: (614) 644-2001.

Mitigation Clearinghouse Data Sheet
Hall Run Headwater
Photo Sheet

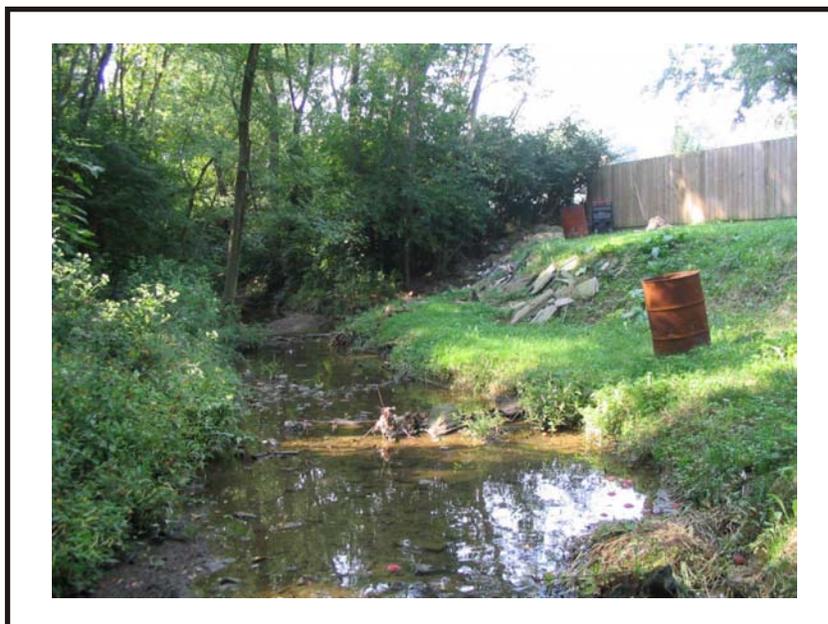


Photo 1: Hall Run Headwater; view upstream showing encroachment of residential development and section of cleared riparian corridor.



Photo 2: Hall Run Headwater; view upstream showing examples of trash within the channel and adjacent scrubby wooded riparian corridor.



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 Phone Number: (513) 732-7745 Fax Number: (513) 732-7310
 E-mail Address for Mitigation Contact: pbraasch@co.clermont.oh.us

OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Hall Run Mainstem - Virginia Ln to Glenrose Ln (RM 3.2-5.1)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/06/26 Longitude (d/m/s): 84/17/40
 Notes on Lat/Long: Position approximately in center of 1.9-mile reach
 Nearest Road Intersection: SR 32 crossing of Hall Run Mainstem
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):

Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?

Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Hall Run (upper)	Peren. & Interm.	No	10,032	Restoration	WWH	0-50/0-50

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Hall Run Mainstem (middle upper portion) flows into the East Fork Little Miami River. In general, the section from Virginia Lane to just south of Glenrose Lane (RM 3.2-5.1) is of moderate quality due to encroachment from residential development. Adjacent land use includes primarily residential, some young, scrubby woodland, and a small portion of public right-of-way. The riparian corridor has been degraded by encroachment from residential development resulting in areas of cleared riparian corridor, dumping of yard waste and trash into the stream channel and a section of wooded corridor degraded by multiple All Terrain Vehicle (ATV) tracks.

Restoration opportunities (with the goal of increasing the current QHEI score) include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting in areas of riparian removal and areas of ATV traffic, creation of 50-100 foot vegetated buffer with native species, removal of trash and yard wastes through voluntary "Stream Sweeps", prevention of open dumping of yard and other wastes, and limitation of ATV use in floodplain and riparian areas.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the restoration effort.

Photographs (if available): A brief text description should accompany each photograph.
Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

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Mitigation Clearinghouse Data Sheet
Hall Run Mainstem (Middle Upper Portion)
Photo Sheet



Photo 1: Hall Run Mainstem (middle upper portion); view downstream showing mix of good substrate (cobble/gravel) and heavy silt (downstream pool at eroding bank) and incomplete, narrow to completely open riparian corridor.



Photo 2: Hall Run Mainstem (middle upper portion); view downstream showing bedrock/boulder slab dominated substrate and complete, but scrubby wooded corridor (LDB) and mostly open corridor (RDB) with residential encroachment, dumped yard waste, and trash.



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OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Salt Run HW - Cincy Nature Ctr to Old SR74 (RM 2.4-3.7)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/06/40 Longitude (d/m/s): 84/15/45
 Notes on Lat/Long: Position approximately in center of 1.3-mile reach
 Nearest Road Intersection: Old State Route 74 crossing of Salt Run Headwater
 Land Ownership: Multiple private owners (mostly) and a small section of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Salt Run HW	Peren. & Interm.	Yes	6,864	Preservation	WWH	0-100/0-100

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Salt Run Headwater flows northward out of Jackson Lake (on the south side of Old State Route 74) into the East Fork Little Miami River. In general, the section from the Cincinnati Nature Center south boundary to Old SR 74 (RM 2.4-3.7) consists predominantly of good quality instream substrate and riparian corridor. Adjacent land use includes steep sloped woodland and some residential development. The riparian corridor is mostly complete and wide, with small sections of completely cleared riparian corridor scattered in a few places. Dumped fill material in one section of completely cleared riparian corridor is contributing to a small amount of silt loading.

Preservation opportunities include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting of small areas of riparian removal, creation of 50-100 foot vegetated buffer with native species, and natural stream bank stabilization.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the preservation effort.

Photographs (if available): A brief text description should accompany each photograph.
 Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

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Mitigation Clearinghouse Data Sheet
Salt Run Headwater
Photo Sheet



Photo 1: Salt Run Headwater; view upstream showing natural wider channel with boulder/slabs/cobble dominated substrates and mostly complete steep sloped wooded riparian corridor.



Photo 2: Salt Run Headwater; view upstream showing narrower natural channel with deep pools and shallow riffles and mostly complete steep sloped wooded riparian corridor.



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OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Salt Run HW Trib - Cincy Nature Ctr to I-275 (RM 0.5-1.0)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/07/22 Longitude (d/m/s): 84/16/06
 Notes on Lat/Long: Position approximately in center of 0.5-mile reach
 Nearest Road Intersection: I-275 (adjacent to upper reaches of Salt Run Headwater West Tributary)
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Salt Run W. Trib.	Intermittent	Yes	2,640	Preservation	Unknown	0-100/0-100

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Salt Run Headwater Tributary (west branch) flows into the Salt Run mainstem, which then flows into the East Fork Little Miami River. In general, the section from the Cincinnati Nature Center northwest boundary to I-275 (RM 0.5-1.0) consists predominantly of good quality instream substrate and riparian corridor. Adjacent land use includes steep sloped woodland, some residential development and agricultural cropland. The riparian corridor is mostly complete and wide, with small sections of completely cleared riparian corridor primarily at two overhead powerline crossings.

Preservation opportunities include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting of small areas of riparian removal, and creation of 50-100 foot vegetated buffer with native species.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the preservation effort.

Photographs (if available): A brief text description should accompany each photograph.
 Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

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Mitigation Clearinghouse Data Sheet
Salt Run Headwater Tributary (West Branch)
Photo Sheet



Photo 1: Salt Run Headwater Tributary (west branch); view downstream showing natural wider channel with boulder/slabs/cobble and sand dominated substrates and mostly complete steep sloped wooded riparian corridor.



Photo 2: Salt Run Headwater Tributary (west branch); view upstream showing narrower natural channel with deep pools and shallow riffles and slightly more scrubby sloped wooded riparian corridor.



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 E-mail Address for Mitigation Contact: pbraasch@co.clermont.oh.us

OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Salt Run HW Trib - Cincy Nature Ctr to Flick Lane (RM 1.5-2.6)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/06/31 Longitude (d/m/s): 84/14/38
 Notes on Lat/Long: Position approximately in center of 1.1-mile reach
 Nearest Road Intersection: Tealtown Road crossing of Salt Run Headwater Tributary (East Branch)
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation
 2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Salt Run E. Trib.	Intermittent	Yes	5,808	Restoration	Unknown	0-25/0-50

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Salt Run Headwater Tributary (east branch) flows into the Salt Run mainstem, which then flows into the East Fork Little Miami River. In general, the section from the Cincinnati Nature Center southeast boundary to Flick Lane (RM 1.5-2.6) is of lower quality due to encroachment from residential development. Adjacent land use includes primarily residential development and some young, scrubby woodland and oldfield. The riparian corridor has been degraded by encroachment from residential development resulting in areas of cleared riparian corridor, channelization, and dumping of yard waste and trash into the stream channel.

Restoration opportunities (with the goal of increasing the current QHEI score) include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting in areas of riparian removal, creation of 50-100 foot vegetated buffer with native species, natural stream bank stabilization, removal of trash from stream channel through voluntary "Stream Sweeps", and prevention of open dumping of yard and other wastes into the stream.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the restoration effort.

Photographs (if available): A brief text description should accompany each photograph.
Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

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Mitigation Clearinghouse Data Sheet
Salt Run Headwater Tributary (East Branch)
Photo Sheet



Photo 1: Salt Run Headwater Tributary (east branch); view downstream showing channelized section with open riparian corridor and narrow scrubby wooded riparian corridor further downstream (background of photo).

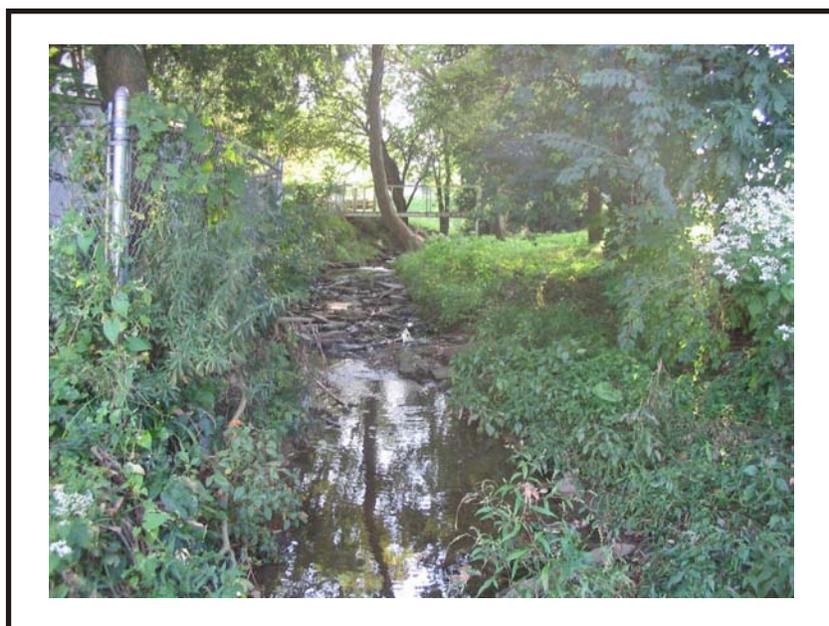


Photo 2: Salt Run Headwater Tributary (east branch); view upstream showing encroachment from residential development and incomplete scrubby wooded riparian corridor.



Contact Information:

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 E-mail Address for Mitigation Contact: pbraasch@co.clermont.oh.us

OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: Salt Run Mainstem - mouth to Cincinnati Nature Cntr (RM 0.0-1.0)
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/08/11 Longitude (d/m/s): 84/14/54
 Notes on Lat/Long: Position approximately in center of 1-mile reach
 Nearest Road Intersection: Round Bottom Road crossing of Salt Run Mainstem (Lower Portion)
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):
 Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?
 Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Salt Run (Lower)	Perennial	No	5,280	Restoration	WWH	0-100/0-100

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The Salt Run Mainstem (lower portion) flows into the East Fork Little Miami River. In general, the section from the mouth to the Cincinnati Nature Center north boundary (RM 0.0-1.0) consists predominantly of fair quality instream substrate and riparian corridor. Adjacent land use includes scattered agricultural fields, residential yards and roadway right-of-way. The riparian corridor is mostly complete, and ranges from narrow to wide, with sections of completely cleared riparian corridor scattered in some places. Small sections of cleared riparian corridor generally coincide with small sections of eroding or slumping steep banks resulting in a few areas of heavy siltation.

Preservation opportunities include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting of small areas of riparian removal, creation of 50-100 foot vegetated buffer with native species, and natural stream bank stabilization.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the preservation effort.

Photographs (if available): A brief text description should accompany each photograph.
 Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

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Mitigation Clearinghouse Data Sheet
Salt Run Mainstem (Lower Portion)
Photo Sheet



Photo 1: Salt Run Mainstem (lower portion); view upstream showing sand/silt dominated portion and open riparian corridor with heavy bank erosion/slumping.



Photo 2: Salt Run Mainstem (lower portion); view upstream showing natural channel with pool/riffle/pool sequence, sand/gravel dominated substrate and section of open riparian corridor in background on both LDB and RDB.



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OHIO EPA USE ONLY Tracking Name: _____
 Submission Date: _____ Tracking Number: _____

Location Information:

Address: _____
Street City State Zip Code
 County: Clermont Township: Union Major River Basin: Little Miami River
 HUC Code: 05090202 Latitude (d/m/s): 39/08/59 Longitude (d/m/s): 84/15/28
 Notes on Lat/Long: Position approximately in center of 2.9-mile reach
 Nearest Road Intersection: Milford Parkway crossing of Lower East Fork Little Miami River
 Land Ownership: Multiple private owners (mostly) and small sections of public right-of-way

Mitigation Project Description:

1) Please indicate the mitigation opportunities available on your site (check all that may apply):

Restoration Creation Enhancement Preservation

2) What mechanism is acceptable to protect the mitigation project in the future?

Conservation Easement Deed Restriction Fee Simple Transfer

Notes:

A - Streams resources **PROPOSED** on your site:

Stream ID	Stream Type Ephemeral Intermittent Perennial	Headwater Stream? Yes/No	Linear Feet	Water Quality Benefit Restoration Enhancement Preservation	Current Stream Designation MWH WWH CWH EWH Unknown	Riparian Width (linear feet) LDB/RDB
Lower EFLMR	Perennial	No	15,312	Restoration	EWH	0-150/0-75

B - Wetland resources **PROPOSED** on your site:

Wetland ID	Restoration (Acres)	Enhancement (Acres)	Preservation (Acres)	Creation (Acres)
NONE				

Buffer/Riparian Width Proposed: _____

C - Lake resources **PROPOSED** on your site:

Lake/Pond ID	Restoration (Linear Feet)	Enhancement (Linear Feet)	Preservation (Linear Feet)	Creation (Linear Feet)
NONE				

Buffer/Riparian Width Proposed: _____



Please provide a text description of your site and the type of resources that are available. Please limit this description to 250 words or less. Look to the Mitigation Clearinghouse User's Guide for points to address in this section and the following section.

The East Fork Little Miami River (EFLMR) is located in the Interior Plateau Ecoregion with headwaters that begin in Highland County, Ohio. It flows generally southwest into East Fork Lake, then generally northwest to the confluence with the Little Miami River in Clermont County, Ohio, south of the City of Milford. In general, the EFLMR, from I-275 to the confluence with Salt Run (RM 2.3-5.2), is of lower quality typically with open to narrow scrubby immature riparian corridor with a few scattered mature canopy trees. Most of this portion of the EFLMR has been degraded by riparian removal, which has led to siltation and embeddedness of substrate materials. This segment has also been degraded by bank shaping activities as well as attempts at bank stabilization through the use of artificial materials. Adjacent land uses include industrial/commercial and agricultural rowcrop.

Restoration opportunities (with the goal of increasing the current QHEI score) include: establishment of conservation easements to prevent degradation or development in floodplain or riparian areas, replanting in areas of riparian removal, creation of 50-100 foot vegetated buffer with native species, and removal of artificial bank stabilization and replacement with natural stream bank stabilization.

Please indicate any special conditions which would restrict or enhance potential mitigation projects on your site.

The project will require coordination with stakeholders in order to identify private land owners who are willing to participate in the restoration effort.

Photographs (if available): A brief text description should accompany each photograph.
Number: 2 (3 max) Format: Print(s) Electronic (specify type _____)

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Mitigation Clearinghouse Data Sheet
Lower East Fork Little Miami River
Photo Sheet



Photo 1: Lower East Fork Little Miami River; view downstream showing glide/riffle/pool sequence and mostly narrow wooded riparian corridor on LDB and moderately wide wooded riparian corridor on RDB.



Photo 2: Lower East Fork Little Miami River; view downstream showing a section of denuded riparian corridor on the LDB.

Appendix E
Photographs

**East Fork Little Miami River, Hall Run and Salt Run
Preservation and Restoration Opportunities Inventory Report
Clermont County, Ohio**



Photo 1: Site 1, Hall Run Headwater; Class I PHWH; Facing Upstream.



Photo 2: Site 2, Hall Run Headwater; Modified Warmwater Habitat; Facing Upstream.



Photo 3: Site 3, Hall Run Headwater Tributary; Class I PHWH; Facing Upstream.



Photo 4: Site 4, Hall Run Headwater Tributary; Modified Class I PHWH; Facing Downstream.



Photo 5: Site 5, Salt Run Headwater Tributary; Modified Warmwater Habitat; Facing Upstream.



Photo 6: Site 6, Salt Run Headwater Tributary; Modified Class II PHWH; Facing Upstream.

**East Fork Little Miami River, Hall Run and Salt Run
Preservation and Restoration Opportunities Inventory Report
Clermont County, Ohio**



Photo 7: Site 7, Salt Run Headwater Tributary; Warmwater Habitat; Facing Upstream.



Photo 8: Site 8, Salt Run Headwater Tributary; Class I PHWH; Facing Upstream.



Photo 9: Site 9, Hall Run Lower Mainstem; Modified Warmwater Habitat; Facing Upstream.



Photo 10: Site 10, Salt Run Upper Mainstem; Warmwater Habitat; Facing Upstream.



Photo 11: Site 11, Lower East Fork Little Miami River; Warmwater Habitat; Facing Upstream.



Photo 12: Site 12, Hall Run Upper Mainstem; Warmwater Habitat; Facing Downstream.

**East Fork Little Miami River, Hall Run and Salt Run
Preservation and Restoration Opportunities Inventory Report
Clermont County, Ohio**



Photo 13: Site 13, Hall Run Upper Mainstem; Warmwater Habitat; Facing Upstream.



Photo 14: Site 14, Hall Run Headwater Tributary; Modified Class II PHWH; Facing Downstream.



Photo 15: Site 15, Hall Run Headwater Tributary; Class II PHWH; Facing Upstream.



Photo 16: Site 16; Hall Run Headwater Tributary; Class II PHWH; Facing Upstream.



Photo 17: Site 17, Salt Run Headwater; Warmwater Habitat; Facing Upstream.



Photo 18: Site 18, Salt Run Headwater Tributary; Warmwater Habitat; Facing Upstream.

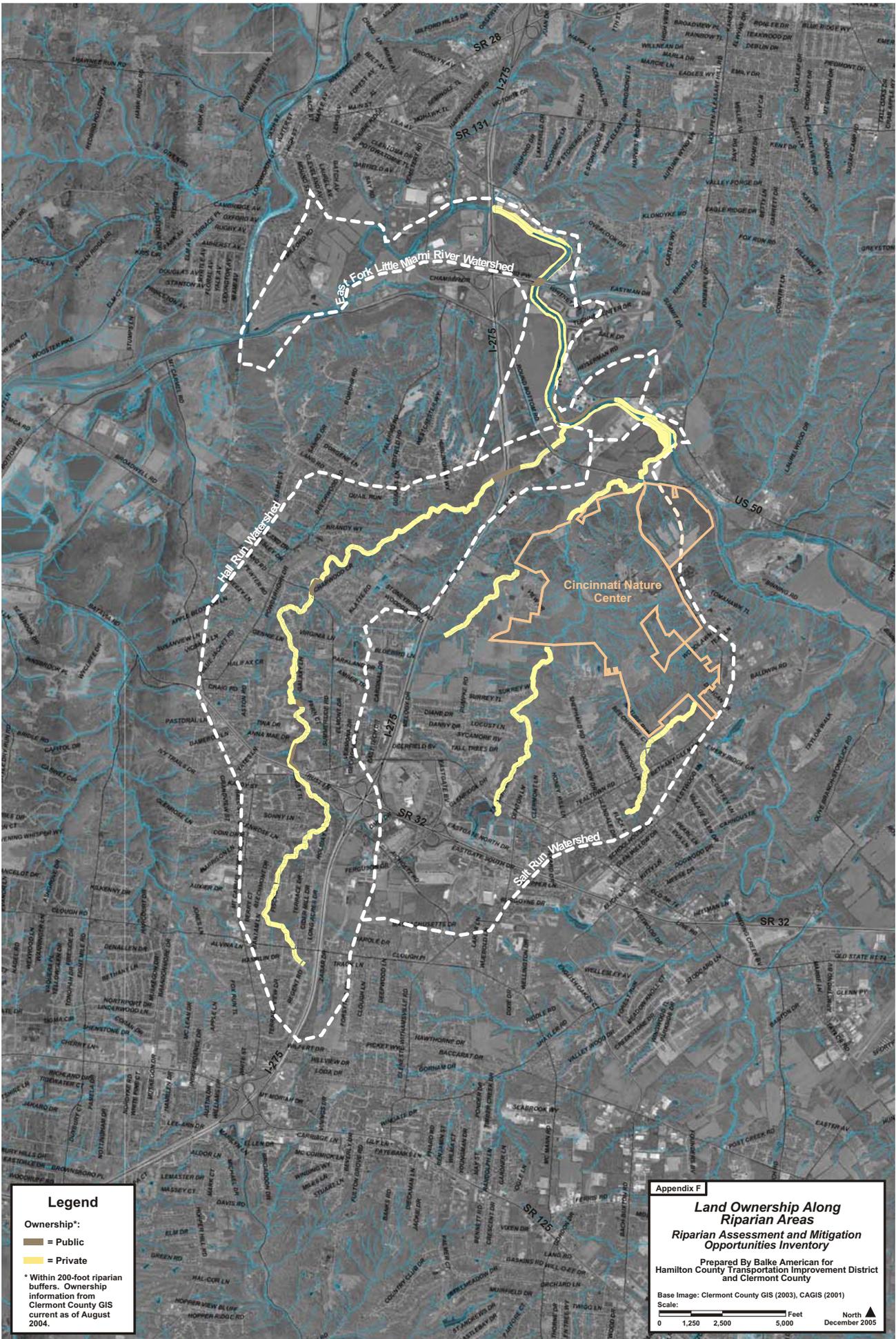
**East Fork Little Miami River, Hall Run and Salt Run
Preservation and Restoration Opportunities Inventory Report
Clermont County, Ohio**



Photo 19: Site 19, Salt Run Lower Mainstem; Warmwater Habitat; Facing Upstream.

Appendix F

Land Ownership Along Riparian Areas



Legend

Ownership*:

- = Public
- = Private

* Within 200-foot riparian buffers. Ownership information from Clermont County GIS current as of August 2004.

Appendix F

Land Ownership Along Riparian Areas

Riparian Assessment and Mitigation Opportunities Inventory

Prepared by Balke American for Hamilton County Transportation Improvement District and Clermont County

Base Image: Clermont County GIS (2003), CAGIS (2001)

Scale: 0 1,250 2,500 5,000 Feet

North

December 2005

Appendix G

**2003 Lower East Fork Management Plan (LEFMP) Management
Strategies for Hall Run, Salt Run and the Lower East Fork Little Miami
River (excerpts from Chapter 5 of the LEFMP)**



**East Fork Little Miami River
Watershed Action Plan**

Lower East Fork Watershed Management Plan 2003



December 2003

Picture of Hall Run in Lower East Fork watershed.

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CHAPTER 5: WATERSHED IMPAIRMENTS

In the previous chapter, a detailed summary of existing water quality conditions in the Lower East Fork watershed was presented, as was a detailed description of the potential sources, or contributors, of water quality impairment. In this chapter, a link between the causes (i.e., pollutants) and pollutant sources will be presented, and recommended strategies for protecting and restoring streams in this watershed.

It is important to note that the quality of the lower 8.8 miles of the East Fork Little Miami River is highly dependent upon contributions from the upper and middle sections of the East Fork basin, in addition to the pollutant loadings and habitat alterations that occur in the Lower East Fork watershed (defined as the area draining to the East Fork downstream of Stonelick Creek). The East Fork Watershed Collaborative is currently working to develop separate Watershed Action

Plans for the Stonelick Creek, Middle East Fork and Upper East Fork watersheds. These documents will provide information on existing water quality conditions, pollutant sources and management strategies for those areas.

Table 10 summarizes the relationship between the causes and sources of stream impairment in the Lower East Fork watershed. For each cause of impairment, several contributing sources are listed for the River and its major tributaries. For example, high instream nutrient concentrations are listed as a cause of impairment. Along the East Fork main stem, the contributing sources are primarily the two wastewater treatment plants. In the tributary watersheds, contributing sources include sanitary sewer overflows, on-site sewage treatment systems, and urban runoff.

Management strategies for the Lower East Fork watershed were developed through a number of public stakeholder and East Fork Watershed Collaborative advisory group (i.e., County Team) meetings. At the County Team meetings, a draft report summarizing the water quality conditions and potential sources of im-

Table 10: Target area summary for the Lower East Fork watershed.

Lower East Fork Watershed - Target Area Summary			
Watershed	Causes of Impairment	Sources of Impairment	Target Areas
Lower East Fork	Nutrients	WWTPs	Lower East Fork Mainstem
		Sanitary Sewer Overflows	Hall Run Wolfpen Run Shayler Run
		On-Site Sewage Treatment Systems	Hall Run Wolfpen Run
	Urban Runoff	All Subwatersheds	
Organic Enrichment/ Low DO	Sanitary Sewer Overflows	Hall Run	
	On-Site Sewage Treatment Systems	Hall Run Wolfpen Run	
Pathogens	Sanitary Sewer Overflows On-Site Sewage Treatment Systems	Wolfpen Run, Hall Run	
Hydromodification Siltation and Habitat Degradation	Urbanization (Channelization/ Development/ Urban Runoff)	Hall Run Wolfpen Run Salt Run Sugarcamp Run Shayler Run	
	Sewer Line Construction	Shayler Run	

pairment in the watershed were presented by the Watershed Coordinator and Clermont County OEQ to representatives of various county, municipal and township departments and organizations (see Appendix 1 for details). After reviewing this information, County Team members worked together to develop different management strategies for a range of pollutant source categories, including point source discharges, urban stormwater runoff, on-site wastewater treatment systems, agricultural runoff, habitat/hydromodification and others. These draft recommendations were then presented to the public at separate stakeholder meetings in the Shayler Run and Lower East Fork subwatersheds. Those attending the stakeholder meetings were asked to rank the importance of proposed management strategies on a scale of 1 to 5, as well as to voice or submit additional ideas. Members of the County Team used information compiled at these meetings to draft the final list of management strategies.

Problem statements and recommended management strategies for the Lower East Fork and its direct tributaries are included in the following pages. Each problem statement provides a summary of use attainment status, and a description of the causes and sources of nonattainment. Estimated pollutant loadings from the different sources are also included. It is important to note that these are estimates only. Clermont County has long expressed interest in taking the lead in developing Total Maximum Daily Loads for the East Fork Little Miami River basin, and is currently seeking funds to complete this through U.S. EPA and Ohio EPA. The development of TMDLs will result in significantly more accurate estimates of pollutant loads throughout the watershed.

Following each problem statement is a listing of recommended management strategies and projects designed to maintain full support of the streams' designated uses. Each task includes a description of the funds needed to complete it, potential sources of funding, a time frame for implementation, and measurable performance goals.

As shown in the tables below, some of the management strategies are relatively inexpensive and easier to accomplish, while others are much more expensive and complex. This should be expected in a rapidly developing watershed. Many of the more costly items are capital improvement projects identified by the

Clermont County Sewer District, and funding has been set aside for these projects. However, funds for some of the other more costly tasks, such as riparian zone protection/preservation and stream restoration projects, are not available at this time. The Collaborative and its partners will continue to search for potential funding sources for these projects, and investigate alternative management strategies if funds are not available. Updates to this action plan will be made as new funding sources and management strategies are identified.

Lower East Fork

Background

As determined by Ohio EPA, The Lower East Fork of the Little Miami River [HUC 11: 05090202-130; WBID#OH53-1; 11-100], from the confluence with the Little Miami River to the entrance of Stonelick Creek at river mile 8.8, is not meeting its EWH water quality use designation due to excessive nutrients and habitat loss. Of this river segment, 1.9 miles are classified as non-supporting, and the remaining 6.9 miles only partially support the aquatic life use designation, primarily due to low fish index (IBI or mIWB) scores. Clermont County and Ohio EPA habitat surveys show lower QHEI scores in the lower two miles of the river. Additional loss of habitat/function can be expected for the entire Lower EFLMR (EWH use designation) unless the riparian corridor and floodplain are placed under permanent conservation management.

Problem Statement

In its 2002 Integrated Report, Ohio EPA reports that high nutrient levels are resulting in impaired use attainment. Significant sources of nutrients include discharges from Clermont County and City of Milford wastewater treatment plants, sanitary sewer overflows in selected tributaries, failing septic systems in selected tributaries, and stormwater runoff from urbanized areas. Using the HSPF model developed for the Lower East Fork watershed and information from the County and City Sewer departments, the total nitrogen loads from the two treatment plants are roughly estimated at 157 tons/year, and total phosphorus loads are roughly 27 tons per year. In addition, over the past three years, bypasses at the County's Lower East Fork treatment plant have resulted in an average of 11 and 0.9 tons per year of total nitrogen and phosphorus, respectively.

Nutrient loadings also result from sanitary sewer overflows that result from excess inflow and infiltration (I/I) that occurs during wet weather. Information related to these are discussed below in separate problem statements for specific subwatersheds, including Hall Run, Salt Run, Shayler Run, Sugarcamp Run and Wolfpen Run.

It is estimated that there are approximately 1100 failing or poorly performing home sewage treatment systems throughout the Lower East Fork watershed, mostly in the Hall Run, Sugarcamp Run and Wolfpen Run subwatersheds. Using the HSPF model and information received from the Clermont Health District, the total nitrogen and phosphorus loads from these systems are estimated at 13.3 and 1.65 tons per year, respectively.

Stormwater runoff also results in significant nutrient loads throughout the watershed. Based on 1992 land use data, approximately 12 percent of the watershed is covered with impervious surfaces. Urban residential development comprises approximately 20 percent of the watershed, while commercial development is present in approximately five percent. The HSPF model predicts respective nitrogen and phosphorus loads from urban stormwater runoff of 29.5 and 4.8 tons annually.

Goals

Note that, unless otherwise stated, these goals apply to the entire Lower East Fork watershed. Additional goals specific to smaller subwatersheds are presented in the following pages.

1. Reduce mean nutrient loadings from the two wastewater treatment plants by 20 percent.
2. Reduce nutrient loadings from on-site septic systems by 40 percent.
3. Reduce nutrient loadings from sanitary overflows by 100 percent.
4. Reduce nutrient loadings from urban stormwater sources by 20 percent.

5. Raise the QHEI for EFLMR RM0 to RM2.2 from current values in 60s to greater than 70.
6. Permanently protect 25% of the riparian corridor between RM 0 and RM 8.8 through land purchase or conservation easement.
7. Meet EWH use support in main stem of the East Fork and WWH use support in direct tributaries.

Task Description (Objective)	Resources	How	Time frame	Performance Indicators
Complete renovations at Lower East Fork, and upgrade portions of the collection system in lower East Fork subwatershed	\$625,000 for WWTP and collection system upgrades	Clermont County Sewer District funds, Ohio EPA WPCLF funds	2003-2007	Meet NPDES NH3 limits Reduce nutrient loads by 20 percent Eliminate SSOs
Remove failing septic systems	\$2,000,000 for central sewer extension into unsewered areas; \$500,000 for septic replacement and homeowner education workshops	Sewer District/WPCLF funds to extend sanitary sewers described in Appendix A; EFWC and Clermont Health District will apply for 319 funds for septic education and replacement	2003-2007	Goal – Reduce the number of failing septic systems by 100 percent. Total nutrient loadings from on-site septic systems will be reduced by 40 percent.
Revise and enforce Clermont County Water Management and Sediment Control regulations	\$150,000 in County staff time	Clermont County General Fund	Revisions complete by 2003; continual enforcement	Completed WMSC Regulations by 2003 Continued trend of increased compliance with regulations 20 percent decrease in TSS concentrations during wet weather at County autosampler stations.
Conduct Better Site Design/Low Impact Development workshop for developers and local zoning commissions	\$15,000	Ohio EPA 319 Grant or OEEF Grant	2003 or 2004	Increased use of Low Impact Development designs in new developments.
Riparian corridor protection	\$3,300,000 for land purchase or permanent conservation easement	EFWC/designated authority will apply for 319 grant, OEPA WRRSP funds, and/or Clean Ohio Fund Grant	June 2003 to Dec 2006	25% of the riparian corridor between RM 0 and RM 8.8 permanently protected through land purchase or conservation easement

Stream habitat enhancement	\$500,000 for habitat improvement projects	EFWC will apply for 319 or USDA grant	June 2003 to Dec 2005	Increase QHEI scores in lower two miles to 70 or above
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Hall Run

Background

Hall Run, a tributary to the East Fork of the Little Miami River (EFLMR) [HUC 11: 05090202-130; WBID#OH53-2; 11-101], is only partially meeting its warmwater habitat (WWH) aquatic life use designation due to organic enrichment and habitat alteration.

Problem Statement

Excessive levels of organic enrichment (with associated depression in DO levels) and habitat loss have resulted in partial attainment of the WWH designated use. Ohio EPA-listed sources of the organic enrichment include failing septic systems and excessive sewer inflow and infiltration (I/I), which results in sanitary sewer overflows during periods of wet weather. Stormwater runoff and nonpoint source pollution associated with urban development also contribute to the impairment.

Using the HSPF model developed by Clermont County and Tetra Tech for the lower East Fork watershed, we have estimated the average annual total BOD and suspended solids loading from sewer overflows in the Hall Run subwatershed to be 0.25 tons/year BOD and 0.15 tons/year TSS. The potential for major line failures, which have occurred in the past, could increase these loads significantly. A large number of failing onsite wastewater treatment systems (estimated 150) are located in the Hall Run subwatershed. Using the model and input received from the Clermont County Health District, we have estimated the total BOD and TSS loadings from failing septic systems in the Hall Run subwatershed to be 2.3 and 1.4 tons/year, respectively.

Significant suspended solids loadings also result from streambank erosion. Based on a 2001 study of the physical characteristics of streams in the East Fork watershed, it was determined the Hall Run headwaters were dominated by the unstable, habitat-poor Rosgen F stream type. Hydromodification associated with locating and installing the sanitary sewer infrastructure has contributed to stream instability. It is estimated that streambank erosion contributes 85 tons of TSS each year.

Goals

1. Reduce BOD & TSS loadings from sanitary overflows by 100 percent.
2. Reduce BOD & TSS loadings from on-site septic systems by 50 percent.
3. Stabilize and restore all segments of Hall Run associated with sewer infrastructure upgrades.
4. Restore 5000 ft of previously channelized Hall Run headwaters.
5. Reduce sediment loadings from streambank erosion by 25 percent.
6. Meet WWH aquatic life use designation in Hall Run
7. Inventory 100 percent of riparian corridor along Hall Run; provide recommendations for re-establishing riparian corridor.

Task Description (Objective)	Resources	How	Time frame	Performance Indicators
Update sewer infrastructure to address I/I and sanitary sewer overflows	\$5,930,000 infrastructure upgrades	Clermont County Sewer District funds to accomplish projects listed in Attachment A	2003-2007	Sanitary sewer overflows from Hall Run collection system resulting from excess I/I will be eliminated.
Conduct home sewage treatment system operation and maintenance workshop for homeowners in Hall Run watershed.	\$10,000 for septic education workshops	EFWC and Clermont Health District will apply for 319 for septic education	2004-2005	Improved operations of 50 septic systems, based on Health District inspections
Stream stabilization and restoration	\$500,000 for restoration / stabilization of 5000 feet of stream bank and habitat. Restore appropriate morphology and reconnect to floodplain.	EFWC or authorized member of the Collaborative will apply for 319, USDA grant, or Ohio EPA WRRSP funds	June 2003 to Dec 2005	Conduct fish and macroinvertebrate surveys to determine compliance with WWH criteria. Improve QHEI scores in section of restored stream to average of 65. Use HSPF model to document sediment load reduction.
Riparian zone assessment	\$25,000 for assessment of riparian zone conditions / need for improvement	Clermont Office of Environmental Quality/Soil and Water Conservation District will fund/conduct	June 2003 to Dec 2005	Document condition of riparian zone in Hall Run watershed / prioritize areas for restoration. This will lead to additional implementation projects

Salt Run

Background

Two miles of Salt Run, a tributary to the East Fork of the Little Miami River [HUC 11: 05090202-130; WBID#OH53-4; 11-103], are only partially meeting its warmwater habitat (WWH) aquatic life use designation due to excessive siltation, and to a lesser degree, excess nutrient loadings.

Problem Statement

Heavy commercial development in the headwaters (Eastgate shopping center) significantly increased the amount of impervious area in this watershed, resulting in increased stormwater runoff peaks and volume, and nutrient loads. Silt loadings resulting from urban runoff are estimated at 90 tons per year, while nitrogen and phosphorus loadings are estimated at 3.4 and 0.6 tons/year, respectively.

Stormwater flows have contributed to streambank erosion and channel entrenchment. An assessment of the physical characteristics of streams in the Salt Run watershed show that all of Salt Run, except the very lowest reaches, is characterized as a Rosgen F stream type. These streams are typically unstable and have poor habitat. It is estimated that streambank erosion contributes 25 tons of sediment per year.

Goals

1. Reduce sediment loadings by 20 percent.
2. Reduce nutrient loadings by 20 percent.

Task Description (Objective)	Resources	How	Time frame	Performance Indicators
Restore and stabilize one mile of Salt Run	\$525,000 for stream restoration projects	EFWC or Clermont County will apply for 319 and USDA grants, or Ohio EPA WRRSP funds.	2005-2007	Restore appropriate morphology of one mile of Salt Run, and reconnect to flood plain. 20 percent load reductions in nutrients and phosphorus