



**BENTHIC MACROINVERTEBRATE AND FISH COMMUNITY DATA
REPORT
SEPTEMBER 2007**

**PROPOSED OHIO RIVER CLEAN FUELS FACILITY
WELLSVILLE, COLUMBIANA AND JEFFERSON COUNTIES, OHIO**

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1.0 INTRODUCTION

1.1 GENERAL INFORMATION

This report presents the findings of benthic macroinvertebrate and fish sampling conducted at the proposed Ohio River Clean Fuels, L.L.C. (ORCF) site located southwest of the city of Wellsville, Columbiana County, Ohio (N40° 35' 18.4'' W080° 41' 06.6'') (see Figures 1 and 2). This report also presents information relating to water quality and assessment of physical habitat within the approximate 644-acre study area, herein referred to as the Site.

The Site includes deciduous forest, bottomland hardwoods, agricultural fields, successional pasture fields, residential development, historically mined areas, and a primitive campground/off-road all-terrain vehicle (ATV) park. The proposed project area is bounded to the north by both residential and undeveloped land, to the south by undeveloped land, to the east by State Route 7, and to the west by undeveloped and residential land. The southernmost portion of the property extends into Jefferson County, Ohio.

The purpose of the benthic macroinvertebrate and fish sampling work was to provide baseline data for those streams within, and adjacent to, the proposed development site. These data will not only help to characterize the aquatic communities but will also be useful in identifying potential sources of impairment. This information may also be used to identify streams that can be used as mitigation relating to the Section 401/404 permit process. The fish data collected on Rocky Run was also used to calculate an Index of Biotic Integrity (IBI) score and provide an opinion relating to the streams "designated use."

Figure 3 provides the "footprint" for the proposed development on the Site and shows the streams that will be potentially impacted. These streams include unnamed tributaries to Rocky Run Tributary A (RR-A), Unnamed Tributaries A and B to Pond E, and Unnamed Tributary E (to the Ohio River). It is noted that all of the aquatic features identified at the site on Figure 3



(streams, wetlands, and ponds) were designated by Civil & Environmental Consultants, Inc. (CEC) during the wetland and stream delineation work in 2007.

Fish sampling was conducted at three locations on Rocky Run, a stream with a drainage area of approximately 3 square miles, which is the largest and only named stream within the proposed study area. Benthic macroinvertebrate sampling was also conducted at these locations on Rocky Run, as well as the smaller tributaries listed above located within the study area that have drainage areas less than one square mile.

Rocky Run is located in the Western Allegheny Plateau ecoregion. The stream has an aquatic life habitat use designation of Warmwater Habitat (WWH) identified in rule 3745-1-13 (Central Ohio tributaries drainage basin) of Chapter 3745-1, Water Quality Standards, of the Ohio Administrative Code. The WWH designation for Rocky Run is based on the 1978 water quality standards and is not based on the results of a biological field assessment performed by the Ohio Environmental Protection Agency (Ohio EPA). Based on our previous conversations with Ohio EPA, we understand that Rocky Run has not been assessed to date.

The field survey was conducted by Civil & Environmental Consultants, Inc. (CEC) on September 17 and 18, 2007. CEC's benthic macroinvertebrate and fish sampling services were completed in accordance with our proposal for professional ecological services dated May 25, 2007 and subsequent authorization to proceed from ORCF.



2.0 METHODOLOGIES

2.1 WATER QUALITY AND PHYSICAL HABITAT ASSESSMENT

2.1.1 Biomonitoring Stations

Benthic macroinvertebrate and fish sampling was performed at three sampling stations located on Rocky Run (Figure 2). Station RR-01 was located to the south of the proposed project site, just upstream from the confluence of Rocky Run and Yellow Creek. Station RR-02 was located further upstream on Rocky Run near the Columbiana/Jefferson county line and directly downstream of the confluence with Rocky Run Tributary RR-A. Station RR-02 was located closest to the proposed site development (on the southwest corner). Station RR-03 was located further upstream on Rocky Run above the confluence with the tributary designated as Tributary RR-D. The physical habitat characteristics and watershed drainage area for each of these stations are discussed in more detail in Section 2.3.1.

Benthic macroinvertebrate sampling was performed on three smaller streams within the project site that would potentially be affected by site development. The length of each sampling station on these tributaries was 200 feet. Tributary RR-A is a tributary to Rocky Run which flows into Rocky Run just upstream from Station RR-02 (Figure 2). This tributary has bedrock and large boulder substrates within the steeper gradient sections of the stream. The sampling station on tributary RR-A was located within a lower gradient area near its confluence with Rocky Run. Tributary UNT-A flows northeasterly and tributary UNT-B flows southeasterly with both tributaries flowing into Pond E in the northern portion of the site. There does not appear to be a hydrological connection between this pond and the Ohio River. UNT-A is located adjacent to a road with a relatively steep hillside that has been (and continues to be) used as an illegal dumping site for household appliances, mattresses, and other household waste. Tributary UNT-B flows through a relatively undisturbed forested area and has an extended section of bedrock stream channel downstream from the benthic sampling station.



2.1.2 Water Quality Parameters and Habitat Assessments

Field water quality parameters including water temperature, conductivity, dissolved oxygen (DO) and pH were measured concurrently with the benthic macroinvertebrate sampling conducted at the sampling stations. The pH was measured in situ using a handheld Cole Parmer Model 300 pH meter. Temperature, conductivity, and DO were measured in situ using a handheld YSI Model 85 meter. These monitoring instruments were maintained, operated, and calibrated per the manufacturer's instructions.

A Qualitative Habitat Evaluation Index (QHEI) was completed for each stream sampling station on Rocky Run in accordance with guidance provided by Rankin (1989) and the Ohio EPA (2006) in *The Qualitative Habitat Evaluation Index [QHEI]: Rationale, Methods, and Application*. A modified Wolman Pebble Count was also performed at each station on Rocky Run according to methods presented in Harrelson, et al. (1994) to characterize the particle size distribution of the stream substrate.

Lastly, Primary Headwater Habitat Evaluation Index (HHEI) was completed for the sampling stations on Tributaries RR-A, UNT-A and UNT-B in accordance with Ohio EPA (2001) guidance.

2.2 BENTHIC MACROINVERTEBRATE SURVEY

A reconnaissance of Rocky Run was performed by CEC biologists on July 9, 2007 to determine if stream conditions were favorable for using Hester-Dendy artificial substrate samplers as the sampling device for benthic macroinvertebrates within this stream. This sampling method is the primary method used by the Ohio EPA to assess the condition of a stream's benthic macroinvertebrate community and to generate the Invertebrate Community Index (ICI). The ICI score is used to determine whether a stream is attaining its designated aquatic life use (OAC 2002).



The reconnaissance indicated that the run habitat of Rocky Run was too shallow to insure complete submersion of the Hester-Dendy samplers during the required six-week colonization period extending from June 15 through September 30. Additionally, heavy sedimentation caused by the use of ATV's both within and adjacent to Rocky Run and the potential for vandalism made the use of Hester-Dendy samplers impractical. In certain areas of Rocky Run, the streambed is used as the road. Therefore, CEC opted to perform more conventional sampling by using a Surber sampler and D-frame kick net sampler to collect benthic macroinvertebrate samples from Rocky Run.

2.2.1 Field Sampling Methods

A Surber sampler (12 inches wide x 12 inches high x 24 inches deep) with 500 micron mesh size nylon Nitex multifilament net was used to collect quantitative benthic samples from the best available riffle habitats at each sampling station on Rocky Run and the station on Tributary RR-A. A D-Frame kicknet (12 inches wide x 10 inches high x 18 inches deep) with nylon Nitex multifilament net (500 μ m mesh size) was used to collect one qualitative benthic sample from all instream habitats including riffle, pool and margin habitats. In the present survey, three Surber (riffle) samples and one D-frame sample was collected at each of these stations. One qualitative D-frame kicknet sample was collected at each station on Tributaries UNT-A and UNT-B by sampling all available habitats.

Each Surber sample or D-frame net sample collected was processed by carefully inverting and emptying the contents into a benthos bucket with a U.S. Standard Number 35 sieve (500 μ m) bottom. The net was examined for clinging organisms, which were washed into the sieve using a backpack sprayer filled with filtered (Number 35 sieve) stream water. Organisms and material retained on the bucket sieve were transferred into a 1-L wide-mouth sample collection bottle and preserved with ethanol (minimal 70% final concentration). The stream name and location, station number, sample type, date and sampler's name were marked on each collection bottle. The Surber sampler net or D-frame net was thoroughly rinsed and inspected after each use prior to



collecting another sample. The benthic samples were placed into coolers and returned to the CEC laboratory for processing and analysis.

2.2.2 Benthic Macroinvertebrate Laboratory Procedures

The benthic macroinvertebrate samples were returned to the CEC benthic laboratory where they were logged in. Each sample was analyzed according to the following procedure. First, the sample jar contents were emptied into a U.S. Standard No. 35 sieve (500 micron mesh) with the ethanol being retained. The sample was then rinsed in the sink to remove the remaining preservative and to rinse the silt and fine sand from the sample. Large rocks, sticks or whole leaves were held above the sieve, rinsed and carefully inspected before being discarded. A small portion of the sample was then placed in a white enamel pan and dispersed by spraying water into the pan. The contents of the pan were searched for benthic macroinvertebrates which were removed and placed in a properly labeled sample vial containing 70% ethanol. This process was repeated until the entire sample (100%) was sorted for macroinvertebrates. The sorted sample material was retained for quality assurance purposes. The sample voucher was sealed until identification by the benthic taxonomist.

The majority of organisms in the samples were identified to genus taxonomic level. Whenever possible, the Hydropsychidae caddisflies and Baetidae mayflies were identified to genus/species level, in order to match the level of taxonomy used by the Ohio EPA. However, since the Invertebrate Community Index (ICI) could not be calculated for these Surber samples, the Chironomidae (midges) were not identified to genus/species level as required for the ICI analysis.

2.2.3 Benthic Macroinvertebrate Data Analysis

The shallow flow conditions, heavy sediment load and threat of vandalism did not permit the use of Hester-Dendy artificial substrate samplers on Rocky Run. Therefore, alternate sampling methods (Section 2.2.1) were used to collect benthic macroinvertebrate samples on Rocky Run.



However, the benthic data collected could not be analyzed using the Ohio EPA Invertebrate Community Index (ICI) due to this difference in sampling methods. However, several metrics and standard statistical methods (Shannon-Weaver diversity index, Hilsenhoff Biotic Index) were used to characterize the benthic macroinvertebrate community at each sampling station on Rocky Run, as well as the other tributaries discussed in Section 2.1.1.

The analysis of the benthic macroinvertebrate data was performed by computing biological metrics based on the data. These metrics have been developed and tested by the USEPA and other agencies (e.g., Ohio EPA 1987) to relate benthic macroinvertebrate community structure to the overall quality of the aquatic ecosystem and as a means of evaluating the nature and magnitude of disturbances to aquatic systems (USEPA 1989, 1990, and 1999).

The following nine benthic macroinvertebrate community metrics were computed for the stream samples:

1. Total Number of Individuals – Defined as the total number of individuals present in the sample. An estimate of density (#individuals/square meter) for benthic macroinvertebrates in riffle habitat was calculated based on the assumption that one square foot of stream bottom is sampled during the collection of each Surber sample.
2. Taxa Richness – Defined as the total number of distinct benthic macroinvertebrate taxa collected in a sample. This metric, according to the USEPA (1989, 1990, and 1999), is a measure of the overall diversity of the macroinvertebrate assemblage, which generally decreases as a result of impacts caused by human activities.
3. Number of Caddisfly Taxa - Defined as the total number of taxa in the order Trichoptera (caddisflies) collected in a sample. This metric is one of the ten metrics used to calculate the OEPA Invertebrate Community Index (ICI).



4. Number of Mayfly Taxa - Defined as the total number of taxa in the order Ephemeroptera (mayflies) collected in a sample. This metric is one of the ten metrics used to calculate the OEPA Invertebrate Community Index (ICI). Mayflies are decidedly pollution sensitive and are often first to decline and eventually disappear from artificial substrate collections with the onset of environmental perturbation (DeShon 1995).

5. Number of EPT Taxa – Defined as the total number of taxa in the orders Ephemeroptera (E; mayflies), Plecoptera (P; stoneflies), and Trichoptera (T; caddisflies) collected in a sample. This metric, according to the USEPA (1989, 1990, and 1999), also generally decreases as a result of impacts caused by human activities.

6. Percent Abundance of EPT Taxa – Defined as the percentage of individuals belonging to the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies), which are generally considered most sensitive to environmental stress. This metric, according to the USEPA (1989, 1990, and 1999), also generally decreases as a result of impacts caused by human activities.

7. Percent Abundance of Dominant Taxon – Defined as the percent relative abundance of the numerically dominant benthic macroinvertebrate taxon collected in a sample. A community dominated by relatively few taxa may indicate environmental stress (Ohio EPA 1987 and USEPA 1989, 1990, and 1999).

8. Shannon-Weaver Diversity Index – Employing a formula presented by Shannon and Weaver (1963), this diversity index was calculated to provide a measure of benthic macroinvertebrate taxa composition, which generally decreases as a result of impacts caused by human activities (USEPA 1990). This index is a probability that measures the average degree of uncertainty (i.e., diversity) of predicting a species of a given individual picked at random from a community. The Shannon-Weaver Index varies from a value of 0.00 for communities with only a single taxon to higher values (> 4.00) for communities having many taxa, each with a few individuals.



9. Hilsenhoff (Family) Biotic Index – Using the family level tolerance values from USEPA (1999), this metric calculates the Hilsenhoff Biotic Index which is a measure of organic pollution present within a stream. Values range from zero (no apparent organic pollution) to 10.00 (severe organic pollution).

2.3 FISH COMMUNITY SURVEY

Fish sampling was performed at three sampling stations on Rocky Run on September 17 and 18, 2007 according to the guidance provided by Ohio EPA (1989) in *Biological Criteria for the Protection of Aquatic Life: Volume III: Standardized Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities* and 2006 Updates to *Biological Criteria for the Protection of Aquatic Life: Volume II and Volume II Addendum, Users Manual for Biological Field Assessment of Ohio Surface Waters*. The fish sampling was conducted using the backpack electrofishing method (Ohio EPA Sampler type F) for headwater sites (<20 square miles drainage area). A detailed description of the sampling stations, sampling methods and fish data analysis methods are presented in the following sections.

2.3.1 Sampling Stations

Three fish sampling stations, each 150 meters (492 feet) in length were established on Rocky Run at the locations shown on Figure 2. Station RR-01 was located off of the proposed project site, near the confluence of Rocky Run with Yellow Creek. The mouth of Rocky Run is approximately 500 feet upstream from the confluence of Yellow Creek with the Ohio River at Ohio River mile point 49.6. The downstream end of Station RR-01 was located approximately 50 feet upstream from the culvert that runs below the steep railroad track embankment. The downstream portion of Station RR-01 was relatively undisturbed with a section of riffle habitat and a pool approximately 30 feet long with a maximum depth of 19 inches. The middle section of the sampling reach did have areas of disturbance from ATV use both within and adjacent to the stream. The upper portion of the sampling reach had some disturbance but there were



sections of pool and glide habitat with depths ranging from 10 to 14 inches. The drainage area calculated by CEC for Station RR-01 was approximately 3.0 square miles.

Station RR-02 was located further upstream on Rocky Run near the Columbian/Jefferson county line and directly downstream of the confluence with Tributary RR-A. This section of the stream was extensively disturbed from ATV use directly within the stream and from sediment entering the stream during heavy rain events from the ATV trails adjacent to the stream and on the steep slopes. The riffle areas were heavily embedded with sand and compacted from ATV traffic. The heavy sediment load has eliminated any deeper pools that may have existed in this area, and only short sections of shallow glide habitat remain. The drainage area calculated by CEC for Station RR-02 was approximately 2.28 square miles.

Station RR-03 was located further upstream on Rocky Run above the confluence with Tributary RR-D. The stream had more bedrock, boulder and cobble substrate at this station compared to the other two stations. It also had more large woody debris particularly in the upper 350 feet of the sampling reach which was relatively undisturbed from ATV traffic. There was an ATV crossing in the stream approximately 150 feet upstream from the downstream end of the station and there was evidence of ATV use in the stream within this lower 150 ft. section, but the compaction of the substrate was not nearly as severe as at Station RR-02. The drainage area calculated for Station RR-03 was approximately 1.40 square miles.

2.3.2 Fish Sampling Methods

Fish sampling was conducted at the three sampling stations on Rocky Run on September 17 (RR-01 and RR-02) and 18 (RR-03), 2007 using the backpack electrofishing unit. Fish sampling was performed at stream stations during daylight hours using a rechargeable battery-powered, backpack-mounted, variable voltage, pulsed-DC output, Smith-Root Model 12B electrofishing unit, with an 11-inch anode ring mounted on a handheld fiberglass pole and a trailing cable rattail cathode. A single electrofishing pass was performed proceeding from downstream to upstream along the 150 meter stream reach at each station. Fish collected were identified to



species in-situ, enumerated, and returned to the stream alive. If present, fish disease, tumors, fin damage, and/or skeletal anomalies were recorded. These data were recorded on the Ohio EPA's (1992) Fish Sampling Field Data Sheets (Appendix B).

2.3.3 Fish Sampling Data Analysis

The fish sampling data obtained at each sampling station was analyzed using the Index of Biotic Integrity (IBI) for headwater streams identified in Ohio EPA (1987, 1989, and 2006). The following twelve metrics identified for use on headwater streams (drainage area <20 square miles) were used to analyze the fish data and calculate an IBI score for each sampling station on Rocky Run:

1. Number of Fish species
2. Number of Darter plus Sculpin species
3. Number of Headwater species
4. Number of Minnow species
5. Number of Sensitive species
6. Percent Abundance of Tolerant species
7. Percent Abundance of Omnivores
8. Proportion of Insectivores
9. Proportion of Pioneering species
10. Number of Individuals
11. Number of Simple Lithophilic species
12. Percent DELT Anomalies

The IBI score calculated for each sampling station is interpreted according to the following ranges established for headwater streams in the Western Allegheny Plateau Ecoregion.



<u>Scoring Range</u>	<u>Narrative Evaluation</u>
50-60	Exceptional
46-49	Very Good
44-45	Good
40-43	Marginally Good
28-39	Fair
18-27	Poor
12-17	Very Poor

An IBI score of 44 is the minimum score required for attainment of the Warmwater Habitat (WWH) aquatic life use for fish for headwater streams in the Western Allegheny Plateau Ecoregion. This numerical biological criteria is codified in the Ohio Water Quality Standards (OAC 3745-1-07; Table 7-14) adopted in May 1990. An IBI score of 50 is established as the minimum score required for attainment of the Exceptional Warmwater Habitat (EWH) according to this code.



3.0 RESULTS

3.1 WATER QUALITY AND PHYSICAL HABITAT ASSESSMENT

3.1.1 Rocky Run

The results for the basic water quality parameters measured at sampling stations on Rocky Run are presented on Table 1. During the survey, water temperature and dissolved oxygen (DO) values ranged from 11.0 to 16.7 °C and 7.08 to 10.12 mg/L, respectively, at the sampling stations. Values for pH and conductivity ranged from 7.51 to 7.73 and 141 to 392 µS/cm, respectively, at the sampling stations. These values appear to be typical of low order streams during the summer and generally supportive of aquatic life in a warmwater habitat. Furthermore, these values do not indicate that the Warmwater Habitat (WWH) water quality criteria were exceeded for temperature (25.6°C daily maximum, Table 7-14A, General Ohio River basin), dissolved oxygen (4.0 mg/L outside mixing zone minimum, Table 7-1) and pH (6.5-9.0 outside mixing zone minimum twenty-four hour average, Table 7-1), respectively (OAC, 2002).

Flow estimates at Rocky Run sampling stations on September 17 and 18, 2007 were 10 to 15 gallons per minute (gpm) at upstream station RR-03, 35 to 50 gpm at Station RR-02 and 100 gpm at downstream Station RR-03. Riffle/run habitat was the dominant habitat type at all three sampling stations, with Station RR-03 having the most shallow pool/glide habitat (137 feet) and Station RR-02 having the least (20 feet), primarily due to the heavy sediment load due to ATV use. The maximum stream depth of 19 inches was measured at Station RR-01. The maximum depth at Station RR-03 was 12 inches and the maximum depth at RR-02 was only 4 inches which greatly reduced the available habitat for fish. Stream width increased from a wetted width range of 2 to 6 feet upstream at Station RR-03 to 3 to 12 feet at Station RR-01 upstream from the confluence with Yellow Creek.

The modified Wolman pebble counts performed at the Rocky Run sampling stations resulted in gravel (60%), cobble (19%) and sand (17%) being identified as the primary substrate particle



sizes at Station RR-01. At Station RR-02, where ATV disruption was extensive, sand (51%) and gravel (31%) were the predominant substrate types. At upstream station RR-03, gravel (35%), sand (19%) and cobble (16%) were the dominant substrate particle sizes. However, the percentages for bedrock (12%), boulder (8%) and silt/clay (10%) were higher at Station RR-03 than the other two stations.

The scores for the Qualitative Habitat Evaluation Index (QHEI) completed for each sampling station on Rocky Run are presented on Table 1. The upstream Station RR-03 had the highest QHEI score (59) which corresponds to a “Good” narrative rating for a headwater stream such as Rocky Run. Station RR-02 had a QHEI score of 39.5, which correlates to a “Poor” narrative rating. This lower score was primarily due to increased embeddedness, a lack of instream (fish) cover, poor stream development and low stability, moderate to heavy erosion potential and poor pool/glide and riffle/run quality. The QHEI score at downstream Station RR-01 was 48, which corresponded to a “Fair” narrative rating.

3.1.2 Tributary RR-A

The results for the basic water quality parameters measured at the sampling station on Tributary RR-A are presented on Table 1. The water temperature and dissolved oxygen (DO) values were 14.7 °C and 7.30 mg/L, respectively. Values for pH and conductivity were 7.94 and 260 µS/cm, respectively. These values appear to be typical of low order streams during the summer and generally supportive of aquatic life in a warmwater habitat. Furthermore, these values do not indicate that the Warmwater Habitat (WWH) water quality criteria were exceeded for temperature (25.6°C daily maximum, Table 7-14A, General Ohio River basin), dissolved oxygen (4.0 mg/L outside mixing zone minimum, Table 7-1) and pH (6.5-9.0 outside mixing zone minimum twenty-four hour average, Table 7-1), respectively (OAC, 2002).

Tributary RR-A had an estimated flow of approximately 10 gpm and the maximum depth was 6 inches (Table 1). The wetted stream width ranged from 1.5 to 4 feet in the sampling reach. Gravel (50%) and sand (30%) were recorded as the dominant substrate particle sizes based on



visual observation. The Primary Headwater Habitat Evaluation Index (HHEI) completed for the sampling station on Tributary RR-A produced a score of 65. Based on the decision making flowchart provided on page 23 of the *Field Evaluation Manual for Ohio's Primary Headwater Streams*, (OEPA 2002) this score is borderline between the Class III PHWH (Perennial) and Class II PHWH (Perennial or Intermittent) categories. The results of the benthic macroinvertebrate sampling performed to evaluate whether the benthic community data supports either the Class II or III PHWH classification is presented in Section 3.2 of this report.

3.1.3 Unnamed Tributaries (UNT-A) and (UNT-B) to Pond E

The results for the basic water quality parameters measured at the sampling stations on Tributaries UNT-A and UNT-B are presented on Table 1. During the survey, water temperature and dissolved oxygen (DO) values ranged from 12.7 to 13.6 °C and 7.20 to 8.0 mg/L, respectively, at the sampling stations. Values for pH and conductivity ranged from 7.35 to 7.80 and 266 to 384 µS/cm, respectively, at the sampling stations. These values appear to be typical of low order streams during the summer and generally supportive of aquatic life in a warmwater habitat. Furthermore, these values do not exceed the Warmwater Habitat (WWH) water quality criteria for temperature (25.6°C daily maximum, Table 7-14A, General Ohio River basin), dissolved oxygen (4.0 mg/L outside mixing zone minimum, Table 7-1) and pH (6.5-9.0 outside mixing zone minimum twenty-four hour average, Table 7-1), respectively (OAC, 2002).

Tributaries UNT-A and UNT-B were very similar in terms of flow, stream width and depth. UNT-A was dominated by gravel (50%) and sand (40%) substrates, while cobble (30%), gravel (30%) and boulder (15%) were dominant substrates at the UNT-B sampling station. Bedrock was present (5%) within the UNT-B sampling reach, however there was an extended section of bedrock in the stream channel downstream from the sampling station.

The Primary Headwater Habitat Evaluation Index (HHEI) completed for the sampling station on Tributary UNT-A produced a score of 49. Based on the decision making flowchart provided on page 23 of the *Field Evaluation Manual for Ohio's Primary Headwater Streams*, (OEPA 2002)



this score leads to the classification of UNT-A as a Class II PHWH (Perennial or Intermittent) stream. The HHEI completed for the sampling station on Tributary UNT-B produced a score of 64. Based on the decision making flowchart provided on page 23 of the *Field Evaluation Manual for Ohio's Primary Headwater Streams*, (OEPA 2002) this score leads to the classification of UNT-B as a Class III PHWH (Perennial) stream. The results of the benthic macroinvertebrate sampling performed to evaluate whether the benthic community data supports these classifications is presented in Section 3.2 of this report.

3.2 BENTHIC MACROINVERTEBRATE SURVEY

3.2.1 Rocky Run

The list of benthic macroinvertebrate taxa identified from the Surber samples (Riffle) and D-frame sample (Qualitative) collected at each station on Rocky Run is presented on the table in Appendix C. The total number shown for each taxon (Riffle) represents the combined total for the three Surber samples collected at each station. The USEPA tolerance value assigned to each taxon that were used to calculate the Hilsenhoff (family) Biotic Index are also shown. Table 2 (located in the Tables section of the report) presents the results for the benthic metrics for the Surber and D-frame samples for each Rocky Run sampling station.

The three Surber samples collected at Station RR-01 produced a total of 328 organisms, which would equate to a density of 1,176 organisms/m². A total of 26 taxa were identified from the three Surber samples, of which 14 were EPT taxa that comprised 47.9% of the total number of organisms in the composite sample. Oligochaeta (22%) was the dominant taxon, and its high tolerance value (10 or highly tolerant) elevated the Hilsenhoff Biotic Index (HBI) score to 5.75 which falls within the "Fair" water quality category.

The qualitative D-frame sample collected at Station RR-01 produced 241 organisms distributed among 30 taxa (Table 2). This diverse sample contained seven Coleoptera (beetle) taxa and nine Dipteran (true flies) taxa. Chironomidae (midge flies) were the dominant taxon (52.7%) in the



qualitative sample. There were eight EPT taxa that comprised 5.8% of the total number of organisms in the sample. A total of 41 distinct taxa were identified from all samples (Surbers and D-frame) collected at Station RR-01.

The impacts of the excessive ATV use both within the stream channel of Rocky Run and the adjacent riparian area at Station RR-02 are reflected in the results on Table 2 that show a decrease in abundance and taxa richness. Only thirty-five organisms were collected from the three Surber samples and a total of nine taxa were identified. The number of EPT taxa (4), as reflected by lower numbers of caddisfly and mayfly taxa, was much lower at Station RR-02 (compared to Stations RR-01 and RR-03). The qualitative sample from Station RR-02 also showed decreased abundance (58 organisms) compared to the other two stations on Rocky Run (241 at RR-01 and 188 at RR-03). The differences in metric results for the qualitative samples were less pronounced than the riffle samples, particularly when comparing Station RR-02 to Station RR-03. A total of 20 benthic taxa were identified from all samples (Surbers and D-frame) collected at Station RR-02.

The metric results for the riffle habitat (Surber) samples from Station RR-03 were better than the other two stations in most cases. The three Surber samples collected at Station RR-03 produced a total of 450 organisms, which would equate to a density of 1,614 organisms/m² (Table 2). A total of 35 taxa were identified from the three samples, of which 18 were EPT taxa that comprised 61.1% of the total number of organisms in the composite sample. Nine of the 18 EPT taxa were caddisfly taxa. Several of these caddisfly taxa (*Glossosoma*, *Goera*, *Wormaldia*, *Diplectrona*, *Rhyacophila*, and *Ceratopsyche slossonae*) are listed as coolwater/coldwater macroinvertebrates by the Ohio EPA (2001). The Shannon-Weaver diversity index was 3.60 (very good) and the HBI score was 3.79 which was within the "Very good" water quality range (3.51 – 4.50). A total of 38 distinct taxa were identified from all samples (Surbers and qualitative D-frame) collected at Station RR-03.



3.2.2 Tributary RR-A

The list of benthic macroinvertebrate taxa identified from the Surber samples (Riffle) and D-frame qualitative sample collected at the sampling station on Tributary RR-A is presented on the table in Appendix C. The total number shown for each taxon (Riffle) represents the combined total for the three Surber samples collected. The USEPA tolerance value assigned to each taxon that were used to calculate the Hilsenhoff (family) Biotic Index are also shown. Table 2 presents the results for the benthic metrics for the Surber and D-frame samples for the Tributary RR-A sampling station.

The three Surber samples collected at Station RR-A produced a total of 395 organisms, which would equate to a density of 1,417 organisms/m². A total of 16 taxa were identified from the three samples, of which seven were EPT taxa that comprised 14.2% of the total number of organisms in the composite sample. The amphipod *Gammarus* (scud or sideswimmer) was the dominant taxon (80.0%). The qualitative D-frame sample collected at Station RR-A contained many of the same taxa that were present in the Surber samples, however EPT taxa were represented by only one organism (stonefly *Paracapnia*).

Tributary RR-A was evaluated by CEC personnel previously in October 2006 as part of the Primary Headwater Habitat Evaluation. The field data sheets from this evaluation are included in Appendix D. This evaluation was performed on a different section of Tributary RR-A located further upstream (above Pond C). This section of stream was flowing at the time of the October 2006 survey, but at the time of a stream reconnaissance in early July 2007 was observed to be barely flowing (flow < 1 gpm). The HHEI score (52) and Headwater Macroinvertebrate Field Evaluation Index (HMFIEI) Score (13) suggest that this upstream section of Tributary RR-A qualifies as a Class II PHWH Stream. The present evaluation of Tributary RR-A near the confluence with Rocky Run produced a HHEI Score of 65 (Table 1 and Appendix B – Field Data Sheets). The benthic macroinvertebrate evaluation (laboratory sorting and analysis of three Surber samples and one qualitative D-frame sample) indicated the presence of four cool water macroinvertebrate taxa (*Leuctra*, *Sweltsa*, *Diplectrona*, and *Rhyacophila*) in the Surber samples



(Appendix C). The presence of three or more species of cool water benthic invertebrates from the cool-cold water macroinvertebrate list can be used to assign a Class III-PHWH use designation to an undesignated headwater stream (OEPA 2001). Therefore, based on the HHEI score and the presence of four cool water taxa, this section of Tributary RR-A adjacent to Rocky Run meets the criteria for a Class III-PHWH stream.

3.2.3 Unnamed Tributaries (UNT-A) and (UNT-B) to Pond E

The list of benthic macroinvertebrate taxa identified from each single D-frame sample (Qualitative) collected at the sampling stations on UNT-A and UNT-B to Pond E on September 18, 2007 are presented on the tables in Appendix C. Table 2 presents the benthic metric results for these two samples. The results are similar for the most part, although the sample from UNT-B contained fewer organisms (336 versus 546 for UNT-A), but more taxa (14 taxa versus 11 for UNT-A). Both samples were dominated by the amphipod *Gammarus* and contained the same number of EPT taxa (3) at similar percent abundances (4.4% and 7.4%). Based on the HHEI score of 49 (Table 1) and the assemblage of benthic macroinvertebrates with only one coolwater macroinvertebrate taxa represented, UNT-A would qualify as a Class II-PHWH stream.

Tributaries UNT-A and UNT-B to Pond E were evaluated by CEC personnel previously in October 2006 as part of the Primary Headwater Habitat Evaluation. The field data sheets from these evaluations are included in Appendix D. These previous evaluations were performed near (but not necessarily at the same) sections of stream that were sampled in September 2007. The October 2006 HHEI score (58) and Headwater Macroinvertebrate Field Evaluation Index (HMF EI) Score (10) for UNT-A supports the classification of UNT-A as a Class II PHWH Stream. The October 2006 HHEI score (75) and Headwater Macroinvertebrate Field Evaluation Index (HMF EI) Score (17) for UNT-B suggests that the stream habitat supports the Class III-PHWH designation, but the biology supports the Class II-PHWH designation. The September 2007 sampling event reaches the same conclusion based on habitat (HHEI = 64) with the biology borderline between the Class II and III designations.



3.2.4 Unnamed Tributary E – (UNT-E) to the Ohio River

Tributary UNT-E was observed to be dry at the time of the September 2007 benthic sampling. Tributary UNT-E was evaluated by CEC personnel previously in October 2006 as part of the Primary Headwater Habitat Evaluation. The field data sheets from this evaluation are included in Appendix D. The HHEI score was 69 due to the dominance of cobble/gravel substrates and a maximum water depth from 22.5 to 30 cm at the time of the survey. The Headwater Macroinvertebrate Field Evaluation Index (HMFEI) Score was 18, which met the criteria for Class II-PHWH stream.

3.3 FISH COMMUNITY SURVEY

The number of fish collected per species at each sampling station on Rocky Run is presented on Table 3. A total of 15 fish species were collected from Rocky Run during this survey.

Fourteen fish species, represented by 216 individuals, were collected at downstream Station RR-01 located closest to the confluence with Yellow Creek (Table 3). The three most abundant species were mottled sculpin (24.5%), creek chub (19.4%), and striped shiner (14.8%). The geographical proximity of the confluence of Rocky Run with Yellow Creek and the larger Ohio River contributed to the collection of juveniles of large river fish species such as freshwater drum (*Aplodinotus grunniens*) and redhorse species (*Moxostoma* sp.). This lower section of Rocky Run appears to provide a refuge for these juvenile fishes reducing their exposure to the larger predator fish in Yellow Creek and the Ohio River.

Electrofishing within the 150 meter section of stream at Station RR-02 produced no fish. This section of stream is severely impacted by ATV use both within the stream channel and on the adjacent steep slopes which contributes heavy sediment loading via runoff during rain events. Fish habitat within this section of stream is practically non-existent due to the filling of both pools and interstitial spaces in riffles by sand/silt. Additionally, ATV use in the channel has



compacted the cobble/gravel substrates, further eliminating habitat (interstitial spaces) where fish and benthic macroinvertebrates can exist.

Electrofishing the 150 meter section of stream at Station RR-03 resulted in the collection of 193 fishes represented by three species (Table 3). Blacknose dace (*Rhinichthys atratulus*) and mottled sculpin (*Cottus bairdi*) which are designated by Ohio EPA (2001) as headwater species were most abundant comprising 64.8% and 19.2% of the total, respectively. The creek chub (pioneering species) accounted for the other 16%.

Table 3 also categorizes the fish species collected from Rocky Run according to various trophic (omnivore, insectivore), breeding (simple lithophil) and tolerance level (sensitive species, tolerant species) categories in order to calculate the headwater IBI metrics. Table 4 presents the results for the headwater IBI metrics analysis for each sampling station. For each station, the raw metric value is presented for each of the 12 individual metrics. Each raw metric value is then scored according to criteria developed for headwaters and presented on the graphs on Figures 4-2 through 4-29 and Tables 4-5 through 4-7 in Ohio EPA (1987, 2006). A score of 5, 3 or 1 is assigned to each metric based on these scoring criteria.

The Headwater IBI score for Station RR-01 located furthest downstream on Rocky Run was 52 (Table 4). This score not only meets the headwater scoring requirement for WWH in the Western Allegheny Plateau ecoregion (44), but exceeds the minimum score (50) required for the Exceptional Warmwater Habitat designation (EWH). The Headwater IBI score for Station RR-02 was 0, because no fish were collected at this sampling station. The Headwater IBI score for Station RR-03 was 32, which places it in the "Fair" range (28-39) and below the required score for meeting the WWH designated use. The drainage area at Station RR-03 was 1.4 square miles, which is close to the cutoff used (≤ 1.0 square mile) for the evaluation of streams in Ohio using the Primary Headwater Habitat Evaluation method (OEPA 2001).

The Headwater IBI score for Station RR-01 located furthest downstream on Rocky Run was 52, which exceeded the minimum score (50) required for the Exceptional Warmwater Habitat



designation (EWH). The attainment of this high score was due in part to the location of this sampling station close to the confluence with Yellow Creek, which permitted juvenile fish from Yellow Creek and the Ohio River to inhabit the lower section of Rocky Run which provided them refuge from predator fish. This elevated the scores for certain IBI metrics, which in turn elevated the final IBI score.

Descriptions for the aquatic life uses (Ohio EPA 1999) as defined in the Ohio Water Quality Standards (WQS) are as follows:

- 1) Warmwater Habitat (WWH) – this use designation defines the “typical” warmwater assemblage of aquatic organisms for Ohio rivers and streams; this use represents the principal restoration target for the majority of water resource management efforts in Ohio.

- 2) Exceptional Warmwater Habitat (EWH) – this use designation is reserved for waters which support “unusual and exceptional” assemblages of aquatic organisms which are characterized by a high diversity of species, particularly those which are highly intolerant and/or rare, threatened, endangered, or special status (i.e., declining species); this designation represents a protection goal for water resource management efforts dealing with Ohio’s best water resources.

- 3) Coldwater Habitat (CWH) – this use is intended for waters which support assemblages of cold water organisms and/or those which are stocked with salmonids with the intent of providing a put-and-take fishery on a year round basis which is further sanctioned by the Ohio DNR, Division of Wildlife.

The fish assemblage in the lower section of Rocky Run does not represent an “unusual and exceptional” assemblage as defined above under Exceptional Warmwater Habitat. There are only two intolerant species (silver shiner and river chub) and the other four species included under the “sensitive species” headwater metric are moderately intolerant. There were no rare,



threatened, endangered or special status fish species among the 14 species collected at Station RR-01 on Rocky Run.

Likewise, the fish assemblage at Station RR-01 does not support the Coldwater Habitat (CWH) designated use. It is not stocked with salmonids and the only coldwater fish species (OEPA 2001) found in the stream was the mottled sculpin. There were no other coldwater fish species such as redbreast dace, native brook trout or brook stickleback that would support the CWH designated use. Therefore, the fish assemblage in the lower section of Rocky Run is most indicative of Warmwater Habitat (WWH) despite the higher IBI score of 52.



4.0 SUMMARY AND CONCLUSIONS

CEC presents the following summary and conclusions regarding the biological sampling conducted at the proposed ORCF Site:

Station RR-01:

- Benthic Macroinvertebrates – Benthic macroinvertebrate sampling at Station RR-01 produced a total of 41 distinct taxa from three Surber samples and one qualitative D-frame kick net sample. This result indicates a moderately diverse benthic community in spite of increased sedimentation resulting from excessive ATV use both within and adjacent to Rocky Run at upstream locations.
- Fish - Fourteen fish species, represented by 216 individual fish, were collected at Station RR-01. The three most abundant species were mottled sculpin (24.5%), creek chub (19.4%), and striped shiner (14.8%). The geographical proximity of the confluence of Rocky Run with Yellow Creek and the larger Ohio River likely contributed to the collection of juveniles of large river fish species such as freshwater drum (*Aplodinotus grunniens*) and redhorse species (*Moxostoma* sp.). This lower section of Rocky Run appears to provide a refuge for these juvenile fishes reducing their exposure to the larger predator fish in Yellow Creek and the Ohio River.
- IBI Score and Designated Use - The Headwater IBI score calculated from the fish data for Station RR-01 was 52. This score not only meets the headwater scoring requirement for Warmwater Habitat (WWH) in the Western Allegheny Plateau ecoregion (44), but slightly exceeds the minimum score (50) required for the Exceptional Warmwater Habitat designation (EWH). The attainment of this high score was due in part to the location of this sampling station close to the confluence with Yellow Creek, which permitted juvenile fish from Yellow Creek and the Ohio River to inhabit the lower section of Rocky



Run. This elevated the scores for certain IBI metrics which, in turn, elevated the final IBI score.

The fish assemblage in the lower section of Rocky Run is most indicative of the Warmwater Habitat (WWH) designated use despite the elevated IBI score of 52. The fish assemblage at Station RR-01 does not represent an “unusual and exceptional” assemblage as required under the Exceptional Warmwater Habitat definition. There are only two intolerant species (silver shiner and river chub) and the other four species included under the “sensitive species” headwater metric are moderately intolerant species. There were no rare, threatened, endangered or special status fish species among the 14 species collected at Station RR-01 on Rocky Run.

The fish assemblage at Station RR-01 also does not support the Coldwater Habitat (CWH) designated use. It is not stocked with salmonids and the only coldwater fish species (OEPA 2001) found in the stream was the central mottled sculpin. There were no other coldwater fish species such as redbside dace, native brook trout or brook stickleback that would support the CWH designated use.

- Qualitative Habitat Evaluation Index (QHEI) - The QHEI completed at RR-01 was reflective of the biological results. The QHEI score at RR-01 was 48 corresponding to “Fair” narrative ratings.

Station RR-02:

- Benthic Macroinvertebrates – Benthic macroinvertebrate sampling conducted at Station RR-02 located near the south-central border of the proposed site development indicated impacts to the benthic community (pronounced decreases in both abundance of organisms and taxa richness). The total number of taxa within the three Surber samples was 9 at RR-02 compared to 26 at the downstream station RR-01 and 35 at the upstream station RR-03. This section of the stream has been extensively disturbed from ATV use



directly within the stream and from sediment entering the stream during heavy rain events from the ATV trails adjacent to the stream and on the steep slopes. The riffle areas were heavily embedded with sand and compacted by ATV traffic.

- Fish - The electrofishing survey at Station RR-02 produced no fish. This section of stream is severely impacted by ATV use both within the stream channel and on the adjacent steep slopes which contributes heavy sediment loads during rain events. Fish habitat within this section of stream is practically non-existent due to the filling of both pools and interstitial spaces in riffles by sand/silt. Additionally, ATV use in the channel has compacted the cobble/gravel substrates, further eliminating habitat (interstitial spaces) where fish (darters and sculpins) can exist. The maximum depth within the 150 meter long stream reach at RR-02 was only 4-inches, which greatly reduced the availability of fish habitat.
- Qualitative Habitat Evaluation Index (QHEI) - The QHEI score at RR-02 was 39.5, which correlates to a “Poor” narrative rating. This lower score was primarily due to increased embeddedness, a lack of instream (fish) cover, poor stream development and low stability, moderate to heavy erosion potential and poor pool/glide and riffle/run quality.
- Wolman Pebble Counts – Wolman pebble counts conducted within the 150 meter reach of Station RR-02 indicate much finer substrates than the other two stations on Rocky Run. Sand comprised 51% of the counts followed by gravel at 31%. The finer substrate is a direct result of heavy ATV use within the streambed and adjacent areas.

Station RR-03:

- Benthic Macroinvertebrates – Benthic macroinvertebrate sampling at Station RR-03, the furthest upstream station on Rocky Run produced a total of 38 distinct taxa (Chironomidae or midges not identified to genus/species level). There were a total of 19



EPT (mayfly, stonefly and caddisfly) taxa indicating good water quality at this station. Eight taxa from Station RR-03 are listed on the Ohio EPA coolwater/coldwater macroinvertebrate taxa list. This sampling station was located in the least disturbed section of Rocky Run.

- Fish - The electrofishing survey conducted at Station RR-03 resulted in the collection of 193 fishes represented by three species. Blacknose dace (*Rhinichthys atratulus*) and mottled sculpin (*Cottus bairdi*) which are designated by Ohio EPA as headwater species were most abundant comprising 64.8% and 19.2% of the total, respectively. The creek chub (pioneering species) accounted for the other 16%.
- Qualitative Habitat Evaluation Index (QHEI) - The QHEI completed at RR-03 was reflective of the biological results. The QHEI scores at RR-03 was 59, respectively corresponding “Good” narrative ratings.

Rocky Run:

- Water Quality - The basic water quality parameters measured at sampling stations on Rocky Run appeared to be typical of low order streams during the late summer and did not exceed Warmwater Habitat (WWH) water quality criteria for temperature (25.6°C daily maximum, Table 7-14A, General Ohio River basin), dissolved oxygen (4.0 mg/L outside mixing zone minimum, Table 7-1) and pH (6.5-9.0 outside mixing zone minimum twenty-four hour average, Table 7-1), respectively (OAC, 2002).

Tributary RR-A:

- Based on the Headwater Habitat Evaluation Index (HHEI) score (65) and the presence of four cool water taxa, the section of Tributary RR-A located near the confluence with Rocky Run meets the criteria for a Class III-PHWH stream.



Tributary UNT-A:

- Based on the HHEI score of 49 and the assemblage of benthic macroinvertebrates identified from the qualitative D-frame sample that was analyzed at the laboratory, that contained only one coolwater macroinvertebrate taxa, Tributary UNT-A to Pond E in the north central section of the proposed site would qualify as a Class II-PHWH stream. The hillside adjacent to this stream has served (and continues to serve) as a local hillside dump that includes appliances, tires, glass and other household garbage within and near the stream.

Tributary UNT-B:

- Tributary UNT-B to Pond E in the northeastern section of the proposed site is less impacted from debris, has cobble, gravel and bedrock substrates, and appears to have a slightly more diverse benthic macroinvertebrate community than Tributary UNT-A. The HHEI score was 64. This stream meets the Class III-PHWH designation based on the HHEI score and substrates.

Tributary UNT-E:

- Tributary UNT-E, which is an unnamed tributary to the Ohio River in the southeastern portion of the proposed Site, was dry at the time of the September 2007 benthic survey. This stream was previously sampled by CEC in October 2006 and the HHEI evaluation at that time indicated that it met the criteria for a Class II- PHWH stream.



5.0 REFERENCES

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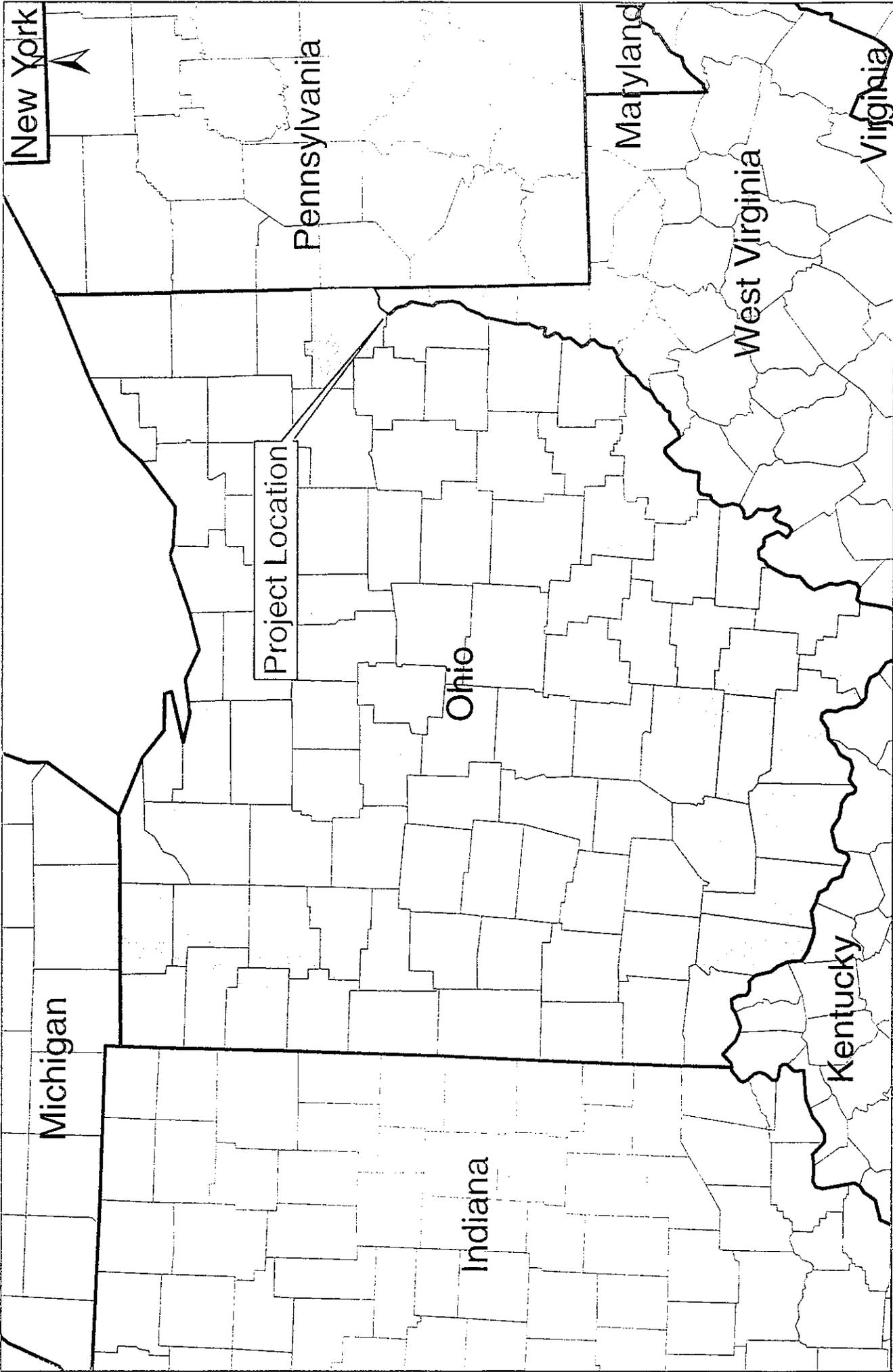
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New York



Project Location

Pennsylvania

Maryland

West Virginia

Virginia

Michigan

Ohio

Indiana

Kentucky

ISSUED FOR: OHIO RIVER CLEAN FUELS, LLC.

ISSUED BY:



CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

333 Baldwin Road
Pittsburgh, PA 15205-9702
1-800-365-2324

Columbus, OH • Cincinnati, OH • Indianapolis, IN • Nashville, TN • Chicago, IL • St. Louis, MO • Export, PA • Detroit, MI

Legend

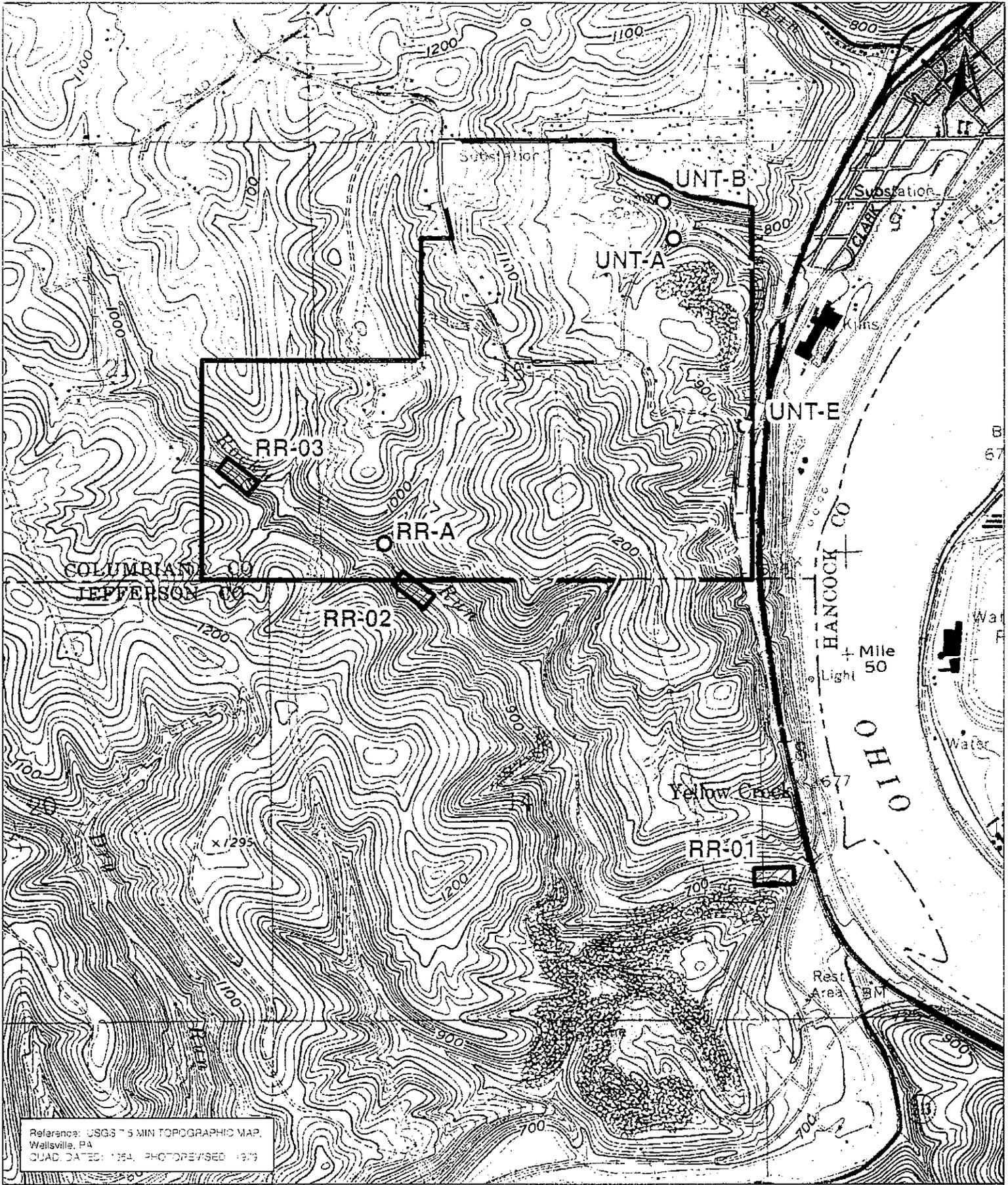
Columbiana County

ESRI 2007
Ohio State
and County Data

DATE: 11/20/07

PROJECT NO.: 061-933.0014

FIGURE: 1



1 inch equals 1,500 feet 	ISSUED FOR: Ohio River Clean Fuels LLC.	USGS MAP WITH SAMPLING LOCATIONS OHIO RIVER CLEAN FUELS FACILITY OHIO RIVER CLEAN FUELS LLC. WELLSVILLE, COLUMBIANA AND JEFFERSON COUNTIES, OHIO	
Legend Site Boundary Approximate Limit of Disturbance Fish and Benthic Sampling Locations Benthic Sampling Stations	ISSUED BY: CIVIL & ENVIRONMENTAL CONSULTANTS, INC. 335 Baldwin Road Pittsburgh, PA 15203-1722 1-400-368-2321	DWN BY: MEH CHK BY: DAN	PROJECT NO.: 061-933.0014 DATE: 11/20/2007 FIGURE: 2

TABLE 1
Stream Water Quality and Habitat Characteristics
September 17 & 18, 2007
Proposed Ohio River Clean Fuels Facility
Columbiana and Jefferson Counties, Ohio
CEC Project 061-933.0014

PARAMETER	Rocky Run Sampling Stations						Rocky Run - Tributary A		Unnamed Tributary A (to Pond E)		Unnamed Tributary B (to Pond E)	
	RR-01 (Downstream) 9-17-2007	RR-02 (Middle Station) 9-17-2007	RR-03 (Upstream) 9-18-2007	RR-01 (Downstream) 9-17-2007	RR-02 (Middle Station) 9-17-2007	RR-03 (Upstream) 9-18-2007	RR-01 (Downstream) 9-17-2007	RR-02 (Middle Station) 9-17-2007	RR-03 (Upstream) 9-18-2007	RR-01 (Downstream) 9-17-2007	RR-02 (Middle Station) 9-17-2007	
Time	Riffle 10:15	Pool 11:8	Riffle 13:30	Pool 13:35	Riffle 9:15	Pool NA	Riffle NA	Pool 15:20	Riffle 11:00	Pool NA	Riffle 12:50	Pool NA
Water Temperature (°C)	11.8	11.8	16.7	15.6	11.0	NA	NA	14.7	12.7	NA	13.6	NA
Dissolved Oxygen (mg/L)	10.12	9.65	7.55	7.08	8.80	NA	NA	7.30	8.00	NA	7.20	NA
pH (Standard Units)	7.52	7.51	7.62	7.73	7.60	NA	NA	7.94	7.35	NA	7.80	NA
Conductivity (µS/cm)	389	392	219	213	141	NA	NA	260	265	NA	384	NA
Stream Flow Rate (gallons per minute) ^a	100	35 - 50	10 - 15	137	8 - 10	< 5	5					
Habitat Reach Length (feet) ^b	412	80	472	20	355	10 - 12.0	137	1.0 - 6.0	0.5 - 5.0	1.0 - 3.0	0.5 - 4.0	0.5 - 4.0
Stream Depth (feet)	2.0 - 19.0	1.0 - 4.0	1.0 - 4.0	3.0 - 7.0	2.0 - 6.0	1.5 - 4.0	1.0 - 3.0	1.0 - 3.0	1.0 - 3.0	1.0 - 3.0	1.0 - 3.0	0.5 - 4.0
Stream Width (feet)	3.0 - 12.0	3.0 - 7.0	3.0 - 7.0	3.0 - 7.0	2.0 - 6.0	1.5 - 4.0	1.0 - 3.0	1.0 - 3.0	1.0 - 3.0	1.0 - 3.0	1.0 - 3.0	0.5 - 4.0
Substrate Composition (%): ^c												
bedrock (> 2,084 millimeters)	0%	2%	2%	2%	12%	0%	0%	0%	0%	0%	0%	5%
boulder slabs						0%	0%	0%	0%	0%	0%	5%
boulder (256 - 2,084 millimeters)	1%	4%	4%	4%	8%	0%	0%	0%	0%	0%	0%	5%
cobble (64 - 256 millimeters)	19%	10%	10%	10%	16%	5%	5%	5%	5%	5%	15%	15%
gravel (2 - 64 millimeters)	60%	31%	31%	31%	35%	15%	15%	15%	5%	5%	30%	30%
sand (0.062 - 2 millimeters)	17%	51%	51%	51%	19%	50%	50%	50%	50%	50%	30%	30%
silt (0.004 - 0.062 millimeters)						30%	30%	30%	40%	40%	5%	5%
clay (< 0.004 millimeters)	3%	2%	2%	2%	10%	5%	5%	5%	5%	5%	5%	5%
leaf pack/woody debris						5%	5%	5%	5%	5%	5%	5%
Ohio BPA QHEI Score ^d	48	36.5	36.5	36.5	59	0%	0%	0%	0%	0%	5%	5%
Ohio BPA HHEI Score ^e	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
General Narrative Rating Based on Scores for Headwater Stream	Fair	Poor	Poor	Poor	Good	Class III PFWH (Perennial)	Class II PFWH (Perennial or Intermittent)	Class III PFWH (Perennial)	Class II PFWH (Perennial or Intermittent)	Class III PFWH (Perennial)	Class III PFWH (Perennial)	Class III PFWH (Perennial)

^a Flow estimated based on visual observation
^b Riffle heading includes combined length for both riffle and run habitat; pool heading includes combined length for both pool and glide habitat
^c A Modified Wolman (1954) Pebble Count technique was employed to determine percent substrate composition as Wentworth (1922) Size Classes for Rocky Run stations.
^d Rankin (1989); Ohio Environmental Protection Agency (2006b).
^e Ohio Environmental Protection Agency (2001)
 NA = Not Applicable

TABLE 2
Stream Benthic Macroinvertebrate Community Metrics
September 17 & 18, 2007
Proposed Ohio River Clean Fuels Facility
Columbiana and Jefferson Counties, Ohio
CEC Project 061-933.0014

Metric	Rocky Run (RR-01) 9/17/2007		Rocky Run (RR-02) 9/17/2007		Rocky Run (RR-03) 9/18/2007		Rocky Run - Trib. A (RR-A) 9/17/2007	
	3 Surber Samples	1 D-Frame Sample	3 Surber Samples	1 D-Frame Sample	3 Surber Samples	1 D-Frame Sample	3 Surber Samples	1 D-Frame Sample
Number Collected	328	241	35	58	450	188	395	97
Density (#/m ²)	1,176	NA	126	NA	1,614	NA	1,417	NA
Total Number of Taxa	26	30	9	16	35	15	16	13
Number of Caddisfly Taxa	4	3	1	2	9	2	2	0
Number of Mayfly Taxa	6	4	3	2	5	2	2	0
Number of EPT Taxa	14	8	4	4	18	4	7	1
Percent Abundance of EPT Taxa	47.9%	5.8%	77.1%	12.1%	61.1%	6.4%	14.2%	1.0%
Percent Dominant Taxon	22.0%	52.7%	62.9%	60.3%	31.8%	81.4%	80.0%	41.2%
Shannon-Weaver Diversity Index	3.33	Oligochaeta	2.47	Chironomidae	3.60	Chironomidae	Gammarus	Gammarus
HBI (Family Biotic Index)*	5.75	2.69	4.00	2.39	3.79	1.30	1.27	2.23
		5.65	5.29	5.29	5.74	4.00	5.21	

Metric	Unnamed Tributary - A (UNT-A) 9/18/2007		Unnamed Tributary - B (UNT-B) 9/18/2007	
	1 D-Frame Sample	1 D-Frame Sample	1 D-Frame Sample	1 D-Frame Sample
Number Collected	546	336		
Density (#/m ²)	NA	NA		
Total Number of Taxa	11	14		
Number of Caddisfly Taxa	1	2		
Number of Mayfly Taxa	1	1		
Number of EPT Taxa	3	3		
Percent Abundance of EPT Taxa	4.4%	7.4%		
Percent Dominant Taxon	86.6%	68.2%		
Shannon-Weaver Diversity Index	0.89	Gammarus	1.77	Gammarus
HBI (Family Biotic Index)*	4.23	4.54		

Hilsenhoff Biotic Index	Water Quality	Degree of Organic Pollution
0.00 - 3.50	Excellent	No apparent organic pollution
3.51 - 4.50	Very Good	Possible slight organic pollution
4.51 - 5.50	Good	Some organic pollution
5.51 - 6.50	Fair	Fairly significant organic pollution
6.51 - 7.50	Fairly Poor	Significant organic pollution
7.51 - 8.50	Poor	Very significant organic pollution
8.51 - 10.00	Very Poor	Severe organic pollution

* Tolerance values from USEPA (1990)

NA = Not Applicable

TABLE 4
Ohio EPA Index of Biotic Integrity (IBI) Metric Values
Rocky Run Fish Sampling - September 17 & 18, 2007
Proposed Ohio River Clean Fuels Facility
Columbiana and Jefferson Counties, Ohio
CEC Project 061-933.0014

OHIO EPA (HEADWATERS) METRIC ^b	ROCKY RUN FISH SAMPLING STATIONS					
	RR-01		RR-02		RR-03	
	Downstream Station above Railroad Culvert	Station Located Near Middle of Site in Disturbed Area (Heavy ATV use)	Station Located Near Middle of Site in Disturbed Area (Heavy ATV use)	Upstream Station primarily in Undisturbed Section of Stream	Upstream Station primarily in Undisturbed Section of Stream	Upstream Station primarily in Undisturbed Section of Stream
	Raw Metric Value	Calculated Metric Score	Raw Metric Value	Calculated Metric Score	Raw Metric Value	Calculated Metric Score
Number of Fish Species	14	5	0	0	3	1
Number of Darter plus Sculpin Species	3	5	0	0	1	3
Number of Headwater Species	1	1	0	0	2	3
Number of Minnow Species	5	5	0	0	2	1
Number of Sensitive Species	6	5	0	0	0	1
Percent Abundance of Tolerant Species	31.5%	5	0%	0	80.8%	1
Percent Abundance of Omnivores	12.0%	3	0%	0	0%	5
Proportion of Insectivores	65.7%	5	0%	0	19.2%	3
Proportion of Pioneering Species	25.0%	5	0%	0	16.1%	5
Number of Individuals ^a	296	3	0	0	74	3
Number of Simple Lithophilic Species	6	5	0	0	1	1
Percent DELT Anomalies	0.0%	5	0%	0	0.00%	5
Headwater IBI		52		0		32
Western Allegheny Plateau Ecoregion						
Headwater IBI Scoring Ranges		Narrative Evaluation				
50 - 60		EXCEPTIONAL				
46 - 49		VERY GOOD				
44 - 45		GOOD				
40 - 43		MARGINALLY GOOD				
28 - 39		FAIR				
18 - 27		POOR				
12 - 17		VERY POOR				

^a number excludes tolerant fish species and is adjusted to relative abundance for 0.3 km stream reach
^b Ohio Environmental Protection Agency (1987)

APPENDIX A

PHOTOGRAPHS OF BIOMONITORING LOCATIONS

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY
COLUMBIANA AND JEFFERSON COUNTIES, OHIO
CEC PROJECT 061-933



SAMPLING STATION (RR-01) ON ROCKY RUN LOOKING UPSTREAM



SAMPLING STATION (RR-01) ON ROCKY RUN LOOKING DOWNSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY



SAMPLING STATION (RR-02) ON ROCKY RUN LOOKING DOWNSTREAM AT ATV CROSSING

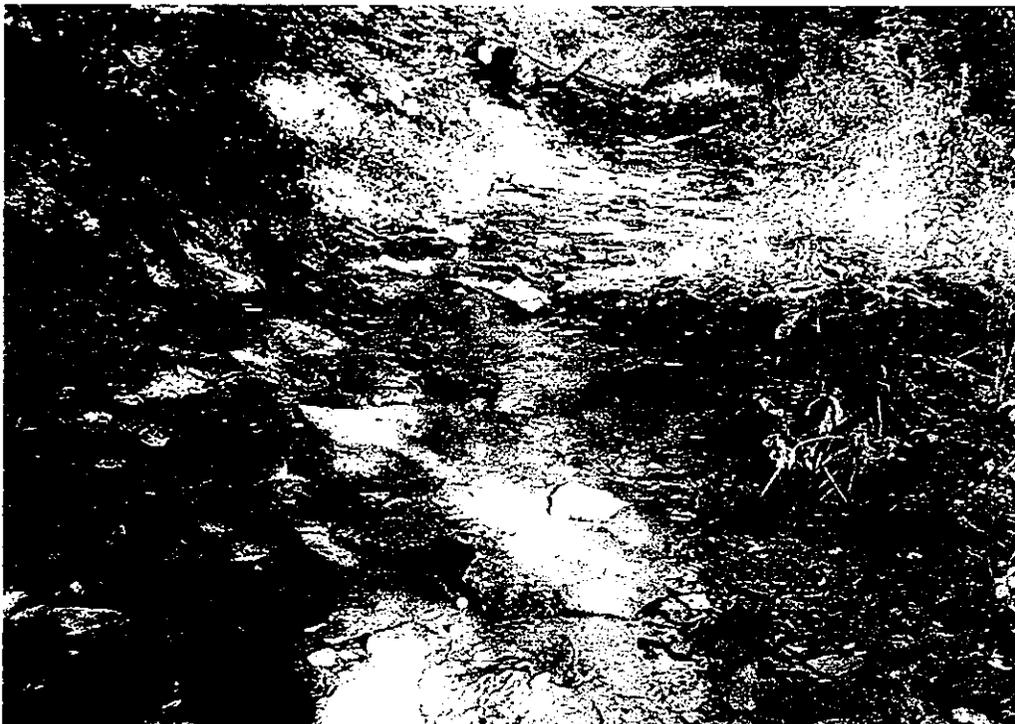


SAMPLING STATION (RR-02) ON ROCKY RUN LOOKING DOWNSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY

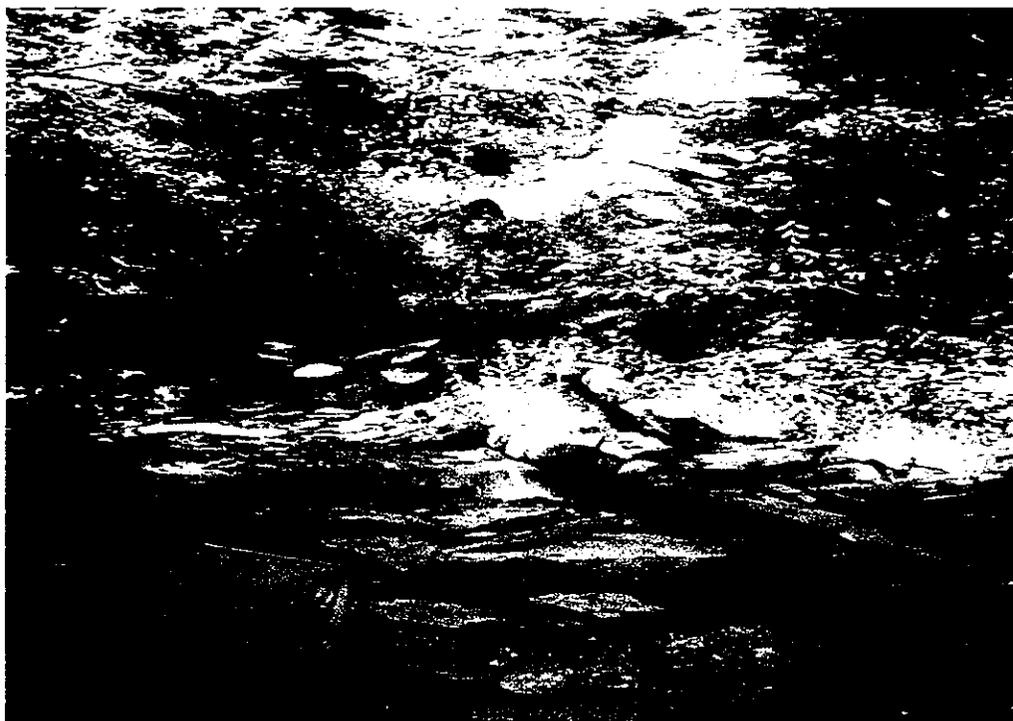


SAMPLING STATION (RR-03) ON ROCKY RUN LOOKING UPSTREAM



SAMPLING STATION (RR-03) ON ROCKY RUN LOOKING UPSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY



SAMPLING STATION ON ROCKY RUN - TRIBUTARY A (RR-A) LOOKING UPSTREAM



SAMPLING STATION ON ROCKY RUN - TRIBUTARY A (RR-A) LOOKING DOWNSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY



SAMPLING STATION ON UNNAMED TRIBUTARY TO POND E (UNT-A) LOOKING UPSTREAM

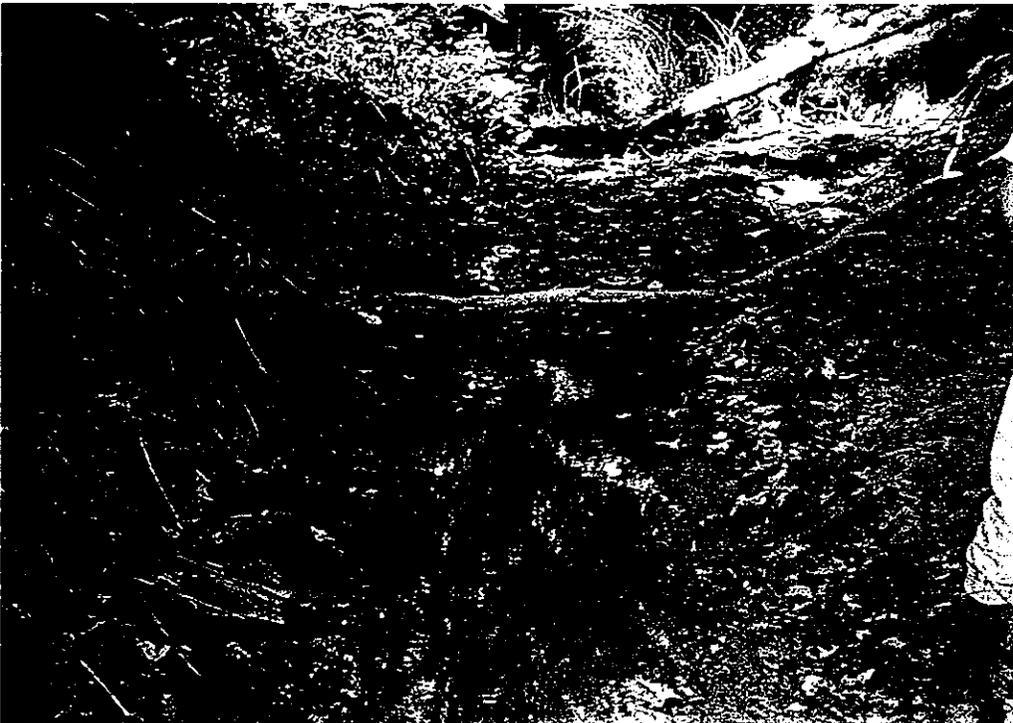


SAMPLING STATION ON UNNAMED TRIBUTARY TO POND E (UNT-A) LOOKING DOWNSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY

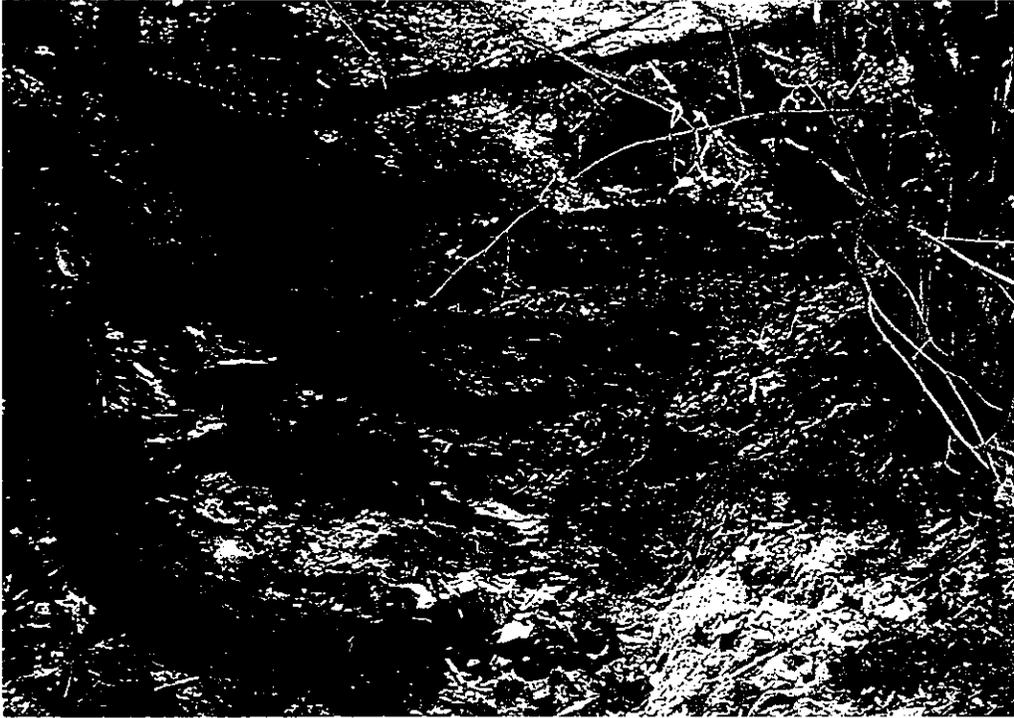


SAMPLING STATION ON UNNAMED TRIBUTARY TO POND E (UNT-B) LOOKING UPSTREAM



SAMPLING STATION ON UNNAMED TRIBUTARY TO POND E (UNT-B) LOOKING UPSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY



SAMPLING STATION ON UNNAMED TRIBUTARY TO OHIO RIVER (UNT-E) LOOKING
DOWNSTREAM



SAMPLING STATION ON UNNAMED TRIBUTARY TO OHIO RIVER (UNT-E) LOOKING UPSTREAM

APPENDIX A
PHOTOGRAPHS OF STREAM SAMPLING STATIONS
OHIO RIVER CLEAN FUELS FACILITY



FRESHWATER DRUM (*APLODINOTUS GRUNNIENS*) COLLECTED AT RR-01 STATION



SMALLMOUTH BASS (*MICROPTERUS DOLOMIEU*) COLLECTED AT RR-01 STATION

APPENDIX B

STREAM BIOMONITORING FIELD DATA FORMS

Stream & Location: Rocky Run RR-01 (Downstream) RM: _____ Date: 9/17/06

Scorers Full Name & Affiliation: MFO/DSP (CEC)

River Code: _____ STORET #: _____ Lat./ Long.: _____ 18 _____ Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<p>BEST TYPES</p> <input type="checkbox"/> BEDR/SLABS (1) <input type="checkbox"/> BOULDER (9) <input checked="" type="checkbox"/> COBBLE (8) <input checked="" type="checkbox"/> GRAVEL (7) <input type="checkbox"/> SAND (6) <input type="checkbox"/> BEDROCK (5)	<p>POOL RIFFLE</p> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	<p>OTHER TYPES</p> <input type="checkbox"/> BARREN (1) <input type="checkbox"/> BERTUS (1) <input type="checkbox"/> MUCK (2) <input type="checkbox"/> SILT (2) <input type="checkbox"/> ARTIFICIAL (0)	<p>POOL RIFFLE</p> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>ORIGIN</p> <input type="checkbox"/> LIMESTONE (1) <input type="checkbox"/> MESS (1) <input type="checkbox"/> WETLANDS (1) <input type="checkbox"/> HARDPAN (1) <input checked="" type="checkbox"/> SANDSTONE (1) <input type="checkbox"/> RIPRAP (1) <input type="checkbox"/> LAGULTRINE (1) <input type="checkbox"/> SHALE (1) <input type="checkbox"/> COALFINES (1)	<p>QUALITY</p> <input type="checkbox"/> HEAVY (1) <input checked="" type="checkbox"/> MODERATE (1) <input type="checkbox"/> NORMAL (1) <input type="checkbox"/> POOR (1) <input type="checkbox"/> MODERATE (1) <input type="checkbox"/> NORMAL (1) <input type="checkbox"/> NONE (1)
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Check ONE (Or 2 & average)

SILT EMBEDDEDNESS

NUMBER OF BEST TYPES: 1 or more 2 or less (1)

Comments _____

12

Substrate Maximum 20

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<p>UNDERCUT BANKS (1)</p> <p>OVERHANGING VEGETATION (1)</p> <p>SHALLOWS (IN SLOW WATER) (1)</p> <p>ROOTMATS (1)</p>	<p>POOLS > 10cm (1)</p> <p>ROOTWADS (1)</p> <p>BOULDERS (1)</p>	<p>OXBOWS BACKWATERS (1)</p> <p>AQUATIC MACROPHYTES (1)</p> <p>LOGS OR WOODY DEBRIS (1)</p>
---	---	--

Check ONE (Or 2 & average)

EXTENSIVE (50% (1)) MODERATE (25-75% (1)) SPARSE (5-25% (1)) NEARLY ABSENT (5% (1))

Comments _____

5

Cover Maximum 20

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<p>SINUOSITY</p> <input type="checkbox"/> HIGH (2) <input checked="" type="checkbox"/> MODERATE (3) <input type="checkbox"/> LOW (2) <input type="checkbox"/> NONE (1)	<p>DEVELOPMENT</p> <input type="checkbox"/> EXCELLENT (4) <input type="checkbox"/> GOOD (3) <input checked="" type="checkbox"/> FAIR (2) <input type="checkbox"/> POOR (1)	<p>CHANNELIZATION</p> <input checked="" type="checkbox"/> NONE (0) <input type="checkbox"/> RECOVERED (1) <input type="checkbox"/> RECOVERING (1) <input type="checkbox"/> REGENERATING/NO RECOVERY (1)	<p>STABILITY</p> <input type="checkbox"/> HIGH (3) <input type="checkbox"/> MODERATE (2) <input checked="" type="checkbox"/> LOW (1)
---	---	--	---

Comments _____

13

Channel Maximum 20

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p>EROSION</p> <input type="checkbox"/> NONE/LITTLE (1) <input checked="" type="checkbox"/> MODERATE (2) <input type="checkbox"/> HEAVY/SEVERE (1)	<p>RIPARIAN WIDTH</p> <input checked="" type="checkbox"/> WIDE > 50m (4) <input type="checkbox"/> MODERATE 0-50m (3) <input type="checkbox"/> NARROW 5-10m (2) <input type="checkbox"/> VERY NARROW < 5m (1) <input type="checkbox"/> NONE (0)	<p>FLOOD PLAIN QUALITY</p> <input checked="" type="checkbox"/> FOREST SWAMP (1) <input type="checkbox"/> SHRUB OR OLD FIELD (2) <input type="checkbox"/> RESIDENTIAL PARK/NEW FIELD (1) <input type="checkbox"/> FENCED PASTURE (1) <input type="checkbox"/> OPEN PASTURE - ROW CROPS (1)
---	---	--

Indicate predominant land use(s) past 100m riparian.

CONSERVATION/THEATRE (1) URBAN OR INDUSTRIAL (1) MINING/CONSTRUCTION (1)

Comments _____

9

Riparian Maximum 10

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<p>MAXIMUM DEPTH</p> <p>Check ONE (ONLY!)</p> <input type="checkbox"/> 0-1m (1) <input type="checkbox"/> 0.7-1m (1) <input checked="" type="checkbox"/> 0.4-0.7m (2) <input type="checkbox"/> 0.2-0.4m (1) <input type="checkbox"/> 0.2m (0)	<p>CHANNEL WIDTH</p> <p>Check ONE (Or 2 & average)</p> <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2) <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1) <input checked="" type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (1)	<p>CURRENT VELOCITY</p> <p>Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL (1) <input type="checkbox"/> VERY FAST (1) <input type="checkbox"/> FAST (1) <input type="checkbox"/> MODERATE (1) <input checked="" type="checkbox"/> SLOW (1) <input type="checkbox"/> INTERSTITIAL (1) <input type="checkbox"/> INTERMITTENT (2) <input type="checkbox"/> EDDIES (1)
---	---	--

Indicate for reach - pools and riffles.

Comments _____

3

Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: NO RIFFLE [metric=0]

<p>RIFFLE DEPTH</p> <input type="checkbox"/> BEST AREAS > 10cm (2) <input checked="" type="checkbox"/> BEST AREAS > 10cm (1) <input type="checkbox"/> BEST AREAS > 5cm (metric=0)	<p>RUN DEPTH</p> <input type="checkbox"/> MAXIMUM > 50cm (2) <input checked="" type="checkbox"/> MAXIMUM > 50cm (1)	<p>RIFFLE / RUN SUBSTRATE</p> <input type="checkbox"/> STABLE (e.g. Cobble, Boulder) (2) <input checked="" type="checkbox"/> MOD. STABLE (e.g. Large Gravel) (1) <input type="checkbox"/> UNSTABLE (e.g. Fine Gravel, Sand) (0)	<p>RIFFLE / RUN EMBEDDEDNESS</p> <input type="checkbox"/> NONE (2) <input type="checkbox"/> LOW (1) <input type="checkbox"/> MODERATE (1) <input checked="" type="checkbox"/> EXTENSIVE (1)
--	--	--	--

Comments Average gradient

2

Riffle / Run Maximum 8

6) GRADIENT (138 ft/mi) VERY LOW-LOW (2) MODERATE (1) HIGH-VERY HIGH (1)

DRAINAGE AREA (3.0 mi²)

%POOL: 10 %GLIDE: 6

%RUN: 0 %RIFFLE: 0

Comments _____

4

Gradient Maximum 10

Combined Riffle/Run 84%

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

AJ SAMPLED REACH

Check ALL that apply

METHOD

BOAT
 WAD
 LINE
 OTHER

STAGE

1st - sample pass - 2nd

HIGH
 SP
 LOW
 NORMAL
 DRY

CLARITY

1st - sample pass - 2nd

25-50 cm
 20-25 cm
 15-20 cm
 10-15 cm
 5-10 cm
 2-5 cm
 1-2 cm
 0-1 cm

BI/AESTHETICS

NUISANCE ALGAE
 INVASIVE MAGROPHITES
 EXCESS TURBIDITY
 DISCOLORATION
 FOAM / SKUM
 OIL SHEEN
 TRASH / LITTER
 UNUSUAL ODOR
 SLUDGE DEPOSITS
 SOBIOUS / UNUSUAL

DJ MAINTENANCE

PUBLIC / PRIVATE / BOTH / NA
 ACTIVE / HISTORIC (BOTH / NA)
 YOUNG-SUCCESSION OLD
 SPRAY / SNAG / REMOVED
 MODIFIED / DIPPED OUT / NA
 . LEVEED / ONE SIDED
 . RELOCATED / CUTOFFS
 . MOVING-BEDLOAD-STABLE
 . ARMoured / SLUMPS
 . ISLANDS / SCORDED
 . IMPOUNDED / DESICCATED
 . FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

EJ ISSUES

WWTP / CSO / NPDES / INDUSTRY
 HARDENED / URBAN / DIRT & GRIME
 CONTAMINATED / LANDFILL
 BMPs-CONSTRUCTION-SEDIMENT
 LOGGING / IRRIGATION / COOLING
 BANK / EROSION / SURFACE
 FALSE BANK / MANURE / LAGOON
 WASH H₂O / TILE / H₂O TABLE
 ACID / MINE / QUARRY / FLOW
 NATURAL / WETLAND / STAGNANT
 PARK / GOLF / LAWN / HOME
 ATMOSPHERE / DATA PAUCITY

FI MEASUREMENTS

Width
 Depth
 Area
 Velocity
 Discharge
 Bankfull width
 Bankfull depth
 Bankfull area
 Bankfull velocity
 Bankfull discharge
 Legacy Tree:

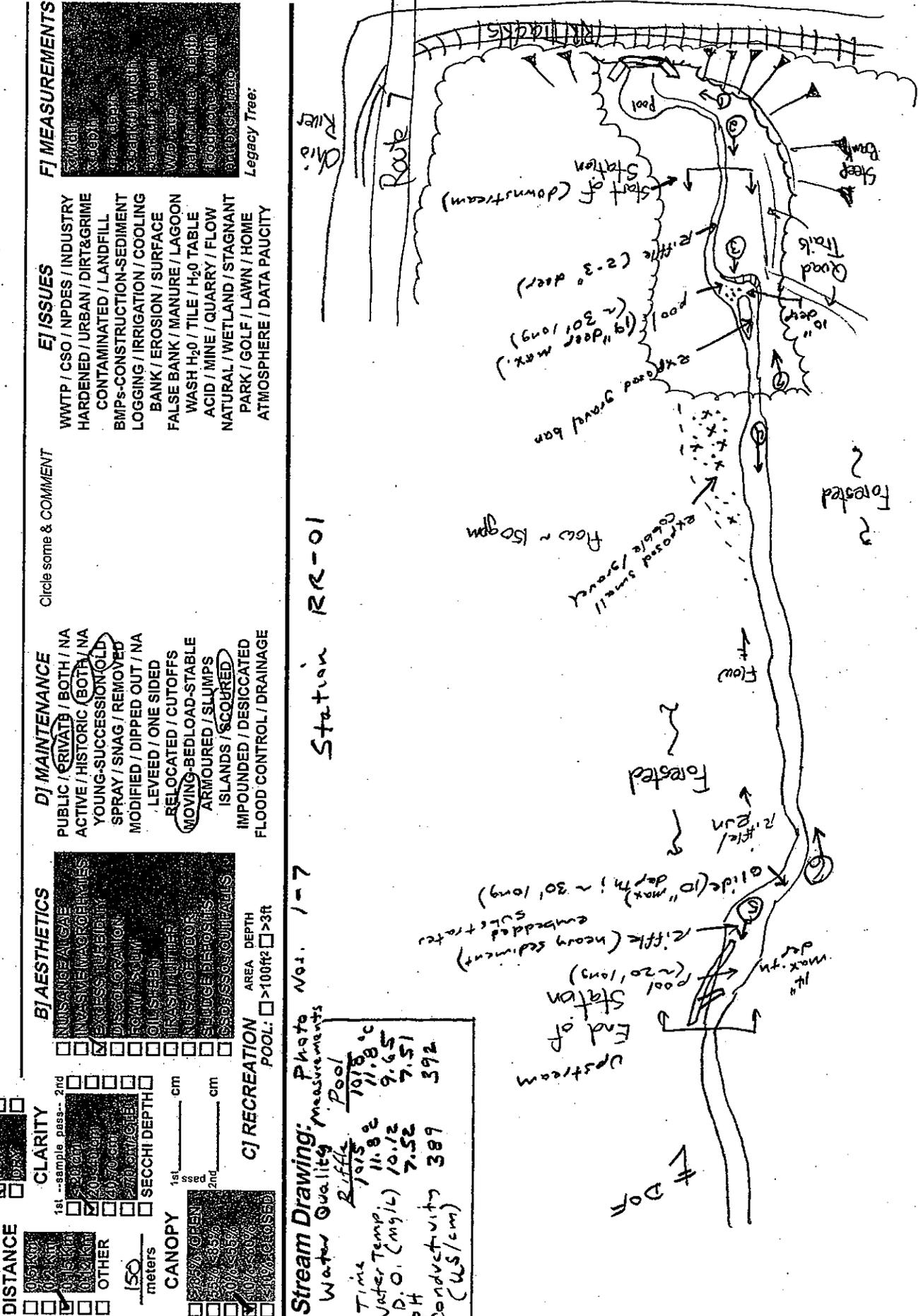
CJ RECREATION

AREA DEPTH
 POOL: >100ft² >3ft

Stream Drawing: Photo No. 1-7

Water Quality Measurements

Time 7:15
 Water Temp. 11.8 °C
 D.O. (mg/L) 10.12
 PH 7.51
 Conductivity 389 (µS/cm)



PEBBLE COUNT FIELD DATA SHEET

Station: <i>PR-01</i>	Project No.: <i>061-933.0014</i>
Stream Name: <i>ROCKY RUN</i>	Date/Time: <i>9.17.07</i>
River Basin: <i>OTTO</i>	Investigators: <i>DAM, WWT, DTP</i>

Particle	Description	Size (mm)	Particle Count		TOTAL
			<i>* ENTIRE REACH -Riffle/Run</i>	Pool/Glide	
FINES	Silt/Clay	< 0.062			3
SAND	Very Fine	0.062 - 0.125			5
	Fine	0.125 - 0.25			5
	Medium	0.25 - 0.5			1
	Coarse	0.5 - 1.0			2
	Very Coarse	1.0 - 2.0			4
GRAVEL	Very Fine	2.0 - 4.0			2
	Fine	4.0 - 5.7			2
	Fine	5.7 - 8.0			3
	Medium	8.0 - 11.3			2
	Medium	11.3 - 16.0			3
	Coarse	16.0 - 22.6			3
	Coarse	22.6 - 32			12
	Very Coarse	32 - 45			14
	Very Coarse	45 - 64			19
COBBLE	Small	64 - 90			9
	Small	90 - 128			9
	Large	128 - 180			1
	Large	180 - 256			
BOULDER	Small	256 - 362			1
	Small	362 - 512			
	Medium	512 - 1024			
	Large	1,024 - 2,048			
BEDROCK	Bedrock	> 2,048			
TOTALS			100		

17%

60%

19%

1%

* DATA TALLIED FOR ENTIRE 150 M REACH; NOT DISTRIBUTED ACCORDING TO HABITAT TYPE

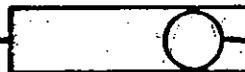
Used
Smith-Root
model 12B Backpack
Electrofisher

Fish Data Sheet

Field Crew: ^{Collector} MFD, MNL, WEST, DJP, DAM ^{Recorder} Time of Day: 10:00 Page 1 of 2
 River/Stream: Rocky Run Sta. RR-01 Location: Downstream (just above RR culvert)
 Date: 9-17-07 Sampler Type: F Time Fished: " " Total Seconds: 1846
 River Code: _____ Depth: 2" - 19" Range Observed Flow: ~100 gpm
 RM: _____ Data Source: _____ Number of Species: 15
 Distance: 150 meters

Anomalies: A-anchor worm; B-black spot; C-leeches; D-deformities; E-eroded fins; F-fungus; L-lesions; M-multiple DELT anomalies; N-blind; P-parasites; Y-popeye; S-emaciated; W-swirled scales; T-tumors; Z-other/ (H-Heavy; L-Light are combined with anomalies A, B, and C)

SPECIES	# WEIGHED	TOTAL COUNTED	WEIGHT (GRAMS)				ANOMALIES			
Creek Chub		(47)								
Freshwater Drum		(4)								
Mottled Sculpin		(23)								
Smallmouth Bass		(2)								
White Sucker		(3)								
	(combine w/ total below *)									
Silver Shiner		(9)								
Striped Shiner		(32)								
White Sucker *		(13)								



Stream & Location: Rocky Run (RR-2) RM: Date: 9/17/07

Scorers Full Name & Affiliation: MFO (cec)

River Code: STORET #: Lat./Long.: Office verified location

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<p>BEST TYPES</p> <input type="checkbox"/> BLDG/SLABS (1) <input type="checkbox"/> POOL RIFFLE <input type="checkbox"/> OTHER TYPES <input type="checkbox"/> POOL RIFFLE	<p>ORIGIN</p> <input type="checkbox"/> LIMESTONE (1) <input type="checkbox"/> SILT <input type="checkbox"/> EMBEDDEDNESS <input type="checkbox"/> MORE THAN SAND THAN SILT	<p>QUALITY</p> <input type="checkbox"/> HEAVY (2) <input type="checkbox"/> MODERATE (1) <input type="checkbox"/> NORMAL (0) <input type="checkbox"/> FREE (0) <input type="checkbox"/> EXTENSIVE (2) <input type="checkbox"/> MODERATE (1) <input type="checkbox"/> NORMAL (0) <input type="checkbox"/> NONE (0)	<p>Substrate 12 Maximum 20</p>
<p><input type="checkbox"/> BOULDER (1) <input type="checkbox"/> COBBLE (1) <input checked="" type="checkbox"/> GRAVEL (1) <input checked="" type="checkbox"/> SAND (1) <input type="checkbox"/> BEDROCK (1)</p> <p>NUMBER OF BEST TYPES: <input checked="" type="checkbox"/> 2 or more <input type="checkbox"/> 1 <input type="checkbox"/> 0 or less</p> <p>Comments: <u>Gravel & sand dominant substrate types.</u></p>	<p><input type="checkbox"/> HARDPAN (1) <input type="checkbox"/> DETRITUS (1) <input type="checkbox"/> MUCK (2) <input type="checkbox"/> SILT (2) <input type="checkbox"/> ARTIFICIAL (0)</p> <p>(Score natural substrates; ignore sludge from point-sources)</p>	<p><input type="checkbox"/> WETLANDS (0) <input type="checkbox"/> HARDPAN (0) <input type="checkbox"/> SANDSTONE (0) <input type="checkbox"/> RIPRAP (0) <input type="checkbox"/> LACUSTRINE (0) <input type="checkbox"/> SHALE (1) <input type="checkbox"/> COAL FINES (2)</p>	

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<p><input type="checkbox"/> UNDERCUT BANKS (1) <input type="checkbox"/> OVERHANGING VEGETATION (1) <input type="checkbox"/> SHALLOWS (IN SLOW WATER) (1) <input type="checkbox"/> ROOT MATS (1)</p>	<p><input type="checkbox"/> POOLS > 10m (2) <input type="checkbox"/> ROOT WADS (1) <input type="checkbox"/> BOULDERS (1)</p>	<p><input type="checkbox"/> OXBOWS/BACKWATERS (1) <input type="checkbox"/> AQUATIC MACROPHYTES (1) <input type="checkbox"/> LOGS OR WOOD/DEBRIS (1)</p>	<p>AMOUNT</p> <p>Check ONE (Or 2 & average)</p> <input type="checkbox"/> EXTENSIVE 75% (1) <input type="checkbox"/> MODERATE 25-75% (0) <input type="checkbox"/> SPARSE 5-25% (0) <input checked="" type="checkbox"/> NEARLY ABSENT 5% (0)
<p>Comments: <u>Apparent lack of fish cover and loss of interstitial spaces in riffles due to sediment and compaction from ATV's</u></p>			<p>Cover 2 Maximum 20</p>

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<p>SINUOSITY</p> <input type="checkbox"/> HIGH (1) <input type="checkbox"/> MODERATE (0) <input checked="" type="checkbox"/> LOW (2) <input type="checkbox"/> NONE (1)	<p>DEVELOPMENT</p> <input type="checkbox"/> EXCELLENT (1) <input type="checkbox"/> GOOD (1) <input type="checkbox"/> FAIR (1) <input checked="" type="checkbox"/> POOR (1)	<p>CHANNELIZATION</p> <input checked="" type="checkbox"/> NONE (1) <input type="checkbox"/> RECOVERED (1) <input type="checkbox"/> RECOVERING (1) <input type="checkbox"/> RECENT OR NO RECOVERY (1)	<p>STABILITY</p> <input type="checkbox"/> HIGH (1) <input type="checkbox"/> MODERATE (2) <input checked="" type="checkbox"/> LOW (1)
<p>Comments: <u>Riffles shallow and flat; no pools due to sediment load from ATV's</u></p>			<p>Channel 10 Maximum 20</p>

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p>EROSION</p> <input type="checkbox"/> NONE/LITTLE (1) <input checked="" type="checkbox"/> MODERATE (2) <input checked="" type="checkbox"/> HEAVY/SEVERE (1)	<p>RIPARIAN WIDTH</p> <input type="checkbox"/> WIDE > 50m (1) <input checked="" type="checkbox"/> MODERATE 10-50m (1) <input type="checkbox"/> NARROW 5-10m (1) <input type="checkbox"/> VERY NARROW < 5m (1) <input type="checkbox"/> NONE (0)	<p>FLOOD PLAIN QUALITY</p> <input checked="" type="checkbox"/> CREST SWAMP (1) <input type="checkbox"/> SARGE OR OLD FIELD (1) <input type="checkbox"/> RESIDENTIAL/PARK NEW FIELD (1) <input type="checkbox"/> FENCED PASTURE (1) <input type="checkbox"/> OPEN PASTURE ROW CROPT (1)	<p>CONSERVATION/TRELLAGE</p> <input type="checkbox"/> URBAN OR INDUSTRIAL (0) <input type="checkbox"/> MINING/CONSTRUCTION (0)
<p>Comments: <u>LEFT BANK - RIPARIAN WIDTH AFFECTED BY ATV TRAILS</u></p>			<p>Indicate predominant land use(s) past 100m riparian. 7 1/2 Riparian Maximum 10</p>

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<p>MAXIMUM DEPTH Check ONE (ONLY!)</p> <input type="checkbox"/> > 1m (1) <input type="checkbox"/> 0.7-1m (1) <input type="checkbox"/> 0.4-0.7m (1) <input type="checkbox"/> 0.2-0.4m (1) <input checked="" type="checkbox"/> < 0.2m (0)	<p>CHANNEL WIDTH Check ONE (Or 2 & average)</p> <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (2) <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1) <input checked="" type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)	<p>CURRENT VELOCITY Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL (1) <input checked="" type="checkbox"/> SLOW (1) <input type="checkbox"/> VERY FAST (1) <input type="checkbox"/> INTERSTITIAL (1) <input type="checkbox"/> FAST (1) <input type="checkbox"/> INTERMITTENT (2) <input type="checkbox"/> MODERATE (1) <input type="checkbox"/> EDDIES (1)	<p>Recreation Potential</p> <p><input type="checkbox"/> Primary Contact <input checked="" type="checkbox"/> Secondary Contact</p>
<p>Comments: <u>28" deep maximum; pools filled with sand.</u></p>			<p>Pool / Current 1 Maximum 12</p>

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). NO RIFFLE [metric=0]

<p>RIFFLE DEPTH</p> <input type="checkbox"/> BEST AREAS > 10cm (2) <input type="checkbox"/> BEST AREAS > 10cm (1) <input checked="" type="checkbox"/> BEST AREAS > 5cm (1) <input type="checkbox"/> (metric=0)	<p>RUN DEPTH</p> <input type="checkbox"/> MAXIMUM > 30cm (2) <input checked="" type="checkbox"/> MAXIMUM < 30cm (1)	<p>RIFFLE / RUN SUBSTRATE</p> <input type="checkbox"/> STABLE (e.g. Cobble Boulder) (2) <input type="checkbox"/> MOD. STABLE (e.g. Large Gravel) (1) <input checked="" type="checkbox"/> UNSTABLE (e.g. Fine Gravel, sand) (0)	<p>RIFFLE / RUN EMBEDDEDNESS</p> <input type="checkbox"/> NONE (2) <input type="checkbox"/> LOW (1) <input type="checkbox"/> MODERATE (0) <input checked="" type="checkbox"/> EXTENSIVE (1)
<p>Comments: <u>Riffles shallow and highly embedded with sand.</u></p>			<p>Riffle / Run 0 Maximum 8</p>

6) **GRADIENT** (138 ft/mi) VERY LOW - LOW (2-4) MODERATE (1) HIGH / VERY HIGH (1-3)

DRAINAGE AREA (2.27 mi²)

%POOL: 0 %GLIDE: 0

%RUN: %RIFFLE:

Gradient 4
Maximum 10

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

AJ SAMPLED REACH
Check ALL that apply

METHOD
 BOAT
 WAD
 LINE
 OTHER

DISTANCE
 0-1 km
 1-2 km
 2-5 km
 5-10 km
 OTHER

STAGE
 1st sample pass... 2nd
 HIGH
 UP
 NORMAL
 DOWN
 DRY

CLARITY
 1st sample pass... 2nd
 0-10 cm
 10-20 cm
 20-30 cm
 30-40 cm
 40-50 cm
 50-60 cm
 60-70 cm
 70-80 cm
 80-90 cm
 90-100 cm

SECCHI DEPTH
 1st sample pass... 2nd
 0-10 cm
 10-20 cm
 20-30 cm
 30-40 cm
 40-50 cm
 50-60 cm
 60-70 cm
 70-80 cm
 80-90 cm
 90-100 cm

CANOPY
 0-25%
 25-50%
 50-75%
 75-90%
 90-100%

CJ RECREATION AREA DEPTH
 POOL: >100ft >3ft

RR-02 located below proposed facility. Flow in Rocky Run generally low (~35-50 gpm) w/ major silt deposits in streambed. ATV use heavy in area causing siltation. Many roads / ATV trails along head main + in stream.

BJ AESTHETICS

NUISANCE ALGAE
 INVASIVE MACROPHYTES
 EXCESSIVE RIBBON ALGAE
 DISSOLUTION
 FOAM / SCUM
 OIL SHEEN
 TRASH / LITTER
 NUISANCE DEBRIS
 SLUDGE DEPOSITS
 GEOSISSOQUENTIALS

DJ MAINTENANCE Circle some & COMMENT

PUBLIC / PRIVATE / BOTH / NA
 ACTIVE / HISTORIC / BOTH / NA
 YOUNG-SUCCESSION (OLD)
 SPRAY / SNAG / REMOVED
 MODIFIED / DIPPED OUT / NA
 LEVEED / ONE SIDED
 RELOCATED / CUTOFFS
 MOVING-BEDLOAD / STABLE
 ARMORED / SLIMPS
 ISLANDS / SCOURED
 IMPOUNDED / DESICCATED
 FLOOD CONTROL / DRAINAGE

EJ ISSUES

WWTP / CSO / NPDES / INDUSTRY
 HARDENED / URBAN / DIRT & GRIME
 CONTAMINATED / LANDFILL
 BMPs - CONSTRUCTION - SEDIMENT
 LOGGING / IRRIGATION / COOLING
 BANK EROSION / SURFACE
 FALSE BANK / MANURE / LAGOON
 WASH H₂O / TILE / H₂O TABLE
 ACID / MINE / QUARRY / FLOW
 NATURAL / WETLAND / STAGNANT
 PARK / GOLF / LAWN / HOME
 ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

Width
 Depth
 Area
 Bankfull width
 W/B ratio
 Riparian tree debris
 Floodplain % width
 Wetland ratio
 Legacy Tree:

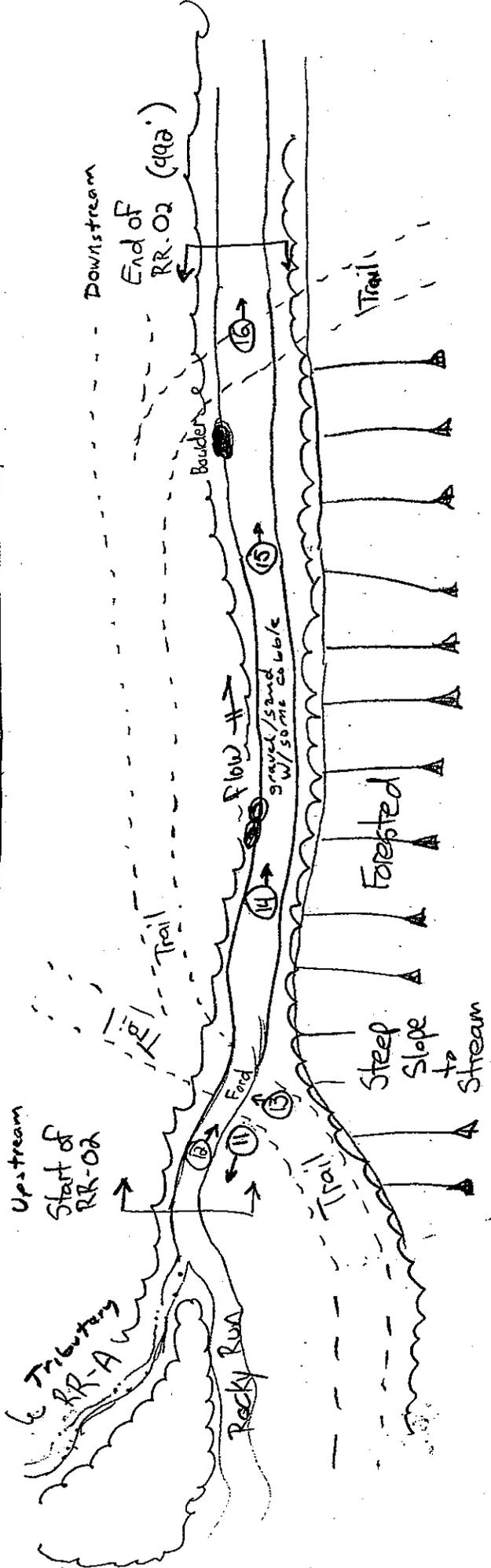
Water Quality

Time	1335
Temp	16.7 °C
pH	7.62
DO (mg/L)	7.55
Conductivity (µS/cm)	219

Pool

1335
15:16
7:08
2:13

Stream Drawing: RR-02 STATION



CEC Pebble Count Data Sheet

CEC Project 061-933.0014 Date 9.17.07

Station RR-02 Rocky Run Crew DJ, MFB, DAM, MNL, WWT

Particle	Description	Size (mm)	Particle Count		TOTAL
			Riffle/Run	Pool/Glide	
FINES	Silt/Clay	< 0.062			2
SAND	Very Fine	0.062 - 0.125			5
	Fine	0.125 - 0.25			7
	Medium	0.25 - 0.5			22
	Coarse	0.5 - 1.0			15
	Very Coarse	1.0 - 2.0			2
GRAVEL	Very Fine	2.0 - 4.0			3
	Fine	4.0 - 5.7			2
	Fine	5.7 - 8.0			2
	Medium	8.0 - 11.3			4
	Medium	11.3 - 16.0			5
	Coarse	16.0 - 22.6			5
	Coarse	22.6 - 32			1
	Very Coarse	32 - 45			4
	Very Coarse	45 - 64			5
COBBLE	Small	64 - 90			3
	Small	90 - 128			5
	Large	128 - 180			1
	Large	180 - 256			1
BOULDER	Small	256 - 362			1
	Small	362 - 512			1
	Medium	512 - 1024			2
	Large	1,024 - 2,048			0
BEDROCK	Bedrock	> 2,048			2
TOTALS→			100	0	100

2
51
31
10
4
2

Stream & Location: Rocky Run (RR-03 upstream) RM: _____ Date: 9/18/06/7

Scorers Full Name & Affiliation: MFO (CEC)
 River Code: _____ STORET #: _____ Lat./Long.: _____ 18 _____ Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<p>BEST TYPES</p> <p><input type="checkbox"/> ELDR SLABS (1) <input checked="" type="checkbox"/> BOULDER (2) <input checked="" type="checkbox"/> COBBLE (3) <input checked="" type="checkbox"/> GRAVEL (4) <input type="checkbox"/> SAND (5) <input type="checkbox"/> BEDROCK (6)</p>	<p>POOL RIFFLE</p> <p><input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>OTHER TYPES</p> <p><input type="checkbox"/> HARPAN (1) <input type="checkbox"/> DEBRIS (2) <input type="checkbox"/> MUCK (2) <input type="checkbox"/> SILT (2) <input type="checkbox"/> ARTIFICIAL (0)</p>	<p>POOL RIFFLE</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p>ORIGIN</p> <p><input type="checkbox"/> LIMESTONE (1) <input type="checkbox"/> TILES (1) <input type="checkbox"/> WETLANDS (0) <input type="checkbox"/> HARPAN (0) <input checked="" type="checkbox"/> SANDSTONE (0) <input type="checkbox"/> RIPRAP (0) <input type="checkbox"/> LAGS/DRIVE (0) <input type="checkbox"/> SHALE (1) <input type="checkbox"/> COAL FINES (2)</p>	<p>QUALITY</p> <p><input type="checkbox"/> HEAVY (2) <input type="checkbox"/> MODERATE (4) <input checked="" type="checkbox"/> NORMAL (3) <input type="checkbox"/> FREE (3) <input type="checkbox"/> EXTENSIVE (2) <input checked="" type="checkbox"/> MODERATE (4) <input checked="" type="checkbox"/> NORMAL (3) <input type="checkbox"/> NONE (1)</p>
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Check ONE (Or 2 & average)

EMBEDDEDNESS: SILT EMBEDDEDNESS

Substrate 16 1/2 Maximum 20

NUMBER OF BEST TYPES: 4 or more (2) 3 or less (0)

Comments: _____

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<p><input type="checkbox"/> UNDERCUT BANKS (1) <input type="checkbox"/> OVERHANGING VEGETATION (1) <input type="checkbox"/> SHALLOWS IN SLOW WATER (1) <input type="checkbox"/> ROOTWADS (1)</p>	<p><input type="checkbox"/> POOLS > 10m (2) <input type="checkbox"/> ROOTWADS (1) <input type="checkbox"/> BOULDERS (1)</p>	<p><input type="checkbox"/> EXBOWS/BACKWATERS (1) <input type="checkbox"/> AQUATIC MACROPHYTES (1) <input type="checkbox"/> LOGS OR WOOLY DEBRIS (1)</p>	<p>AMOUNT</p> <p>Check ONE (Or 2 & average)</p> <p><input type="checkbox"/> EXTENSIVE (2) <input type="checkbox"/> MODERATE (4) <input checked="" type="checkbox"/> SPARSE (2) <input type="checkbox"/> NEARLY ABSENT (3)</p>
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Cover 6 Maximum 20

Comments: _____

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<p>SINUOSITY</p> <p><input type="checkbox"/> HIGH (1) <input checked="" type="checkbox"/> MODERATE (2) <input checked="" type="checkbox"/> LOW (2) <input type="checkbox"/> NONE (1)</p>	<p>DEVELOPMENT</p> <p><input type="checkbox"/> EXCELLENT (1) <input checked="" type="checkbox"/> GOOD (5) <input type="checkbox"/> FAIR (6) <input type="checkbox"/> POOR (1)</p>	<p>CHANNELIZATION</p> <p><input checked="" type="checkbox"/> NONE (0) <input type="checkbox"/> RECOVERED (1) <input type="checkbox"/> RECOVERING (3) <input type="checkbox"/> RECENT OR NO RECOVERY (1)</p>	<p>STABILITY</p> <p><input type="checkbox"/> HIGH (1) <input checked="" type="checkbox"/> MODERATE (2) <input type="checkbox"/> LOW (1)</p>
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Channel 15 1/2 Maximum 20

Comments: _____

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p>EROSION</p> <p><input checked="" type="checkbox"/> NONE/LITTLE (3) <input type="checkbox"/> MODERATE (2) <input type="checkbox"/> HEAVY/SEVERE (1)</p>	<p>RIPARIAN WIDTH</p> <p><input checked="" type="checkbox"/> WIDE > 50m (1) <input type="checkbox"/> MODERATE 10-50m (3) <input type="checkbox"/> NARROW 5-10m (2) <input type="checkbox"/> VERY NARROW < 5m (1) <input type="checkbox"/> NONE (0)</p>	<p>FLOOD PLAIN QUALITY</p> <p><input checked="" type="checkbox"/> FOREST SWAMP (1) <input type="checkbox"/> SHRUB OR OLD FIELD (2) <input type="checkbox"/> RESIDENTIAL/PARK/NEW FIELD (1) <input type="checkbox"/> FENCED PASTURE (1) <input type="checkbox"/> OPEN PASTURE/ROWCROP (0)</p>	<p><input type="checkbox"/> CONSERVATION/HILLAGE (1) <input type="checkbox"/> URBAN OR INDUSTRIAL (0) <input type="checkbox"/> MINING/CONSTRUCTION (0)</p>
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Indicate predominant land use(s) past 100m riparian.

Riparian 9 1/2 Maximum 10

Comments: Right descending bank steeper than left bank

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<p>MAXIMUM DEPTH</p> <p>Check ONE (ONLY!)</p> <p><input type="checkbox"/> > 1m (1) <input type="checkbox"/> 0.7-1m (2) <input type="checkbox"/> 0.4-0.7m (2) <input checked="" type="checkbox"/> 0.2-0.4m (1) <input type="checkbox"/> < 0.2m (0)</p>	<p>CHANNEL WIDTH</p> <p>Check ONE (Or 2 & average)</p> <p><input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH (1) <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH (1) <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH (0)</p>	<p>CURRENT VELOCITY</p> <p>Check ALL that apply</p> <p><input type="checkbox"/> TORRENTIAL (1) <input type="checkbox"/> VERY FAST (1) <input type="checkbox"/> FAST (1) <input type="checkbox"/> MODERATE (1) <input checked="" type="checkbox"/> SLOW (1) <input type="checkbox"/> INTERMITTENT (1) <input type="checkbox"/> INTERMITTENT (2) <input type="checkbox"/> EDDIES (1)</p>	<p>Recreation Potential</p> <p><input type="checkbox"/> Primary Contact <input checked="" type="checkbox"/> Secondary Contact</p> <p>(circle one and comment on back)</p>
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Indicate for reach - pools and riffles.

Pool / Current 4 Maximum 12

Comments: 12" max. pool depth

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). NO RIFFLE [metric=0]

<p>RIFFLE DEPTH</p> <p><input type="checkbox"/> BEST AREAS > 10cm (2) <input type="checkbox"/> BEST AREAS 5-10cm (1) <input checked="" type="checkbox"/> BEST AREAS < 5cm (metric=0)</p>	<p>RUN DEPTH</p> <p><input type="checkbox"/> MAXIMUM > 50cm (2) <input checked="" type="checkbox"/> MAXIMUM < 50cm (1)</p>	<p>RIFFLE / RUN SUBSTRATE</p> <p><input checked="" type="checkbox"/> STABLE (e.g. Cobble, Boulder) (2) <input type="checkbox"/> MOD. STABLE (e.g. Large Gravel) (1) <input type="checkbox"/> UNSTABLE (e.g. Fine Gravel/Sand) (0)</p>	<p>RIFFLE / RUN EMBEDDEDNESS</p> <p><input type="checkbox"/> NONE (2) <input checked="" type="checkbox"/> LOW (1) <input checked="" type="checkbox"/> MODERATE (1) <input type="checkbox"/> EXTENSIVE (1)</p>
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Riffle / Run 3 1/2 Maximum 8

Comments: Average gradient

6) GRADIENT (138 ft/mi) VERY LOW-LOW (2) MODERATE (6-10) HIGH-VERY HIGH (10-5)

DRAINAGE AREA (1.4 mi²)

%POOL: 17 %GLIDE: 11 Gradient 4 Maximum 10

%RUN: _____ %RIFFLE: _____

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Reach is typical of stream, v/cw 300 ft. at zone mostly unimpacted by ATV's; bottom 192' has areas where ATV's go through the stream; but is not as severely disturbed as at Station RR-02
Photographs # 19-26

AJ SAMPLED REACH

Check ALL that apply

METHOD
 BOV MANT LINE OTHER

STAGE
 1st -sample pass--2nd
 HIGH NORMAL LOW DRY

CLARITY
 1st -sample pass--2nd
 20-30 cm 40-60 cm 80-100 cm 120-150 cm 180-200 cm 200-250 cm 250-300 cm 300-350 cm 350-400 cm 400-450 cm 450-500 cm 500-550 cm 550-600 cm 600-650 cm 650-700 cm 700-750 cm 750-800 cm 800-850 cm 850-900 cm 900-950 cm 950-1000 cm

DISTANCE
 0-100 100-200 200-300 300-400 400-500 500-600 600-700 700-800 800-900 900-1000

OTHER
 OTHER

150
 meters

CANOPY
 0-25% OPEN 25-50% OPEN 50-75% OPEN 75-100% OPEN

SECCHI DEPTH
 1st _____ cm
 2nd _____ cm

CJ RECREATION
 AREA DEPTH
 POOL: >100ft >3ft

BJ AESTHETICS

NUISANCE ALGAE
 INVASIVE MACROPHYTES
 EXCESS TURBIDITY
 DISCOLORATION
 FOAM/SCUM
 OIL SPILL
 IRREGULAR LITTER
 NUISANCE ODOR
 SLUDGE DEPOSITS
 COSS/SO/CU/FALLS

DJ MAINTENANCE

PUBLIC / PRIVATE / BOTH / NA
 ACTIVE / HISTORIC / BOTH / NA
 YOUNG-SUCCESSION-OLD
 SPRAY / SNAG / REMOVED
 MODIFIED / DIPPED OUT / NA
 LEVEED / ONE SIDED
 RELOCATED / CUTOFFS
 MOVING-BEDLOAD-STABLE
 ARMoured / SLUMPS
 ISLANDS / SCoured
 IMPOUNDED / DESICCATED
 FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

EJ ISSUES

WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT & GRIME
 CONTAMINATED / LANDFILL
 BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING
 BANK EROSION / SURFACE FALSE BANK / MANURE / LAGOON
 WASH H₂O / TILE / H₂O TABLE
 ACID / MINE / QUARRY / FLOW
 NATURAL / WETLAND / STAGNANT
 PARK / GOLF / LAWN / HOME
 ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

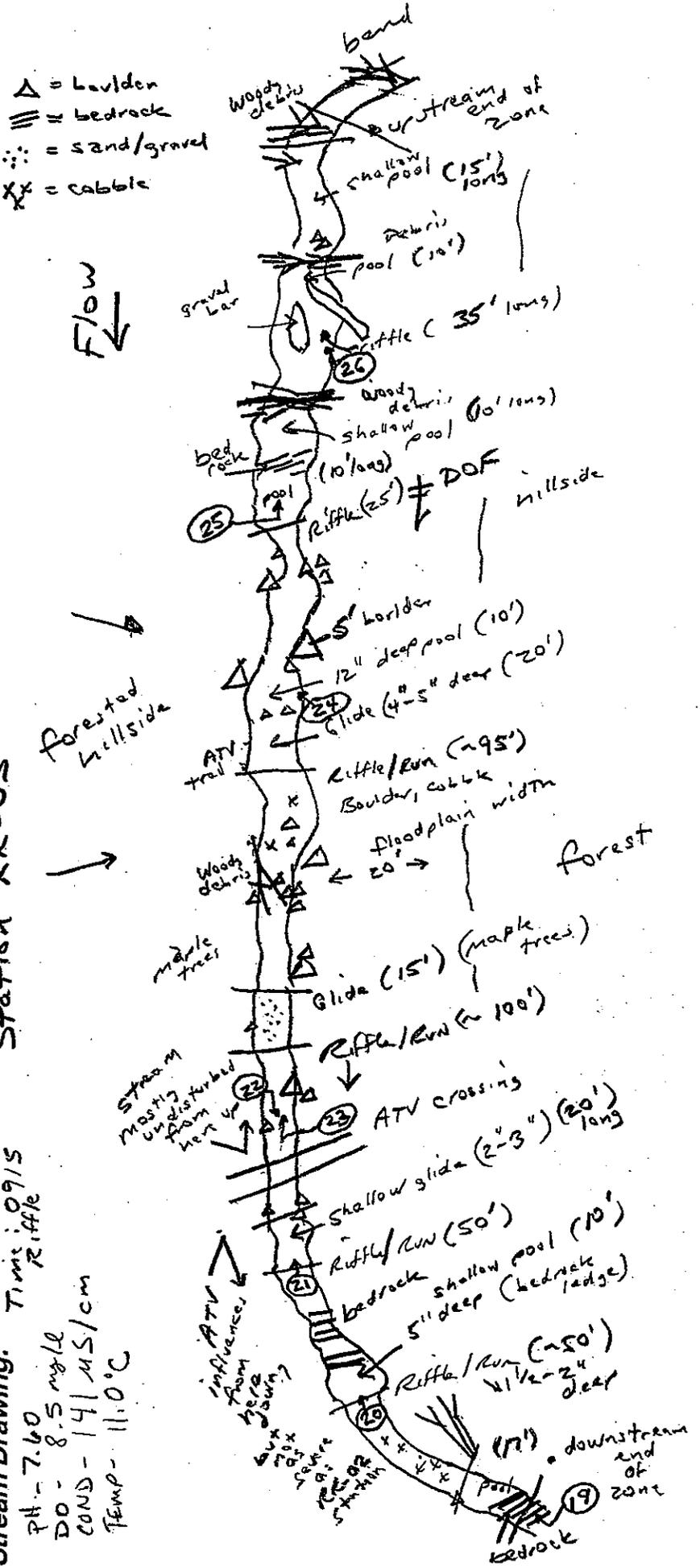
WIDTH
 DEPTH
 OPEN-DEPTH
 BANKFULL WIDTH
 BANKFULL X DEPTH
 W/B RATIO
 CHANNEL MAX. DEPTH
 FLOW VELOCITY
 CHANNEL WIDTH
 CHANNEL RATIO

Legacy Tree:

Stream Drawing:

Time: 09/15
 Riffle
 pH - 7.60
 DO - 8.5 mg/l
 COND - 141 μS/cm
 Temp - 11.0°C

Station RR-03



- △ = Boulder
- ≡ = bedrock
- ∴ = sand/gravel
- xx = cobbles

CEC Pebble Count Data Sheet

CEC Project 061-933.0014 Date 9-18-07
 Station Rocky Run (RR-03 - upstream) Crew MFP, WWT, DSP, MNL

Particle	Description	Size (mm)	Particle Count		TOTAL
			Riffle/Run	Pool/Glide	
FINES	Silt/Clay	< 0.062		###-###	10
SAND	Very Fine	0.062 - 0.125			1
	Fine	0.125 - 0.25			3
	Medium	0.25 - 0.5	###		8
	Coarse	0.5 - 1.0			
	Very Coarse	1.0 - 2.0			7
GRAVEL	Very Fine	2.0 - 4.0			4
	Fine	4.0 - 5.7			5
	Fine	5.7 - 8.0			2
	Medium	8.0 - 11.3			2
	Medium	11.3 - 16.0			6
	Coarse	16.0 - 22.6	###		5
	Coarse	22.6 - 32			2
	Very Coarse	32 - 45			5
	Very Coarse	45 - 64			4
COBBLE	Small	64 - 90			6
	Small	90 - 128			3
	Large	128 - 180			5
	Large	180 - 256			2
BOULDER	Small	256 - 362			3
	Small	362 - 512			1
	Medium	512 - 1024			2
	Large	1,024 - 2,048			2
BEDROCK	Bedrock	> 2,048	###	###	12
TOTALS→			59	41	100

} 10
 } 19
 } 35
 } 16
 } 8
 } 12

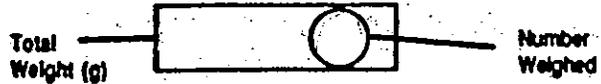
Fish Data Sheet

Used 2
Smith-Roof model 12B
Backpack for survey.

Field Crew: Collector MFO, WWT, Recorder MNL, DJP Time of Day: 0955 Page 1 of 1
 River/Stream: Rocky Run Location: RR-03 (upstream station)
 Date: 9-18-07 Sampler Type: BACKPACK F Time Fished: " " Total Seconds 719 sec
 River Code: _____ Depth: 1 1/2" - 12" Started _____ Observed Flow: 10-156cm
 RM: _____ Data Source: _____ ~ 0955 Number of Species: 3
 Distance: 150 meters

Anomalies: A-anchor worm; B-black spot; C-leeches; D-deformities; E-eroded fins; F-fungus; L-lesions; M-multiple DELT anomalies; N-blind; P-parasites; Y-popeye; S-emaciated; W-swirled scales; T-tumors; Z-other. (H-Heavy; L-Light are combined with anomalies A, B, and C)

SPECIES	# WEIGHED	TOTAL COUNTED	WEIGHT (GRAMS)				ANOMALIES			
		125								
BLACKNOSE DACE		13+18+6+7+12+5+5+4+ 5+6+4+5+2+8+6+5+2+9 +11								
CREEK CRAYD		31								
MOTTLED SCULPIN		37								



SITE NAME/LOCATION Rocky Run (Trib RR-A)

SITE NUMBER RIVER BASIN DRAINAGE AREA (mi²) <1

LENGTH OF STREAM REACH (ft) 200 LAT. LONG. RIVER CODE RIVER MILE

DATE 9-17-07 SCORER MFO 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

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

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> Bldr Slabs (6 pts)	<input type="checkbox"/> 0%	<input type="checkbox"/> Silt (3 pts)	<input type="checkbox"/> 5%
<input type="checkbox"/> Boulder (5-256 mm) (6 pts)	<input checked="" type="checkbox"/> 5%	<input type="checkbox"/> Leaf Pack/Woody Debris (3 pts)	<input type="checkbox"/> 0%
<input type="checkbox"/> Bedrock (16 pts)	<input type="checkbox"/> 0%	<input type="checkbox"/> Fine Detritus (3 pts)	<input type="checkbox"/> 0%
<input type="checkbox"/> Cobble (6-256 mm) (2 pts)	<input checked="" type="checkbox"/> 15%	<input type="checkbox"/> Clay or Hardpan (0 pts)	<input type="checkbox"/> 0%
<input checked="" type="checkbox"/> Gravel (2-64 mm) (9 pts)	<input checked="" type="checkbox"/> 50%	<input type="checkbox"/> Muck (0 pts)	<input type="checkbox"/> 0%
<input checked="" type="checkbox"/> Sand (<2 mm) (4 pts)	<input checked="" type="checkbox"/> 30%	<input type="checkbox"/> Artificial (3 pts)	<input type="checkbox"/> 0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 20% (A) 0% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15 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 type="checkbox"/> 5-10 cm (15 pts)
<input checked="" type="checkbox"/> 15-30 cm (10 pts)	<input type="checkbox"/> No water or no visible channel (0 pts)
<input type="checkbox"/> 10-22.5 cm (25 pts)	

COMMENTS MAXIMUM POOL DEPTH (centimeters): 6"

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

<input type="checkbox"/> 30 meters (30 pts)	<input type="checkbox"/> 10m - 15m (30 pts)
<input checked="" type="checkbox"/> 10m - 20m (20 pts)	<input type="checkbox"/> 10m - 15m (30 pts)
<input type="checkbox"/> 10m - 30m (20 pts)	<input type="checkbox"/> 10m - 15m (30 pts)

COMMENTS AVERAGE BANKFULL WIDTH (meters): 2 1/2

HHEI Metric Points

Substrate Max = 40

20

A + B

Pool Depth Max = 30

25

Bankfull Width Max=30

20

This information must also be completed

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

RIPARIAN WIDTH		FLOODPLAIN QUALITY	
L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wide >10m		(Mature Forest) Wetland	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field	
<input 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	
COMMENTS <u>maple, elm</u>		<input type="checkbox"/>	<input type="checkbox"/>
		Conservation Tillage	
		Urban or Industrial	
		Open Pasture, Row Crop	
		Mining or Construction	

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 ~ 10 GPM

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

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

STREAM GRADIENT ESTIMATE

<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: Rocky Run Distance from Evaluated Stream 250 feet
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: Wellsville NRCS Soil Map Page: NRCS Soil Map Stream Order
 County: Wyandot Columbiana Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Quantity: 0.00
 Photograph Information: Photo 17 (downstream), 18 (upstream)
 Elevated Turbidity? (Y/N): No Canopy (% open): 10%
 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) 14.7 Dissolved Oxygen (mg/l) 7.30 pH (S.U.) 7.94 Conductivity (µmhos/cm) 260
 Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

For lower end flow / No flow 1/4 mile upstream

Additional comments/description of pollution impacts: siltation in stream below boulder falls

BIOTIC EVALUATION

3 Surber samples from riffle, 1 Qual. D-frame from pool/glide, Woody debris

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) Y see below

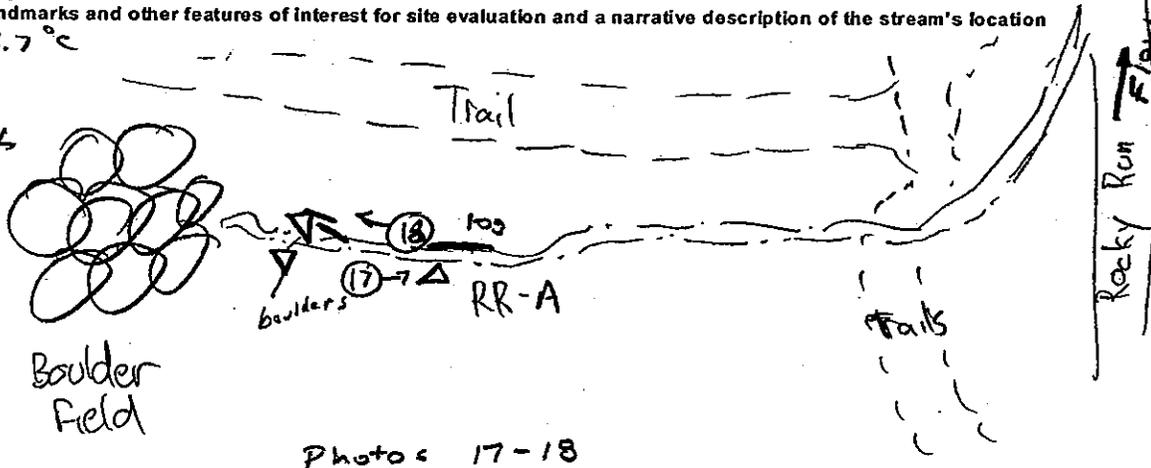
Comments Regarding Biology: _____

1515 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

pool
9-17-07
 Water Temp = 14.7°C
 pH = 7.94
 Cond = 260 µS/cm
 D.O. = 7.30 mg/l

FLOW →



1. Fish:

Voucher Specimens Retained? (select)

Time Spent (minutes):

Sample Method No Evaluation

Stream Length Assessed (meters)

Species	Number Caught	Notes
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

2. Salamanders:

Voucher Specimens Retained? (circle) N

Time Spent (minutes):

Sample Method No Evaluation

Stream Length Assessed (meters)

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Northern Dusky (<i>Desmognathus fuscus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Two-lined (<i>Eurycea bislineata</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Long-tailed (<i>Eurycea longicauda</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Cave (<i>Eurycea lucifuga</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Red (<i>Pseudotriton ruber</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Mud (<i>Pseudotriton montanus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Spring (<i>Gyrinophilus porphyriticus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Mole spp. (<i>Ambystoma spp.</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Four-toed (<i>Hemidactylium scutatum</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Other (name) <input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Total	0	0	0

Notes on Vertebrates:

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)	NA 0	Crayfish (Decapoda) (HMFEI pts = 2)	NA 0	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	NA 0
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) (HMFEI pts = 1)	NA 0	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	NA 0	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	NA 0
Sow Bugs (Isopoda) (HMFEI pts = 1)	NA 0	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) (HMFEI pts = 2)	NA 0	Cranefly Larvae (Tipulidae) (HMFEI pts = 3)	NA 0
Scuds (Amphipoda) (HMFEI pts = 1)	NA 0	Larvae of other Flies (enter name in comments) (Diptera): (HMFEI pts = 1)	NA 0	EPT TAXA* Total No. EPT Taxa = 0	
Water Mites (Hydracarina) (HMFEI pts = 1)	NA 0	Midges (Chironomidae) (HMFEI pts = 1)	NA 0	Mayfly Nymphs (Ephemeroptera) Taxa Present: 0 HMFEI pts = NA 0 No. Taxa (x) 3] 0	
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	NA 0	Snails (Gastropoda) (HMFEI pts = 1)	NA 0		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	NA 0	Clams (Bivalvia) (HMFEI pts = 1)	NA 0	Stonefly Nymphs (Plecoptera) Taxa Present: 0 HMFEI pts = NA 0 No. Taxa (x) 3] 0	
Other Beetles (Coleoptera) (HMFEI pts = 1)	NA 0	Other Taxa : []			
Other Taxa: []		Other Taxa: []		Caddisfly Larvae (Trichoptera) Taxa Present: 0 HMFEI pts = NA 0 No. Taxa (x) 3] 0	
Other Taxa: []		Other Taxa []			

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

Voucher Sample ID []

Time Spent (minutes): []

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

HMFEI assessment not performed; Qualitative D-frame sample collected for laboratory analysis

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

NA

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

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

QHEI PERFORMED? - Yes No QHEI Score N/A (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

WWH Name: Ohio River Distance from Evaluated Stream ~4000 feet
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: Wellsville NRCS Soil Map Page: _____ NRCS Soil Map Stream Order Intermittent
 County: Wyandot Columbiana Township / City: Wellsville

MISCELLANEOUS

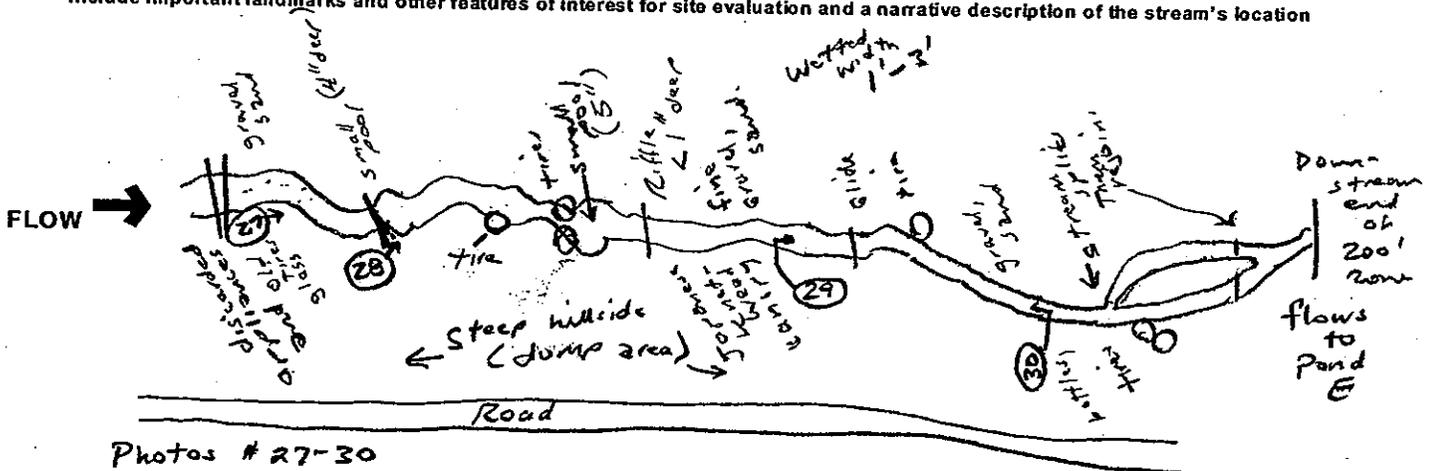
Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: 0.00
 Photograph Information: Photographs Flow < 5 gpm
 Elevated Turbidity? (Y/N): N Canopy (% open): 100%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: N/A
 Time: 1100
 Field Measures: Temp (°C) 12.7 Dissolved Oxygen (mg/l) 8.0 pH (S.U.) 7.35 Conductivity (µmhos/cm) 266
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: Representative in terms of habitat, but hillside dump for extended distance downstream.
 Additional comments/description of pollution impacts: Hillside dump on Right descending bank, appears to have been there for quite a while (10 years or more).

BIOTIC EVALUATION

One qualitative sample collected with D-frame net. 2 kicks in riffle/run, 2 jabs in pool/glide
 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 (1 larva) Voucher? (Y/N) N
 Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) Q one qualitative sample collected
 Comments Regarding Biology: Seeds, 1 crayfish 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



1. Fish: Voucher Specimens Retained? (select) Time Spent (minutes):
 Sample Method No Evaluation Stream Length Assessed (meters)

Species	Number Caught	Notes

2. Salamanders: Voucher Specimens Retained? (circle) N Time Spent (minutes):
 Sample Method No Evaluation Stream Length Assessed (meters)

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	0	0	0
Northern Dusky (<i>Desmognathus fuscus</i>)	0	0	0
Two-lined (<i>Eurycea bislineata</i>)	0	0	0
Long-tailed (<i>Eurycea longicauda</i>)	0	0	0
Cave (<i>Eurycea lucifuga</i>)	0	0	0
Red (<i>Pseudotriton ruber</i>)	0	0	0
Mud (<i>Pseudotriton montanus</i>)	0	0	0
Spring (<i>Gyrinophilus porphyriticus</i>)	0	0	0
Mole spp. (<i>Ambystoma spp.</i>)	0	0	0
Four-toed (<i>Hemidactylium scutatum</i>)	0	0	0
Other (name) <input type="text"/>	0	0	0
Total	0	0	0

Notes on Vertebrates:

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" value="NA"/> <input type="text" value="0"/>	Crayfish (Decapoda) (HMFEI pts = 2)	<input type="text" value="NA"/> <input type="text" value="0"/>	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	<input type="text" value="NA"/> <input type="text" value="0"/>
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	<input type="text" value="NA"/> <input type="text" value="0"/>	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	<input type="text" value="NA"/> <input type="text" value="0"/>
Sow Bugs (Isopoda) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Rifle Beetles (Dryopidae, Elmidae, Ptilodactylidae) (HMFEI pts = 2)	<input type="text" value="NA"/> <input type="text" value="0"/>	Cranefly Larvae (Tipulidae) (HMFEI pts = 3)	<input type="text" value="NA"/> <input type="text" value="0"/>
Scuds (Amphipoda) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Larvae of other Flies (enter name in comments) (Diptera): (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	EPT TAXA* Total No. EPT Taxa = <input type="text" value="0"/>	
Water Mites (Hydracarina) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Midges (Chironomidae) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Mayfly Nymphs (Ephemeroptera) Taxa Present: <input type="text" value="0"/> HMFEI pts = <input type="text" value="NA"/> <input type="text" value="0"/> No. Taxa (x) 3] <input type="text" value="0"/>	
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Snails (Gastropoda) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Clams (Bivalvia) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Stonefly Nymphs (Plecoptera) Taxa Present: <input type="text" value="0"/> HMFEI pts = <input type="text" value="NA"/> <input type="text" value="0"/> No. Taxa (x) 3] <input type="text" value="0"/>	
Other Beetles (Coleoptera) (HMFEI pts = 1)	<input type="text" value="NA"/> <input type="text" value="0"/>	Other Taxa : <input type="text"/>			
Other Taxa: <input type="text"/>		Other Taxa: <input type="text"/>		Caddisfly Larvae (Trichoptera) Taxa Present: <input type="text" value="0"/> HMFEI pts = <input type="text" value="NA"/> <input type="text" value="0"/> No. Taxa (x) 3] <input type="text" value="0"/>	
Other Taxa: <input type="text"/>		Other Taxa: <input type="text"/>			

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

Voucher Sample ID Time Spent (minutes):

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

HMFEI assessment not performed; Qualitative D-frame sample collected for laboratory analysis

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

NA

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 UNT-13 (TO POND E)

SITE NUMBER RIVER BASIN Ohio River DRAINAGE AREA (mi²) 2.1

LENGTH OF STREAM REACH (ft) 200 LAT. LONG. RIVER CODE RIVER MILE

DATE 9-18-07 SCORER MFO 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 REPENDS ON 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"/> Bldr Slabs (16 pts)	5%	<input type="checkbox"/> SILT (3 pts)	5%
<input type="checkbox"/> Boulder (>56 mm) (16 pts)	15%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS (3 pts)	5%
<input type="checkbox"/> Bedrock (16 pts)	5%	<input type="checkbox"/> FINE DETRITUS (15 pts)	0%
<input checked="" type="checkbox"/> Cobble (65-256 mm) (12 pts)	30%	<input type="checkbox"/> CLAY or HARD PAN (0 pt)	0%
<input checked="" type="checkbox"/> Gravel (2-63 mm) (9 pts)	30%	<input type="checkbox"/> MUCK (0 pts)	0%
<input type="checkbox"/> Sand (<2 mm) (6 pts)	5%	<input type="checkbox"/> ARTIFICIAL (3 pts)	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 55 (A) 0% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 TOTAL NUMBER OF SUBSTRATE TYPES: 8

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"/> 90+ centimeters (20 pts)	<input checked="" type="checkbox"/> 45-90 cm (15 pts)
<input type="checkbox"/> 25-30 cm (10 pts)	<input type="checkbox"/> 5-15 cm (5 pts)
<input type="checkbox"/> 10-22.5 cm (2.5 pts)	<input type="checkbox"/> NO WATER OR MOIST CHANNEL (0 pts)

COMMENTS MAXIMUM POOL DEPTH (centimeters): 10

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

<input checked="" type="checkbox"/> 40+ meters (13) (30 pts)	<input type="checkbox"/> 10-15 m (3) (15 pts)
<input type="checkbox"/> 30 m (10) (15 pts)	<input type="checkbox"/> 5-10 m (3) (10 pts)
<input type="checkbox"/> 10-30 m (3) (10 pts)	<input type="checkbox"/> 10 m (< 3) (5 pts)

COMMENTS AVERAGE BANKFULL WIDTH (meters): 1.75

HHEI Metric Points

Substrate Max = 40

29

A + B

Pool Depth Max = 30

15

Bankfull Width Max = 30

20

This information must also be completed

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

RIPARIAN WIDTH	FLOODPLAIN QUALITY	
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (Per Bank) Wide >10m	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (Most Predominant per Bank) 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 type="checkbox"/> <input type="checkbox"/> Narrow <5m	<input 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):

Stream Flowing Moist Channel, isolated pools, no flow (Intermittent)

Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral)

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

1. Fish:

Voucher Specimens Retained? (select)

Time Spent (minutes):

Sample Method No Evaluation

Stream Length Assessed (meters)

Species	Number Caught	Notes

2. Salamanders:

Voucher Specimens Retained? (circle) N

Time Spent (minutes):

Sample Method No Evaluation

Stream Length Assessed (meters)

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Northern Dusky (<i>Desmognathus fuscus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Two-lined (<i>Eurycea bislineata</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Long-tailed (<i>Eurycea longicauda</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Cave (<i>Eurycea lucifuga</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Red (<i>Pseudotriton ruber</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Mud (<i>Pseudotriton montanus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Spring (<i>Gyrinophilus porphyriticus</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Mole spp. (<i>Ambystoma spp.</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Four-toed (<i>Hemidactylium scutatum</i>)	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Other (name) <input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Total	0	0	0

Notes on Vertebrates:

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)	NA 0	Crayfish (Decapoda) (HMFEI pts = 2)	NA 0	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	NA 0
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) (HMFEI pts = 1)	NA 0	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	NA 0	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	NA 0
Sow Bugs (Isopoda) (HMFEI pts = 1)	NA 0	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) (HMFEI pts = 2)	NA 0	Cranefly Larvae (Tipulidae) (HMFEI pts = 3)	NA 0
Scuds (Amphipoda) (HMFEI pts = 1)	NA 0	Larvae of other Flies (enter name in comments) (Diptera): (HMFEI pts = 1)	NA 0	EPT TAXA* Total No. EPT Taxa = 0	
Water Mites (Hydracarina) (HMFEI pts = 1)	NA 0	Midges (Chironomidae) (HMFEI pts = 1)	NA 0	Mayfly Nymphs (Ephemeroptera) Taxa Present: 0 HMFEI pts = NA No. Taxa (x) 3] NA 0	
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	NA 0	Snails (Gastropoda) (HMFEI pts = 1)	NA 0		
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	NA 0	Clams (Bivalvia) (HMFEI pts = 1)	NA 0	Stonefly Nymphs (Plecoptera) Taxa Present: 0 HMFEI pts = NA No. Taxa (x) 3] NA 0	
Other Beetles (Coleoptera) (HMFEI pts = 1)	NA 0	Other Taxa : []			
Other Taxa: []		Other Taxa: []		Caddisfly Larvae (Trichoptera) Taxa Present: 0 HMFEI pts = NA No. Taxa (x) 3] NA 0	
Other Taxa: []		Other Taxa []			

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

Voucher Sample ID [] Time Spent (minutes): []

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

HMFEI assessment not performed; Qualitative D-frame sample collected for laboratory analysis

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

NA

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 C

BENTHIC MACROINVERTEBRATE DATA

APPENDIX C
 STREAM BENTHIC MACROINVERTEBRATE DATA
 OHIO RIVER CLEAN FUELS FACILITY
 COLUMBIANA AND JEFFERSON COUNTIES, OHIO
 CEC PROJECT: 061 - 933

Phylum	Class	Order	Taxon			Total	Tolerance Value ^a	Sum	HBI
			Family	Genus	Species				
Annellida	Oligochaeta					16	10	160	
Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea		1	8	8	
Arthropoda	Insecta	Coleoptera	Dryopidae	Helichus		2	5	10	
Arthropoda	Insecta	Coleoptera	Dytiscidae			1	NA		
Arthropoda	Insecta	Coleoptera	Dytiscidae	Hydroporus		1	NA		
Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus		1	NA		
Arthropoda	Insecta	Coleoptera	Elmidae	Dubiraphia		27	4	108	
Arthropoda	Insecta	Coleoptera	Elmidae	Optoservus		1	4	4	
Arthropoda	Insecta	Coleoptera	Elmidae	Stenelmis		2	4	8	
Arthropoda	Insecta	Diptera	Ceratopogonidae			10	6	60	
Arthropoda	Insecta	Diptera	Chironomidae			127	6	762	
Arthropoda	Insecta	Diptera	Culicidae	Anopheles		1	NA	0	
Arthropoda	Insecta	Diptera	Dolichopodidae	Rhaphium		1	4	4	
Arthropoda	Insecta	Diptera	Tabanidae	Chysops		1	6	6	
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		1	3	3	
Arthropoda	Insecta	Diptera	Tipulidae	Molophilus		1	3	3	
Arthropoda	Insecta	Diptera	Tipulidae	Pseudolimnophila		3	3	9	
Arthropoda	Insecta	Diptera	Tipulidae	Tipula		1	3	3	
Arthropoda	Insecta	Ephemeroptera	Baetidae			3	4	12	
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		1	4	4	
Arthropoda	Insecta	Ephemeroptera	Caenidae	Caenis	flavistriga	1	7	7	
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Leptophlebia		2	2	4	
Arthropoda	Insecta	Megaloptera	Corydalidae	Nigronia		1	0	0	
Arthropoda	Insecta	Megaloptera	Stalidae	Stalis		1	4	4	
Arthropoda	Insecta	Odonata	Calopterygidae	Calopteryx		26	5	130	
Arthropoda	Insecta	Odonata	Coenagrionidae			1	9	9	
Arthropoda	Insecta	Plecoptera	Nemouridae			1	2	2	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	morosa group	1	4	4	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	slossonae	1	4	4	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche		4	4	16	
						241		1344	5.65

APPENDIX C
 STREAM BENTHIC MACROINVERTEBRATE DATA
 OHIO RIVER CLEAN FUELS FACILITY
 RR-01 - Riffle (9/17/2007)

Phylum	Class	Order	Taxon			Species	Total	Tolerance Value ^a	Sum	HBI
			Family	Genus						
Annellida	Oligochaeta						72	10	720	
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		1	4	4		
Arthropoda	Insecta	Coleoptera	Dryopidae	Helichus		1	5	5		
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus		10	4	40		
Arthropoda	Insecta	Coleoptera	Elmidae	Stenelmis		7	4	28		
Arthropoda	Insecta	Diptera	Ceratopogonidae			3	6	18		
Arthropoda	Insecta	Diptera	Chironomidae			58	6	348		
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia		1	6	6		
Arthropoda	Insecta	Diptera	Simuliidae	Simulium		1	6	6		
Arthropoda	Insecta	Diptera	Tabanidae	Chysops		1	6	6		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		39	4	156		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	flavistriga	2	4	8		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphelot	hageni	1	4	4		
Arthropoda	Insecta	Ephemeroptera	Caenidae	Caenis		1	7	7		
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella		2	1	2		
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Sternonema		1	4	4		
Arthropoda	Insecta	Odonata	Calopterygidae	Calopteryx		1	5	5		
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa		1	1	1		
Arthropoda	Insecta	Plecoptera	Leuctridae	Leuctra		1	0	0		
Arthropoda	Insecta	Plecoptera	Nemouridae			1	2	2		
Arthropoda	Insecta	Plecoptera	Nemouridae	Soyedina		1	2	2		
Arthropoda	Insecta	Trichoptera	Hydropsychidae			11	4	44		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	morosa group	3	4	12		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	slossonae	21	4	84		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche		63	4	252		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	spp.	9	4	36		
Nematomorpha						15	NA			
						328		1800	5.75	

APPENDIX C
STREAM BENTHIC MACROINVERTEBRATE DATA
OHIO RIVER CLEAN FUELS FACILITY

RR-02 - Qualitative (9/17/2007)							Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species	Taxon				
Annelida	Oligochaeta						1	10	10	
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus			5	4	20	
Arthropoda	Insecta	Coleoptera	Curculionidae				1	NA		
Arthropoda	Insecta	Coleoptera	Dytiscidae				1	NA		
Arthropoda	Insecta	Coleoptera	Hydrophilidae				1	NA		
Arthropoda	Insecta	Diptera	Chironomidae				35	6	210	
Arthropoda	Insecta	Diptera	Tipulidae	Antocha			1	3	3	
Arthropoda	Insecta	Diptera	Tipulidae	Molophilus			1	3	3	
Arthropoda	Insecta	Diptera	Tipulidae	Tipula			2	3	6	
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	flavistriga		4	4	16	
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae				1	1	1	
Arthropoda	Insecta	Lepidoptera	Lepidoptera				1	5	5	
Arthropoda	Insecta	Lepidoptera	Cossidae				1	5	5	
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis			1	4	4	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Diplectrona			1	4	4	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche			1	4	4	
							58		291	5.29

RR-02 - Rittie (9/17/2007)							Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species	Taxon				
Annelida	Oligochaeta						1	10	10	
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus			4	4	16	
Arthropoda	Insecta	Diptera	Chironomidae				1	6	6	
Arthropoda	Insecta	Diptera	Culicidae	Anopheles			1	NA	0	
Arthropoda	Insecta	Diptera	Muscidae	Limnophora			1	6	6	
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	sp.		7	4	28	
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	flavistriga		15	4	60	
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae				2	1	2	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Chaumatopsyche			3	4	12	
							35		140	4.00

APPENDIX C
 STREAM BENTHIC MACROINVERTEBRATE DATA
 OHIO RIVER CLEAN FUELS FACILITY
 RR-03 - Qualitative (9/18/2007)

Taxon							Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species					
Annelida	Oligochaeta					6	10	60		
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		1	4	4		
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus		1	4	4		
Arthropoda	Insecta	Diptera	Ceratopogonidae			1	6	6		
Arthropoda	Insecta	Diptera	Ceratopogonidae	Arthropogon		1	6	6		
Arthropoda	Insecta	Diptera	Chironomidae			153	6	918		
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia		1	6	6		
Arthropoda	Insecta	Diptera	Tabanidae	Chrysops		7	6	42		
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		2	3	6		
Arthropoda	Insecta	Diptera	Tipulidae	Pseudolimnophila		1	3	3		
Arthropoda	Insecta	Diptera	Tipulidae	Tipula		2	3	6		
Arthropoda	Insecta	Ephemeroptera	Ephemereilidae			8	1	8		
Arthropoda	Insecta	Ephemeroptera	Ephemereilidae	Eurylophella		2	1	2		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Chaumatopsyche		1	4	4		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	slossonae	1	4	4		
						188		1079	5.74	

APPENDIX C
 STREAM BENTHIC MACROINVERTEBRATE DATA
 OHIO RIVER CLEAN FUELS FACILITY
 RR-03 - Riffle (9/18/2007)

Phylum	Class	Order	Taxon			Species	Total	Tolerance Value ^a	Sum	HBI
			Family	Genus						
Arthropoda	Oligochaeta									
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		58	10	580		
Arthropoda	Crustacea	Decapoda	Cambaridae	Cambarus		1	4	4		
Arthropoda	Insecta	Coleoptera	Dryopidae	Helichus		1	6	6		
Arthropoda	Insecta	Coleoptera	Elmidae	Helichus		1	5	5		
Arthropoda	Insecta	Coleoptera	Elmidae	Optoserius		14	4	56		
Arthropoda	Insecta	Coleoptera	Elmidae	Stenelmis		5	4	20		
Arthropoda	Insecta	Coleoptera	Psephenidae	Stenelmis		5	4	20		
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ecioptria		10	6	60		
Arthropoda	Insecta	Diptera	Chironomidae			63	6	378		
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia		1	6	6		
Arthropoda	Insecta	Diptera	Tabanidae	Chrysops		1	6	6		
Arthropoda	Insecta	Diptera	Tipulidae	Antocha		2	3	6		
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota		2	3	6		
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma		6	3	18		
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		1	3	3		
Arthropoda	Insecta	Diptera	Tipulidae	Pseudolimnophila		1	3	3		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		3	4	12		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		5	4	20		
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae			143	1	143		
Arthropoda	Insecta	Ephemeroptera	Ephemeridae	Ephemera		1	4	4		
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae			9	2	18		
Arthropoda	Insecta	Megaloptera	Corydalidae	Nigronia		3	0	0		
Arthropoda	Insecta	Plecoptera	Capniidae	Paracapnia		10	1	10		
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa		6	1	6		
Arthropoda	Insecta	Plecoptera	Perlidae	Acroneturia		1	1	1		
Arthropoda	Insecta	Plecoptera	Perlidae			1	2	2		
Arthropoda	Insecta	Glossosomatidae	Glossosomatidae	Glossosoma		17	0	0		
Arthropoda	Insecta	Trichoptera	Goeridae	Goera		4	3	12		
Arthropoda	Insecta	Trichoptera	Hydropsychidae			12	4	48		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche		37	4	148		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Diplectrona		8	4	32		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	sp.	1	4	4		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche		10	4	40		
Arthropoda	Insecta	Trichoptera	Philopotamidae	Wormaldia		2	3	6		
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus		4	6	24		
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila		1	0	0		
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila		1	0	0		
						450		1707	3.79	

APPENDIX C
STREAM BENTHIC MACROINVERTEBRATE DATA
OHIO RIVER CLEAN FUELS FACILITY

RR-A - Qualitative (9/17/2007)

Taxon						Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species				
Annelida	Oligochaeta					5	10	50	
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		40	4	160	
Arthropoda	Crustacea	Decapoda	Cambaridae	Cambarus		1	6	6	
Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea		2	8	16	
Arthropoda	Insecta	Diptera	Ceratopogonidae			3	6	18	
Arthropoda	Insecta	Diptera	Chironomidae			36	6	216	
Arthropoda	Insecta	Diptera	Stratiomyidae			1	6	6	
Arthropoda	Insecta	Diptera	Tabanidae	Chrysops		2	6	12	
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		1	3	3	
Arthropoda	Insecta	Diptera	Tipulidae	Molophilus		1	3	3	
Arthropoda	Insecta	Diptera	Tipulidae	Pseudolimnophila		3	3	9	
Arthropoda	Insecta	Lepidoptera				1	5	5	
Arthropoda	Insecta	Plecoptera	Capniidae	Paracapnia		1	1	1	
						97		505	5.21

RR-A - Riffle (9/17/2007)

Taxon						Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species				
Annelida	Oligochaeta					5	10	50	
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		316	4	1264	
Arthropoda	Crustacea	Decapoda	Cambaridae	Cambarus		1	6	6	
Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea		1	8	8	
Arthropoda	Insecta	Colleoptera	Psephenidae	Ectopria		4	4	16	
Arthropoda	Insecta	Diptera	Chironomidae			8	6	48	
Arthropoda	Insecta	Diptera	Tabanidae	Chrysops		1	6	6	
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		2	3	6	
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		2	4	8	
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae			1	1	1	
Arthropoda	Insecta	Plecoptera	Leuctridae	Leuctra		3	0	0	
Arthropoda	Insecta	Plecoptera	Capniidae	Paracapnia		9	1	9	
Arthropoda	Insecta	Plecoptera	Chloroperidae	Swellisa		1	1	1	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Diplectrona		38	4	152	
Arthropoda	Insecta	Trichoptera	Rhyacophiliidae	Rhyacophila		2	1	2	
Nematomorpha						1	NA		
						395		1577	4.00

APPENDIX C
STREAM BENTHIC MACROINVERTEBRATE DATA
OHIO RIVER CLEAN FUELS FACILITY

UNT-A - Qualitative (9/18/2007)							Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species					
Arthropoda	Oligochaeta					2	10	20		
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		473	4	1892		
Arthropoda	Crustacea	Decapoda	Cambaridae	Cambarus		1	6	6		
Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea		29	8	232		
Arthropoda	Insecta	Diptera	Chironomidae			4	6	24		
Arthropoda	Insecta	Diptera	Tabanidae	Chrysops		2	6	12		
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		5	3	15		
Arthropoda	Insecta	Diptera	Tipulidae	Tipula		6	3	18		
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae			1	2	2		
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa		1	1	1		
Arthropoda	Insecta	Trichoptera	Limnephilidae			22	4	88		
						546		2310		4.23

UNT-B - Qualitative (9/18/2007)							Total	Tolerance Value ^a	Sum	HBI
Phylum	Class	Order	Family	Genus	Species					
Annelida	Oligochaeta					2	10	20		
Arthropoda	Crustacea	Amphipoda	Gammaridae	Gammarus		229	4	916		
Arthropoda	Crustacea	Decapoda	Cambaridae	Cambarus		2	6	12		
Arthropoda	Crustacea	Isopoda	Asellidae	Caecidotea		19	8	152		
Arthropoda	Insecta	Coleoptera	Psephenidae	Ectopria		6	4	24		
Arthropoda	Insecta	Diptera	Ceratopogonidae			3	6	18		
Arthropoda	Insecta	Diptera	Chironomidae			44	6	264		
Arthropoda	Insecta	Diptera	Tabanidae	Chrysops		2	6	12		
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		3	3	9		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Dipheter	hageni	1	4	4		
Arthropoda	Insecta	Megaloptera	Corydalidae	Nigronia		1	0	0		
Arthropoda	Insecta	Trichoptera	Hydropsychidae			4	4	16		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Diplectrona		17	4	68		
Arthropoda	Insecta	Trichoptera	Limnephilidae			2	4	8		
Platyhelminthes	Turbellaria	Tricladida	Planariidae			1	4	4		
						336		1527		4.54

NA = Not Applicable
^a USEPA (1989) and (1990) Tolerance Values

APPENDIX D

**PRIMARY HEADWATER HABITAT EVALUATION (HHEI) FORMS
AND CEC STREAM OBSERVATIONS FIELD DATA SHEETS**

2006 SURVEY

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Ohio River Clean Fuel Facility

Class II SITE NUMBER RR-A (p) RIVER BASIN Ohio DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE Oct 11, 2006 SCORER Parise COMMENTS Combination of HHEI Score & Biology

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"/> Bldr Slabs [16 pts]	0.0%	<input type="checkbox"/> SILT [3 pt]	10.0%
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0.0%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
<input type="checkbox"/> BEDROCK [16 pt]	0.0%	<input type="checkbox"/> FINE DETRITUS [3 pts]	0.0%
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	45.0%	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	25.0%
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10.0%	<input type="checkbox"/> MUCK [0 pts]	0.0%
<input type="checkbox"/> SAND (<2 mm) [6 pts]	10.0%	<input type="checkbox"/> ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 45.0% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 5

HHEI Metric Points

Substrate Max = 40

17

A + B

Pool Depth Max = 30

30

Bankfull Width Max=30

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 type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input checked="" 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): 23.0

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 checked="" type="checkbox"/> > 1.0 m - 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]	

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 0.64

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	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Per Bank) Wide >10m		(Most Predominant per Bank) Mature Forest, Wetland		Conservation Tillage	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field		Urban or Industrial	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture		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 _____

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 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: _____ Distance from Evaluated Stream _____
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: Wellsville NRCS Soil Map Page: 92 NRCS Soil Map Stream Order _____
 County: Columbiana Township / City: Yellow Creek/Wellsville

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Oct 11, 2006 Quantity: _____

Photograph Information: See Map Below

Elevated Turbidity? (Y/N): N Canopy (% open): 45%

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

Field Measures: Temp (°C) 14.80 Dissolved Oxygen (mg/l) 8.56 pH (S.U.) 6.91 Conductivity (µmhos/cm) 172

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

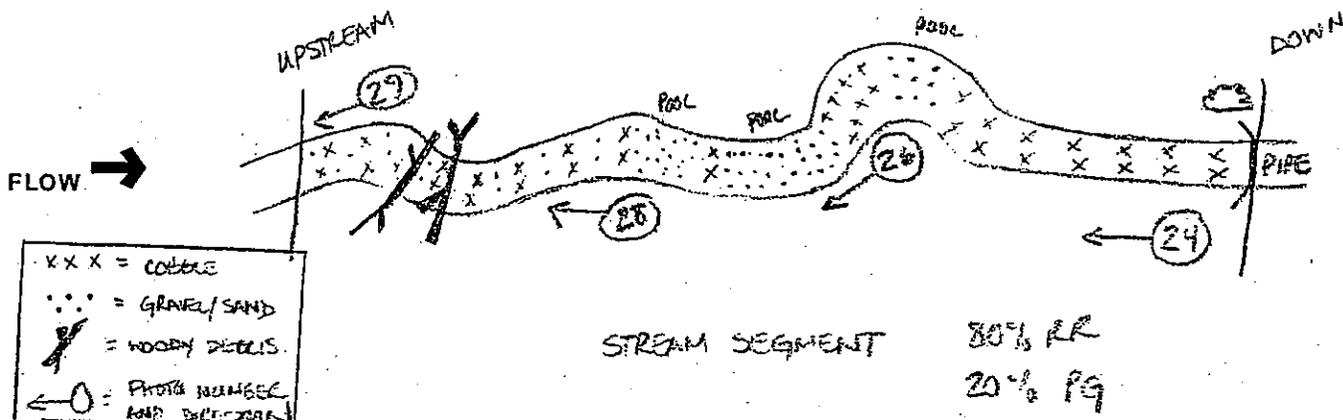
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) 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: _____

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



Ohio River Clean Fuel Facility

1. Fish: Voucher Specimens Retained? (select) ^N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species	Number Caught	Notes
Blank	0	
	0	
	0	
	0	
	0	

2. Salamanders: Voucher Specimens Retained? (circle) ^N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	0	0	0
Northern Dusky (<i>Desmognathus fuscus</i>)	0	0	0
Two-lined (<i>Eurycea bislineata</i>)	0	0	0
Long-tailed (<i>Eurycea longicauda</i>)	0	0	0
Cave (<i>Eurycea lucifuga</i>)	0	0	0
Red (<i>Pseudotriton ruber</i>)	0	0	0
Mud (<i>Pseudotriton montanus</i>)	0	0	0
Spring (<i>Gyrinophilus porphyriticus</i>)	0	0	0
Mole spp. (<i>Ambystoma spp.</i>)	0	0	0
Four-toed (<i>Hemidactylium scutatum</i>)	0	0	0
Other (name)	0	0	0
Total	0	0	0

Notes on Vertebrates: _____

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) NA <input type="text" value="0"/> (HMFEI pts = 1)	Crayfish (Decapoda) NA <input type="text" value="0"/> (HMFEI pts = 2)	Fishfly Larvae (Corydalidae) NA <input type="text" value="0"/> (HMFEI pts = 3)
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) C <input type="text" value="1"/> (HMFEI pts = 1)	Dragonfly Nymphs (Anisoptera) NA <input type="text" value="0"/> (HMFEI pts = 2)	Water Penny Beetles (Psephenidae) NA <input type="text" value="0"/> (HMFEI pts = 3)
Sow Bugs (Isopoda) NA <input type="text" value="0"/> (HMFEI pts = 1)	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) NA <input type="text" value="0"/> (HMFEI pts = 2)	Cranefly Larvae (Tipulidae) R <input type="text" value="3"/> (HMFEI pts = 3)
Scuds (Amphipoda) NA <input type="text" value="0"/> (HMFEI pts = 1)	Larvae of other Flies (enter name in comments) (Diptera): NA <input type="text" value="0"/> (HMFEI pts = 1)	EPT TAXA* Total No. EPT Taxa = <u>3</u>
Water Mites (Hydracarina) NA <input type="text" value="0"/> (HMFEI pts = 1)	Midges (Chironomidae) NA <input type="text" value="0"/> (HMFEI pts = 1)	Mayfly Nymphs (Ephemeroptera) Taxa Present: 1 HMFEI pts = R <input type="text" value="3"/> No. Taxa (x) 3]
Damselfly Nymphs (Zygoptera) NA <input type="text" value="0"/> (HMFEI pts = 1)	Snails (Gastropoda) NA <input type="text" value="0"/> (HMFEI pts = 1)	Stonefly Nymphs (Plecoptera) Taxa Present: 0 HMFEI pts = NA <input type="text" value="0"/> No. Taxa (x) 3]
Alderfly Larvae (Sialidae) NA <input type="text" value="0"/> (HMFEI pts = 1)	Clams (Bivalvia) NA <input type="text" value="0"/> (HMFEI pts = 1)	
Other Beetles (Coleoptera) NA <input type="text" value="0"/> (HMFEI pts = 1)	Other Taxa:	
Other Taxa:	Other Taxa:	Caddisfly Larvae (Trichoptera) Taxa Present: 2 HMFEI pts = C <input type="text" value="6"/> No. Taxa (x) 3]
Other Taxa:	Other Taxa:	

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

Voucher Sample ID _____

Time Spent (minutes): 15

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

Representative of RR-A (per) _____

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

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



**FIELD DATA SHEET
STREAM OBSERVATIONS**

Project:	Ohio River Clean Fuel Facility	Date:	10/11/2006
CEC Project No:	061-933	County:	Columbiana
Stream Name:	RR-A	State:	Ohio
Investigators:	D. Parise & M. Nagy - CEC	Classification:	Perennial
General Location Southwest of Wellsville, Ohio			

Streambed Composition	Check only dominant substrate types			
	<input checked="" type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Silt/Clay	<input checked="" type="checkbox"/> Sand	<input type="checkbox"/> Boulder
	<input checked="" type="checkbox"/> Gravel	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetated	

Defined Bed and Bank?	Yes
Estimated Flow (gal/min):	10 - 20 GPM
Estimated Width (ft):	1 - 3
Estimated Depth (in):	1 - 9
Weather Conditions:	Rain 62°
Heavy rainfall in last 7 days?	Yes
General Comments:	Survey ended at property boundary

Field Observations of Aquatic Biota			
	Few	Common	Abundant
Ephemeroptera (mayflies)	X		
Trichoptera (caddisflies)		X	
Plecoptera (stoneflies)			
Amphipoda (scuds)			
Chironomidae (midges)			
Coleoptera (aquatic beetles)			
Decapoda (crayfish)			
Isopoda (isopods)			
Megaloptera (dobsonflies and alderflies)			
Oligochaeta (aquatic worms)			
Platyhelminthes (flatworms)		X	
Tipulidae (crane flies)	X		
Zygoptera (damselflies and dragonflies)			
Bivalvia (mussels)			
Fish (list, if able)			
Other			

HHEI Score (sum of metrics 1, 2, 3) :

 SITE NAME/LOCATION Ohio River Clean Fuel Facility

Class II SITE NUMBER UNT-A (p) RIVER BASIN Ohio DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE Oct 12, 2006 SCORER Parise COMMENTS Combination of HHEI Score & Biology

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

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

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> Bldr Slabs [16 pts]	0.0%	<input type="checkbox"/> Silt [3 pts]	35.0%
<input type="checkbox"/> Boulder (>256 mm) [16 pts]	0.0%	<input type="checkbox"/> Leaf Pack/Woody Debris [3 pts]	0.0%
<input type="checkbox"/> Bedrock [16 pt]	0.0%	<input type="checkbox"/> Fine Detritus [3 pts]	0.0%
<input checked="" type="checkbox"/> Cobble (65-256 mm) [12 pts]	45.0%	<input type="checkbox"/> Clay or Hardpan [0 pt]	0.0%
<input type="checkbox"/> Gravel (2-64 mm) [9 pts]	20.0%	<input type="checkbox"/> Muck [0 pts]	0.0%
<input type="checkbox"/> Sand (<2 mm) [6 pts]	0.0%	<input type="checkbox"/> Artificial [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **45.0%** (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15 TOTAL NUMBER OF SUBSTRATE TYPES: 3

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

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

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 17.8

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

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 1.20

HHEI Metric Points

Substrate Max = 40
18
A + B

Pool Depth Max = 30
25

Bankfull Width Max=30
15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

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

COMMENTS _____

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

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

COMMENTS _____

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

<input type="checkbox"/> None <input type="checkbox"/> 0.5	<input type="checkbox"/> 1.0 <input type="checkbox"/> 1.5	<input type="checkbox"/> 2.0 <input type="checkbox"/> 2.5	<input checked="" type="checkbox"/> 3.0 <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: _____ Distance from Evaluated Stream _____
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: Wellsville NRCS Soil Map Page: 92 NRCS Soil Map Stream Order
 County: Columbiana Township / City: Yellow Creek/Wellsville

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Oct 11, 2006 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 75%

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

Field Measures: Temp (°C) 10.90 Dissolved Oxygen (mg/l) 9.54 pH (S.U.) 6.91 Conductivity (µmhos/cm) 225

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

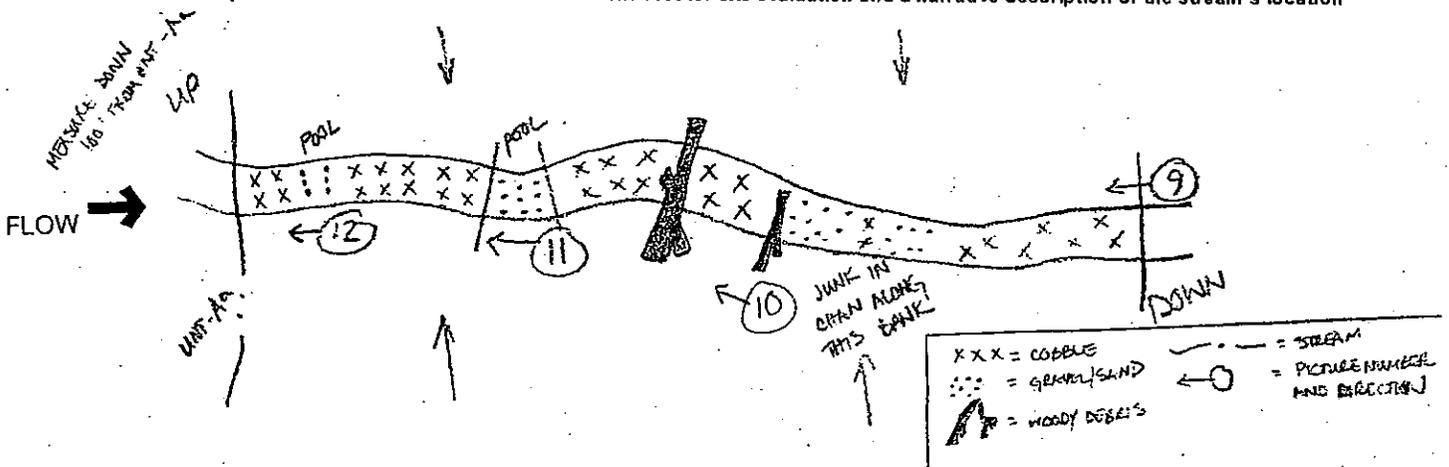
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) 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: _____

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



Ohio River Clean Fuel Facility

1. Fish: Voucher Specimens Retained? (select) N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species	Number Caught	Notes
Blank	0	
	0	
	0	
	0	
	0	

2. Salamanders: Voucher Specimens Retained? (circle) N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	0	0	0
Northern Dusky (<i>Desmognathus fuscus</i>)	0	0	0
Two-lined (<i>Eurycea bislineata</i>)	0	0	0
Long-tailed (<i>Eurycea longicauda</i>)	0	0	0
Cave (<i>Eurycea lucifuga</i>)	0	0	0
Red (<i>Pseudotriton ruber</i>)	0	0	0
Mud (<i>Pseudotriton montanus</i>)	0	0	0
Spring (<i>Gyrinophilus porphyriticus</i>)	0	0	0
Mole spp. (<i>Ambystoma spp.</i>)	0	0	0
Four-toed (<i>Hemidactylium scutatum</i>)	0	0	0
Other (name)	0	0	0
Total	0	0	0

Notes on Vertebrates: _____

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) NA 0 (HMFEI pts = 1)	Crayfish (Decapoda) NA 0 (HMFEI pts = 2)	Fishfly Larvae (Corydalidae) NA 0 (HMFEI pts = 3)
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) A 1 (HMFEI pts = 1)	Dragonfly Nymphs (Anisoptera) NA 0 (HMFEI pts = 2)	Water Penny Beetles (Psephenidae) NA 0 (HMFEI pts = 3)
Sow Bugs (Isopoda) NA 0 (HMFEI pts = 1)	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) NA 0 (HMFEI pts = 2)	Cranefly Larvae (Tipulidae) NA 0 (HMFEI pts = 3)
Scuds (Amphipoda) NA 0 (HMFEI pts = 1)	Larvae of other Flies (enter name in comments) (Diptera): NA 0 (HMFEI pts = 1)	EPT TAXA* Total No. EPT Taxa = 3
Water Mites (Hydracarina) NA 0 (HMFEI pts = 1)	Midges (Chironomidae) NA 0 (HMFEI pts = 1)	Mayfly Nymphs (Ephemeroptera) Taxa Present: 0 HMFEI pts = NA 0 No. Taxa (x) 3
Damselfly Nymphs (Zygoptera) NA 0 (HMFEI pts = 1)	Snails (Gastropoda) NA 0 (HMFEI pts = 1)	
Alderfly Larvae (Sialidae) NA 0 (HMFEI pts = 1)	Clams (Bivalvia) NA 0 (HMFEI pts = 1)	Stonefly Nymphs (Plecoptera) Taxa Present: 1 HMFEI pts = A 3 No. Taxa (x) 3
Other Beetles (Coleoptera) NA 0 (HMFEI pts = 1)	Other Taxa:	
Other Taxa:	Other Taxa:	Caddisfly Larvae (Trichoptera) Taxa Present: 2 HMFEI pts = A 6 No. Taxa (x) 3
Other Taxa:	Other Taxa:	

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

Voucher Sample ID _____

Time Spent (minutes): 15

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

Representative of UNT-A (per) _____

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

10

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



**FIELD DATA SHEET
STREAM OBSERVATIONS**

Project:	Ohio River Clean Fuel Facility	Date:	10/12/2006
CEC Project No:	061-933	County:	Columbiana
Stream Name:	UNT - A	State:	Ohio
Investigators:	D. Parise & M. Nagy - CEC	Classification:	Perennial
General Location Southwest of Wellsville, Ohio			

Streambed Composition	Check only dominant substrate types			
	<input checked="" type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Silt/Clay	<input type="checkbox"/> Sand	<input type="checkbox"/> Boulder
	<input checked="" type="checkbox"/> Gravel	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetated	

Defined Bed and Bank?	Yes
Estimated Flow (gal/min):	5 - 10 GPM
Estimated Width (ft):	0.5 - 4
Estimated Depth (in):	1 - 7
Weather Conditions:	Cloudy 35°
Heavy rainfall in last 7 days?	Yes
General Comments:	

Field Observations of Aquatic Biota			
	Few	Common	Abundant
Ephemeroptera (mayflies)			
Trichoptera (caddisflies)			X
Plecoptera (stoneflies)			
Amphipoda (scuds)			X
Chironomidae (midges)			
Coleoptera (aquatic beetles)			
Decapoda (crayfish)			
Isopoda (isopods)			
Megaloptera (dobsonflies and alderflies)			
Oligochaeta (aquatic worms)			
Platyhelminthes (flatworms)			X
Tipulidae (crane flies)			
Zygoptera (damselflies and dragonflies)			
Bivalvia (mussels)			
Fish (list, if able)			
Other			

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Ohio River Clean Fuel Facility
 Class II SITE NUMBER UNT-B (p) RIVER BASIN Ohio DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE Oct 12, 2006 SCORER Parise COMMENTS Combination of HHEI Score & Biology

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 IN 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"/> BLDR SLABS (16 pts)	0.0%	<input type="checkbox"/> SILT (3 pt)	0.0%
<input type="checkbox"/> BOULDER (>256 mm) (16 pts)	5.0%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS (3 pts)	0.0%
<input type="checkbox"/> BEDROCK (16 pt)	10.0%	<input type="checkbox"/> FINE DETRITUS (3 pts)	0.0%
<input checked="" type="checkbox"/> COBBLE (65-256 mm) (12 pts)	50.0%	<input type="checkbox"/> CLAY or HARDPAN (0 pt)	0.0%
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) (9 pts)	35.0%	<input type="checkbox"/> MUCK (0 pts)	0.0%
<input type="checkbox"/> SAND (<2 mm) (6 pts)	0.0%	<input type="checkbox"/> ARTIFICIAL (3 pts)	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 65.0% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 TOTAL NUMBER OF SUBSTRATE TYPES: 4

HHEI Metric Points
Substrate Max = 40
25
A + B

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

> 30 centimeters (20 pts)
 > 22.5 - 30 cm (30 pts)
 > 10 - 22.5 cm (25 pts)
 > 5 cm - 10 cm (15 pts)
 < 5 cm (5 pts)
 NO WATER OR MOIST CHANNEL (0 pts)

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 25.4

Pool Depth Max = 30
30

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

> 4.0 meters (30 pts)
 > 3.0 m - 4.0 m (25 pts)
 > 1.5 m - 3.0 m (20 pts)
 > 1.0 m - 1.5 m (15 pts)
 < 1.0 m (5 pts)

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 2.16

Bankfull Width Max=30
20

This information must also be completed

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

RIPARIAN WIDTH		FLOODPLAIN QUALITY			
L	R	L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wide >10m		Mature Forest, Wetland		Conservation Tillage	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field		Urban or Industrial	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture		Mining or Construction	

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):
 Stream Flowing
 Subsurface flow with isolated pools (Interstitial)
 Moist Channel, isolated pools, no flow (intermittent)
 Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):
 None
 0.5
 1.0
 1.5
 2.0
 2.5
 3.0
 >3

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

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

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

DOWNSTREAM DESIGNATED USE(S)

WWH Name: _____ Distance from Evaluated Stream _____
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: Wellsville NRCS Soil Map Page: 92 NRCS Soil Map Stream Order _____
 County: Columbiana Township / City: Yellow Creek/Wellsville

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Oct 11, 2006 Quantity: _____

Photograph Information: See Map Below

Elevated Turbidity? (Y/N): N Canopy (% open): 50%

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

Field Measures: Temp (°C) 11.80 Dissolved Oxygen (mg/l) 9.83 pH (S.U.) 7.63 Conductivity (µmhos/cm) 285

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

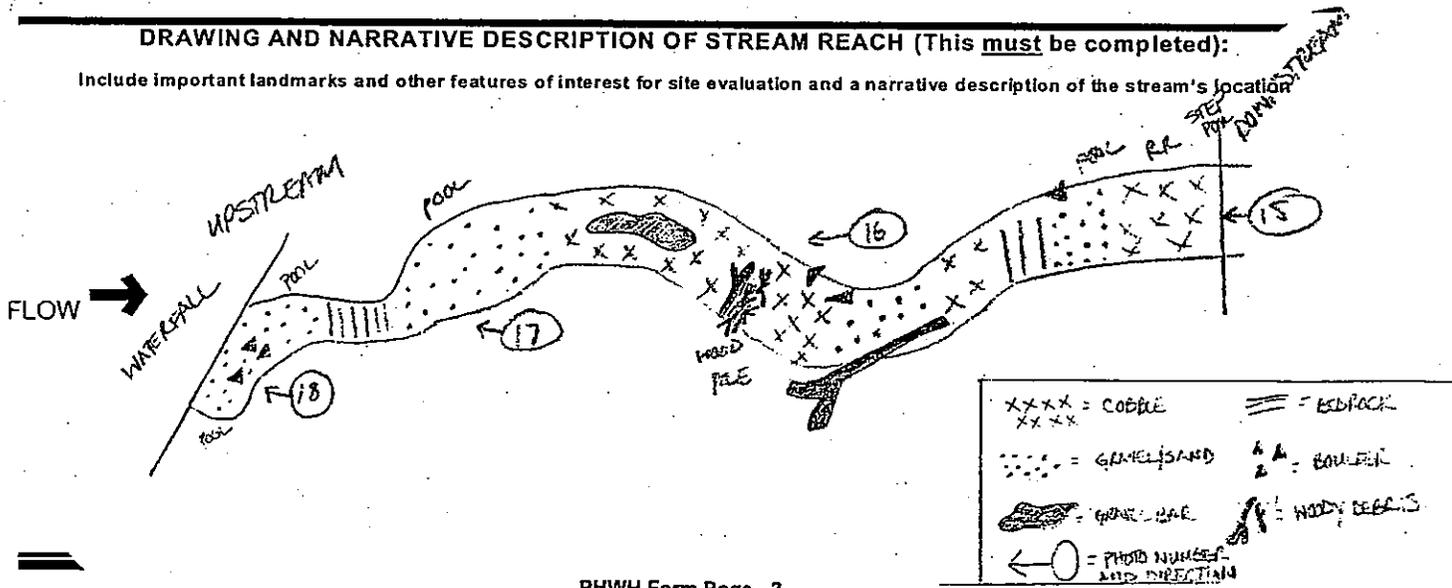
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) 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: _____

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



Ohio River Clean Fuel Facility

1. Fish: Voucher Specimens Retained? (select) N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species	Number Caught	Notes
Blank	0	
	0	
	0	
	0	
	0	

2. Salamanders: Voucher Specimens Retained? (circle) N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	0	0	0
Northern Dusky (<i>Desmognathus fuscus</i>)	0	0	0
Two-lined (<i>Eurycea bislineata</i>)	0	0	0
Long-tailed (<i>Eurycea longicauda</i>)	0	0	0
Cave (<i>Eurycea lucifuga</i>)	0	0	0
Red (<i>Pseudotriton ruber</i>)	0	0	0
Mud (<i>Pseudotriton montanus</i>)	0	0	0
Spring (<i>Gyrinophilus porphyriticus</i>)	0	0	0
Mole spp. (<i>Ambystoma spp.</i>)	0	0	0
Four-toed (<i>Hemidactylum scutatum</i>)	0	0	0
Other (name)	0	0	0
Total	0	0	0

Notes on Vertebrates: _____

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) NA 0 (HMFEI pts = 1)	Crayfish (Decapoda) NA 0 (HMFEI pts = 2)	Fishfly Larvae (Corydalidae) NA 0 (HMFEI pts = 3)
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) A 1 (HMFEI pts = 1)	Dragonfly Nymphs (Anisoptera) NA 0 (HMFEI pts = 2)	Water Penny Beetles (Psephenidae) C 3 (HMFEI pts = 3)
Sow Bugs (Isopoda) A 1 (HMFEI pts = 1)	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) NA 0 (HMFEI pts = 2)	Cranefly Larvae (Tipulidae) NA 0 (HMFEI pts = 3)
Scuds (Amphipoda) A 1 (HMFEI pts = 1)	Larvae of other Flies (enter name in comments) (Diptera): NA 0 (HMFEI pts = 1)	EPT TAXA* Total No. EPT Taxa = 3
Water Mites (Hydracarina) NA 0 (HMFEI pts = 1)	Midges (Chironomidae) R 1 (HMFEI pts = 1)	Mayfly Nymphs (Ephemeroptera) Taxa Present: 1 HMFEI pts = C 3 No. Taxa (x) 3]
Damselfly Nymphs (Zygoptera) NA 0 (HMFEI pts = 1)	Snails (Gastropoda) NA 0 (HMFEI pts = 1)	
Alderfly Larvae (Sialidae) R 1 (HMFEI pts = 1)	Clams (Bivalvia) NA 0 (HMFEI pts = 1)	Stonefly Nymphs (Plecoptera) Taxa Present: 1 HMFEI pts = A 3 No. Taxa (x) 3]
Other Beetles (Coleoptera) NA 0 (HMFEI pts = 1)	Other Taxa:	
Other Taxa:	Other Taxa:	Caddisfly Larvae (Trichoptera) Taxa Present: 1 HMFEI pts = A 3 No. Taxa (x) 3]
Other Taxa:	Other Taxa:	

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

Voucher Sample ID _____

Time Spent (minutes): **15**

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

Representative of UNT-B (per) _____

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

17

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



**FIELD DATA SHEET
STREAM OBSERVATIONS**

Project:	Ohio River Clean Fuel Facility	Date:	10/12/2006
CEC Project No:	061-933	County:	Columbiana
Stream Name:	UNT - B	State:	Ohio
Investigators:	D. Parise & M. Nagy - CEC	Classification:	Perennial
General Location Southwest of Wellsville, Ohio			

Streambed Composition	Check only dominant substrate types			
	<input checked="" type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Silt/Clay	<input type="checkbox"/> Sand	<input type="checkbox"/> Boulder
	<input checked="" type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetated	

Defined Bed and Bank?	Yes
Estimated Flow (gal/min):	> 10 GPM
Estimated Width (ft):	1 - 10
Estimated Depth (in):	1 - 10
Weather Conditions:	Cloudy 35°
Heavy rainfall in last 7 days?	Yes
General Comments:	
Channel ended at old spring house	

Field Observations of Aquatic Biota			
	Few	Common	Abundant
Ephemeroptera (mayflies)		X	
Trichoptera (caddisflies)			X
Plecoptera (stoneflies)			X
Amphipoda (scuds)			X
Chironomidae (midges)	X		
Coleoptera (aquatic beetles)		X	
Decapoda (crayfish)			
Isopoda (isopods)			X
Megaloptera (dobsonflies and alderflies)	X		
Oligochaeta (aquatic worms)			
Platyhelminthes (flatworms)			X
Tipulidae (crane flies)			
Zygoptera (damselflies and dragonflies)			
Bivalvia (mussels)			
Fish (list, if able)			
Other			

SITE NAME/LOCATION Ohio River Clean Fuel Facility

 Class II SITE NUMBER UNT-E (p) RIVER BASIN Ohio DRAINAGE AREA (mi²) _____

 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

 DATE Oct 24, 2006 SCORER Parise COMMENTS Combination of HHEI Score & Biology
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

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

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> Bldr Slabs [16 pts]	0.0%	<input type="checkbox"/> Silt [3 pt]	0.0%
<input type="checkbox"/> Boulder (>256 mm) [16 pts]	0.0%	<input type="checkbox"/> Leaf Pack/Woody Debris [3 pts]	0.0%
<input type="checkbox"/> Bedrock [16 pt]	0.0%	<input type="checkbox"/> Fine Detritus [3 pts]	0.0%
<input checked="" type="checkbox"/> Cobble (65-256 mm) [12 pts]	60.0%	<input type="checkbox"/> Clay or Hardpan [0 pt]	0.0%
<input checked="" type="checkbox"/> Gravel (2-64 mm) [9 pts]	25.0%	<input type="checkbox"/> Muck [0 pts]	0.0%
<input type="checkbox"/> Sand (<2 mm) [6 pts]	15.0%	<input type="checkbox"/> Artificial [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **60.0%** (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21 TOTAL NUMBER OF SUBSTRATE TYPES: 3

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

<input type="checkbox"/> >30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input checked="" 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): 22.9

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 checked="" type="checkbox"/> > 1.0 m - 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]	

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 1.22

HHEI Metric Points

Substrate Max = 40

24

A + B

Pool Depth Max = 30

30

Bankfull Width Max=30

15

This information must also be completed

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

RIPARIAN WIDTH		FLOODPLAIN QUALITY			
L	R	L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wide >10m		Mature Forest, Wetland		Conservation Tillage	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field		Urban or Industrial	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture		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 _____

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 type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input checked="" type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
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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: _____ Distance from Evaluated Stream _____
 CWH Name: _____ Distance from Evaluated Stream _____
 EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: Wellsville NRCS Soil Map Page: 92 NRCS Soil Map Stream Order _____
 County: Columbiana Township / City: Yellow Creek/Wellsville

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Oct 11, 2006 Quantity: _____

Photograph Information: See Map Below

Elevated Turbidity? (Y/N): N Canopy (% open): 75%

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

Field Measures: Temp (°C) 7.70 Dissolved Oxygen (mg/l) 9.12 pH (S.U.) 7.21 Conductivity (µmhos/cm) 164

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

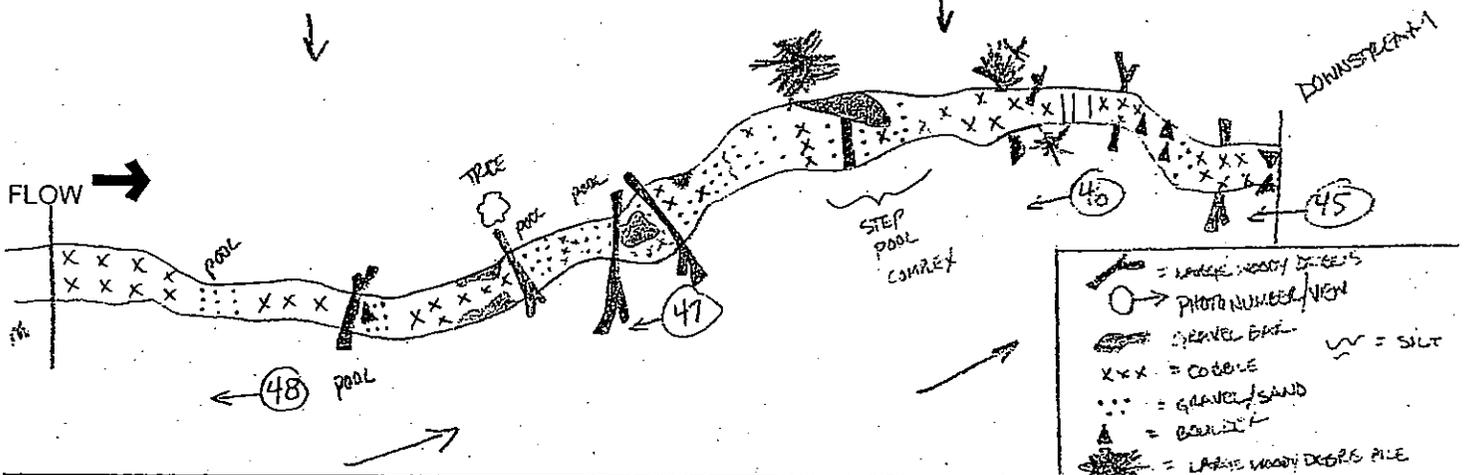
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) 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: _____

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



Ohio River Clean Fuel Facility

1. Fish: Voucher Specimens Retained? (select) ^N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species	Number Caught	Notes
Blank	0	
	0	
	0	
	0	
	0	

2. Salamanders: Voucher Specimens Retained? (circle) ^N Time Spent (minutes): _____
 Sample Method No Evaluation Stream Length Assessed (meters) _____

Species (Genus)	# Larvae	# Juveniles/Adults	Total Number
Mountain Dusky (<i>Desmognathus ochrophaeus</i>)	0	0	0
Northern Dusky (<i>Desmognathus fuscus</i>)	0	0	0
Two-lined (<i>Eurycea bislineata</i>)	0	0	0
Long-tailed (<i>Eurycea longicauda</i>)	0	0	0
Cave (<i>Eurycea lucifuga</i>)	0	0	0
Red (<i>Pseudotriton ruber</i>)	0	0	0
Mud (<i>Pseudotriton montanus</i>)	0	0	0
Spring (<i>Gyrinophilus porphyriticus</i>)	0	0	0
Mole spp. (<i>Ambystoma spp.</i>)	0	0	0
Four-toed (<i>Hemidactylium scutatum</i>)	0	0	0
Other (name)	0	0	0
Total	0	0	0

Notes on Vertebrates: _____

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) NA (HMFEI pts = 1)	0	Crayfish (Decapoda) (HMFEI pts = 2)	NA	0	Fishfly Larvae (Corydalidae) (HMFEI pts = 3)	NA	0	
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) R (HMFEI pts = 1)	1	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2)	NA	0	Water Penny Beetles (Psephenidae) (HMFEI pts = 3)	R	3	
Sow Bugs (Isopoda) (HMFEI pts = 1)	R	1	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) (HMFEI pts = 2)	NA	0	Crane-fly Larvae (Tipulidae) (HMFEI pts = 3)	NA	0
Scuds (Amphipoda) (HMFEI pts = 1)	R	1	Larvae of other Flies (enter name in comments) (Diptera): (HMFEI pts = 1)	NA	0	EPT TAXA* Total No. EPT Taxa = <u>4</u>		
Water Mites (Hydracarina) (HMFEI pts = 1)	NA	0	Midges (Chironomidae) (HMFEI pts = 1)	NA	0	Mayfly Nymphs (Ephemeroptera) Taxa Present: 1 HMFEI pts = No. Taxa (x) 3]	R	3
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1)	NA	0	Snails (Gastropoda) (HMFEI pts = 1)	NA	0			
Alderfly Larvae (Sialidae) (HMFEI pts = 1)	NA	0	Clams (Bivalvia) (HMFEI pts = 1)	NA	0	Stonefly Nymphs (Plecoptera) Taxa Present: 1 HMFEI pts = No. Taxa (x) 3]	A	3
Other Beetles (Coleoptera) (HMFEI pts = 1)	NA	0	Other Taxa:					
Other Taxa:			Other Taxa:			Caddisfly Larvae (Trichoptera) Taxa Present: 2 HMFEI pts = No. Taxa (x) 3]	A	6
Other Taxa:			Other Taxa:					

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

Voucher Sample ID _____

Time Spent (minutes): 15

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

Representative of UNT-E (per) _____

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

18

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



**FIELD DATA SHEET
STREAM OBSERVATIONS**

Project:	Ohio River Clean Fuel Facility	Date:	10/24/2006
CEC Project No:	061-933	County:	Columbiana
Stream Name:	UNT - E	State:	Ohio
Investigators:	D. Parise & M. Nagy - CEC	Classification:	Perennial
General Location Southwest of Wellsville, Ohio			

Streambed Composition	Check only dominant substrate types			
	<input checked="" type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Silt/Clay	<input type="checkbox"/> Sand	<input type="checkbox"/> Boulder
	<input checked="" type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetated	

Defined Bed and Bank?	Yes
Estimated Flow (gal/min):	10 - 20 GPM
Estimated Width (ft):	3 - 8
Estimated Depth (in):	2 - 12
Weather Conditions:	Snow 38°
Heavy rainfall in last 7 days?	Yes
General Comments:	

Field Observations of Aquatic Biota			
	Few	Common	Abundant
Ephemeroptera (mayflies)	X		
Trichoptera (caddisflies)			X
Plecoptera (stoneflies)			X
Amphipoda (scuds)	X		
Chironomidae (midges)			
Coleoptera (aquatic beetles)	X		
Decapoda (crayfish)			
Isopoda (isopods)	X		
Megaloptera (dobsonflies and alderflies)			
Oligochaeta (aquatic worms)			
Platyhelminthes (flatworms)	X		
Tipulidae (crane flies)			
Zygoptera (damselflies and dragonflies)			
Bivalvia (mussels)			
Fish (list, if able)			
Other			

